



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ

Σχολή Επιστημών της Διοίκησης

Τμήμα Ναυτιλίας και Επιχειρηματικών Υπηρεσιών

ΔΙΑΤΡΙΒΗ

για την απόκτηση διδακτορικού διπλώματος του
Τμήματος Ναυτιλίας και Επιχειρηματικών
Υπηρεσιών

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Balanced Port Performance Analysis: Port Users and Service Providers Interactions, Generation of Relationships, and Measurement of Perceived Value

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Τους οφείλω τα πάντα...*

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Το έργο συγχρηματοδοτείται

- 75% της Δημόσιας Δαπάνης από την Ευρωπαϊκή Ένωση – Ευρωπαϊκό Κοινωνικό Ταμείο
- 25% της Δημόσιας Δαπάνης από το Ελληνικό Δημόσιο – Υπουργείο Ανάπτυξης – Γενική Γραμματεία Έρευνας και Τεχνολογίας
- και από τον Ιδιωτικό Τομέα

στο πλαίσιο του Μέτρου 8.3 του Ε.Π. Ανταγωνιστικότητα – Γ΄ Κοινοτικό Πλαίσιο Στήριξης.



¹ Μέτρο 8.3 του Επιχειρησιακού Προγράμματος ‘Ανταγωνιστικότητα’ – Γ΄ Κοινοτικό Πλαίσιο Στήριξης.

² Το έργο χωρίζεται στους εξής τρεις πυλώνες:

Πυλώνας Ι. Στρατηγική συνεργασιών, εταιρική διακυβέρνηση και ανταγωνιστικότητα στην ελληνική ναυτιλία

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Πυλώνας ΙΙΙ. Ναυτιλιακές Εταιρίες και πρόσβαση στην αγορά των λιμενικών υπηρεσιών: σχέσεις χρηστών λιμένων και παρόχων λιμενικών υπηρεσιών.

ΠΕΡΙΛΗΨΗ

Η λιμενική βιομηχανία χαρακτηρίζεται από ραγδαίες εξελίξεις οι οποίες έχουν συμβάλει καθοριστικά στην αλλαγή των 'παραδοσιακών' μορφών διοίκησης, οργάνωσης, στρατηγικών και προσφοράς λιμενικών υπηρεσιών. Παράλληλα έχουν συμβάλει στην διαμόρφωση ενός ιδιαίτερα περίπλοκου περιβάλλοντος λειτουργίας της λιμενικής βιομηχανίας. Ο ρυθμός ανάπτυξης του μοναδοποιημένου φορτίου (containerized cargo) δημιούργησε νέες προκλήσεις και απαιτήσεις για τους λιμένες. Η προσφορά τεχνολογικά προηγμένων λιμενικών υπηρεσιών, συστημάτων πληροφόρησης, υπηρεσιών προστιθέμενης αξίας καθώς και ποιοτικών ανωδομών και υποδομών συμβάλλουν μεταξύ άλλων στην αύξηση της ανταγωνιστικότητάς τους. Παράλληλα, συμβάλλουν καθοριστικά και στην αύξηση του ενδο-λιμενικού ανταγωνισμού ο οποίος διαμορφώνεται πλέον σε πρωτόγνωρα επίπεδα.

Υπό αυτές τις συνθήκες, οι λιμένες ανά τον κόσμο προχωρούν σε εκτεταμένα προγράμματα μεταρρυθμίσεων τα οποία ευνοούν την συμμετοχή του ιδιωτικού τομέα στην παροχή λιμενικών υπηρεσιών ή/και την χρηματοδότηση λιμενικών έργων. Σήμερα, ο κάθε λιμένας χαρακτηρίζεται ως μια μοναδική περίπτωση. Υπό αυτές τις συνθήκες, η μέτρηση της επίδοσης των λιμένων καθίσταται ιδιαίτερα σημαντική και συμβάλλει στο να καθοριστεί η αποτελεσματικότητα των προγραμμάτων μεταρρύθμισης και ο βαθμός επίτευξης των στόχων που είχαν αρχικά τεθεί. Παράλληλα, οι Λιμενικές Αρχές μεταβάλλονται. Από οργανισμούς υπεύθυνους για όλες τις λειτουργίες που σχετίζονται με ένα λιμένα μεταμορφώνονται σε ρυθμιστικές αρχές και οργανισμούς υπεύθυνους για την διαχείριση και τον συντονισμό των λιμενικών υπηρεσιών.

Καθώς οι λειτουργίες της Λιμενικής Αρχής μεταβάλλονται, τα μέλη της λιμενικής κοινότητας (ναυτιλιακές εταιρίες, διαχειριστές τερματικών σταθμών, διαχειριστές φορτίων κ.α.) αυξάνουν το βαθμό επιρροής τους στην οργάνωση, διοίκηση, διακυβέρνηση και προσφορά λιμενικών υπηρεσιών. Οι ναυτιλιακές εταιρίες γραμμών, διαχειριστές τερματικών σταθμών και διαχειριστές φορτίων

εφαρμόζουν εκτεταμένες στρατηγικές κάθετης και οριζόντιας ολοκλήρωσης με στόχο τον έλεγχο μεγαλύτερου μέρους της εφοδιαστικής αλυσίδας. Ωστόσο ο βαθμός στον οποίο αυτές οι στρατηγικές επηρεάζουν την επίδοση του και την αξία των προσφερόμενων υπηρεσιών παραμένει άγνωστος και υπό εξέταση.

Οι λιμένες πλέον θεωρούνται και εξετάζονται ως μέρη της εφοδιαστικής αλυσίδας και εξαιτίας του κεντρικού τους ρόλου επηρεάζουν καθοριστικά την ανταγωνιστικότητα όλης της εφοδιαστικής αλυσίδας. Ένα νέο στάδιο ανάπτυξης των λιμένων είναι η 'περιφεροποίησή' τους (regionalization) τόσο ως προς την ενδοχώρα όσο και προς τις θαλάσσιες συνδέσεις. Αυτές οι αλλαγές δημιουργούν νέες απαιτήσεις για τους λιμένες ώστε να παραμείνουν ανταγωνιστικοί. Θα πρέπει να αυξήσουν τον αριθμό και την ποιότητα των συνδέσεων τους με την ενδοχώρα, να παρέχουν υπηρεσίες προστιθέμενης αξίας, να συντονιστούν με τα υπόλοιπα μέλη της εφοδιαστικής αλυσίδας και να επιτύχουν μεγάλο βαθμό ολοκλήρωσης με υπηρεσίες logistics (με έμφαση στην σύνδεση τους με κέντρα διανομής φορτίων). Το εύρος των λιμενικών υπηρεσιών αυξάνεται σε σημαντικό βαθμό και έτσι αύξηση της ανταγωνιστικότητας των λιμένων γίνεται ιδιαίτερα απαιτητική. Παράλληλα ο βαθμός αλληλεξάρτησης των μελών της λιμενικής κοινότητας αυξάνεται και ο συντονισμός τους είναι απαραίτητος για την προσφορά αποτελεσματικών υπηρεσιών. Ωστόσο παραμένει άγνωστο σε πιο βαθμό αυτή η αλληλεξάρτηση επηρεάζει την επίδοση των λιμένων.

Οι ραγδαίες εξελίξεις της λιμενικής βιομηχανίας έχουν διαμορφώσει ένα ιδιαίτερα ανταγωνιστικό και περίπλοκο περιβάλλον λειτουργίας στο οποίο οι λιμένες καλούνται να προσαρμοστούν αποτελεσματικά. Σε αυτό το πλαίσιο, η μέτρηση της επίδοσης των λιμένων καθίσταται ιδιαίτερα σημαντική καθώς τα μέλη της λιμενικής κοινότητας θα πρέπει να παρακολουθήσουν α) πως προσαρμόζονται στις νέες συνθήκες, και β) αν οι στρατηγικές τους είναι αποτελεσματικές. Παράλληλα η επίδοση των λιμένων καθορίζει και τον λιμενικό σχεδιασμό καθώς και το σχεδιασμό σχετικών πολιτικών.

Η εκτεταμένη επισκόπηση της μέτρησης επίδοσης των λιμένων, τόσο σε βιβλιογραφικό όσο και πρακτικό επίπεδο, καταδεικνύει ένα ιδιαίτερα έντονο ενδιαφέρον σε θέματα λιμενικής απόδοσης (efficiency). Στην πλειοψηφία τους

οι μετρήσεις της απόδοσης των λιμενικών υπηρεσιών χρησιμοποιούν δεδομένα που προέρχονται εσωτερικός (internally generated information) και συνδέονται με υπηρεσίες φορτω-εκφόρτωσης. Δεδομένα που προέρχονται εξωτερικώς (externally generated information) χρησιμοποιούνται κυρίως για την κατανόηση της επιλογής λιμένων και την ανταγωνιστικότητά τους και όχι για την μέτρηση της επίδοσης και αποτελεσματικότητά τους. Οι ανωτέρω αναφερόμενες προσπάθειες συνήθως επικεντρώνονται σε μια λιμενική υπηρεσία ή έναν πάροχο λιμενικών υπηρεσιών και σπανιότερα εξετάζουν το λιμάνι συνολικά.

Το μοντέλο Μέτρησης Επίδοσης Επιχειρήσεων (Business Performance Measurement) που υιοθετούν μια ισορροπημένη προσέγγιση (balanced approach) χρησιμοποιούνται εκτεταμένα από επιχειρήσεις και οργανισμούς κατά τα τελευταία χρόνια, ενώ είναι αντικείμενο εκτεταμένης ακαδημαϊκής μελέτης και ερευνών. Τα οφέλη της υιοθέτησης ισορροπημένων μοντέλων μέτρησης της επίδοσης αναγνωρίζονται διεθνώς, ενώ το ιδιαίτερο χαρακτηριστικό τους είναι ότι συνδυάζουν μεταξύ άλλων πληροφορίες που προέρχονται εσωτερικώς και εξωτερικώς. Η υιοθέτηση τέτοιων μοντέλων στην λιμενική βιομηχανία δεν είναι διαδεδομένη κυρίως εξαιτίας της έλλειψης μεθοδολογιών μέτρησης πληροφοριών που προέρχονται εξωτερικώς στα πλαίσια της επίδοσης και αποτελεσματικότητας των λιμένων. Η παρούσα διδακτορική μελέτη κινείται προς αυτή τη κατεύθυνσή.

Πιο συγκεκριμένα, στόχος της παρούσας διδακτορικής διατριβής είναι η μελέτη και εις βάθος κατανόηση της προσληφθείσας αξίας των χρηστών λιμενικών υπηρεσιών. Τα επιμέρους ερωτήματα που καλείται να απαντήσει η παρούσα μελέτη είναι: Πως μπορεί να μετρηθεί η προσληφθείσα αξία των χρηστών των λιμένων; Που δημιουργείται η προσληφθείσα αξία των χρηστών των λιμένων; Ποιες είναι οι στρατηγικές των παρόχων λιμενικών υπηρεσιών με στόχο τη μεγιστοποίηση της προσληφθείσας αξίας των πελατών τους; Ποιες οι στρατηγικές των χρηστών λιμενικών υπηρεσιών με στόχο τη μεγιστοποίηση της προσληφθείσας τους αξίας; Πως μπορούν οι λιμενικές αρχές να διευκολύνουν την συν-δημιουργία αξίας μεταξύ των μελών της λιμενικής κοινότητας; Τι δημιουργεί προσληφθείσα αξία για τους χρήστες των λιμένων;

και, Τι επηρεάζει και σε ποιο βαθμό τη προσληφθείσα αξία των χρηστών των λιμένων;

Για να απαντήσει στα παραπάνω ερωτήματα, η παρούσα διδακτορική διατριβή προχωρά στο σχεδιασμό και εφαρμογή μια νέας μεθοδολογίας. Βασικά συστατικά της είναι η αναγνώριση των αλληλεπιδράσεων και των σχέσεων των χρηστών και παρόχων λιμενικών υπηρεσιών, η αναγνώριση των παραγόντων που επηρεάζουν την προσληφθείσα αξία των χρηστών καθώς και η μέτρηση της βαρύτητάς τους. Η έρευνα επικεντρώνεται στα εμπορευματοκιβώτια, πραγματοποιήθηκε σε τρία διαδοχικά στάδια και συνδυάζει ανάλυση ποιοτικών και ποσοτικών δεδομένων. Τα δύο πρώτα στάδια αφορούν ποιοτική ανάλυση μέσω μελέτης περιπτώσεων και η συλλογή δεδομένων πραγματοποιήθηκε μέσω 18 ημι-δομημένων συνεντεύξεων με χρήστες και παρόχους λιμενικών υπηρεσιών σε ένα διεθνές δείγμα λιμένων (Πειραιάς, Θεσσαλονίκη, Αμβέρσα, Μπριζ). Το τρίτο στάδιο της έρευνας, αφορά ποσοτική ανάλυση και η συλλογή δεδομένων πραγματοποιήθηκε από πέντε (5) διεθνείς λιμένες (Πειραιάς, Αμβέρσα, Μπριζ, Ρότερνταμ, Αμβούργο). Η προσληφθείσα αξία των χρηστών των λιμένων εξετάστηκε ως ένα πολυδιάστατο (multidimensional) μοντέλο διαμορφωτικής δομής (formative construct) με την μέθοδο των Μερικών Ελαχίστων Τετραγώνων (Partial Least Squares).

Η παρούσα μελέτη αναγνωρίζει, καταγράφει και αναλύει τις αλληλεπιδράσεις των μελών της λιμενικής κοινότητας. Προχωρά στην δημιουργία δύο διαφορετικών λιμενικών δομών οι οποίες ανταποκρίνονται σε δυο διακριτές καταστάσεις: Η πρώτη αφορά την ύπαρξη ενός αφιερωμένου τερματικού σταθμού ενώ η δεύτερη ενός τερματικού σταθμού κοινής χρήσης. Οι αλληλεπιδράσεις μεταξύ των μελών της λιμενικής κοινότητας είναι λειτουργικές (operational) και εμπορικές (commercial) ενώ σε πολλές περιπτώσεις υπάρχουν και 'εσωτερικές' αλληλεπιδράσεις που αφορούν τις σχέσεις μεταξύ θυγατρικών εταιριών. Οι αλληλεπιδράσεις επίσης, είναι είτε άμεσες είτε έμμεσες. Τα αποτελέσματα της έρευνας αποδεικνύουν ότι η προσληφθείσα αξία των χρηστών των λιμένων επηρεάζεται από τις λειτουργικές και εμπορικές τους αλληλεπιδράσεις με άλλα μέλη της λιμενικής

κοινότητας και τα δομικά χαρακτηριστικά του λιμανιού. Παράλληλα μεταξύ των μελών της λιμενικής κοινότητας υπάρχει ένα πλήθος αλληλεπιδράσεων υβριδικής μορφής, οι οποίες αναγνωρίζονται και αναλύονται. Εντός των λιμενικών δομών είναι διακριτή η ύπαρξη “καναλιών εσωτερικών μεταφορών” όπου ένα εμπορευματοκιβώτιο φτάνει στον τελικό του προορισμό μέσω αλληλεπιδράσεων, μόνο θυγατρικών μεταξύ τους, εταιριών. Το πως επιδρούν οι διαφορετικές μορφές αλληλεπίδρασης στην προσληφθείσα αξία των χρηστών των λιμένων αποτελεί επίσης θέμα εκτεταμένης ανάλυσης.

Αντικείμενο μελέτης υπήρξαν επίσης, οι σχέσεις μεταξύ χρηστών και παρόχων λιμενικών υπηρεσιών. Εντός των λιμένων αναγνωρίζεται η ύπαρξη “λιμενικών αλυσίδων αξίας” (port value chains) που οφείλονται στις αλληλοεξαρτήσεις των μελών της λιμενικής κοινότητας. Οι σχέσεις που αναπτύσσουν οι πάροχοι λιμενικών υπηρεσιών εξαρτώνται από τις στρατηγικές τους, τις συνθήκες της αγοράς καθώς και ένα αριθμό ιδιαίτερων ανά περίπτωση παραγόντων. Γενικά, οι χρήστες λιμενικών υπηρεσιών επιλέγουν είτε να αναπτύξουν στενές σχέσεις με άλλα μέλη της λιμενικής κοινότητας είτε να παραμείνουν αυτόνομοι. Η ανάπτυξη στενών σχέσεων μεταξύ δύο ή και περισσότερων μελών της λιμενικής κοινότητας μπορεί να οδηγήσει σε κοινές προσπάθειες συν-δημιουργίας αξίας για τους χρήστες. Ωστόσο, οι έντονες διαφορές που υπάρχουν εντός της λιμενικής κοινότητας σε επίπεδο δύναμης των παικτών δεν ευνοούν την ανάπτυξη τέτοιων σχέσεων. Σε αυτό το πλαίσιο ένας νέος ρόλος για την Λιμενική Αρχή αναδεικνύεται. Δεδομένου του ουδέτερου χαρακτήρα της, η Λιμενική Αρχή μπορεί να αναλάβει πρωτοβουλίες ώστε να διευκολύνει την ανάπτυξη σχέσεων μεταξύ των μελών της λιμενικής κοινότητας που θα οδηγούν σε συν-δημιουργία αξίας. Ακόμα, οι λιμένες αναγνωρίζονται ως δίκτυα εταιριών τα οποία απαιτούν μια νέα θεώρηση των στρατηγικών των παρόχων λιμενικών υπηρεσιών.

Η μέτρηση της βαρύτητας των παραγόντων που επηρεάζουν την προσληφθείσα αξία των χρηστών των λιμένων σηματοδοτεί μια σημαντική μεταστροφή των χρηστών λιμενικών υπηρεσιών. Ενώ κατά το παρελθόν έδιναν ιδιαίτερη σημασία στο κόστος, πλέον δίνουν ιδιαίτερη έμφαση στην αξία των υπηρεσιών που απολαμβάνουν. Παράλληλα η σημασία που δίνουν

στις σχέσεις που διατηρούν με άλλα μέλη της λιμενικής κοινότητας είναι μεγαλύτερη από αυτή που δίνουν στην παραγωγικότητα των λιμενικών υπηρεσιών. Αναγνωρίζεται ότι για τους χρήστες λιμενικών υπηρεσιών ένα σημαντικό μέρος της προσληφθείσας αξίας προέρχεται από τις σχέσεις που αναπτύσσουν με άλλα μέλη της λιμενικής κοινότητας. Τα επιμέρους στοιχεία και ο βαθμός που επηρεάζουν την προσληφθείσα αξία των χρηστών αποτελούν θέμα εκτεταμένης ανάλυσης.

Η έγκριση της διδακτορικής διατριβής από το Τμήμα Ναυτιλίας και Επιχειρηματικών Υπηρεσιών, δεν υποδηλώνει απαραίτητα και αποδοχή της (N. 5343/1932, άρθρο 20, παράγραφος 2).

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LIST OF ABBREVIATIONS, ACRONYMS AND CODENAMES

AHP: Analytical Hierarchy Process
AVE: Average Variance Extracted
B-2-B: Business-to-Business
BOT: Built, Operate and Transfer
BPM: Business Performance Measurement
CAV: Customer Value Audit
CRS or CCR Model: Constant Returns-to-Scale
CTQI: Container Terminal Quality Indicator
CTRMC: Container Terminal Resource Management Center
CVD: Customer Value Determination
DEA: Data Envelopment Analysis
DMU: Decision Making Units
DPO: Dockworkers' Professional Organizations
EDI: Electronic Data Interchange
ESPO: European SeaPorts Organization
FF: Freight Forwarders
FITO: ITO's Subsidiaries (offering logistic services)
GSL: Global Shipping Companies
HAR: Hinterland Access Regimes
HFP: Hierarchical Fuzzy Process
InTO: Inland Terminal Operator
IT: Information Technology
ITO: International Terminal Operators
KAM: Key Account Managers
M&A: Mergers and Acquisitions
PA: Port Authority
PAB: Port of Algeciras Bay
PI: Performance indicator
PLS: Partial Least Squares
PPM: Port Performance Measurement

PPRN: Port Performance Research Network
R/FSL: Regional or Feeder Shipping lines
RSL: Local/Regional Shipping Lines
RTB: Rail, Truck, Barge
SCM: Supply Chain Management
SEM: Structural Equation Modeling
SFA: Stochastic Frontier Analysis
SFM: Stochastic Frontier Models
SH: Shippers
SL: Liner Shipping Subsidiaries (offering forwarding services)
SUB: Subcontractors
TFP: Total Factor Productivity
TO: Terminal Operator
TOC: Terminal Operating Companies
ULCV: Ultra Large Container Vessels
VRS or BCC Model: Variable Returns-to-Scale

CHAPTER 1. INTRODUCTION

1.1 SETTING THE SCENE

In the era of globalised and expanding trade, ports represent a highly dynamic sector. During the last decades the sector has been marked by the frequent and structural changes on the managerial, economic, operational, and policy levels. This results, among others, in the formulation of a complex environment within which contemporary ports operate. The levels of competition between and within ports have intensified, standing both as cause and result of the accelerated changes observed. The economic crisis of the later part of the 2000s, including the subsequent decrease of cargo volumes carried, have further increased the competition between and within ports, though the actual effects cannot be fully anticipated yet. Taking also into account the challenges posed by the erosion of the geographical monopolies of ports, the attainment of significant levels of performance holds an important place.

In this context, the measurement of port performance stands a key strategic objective of any port aiming to strengthen its competitiveness. Such measurement reveals malfunctions and performance gaps, while it guides port decision-making and future planning in quest of self-improvement. Thus it needs to be accurate, efficient and provide useful information, so as to deliver the results sought. When the sector searches for improved Port Performance Measurement (PPM) practices, the scholar's efforts to improve the existing, and/or design new tools and methodologies have become widely known.

The present study adds to this research stream. Grounded on the identified necessity to turn attention to the development of balanced PPM systems and

methodologies and especially to the rather unexploited measurement of port effectiveness, the study generates knowledge on *the port users' perceived value*.

The perceived value influences to a great extent the users' satisfaction and outcome variables. In ports, it remains questionable *how the port users' perceived value could be measured*. A number of related questions arise: Where is the port users' perceived value extracted from? Which are the strategies of the port service providers towards the increase of their value offering? Which are the strategies of port users to enjoy an increased perceived value? How can the PAs facilitate the co-creation of value? What creates value for the port users? What influences the generation of the port users' value and to what extent?

The objectives of the conducted research are to provide answers to the preceded questions, provide conceptual advancements and set the foundations of a tool for measuring the port users' perceived value. It does so through a novel methodology, which combines qualitative and quantitative data and analysis, and the empirical research of four key issues:

- 1) *The identification of the various types of interactions that take place between the actors of a port cluster*. The collected empirical data result in the development, mapping, and analysis of three distinctive port settings and an illustration of the distinctive port users and service providers' interactions that take place within each of these settings. This enables the classification of the different types of interactions and conclusions on which parties are involved in which (crucial) port services exchanges. The impact of the port stakeholders' strategies (e.g. vertical integration) on their perceived value is also under study. This detailed holistic approach of the activities taking place in a port cluster, grounds the subsequent further analysis and conclusions on the relationships developed between port service providers and users. It also contributes to a comprehensive understanding of the value drivers that the empirical research identifies.
- 2) *The identification and analysis of the nature and structures of the relationships developed between port users and service providers*. First, the study establishes that these relationships fall within a Business-to-Business

(B-2-B) framework. In such cases, users the perceived value is functional specific as well as relational specific and, thus, it is essential to understand and analyze the characteristics of the relationships developed between the involved parties in port service exchanges. Influenced much by the interactions that take place, port users and service providers develop relationships in order to support their strategic planning, with the structure of the port cluster and the bargaining position of each firm on a global scale, largely influencing the relationships developed.

- 3) *The detection of the factors that generate value for the different types of port users.* Revealing and understanding these factors enhances the understanding of port users strategic decisions and potential causes of defection. This enables a focused search for port performance gaps, and offers to services providers the opportunity of taking accordant actions. This study reveals the drivers that generate value for the main port users, as indentified through the elaboration of case studies.
- 4) *The measurement of the extent to which each of the factors that generate value, influences the port users' perceived value.* The fourth part of the research measures the impact of the recognized value drivers on the total perceived value. It does so through a quantitative analysis that involves the application of the Partial Least Squares (PLS) technique and concludes on the most important elements that influence port users perceived value during the (identified at the previous stages of the research) most vital interactions with: (1) the Terminal Operators, (2) the Shipping Lines, (3) the Inland Terminals, the (4) Port Authority and (5) the structural characteristics of a port.

The empirical research refers to container ports and was carried out in three phases. The first and the second phases extracted qualitative data and involved semi-structured interviews with the stakeholders (the shipping lines, the port authorities, the freight forwarders and the shippers) in four case studies, namely the European ports of Antwerp, Zeebrugge, Piraeus, and Thessaloniki. The analysis of the findings of these two stages grounded the third research phase. The latter refers to the collection of quantitative data from five major

European ports (Antwerp, Zeebrugge, Piraeus, Rotterdam, Hamburg) with the use of questionnaires. For the analysis of the results, a component-based Structural Equation Modeling (SEM) technique is adopted with the use of the Partial Least Squares (PLS) method.

1.2 BACKGROUND TO THE RESEARCH

The first paper about seaports that was published in the scientific journal *Maritime Studies Management*³ suggested that a modern port fulfills two main functions. The first one is the transit or operational function (e.g. handling cargo at the interface between sea and land transport). The second one is the industrial or manufacturing function (e.g. serving as a base for suitable manufacturing industry) (Takel, 1973, p. 40). A few years later, Hayut (1981, p. 160) recognized the dynamism that characterizes ports: “During the last two decades ocean transportation has experienced rapid changes. Not only have the size and draft of ships increased spectacularly, rendering many older ports unusable, but the methods of handling cargo have been drastically modified”. The impact of ocean and inland connections on port competitiveness (Muddle, 1934) as well as the need to study the complex physical and human factors that define their ability to attract traffic (Weigend, 1958) had already been underlined in 1934 and 1958, respectively. Differential expansion of port facilities and structural works (infrastructure) as leading factors affecting inter-port competition (Kenyon, 1970), the use of inland concentration depots aiming towards ports’ hinterland expansion (Bird, 1967), and the recognition of captive and contestable hinterlands (O’Dell, 1941), are all issues that have been tackled with for more than 40 years.

The general nature of the problems faced by ports today has not changed. However, a dynamic economic environment implies that the technical and institutional conditions in which they arise, do change (Heaver, 2006; 2011).

³ Today the journal is entitled “Maritime Policy and Management”

Significant developments such as globalization, containerization and technological progress, to name but a few, contribute to the formation of a new socioeconomic and operational environment. The extent is such that traditional styles of port management, organization and operations are becoming obsolete. The themes that centered the port scientists' interests in the past remain topical. At the same time, a range of new problems deserves detailed examination.

The advent of the new challenges generates pressures on ports and their users. In order to retain and increase competitiveness, they all have to adjust, exploit and capture emerging opportunities. Towards this end, extended devolution programs have dominated port development during the last 20 years (see: Brooks and Cullinane, 2007a). An increased participation of private companies in the provision of port services results in fundamental consequences upon port structure, governance, management and operations. Today, intense competition and new forms of stakeholders' interactions, relations and partnerships characterize an extremely complex port sector (Chapter 2).

The majority of port studies conducted over the last decade has recognized that the comprehensive understanding of all these changes is a precondition for a thorough understanding of the needed adjustments. Scholars have produced a series of new concepts aiming to interpret these latest trends. These concepts focus, *inter alia*, on the globalization of port operations (De Souza et. al., 2003; Slack and Fremont, 2005); the transformation of ports to elements in supply chains (Robinson, 2002); the functional and spatial regionalization of port activities (Notteboom and Rodrigue, 2005); the benefits of intra-port competition (De Langen and Pallis, 2006) by reducing the impact of entry barriers (De Langen and Pallis, 2007); port co-opetition (Song, 2003); the governance of port devolution (Brooks and Cullinane, 2007b); and the forms of private entry in container terminal operations (Peters, 2001; Olivier, 2005; Midoro et al., 2005). These trends challenge the conventional organization and classification of ports (Bichou and Gray, 2005; Olivier and Slack, 2006), and pose vital port policy questions.

Yet, using Kant's terminology, research in port economics, management and policy is still an immature research field (for details: Pallis et. al., 2010). New conceptualizations, the development of new theories and sharing knowledge,

research questions, and hypotheses are deemed necessary in order to move on to a mature independent research field.

In this vein, Port Performance Measurement (PPM) stands as a key issue with further research found wanted. Relevant stakeholders launch new initiatives, redefine the way of doing business, operations, services offered, and reconfigure strategies, administrative structures and management. Within this continuous self-improvement philosophy, decision makers need to be aware of the outcomes of other market players' actions. An effective PPM is a valuable tool to unveil deficiencies, provide essential information on decision-making, and compare outcomes to the objectives initially set. Conversely, a poorly designed, or poorly implemented, PPM inhibits the danger of producing inaccurate and faulty information. When the latter is the case, the effectiveness and efficiency of future planning remains controversial. The development and implementation of proper, well-designed and effective PPM tools is a key to port competitiveness.

Performance is comprised of two distinctive, yet complementary, components: efficiency and effectiveness. Nowadays, in many other industries a substantial proportion of businesses adopt the so-called *balanced Business Performance Measurement (BPM) systems*, which also capture the interest of the scientific community. The balanced approach calls for an enrichment of the traditional performance measurements - typified by the use of financial and efficiency data - with the users' perspectives, innovation, research and development and many more, depending on the chosen BPM system (Chapter 4).

The majority of existing efforts to measure port performance is mostly directed towards one performance component, namely *efficiency* (most frequently used as synonymous with: *productivity*). In this vein, a variety of tools and methods⁴ are regularly used in port research. The other port performance component, namely *effectiveness*, remains comparatively neglected. Efforts to develop accordant methods and tools for measuring port effectiveness have not developed at a similar pace, and this also stands true for development on the practical (port) level. Still, the collection, processing and proper organization, assessment, and use of externally generated information can lead towards an

⁴ Data Envelopment Analysis (DEA), Total Factor Productivity (TFP) and Stochastic Frontier Analysis (SFA)

ample PPM and assist service providers to fully understand the users' views regarding the services offered and the respective needs. Calls for relevant port research with both theoretical and practical significance have intensified, while the industry also looks for additional elements to the PPMs in place (Chapter 3).

In order to fill this knowledge gap, the study unfolds conceptual and empirical research, advancing knowledge and conceptualization of the activities that port service providers and users develop, and sets the foundations for a tool to measure the port users' perceived value extracted from these services. Assessing the users' perspectives with the use of this tool⁵ contributes significantly to filling the gap of measuring port effectiveness, and, thus on the development of a balanced PPM that incorporates both the efficiency and effectiveness components of port performance.

Assessing the port users' perspectives is a task of apparent difficulty. This is not least because the launching of vertical and horizontal integration strategies, accompanies the increased operating complexity, with both developments contributing to the blurring of the distinction between the port users and service providers. In combination with the wide variety of different governance models applied to ports, each port might be considered as a 'unique' case. The absence of a typology of the services offered or used in a visited port, the scope of the services offered by each provider, the relationships and interactions developed between the port users and service providers, along with the lack of a deterministic approach of the limits of any given port, are factors posing substantial difficulties to the development of studies that adopt holistic approaches. Responding to all these, research efforts head towards the examination of specific port services or respond positively to calls for 'actor based' port research (Hall, 2004); scholars focus on specific service providers or users in order to analyze attractiveness, choice determinants, and effectiveness (see: Lirn et al, 2003; 2004; Ng, 2006; Brooks and Pallis, 2008; Brooks et al., 2010). An increase of the number of studies adopting a holistic port approach remains wanted. **Working with such approach, the study responds to the need to delineate who provides and who receives port related services within the emerging port settings, and clarifies the**

⁵ While the perceived value affects directly and significantly the users' satisfaction and behavioral intentions.

characteristics of each service exchange that takes place within these settings (Chapter 6).

In a 'non-port' context, satisfaction measurements have been highly appraised and widely used. The results of the relevant scholarly research provide valuable and useful information on the users and customers' perspectives over services or products enjoyed. As demonstrated later in this study (Chapter 4), with the port users and service providers' relationships falling within a B-2-B framework, the *perceived value* rather than the *satisfaction* measurements are a better predictor of outcome variables. Therefore, the focus of the empirical research turns to the port users' perceived value measurement. In B-2-B relationships, customers shift from the evaluation of separate offerings only, to the evaluation of the multiple existing relationships as a whole. The customers' perception is that they receive at least two different categories of value; *functional* and *relationship value*, respectively. Furthermore, the port users and service providers' relationships are not static dyadic ones. Rather than that, the port users participate in a network of business where 'every supplier has an impact upon his customer's customer' and so on. **In order to assess the port users' perceived value, the study provides the essential analysis and understanding of the relationships that develop with port service providers and other port users as well (Chapter 7). This relevant has been largely absent from port research.**

The perceived value is conceptualized as a trade-off between *benefits* and *sacrifices* (Zeithaml, 1988) that impacts decisively on the users' satisfaction. *Sacrifices* are the overall monetary and non-monetary costs that the customer invests in, or hands to the supplier, in order to complete a transaction, or to maintain a relationship with the supplier. *Benefits* are a combination of physical attributes, service attributes, and technical support available, in relation to the use of the product, the purchase price, and other indicators of perceived quality (Payne and Holt, 1999). For port services, it remains unclear, which are the port users' value drivers and how they can be categorized as benefits or sacrifices. **A part of the empirical qualitative research is devoted to providing an answer to this question and beyond (Chapter 8).**

The final part of the empirical research provides a quantitative determination of the extent to which each value driver impacts the total port users' perceived value (Chapter 9). This quantification takes place for the first time in port studies. Along with the previous stages of the empirical research, it completes an analysis that delivers valuable information of theoretical and practical (to multiple stakeholders - e.g. service providers, policy and decision makers) significance, and reveals: (1) What exactly do port users value? (2) of all the things that port users value, which are the most and least important? and, (3) how well do ports deliver value to the users of the provided services?

The empirical research on the port users' perceived value assesses the surprisingly under-research perspectives of the customers' vie. It is also a contribution to the theoretical and practical debate on the development of more efficient and effective PPM systems. It does so by advancing the current knowledge on the interactions and relationships between the port users and service providers, the identification of the vital port users' value drivers, and the measurement of the impact on the total port users' perceived value, thus providing the foundations of a tool for measuring the port users' perceived value.

1.3 ORGANISATION OF THE STUDY

The chapters that follow are divided into three parts that serve to reach the research objectives and draw conclusions. The first part (Chapters 2 to 4) presents the theoretical framework and the factual background that informed the empirical research and shaped its objectives. Chapter 5 presents the research design and the methodological framework applied. Chapters 6 to 9 present the results of the conducted research.

Chapter 2 describes the contemporary container port characteristics. The importance of PPMs and their dynamic nature are underlined. **Chapter 3** concentrates on PPM practices currently applied both to scholarly research and to practice. The analysis suggests that PPM research and applications put emphasis on ports efficiency and financial output, while they largely neglect the port users' perspectives. Finally, Chapter 3 questions whether there are ways to improve existing PPMs. **Chapter 4** redirects PPM towards a balanced approach and recognizes that the assessment of the port users' perspectives is the missing link towards this end. This is followed by a detailed discussion on the concept of perceived value and the reasons for choosing its measurement as the appropriate one for assessing the port users' perspectives.

Chapter 5 recapitulates the methodological approach of this study. It presents the suggestions that have informed the researcher's methodological choices - justifying, *inter alia*, the research design and methodology of the present thesis. It reports on the techniques employed during the developed and applied 7-stage methodology, and the scientific tools for analyzing the qualitative and quantitative data derived throughout the research process - making it possible and valid to draw more general conclusions.

The third part of the study turns its attention to the findings of the empirical research conducted. **Chapter 6** delineates the port users and service providers' interactions. It develops and analyses two distinct port settings modeling the port users and service providers' interactions. The Chapter concludes with presenting a number of possible interactions, the participating firms, and the several services being exchanged in each port setting. **Chapter 7** analyzes the findings on the different types of relationships developed between the shipping lines and the freight forwarders with the various port stakeholders, as well as the different strategies of the port stakeholders in the development of these relationships. **Chapter 8** provides a qualitative analysis of the elements found to impact the port users' perceived value. **Chapter 9** presents the results of the quantitative analysis conducted, including the modeling of five interactions of the port users and the measurement of the importance of value attributes with the use of PLS analysis.

Finally, **Chapter 10** discusses the conclusions of the present thesis, relates the study to previous theoretical suggestions regarding PPM, the port users'

perceived value and port effectiveness. In the light of these findings, the study concludes with suggestions for further research.

CHAPTER 2. THE CONTEMPORARY CONTAINER PORTS

2.1 INTRODUCTION

Ports and port related industries face major challenges. The extent is such that traditional styles of port management, strategies and operations become obscure and a 'rethinking of ports' is required (Olivier and Slack, 2006). Globalisation, containerisation and technological progress are some of the most significant developments that form a new context. A high level of complexity, along with rapid developments, characterizes the new "playing field" of container ports.

The present chapter provides an overview of the technological, operational, economical and organizational developments that have altered the port sector and have created new functions of port services. The contextual changes that have led to the formation of the contemporary port industry with new trends, challenges and opportunities emerging are also presented. The last section emphasizes on the reflections of contextual changes in port performance measurement. The need to measure port performance under a multidimensional tool that would not neglect the ports' contemporary characteristics is also under analysis.

2.2 THE STRUCTURAL CHANGES OF THE PORT SECTOR

2.2.1 Maritime transport and global trade

Globalization has influenced the course of economic history and the structure of almost every industry. Ports are not an exception. The transition of the sector has been accelerated by the rapid expansion of containerization (Levinson, 2006). The globalization drivers in the container transport industry can be described as globalised customers (market drivers), economies of scale and scope in increased scale of operations (cost drivers), trade policies and labor regulations (government drivers), and the threat of global competitors (competitive drivers) (Yip, 1989).

Maritime transport remains the backbone of international trade with over 80 percent of the world's merchandise trade by volume carried at sea. During the past three decades the annual average growth rate of the world's seaborne trade has been estimated at 3.1 per cent (UNCTAD, 2008)⁶. Liner shipping and containerized trade remain the most dynamic sector of maritime transportation. Since 1990, container traffic has increased with an average annual growth rate of 9.8 per cent. In 2007, global container trade was estimated at 143 million TEUs, a 10,8 per cent increase over 2006 (UNCTAD, 2008). In November 2009 the container carrying capacity reached 12,9 million TEUs (BRS-Alphaliner, 2009). The recent economic crisis (2008-2009) has caused a remarkable declining throughput for ports (cf. Pallis and De Langen, 2010). Although it is early to comprehensively estimate the structural effects of the crisis, new opportunities and challenges for development are emerging.

⁶ In 2007, international seaborne trade was estimated at 8.02 billion tons of goods loaded, a volume increase of 4.8 per cent over the previous year (UNCTAD, 2008).

2.2.2 The importance of containerization

The increasing prevalence of global value chains; the renewed emphasis on technology exploitation; the growing importance of intangibles; the recognition of the vital role of people and skills; and the move to a low carbon economy are considered as the five major dynamics of change in global manufacturing (BERR, 2008). The globalization of production is concomitant to the globalization of trade, as one cannot function without the other. As a result, international trade decreases the overall costs of production worldwide.

The increasing significance of containerization is a reflection of the changes that have occurred in the international organization of manufacturing and production. The move to low-cost offshore production zones (for example China, southeast Asia, India, Latin America and even Eastern Europe) has resulted into a greater share of world output entering the global trade markets⁷. The sourcing of raw materials and finished products has become increasingly globalized and producers in various, often distant, areas of the world are increasingly forced to compete with one another for the same markets. With a greater proportion of cargo, specifically manufactured and semi-manufactured products, moving internationally the containers' rate of growth is increasing substantially. In 1980, containerships accounted for 1.16 per cent of the worlds' fleet (in terms of capacity) while in 2008 they have reached 12.9 per cent (UNCTAD, 2008).

Containerization has radically altered maritime transportation; changed trading patterns; ship routing and itineraries; ship design and size; cargo handling equipment and operations; inland transport and freight terminals; commercial practices and customs procedures; employment and working practices; and information and communication systems (for a detailed analysis: Martin and Thomas, 2001). However, containerization's greatest impact has been on ports and the way they accommodate container carriers and their cargoes leading to radical changes of the ports' traditional structures,

⁷ At the time of writing Brazil, Russia, India and China are considered the most dynamic economies of the world. Their geographical characteristics are illustrative of the continuation process of globalization.

management, strategies and governance models. Due to this fact, port expansion, infrastructure investments and, often, the development of greenfield port expansion projects are decisive factors that influence their competitiveness.

2.2.3 Vessel specialization and growth

The significant growth of container trade results into an increase in the size of vessels. The number of post-panamax Ultra Large Container Vessels (ULCVs) is increasing continuously. Post-panamax vessels with a carrying capacity of 11.000-13.500 TEUs and 15.5m draught are already operating. The growth of container ship size increases the cost of building or buying them as well as their operating costs. Shipping lines try to minimize these operating costs by reducing the time that a vessel spends in a port (by demanding efficient services) (Peters, 2001) and the number of ports of call, thus leading to an increased inter-port competition. In this vein, the capital intensity of port operations is increased and investments in greater depth of port waters and improved accessibility are critical in order to be able to serve the new 'generation' of container ships. Furthermore, investments devoted to the modernization of port infrastructures and better equipment in quays and terminals are needed, in order to face the increased competitive pressures, win turn the outcome of the limitation of port calls by shipping lines. Ports aim to employ strategies and take accordant actions so as to increase their value offering to shipping lines in order to remain or to be added to their ports of call list. On the other hand, shipping lines favor the use of ports that increase the value they perceived to receive. If that is the case, ports are hardly excluded from their ports of call list.

Scholars have explicitly analyzed that relations between port efficiency, maritime costs and trade flows do exist. Port cost impacts upon international trade patterns (Sanchez et al., 2003) and volumes (Clarck et. al., 2004).

Similarly, port infrastructure development impacts on freight rates and trade costs (Rettab and Azzam, 2008; Wilmsmeier and Hoffman, 2008)⁸.

2.2.4 The role of port informatics

The transformation of the industry accelerates due to the widespread application of informatics in port operations. Through these applications, ports supply 'clever' services - based on innovation, knowledge, decentralized planning, and intra-industry support. Today ports co-ordinate traffic via information networking in the areas of terminal access, scheduling, cargo booking, security, safety, administration, intermodal activities, and port users' information. Information Technology (IT) systems electronically link port administration, terminal operators, truckers, customs, freight forwarders, ship agents and other members of the port community. A consequence is the decentralization of port services provision and the connection of the port zone with semi-autonomous (in relation to the port) areas. A number of complementary value-added *port-related* services, of which efficient supply does not require the location of the production units within the port zone, are already supplied by enterprises located in the wider geographical areas and are virtually co-ordinated via communication systems. The importance of information handling is increasing and adds new features to port competition (Peters, 2001; Lee and Song, 2010).

Terminals and ports invest heavily in computer hardware and software and develop extensive communications systems. Planning and control procedures are decisively improved with the use of Information Technology, thus increasing port competitiveness.

Additionally, Peters advocates (2001) (and further confirmed by the present research; see: Chapters 8 and 9) that IT is now seen as a major battleground among carriers, forwarders, logistics based integrators and, potentially, pure technology companies which may use their systems expertise to enter the

⁸ Nevertheless, simulation (Turner, 2000; Paixao-Casaca, 2005) and forecasting (Fung, 2001) attempts have been limited.

industry at the expense of traditional players. The goal for these companies is to capture electronically control of the cargo. Companies use IT in order to integrate the various participants in port operations and enhance the proper and rapid exchange of crucial information between them. The importance of IT for ports and their stakeholders is highly anticipated given some recent trends⁹. All these largely impact and transform the traditional interactions and relationships developed between port users and service providers. The potential number of interactions and relationships is also influenced, thus deserving further examination.

A number of papers provide a review of port development issues in general, highlighting contemporary trends and challenges faced by seaports (Moglia and Sanguineri, 2003; De Langen, 2005), historical developments (Suykens and van de Voorde, 1998) and national practices (Helling and Poister, 2000). All these studies are broad and rather descriptive (also: Maloni and Jackson, 2005) and are complemented by more detailed case - studies for the ports of Hong-Kong (Wang, 1998), Kaohsiung (Haynes et. al., 1997) and Felixstowe (Baird, 1999). They also suggest that attention needs to be paid to information technology and identify implications of network integration.

2.3 NEW GOVERNANCE MODELS

2.3.1 Port models

The modernization and development of new facilities are vital elements towards the fulfillment of the port users' needs. Within a context of increased

⁹ The ports of Amsterdam and Rotterdam recently established a common EDI (Exchange Data Information) system named Portlink, while a number of the global ocean carriers have recently launched a common EDI system under the name "INTTRA".

demand for substantial capital investments, the participation of the private sector in the provision of port services or the financing of port infrastructure developments has emerged. Baird (2000) details the driving forces towards port privatization: the need to improve port efficiency, thus introducing efficiency and the know-how of the private sector; the increased specialization of port services and the pressure to reduce demands on the public sector budget and lower expenditure on port labor. The granting of long term leases and concessions to private companies, via mechanisms such as BOT (Build, Operate and Transfer) schemes (for a complete analysis see: WBPRTK 2007; Pallis et al., 2008) are the most common forms of privatization. Moreover, private capital injection introduced the ability to shift the financial burden of port expansion and development to the beneficiaries of the expenditures.

The modernization of existing governance models remains a potential. It demands a better knowledge of the rapidly changing demand. Port privatization, corporatization, and commercialization, have become possible after the introduction of extensive port reform¹⁰ practices during the last two decades. Governments in pursuit of attracting private capitals have adopted alternative service delivery models most often associated with a significant reduction of the public sector's involvement in the provision of port services in several parts of the world. The role of several port authorities has been transformed from institutions in charge of all port activities to an administrator, coordinator and regulator of these activities. In the light of these changes, the contribution of regular and comprehensive measurement of ports performance is more significant than ever.

As port privatization practises have been widespread, scholars attempt to theorize the new context of governance by reassessing port models and studying the impacts of globalization. Port privatization trends (Baird, 1997a; Cullinane and Song, 2002), the public sector's involvement in ports (Notteboom and Winkelmanns, 2001a), the new roles between the private and the public

¹⁰ WBPRTK (2007) recognizes three broad forces that are generating momentum for port reform: external forces of competition and technology from the shipping industry, the acknowledged financial and operational benefits of private participation in infrastructure development and service delivery and the diversification and globalization of investors and operators in the port industry (WBPRTK, 2007).

sector (Juhel, 2001) and an 'agile fourth generation' of ports (Paixao and Marlow, 2003; Beresford et. al., 2004) are the outcome of studies towards this end. This implies a need to shift agendas from port ownership to port governance.

2.3.2 Shifting agendas: from ownership to governance

Aiming to address these institutional changes, scholars direct discussions towards the examination of governance rather than ownership, as the latter is of limited value for justifying a port's characteristics¹¹. Based on the distinction between public and private roles in port management (WBPRTK, 2007), four institutional models (public service port, private service port, tool port and landlord port) are defined. Baird (1995; 1997a) also constructed a port function matrix containing four port models (namely public, public/private, private/public and private). This typology is based on the provision of regulator, landowner, and operator, services offered by either public or private sectors. These models differ between them by (a) whether the services are provided by the public sector, the private sector or mixed ownership providers; (b) their orientation; (c) who owns the superstructure and capital equipment and; (d) who provides dock labour and management. The presence of multiple actors of different nature increases port complexity (Chapter 6) and has implications on governance reforms.

The choice of the model adopted in each country is influenced by the way the ports are organized, structured and managed. Ideological factors are also at play as well (Chlomoudis and Pallis, 2002; Vaggelas, 2008). These factors include the socio-economic structure of a country, the historical development of the port, the location of the port, and the types of cargo that are typically handled (Brooks, 2004). The general belief that public port organizations are less responsive to demand and supply conditions than private companies, is not always justified (Notteboom and Winkelmans, 2001a). Econometric analysis of

¹¹ As port complexity is increasing substantially, the ownership of the port authority is not sufficient to depict information on its operational status. Rather, such information may be extracted from understanding how a port is governed as a whole.

the relative productive efficiency of the ports sector pre- and post-privatization seems to suggest that ownership itself is not categorically related to efficiency in port operations (Song and Cullinane, 2001; Cullinane et al., 2002a). Port governance is associated with the broader institutional frameworks in which the economy develops (Ng and Pallis, 2010), challenging the “myth of the perfect model” (Brooks and Pallis, 2010). Thus, the redirection of research to governance is both justified and useful. What is essential for ports today is to adopt the governance model that will increase the value offered to its users. In order to do so, ports need to measure their performance (including a perceived value dimension) so as to assess the governance model in place, allocate malfunctions, and take accordant actions.

A great variety of governance models are present today in the seaport industry. Each seaport is unique and major groupings of models acquired are difficult to be made. For example in a sample of 42 ports, Brooks and Cullinane (2007b) recognized 34 different configurations of governance models. This raises the difficulty of the analysis of seaports, as their uniqueness makes the drawing of general conclusions an extremely complex task.

With contemporary port governance marked by changes in strategies, structures and environment, Port Authorities (PAs) face challenges they have to cope with. Strategy (Notteboom and Winkelmanns, 2001a) and management (Brooks, 2004; Brooks and Pallis, 2008) in combination with frameworks which provide public goods (Vining and Boardman, 2008; Chlomoudis et. al., 2003) are also re-examined.

The Ports' location (Baird, 1997b); the size (Tovar et. al., 2007; Ircha, 2001c); the strategy (Dekker and Verhaeghe, 2008); and the investments (Koh, 2001; Wiegmans et al., 2002) are also re-assessed, whereas an extensive number of studies deal with the interplay of international, national, and local factors in shaping port development (Hoyle 1999; Todd, 1997; Comtois, 1999; Marcadon 1999; Brunt, 2000; Wang & Slack 2000; Brodin, 2001; Loo & Hook, 2002; Wood, 2004; Paul, 2005; Wood & Dibben 2005; Grossmann, 2008). All these signify the need for a ports' re-thinking (Olivier and Slack, 2006).

2.3.3 Measuring the performance of port devolution programmes

Port reformers, whether PA's or other relevant managing bodies, need to explicitly assess the objectives they seek to achieve. Different objectives have important implications on the types of reforms being pursued. The transition of port operations to (semi-) private ones needs to follow a plan that accommodates a clear understanding of how well the port functions after the implementation of the program. After all, there are numerous cases in which devolution programs did not work out (see: WBPRTK, 2007) as they did not achieve optimal performance or/and did not deliver the full benefits they had originally sought.

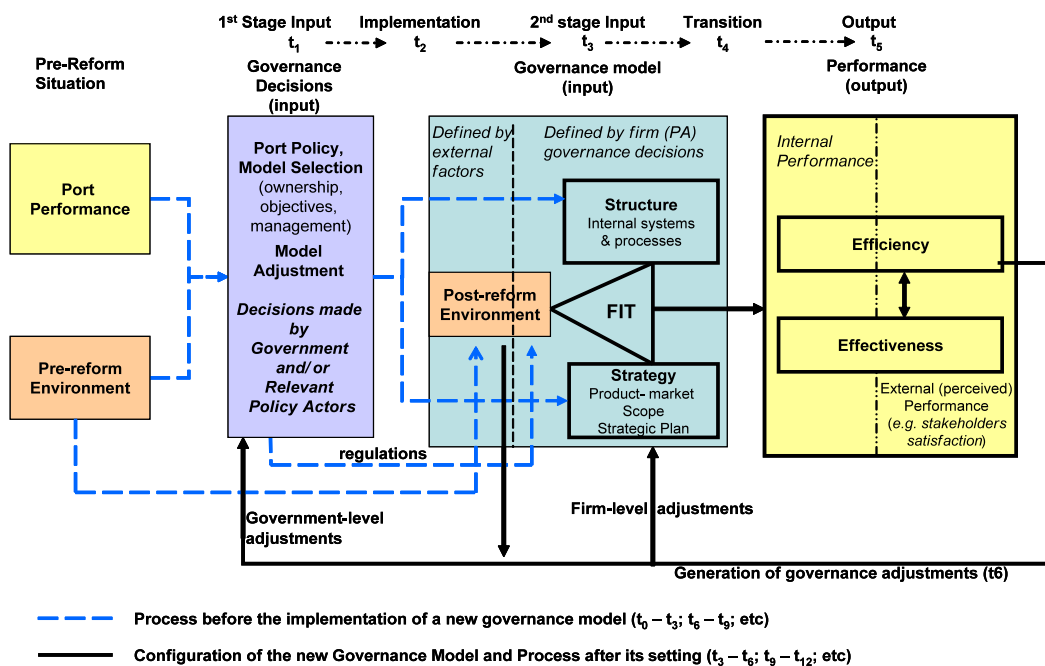
The mechanism to revert such a situation is to detail the links between the governance model (as an input) and its performance (or output). This way ports are fully aware of the produced deficiencies and understand *if* and *how* governance models fail to deliver a well-performing port reform program. A prerequisite is to detail the exact components of this performance, the agents to measure these components, and, depending on the strategic intent of the port, to prioritize the choice of the performance components. (Brooks and Pallis, 2008).

From a governance perspective, any model applied to ports is defined by the configuration of three inputs: (a) the *strategy* (the objectives, the decisions on its product-market scope, and the plan for effecting these) of the port, as developed by the port authority; (b) the *structure*, which is implemented as a result of government regulations and policies, and the strategy chosen by the PA; and (c) the *environment* in which a port operates having both controllable and uncontrollable factors (Baltazar and Brooks, 2007). The consistency or fits of the inputs determines their output, which is *port performance*.

Brooks and Pallis (2008) put forward a model that links governance and performance and suggests that given governance decisions of policy makers, a governance model is applied that results in certain levels of performance (figure 2.3.1). The latter, should be measured and compared to the desired outcomes, especially due to the port sector's dynamism. Corrective actions are

guided by that comparison. In this vein, the target is to measure port performance with the use of techniques that will generate the proper and accurate information needed. With performance being compromised by two components, namely efficiency and effectiveness respectively, measurements of performance should focus equivalently on both without neglecting either of them.

Figure 2.3.1. A Model for Assessing the Performance of Port Governance



Source: Brooks and Pallis, 2008, p. 415

The comparative analyses of port governance models use global (Baird, 2002a) or regional samples (Hoffmann, 2001; Cullinane and Song, 2001; Ircha, 2001a; 2001b). On a national scale studies evaluate port governance reform results in general economic terms (Saundry and Turnbull, 1997; Haralambides and Behrens, 2000; Ircha, 2001b; Dion et al., 2002; Kim and Kim, 2007; Serebrisky and Trujillo, 2005; Castillo–Manzano et al., 2008; Pardali, 2008; Qiu, 2008); in legislative terms (Everett, 2003; 2007; Everett and Pettitt, 2006); or in financial ones (Pallis and Syriopoulos, 2007). Descriptive studies of national systems, including pre-reform and on-going reform critiques, and relevant policy suggestions, appeared more frequently in the period 1997-2001 (Ircha, 1997;

Misztal and Zurek 1997; Everett and Robinson, 1998; Mangan and Furlong, 1998; Shashikumar, 1998; Goulielmos, 1999; Cullinane and Song, 1998; Shin, 2000; Baaj and Issa, 2001) and to a lesser extent more recently (Psaraftis, 2005a; Llacer, 2006).

2.3.4 Changing the units of analysis: From port to terminal

As already noted (section 2.2) the greatest impact of containerization on ports is the request for increased specialization and extended operational changes of the container terminals. In order to remain competitive, container terminals demand extensive investments and a reorientation of management procedures. At the same time, changes in governance models provide opportunities for entry to private international terminal operators and shipping lines. Private actors massively seized these opportunities so that nowadays they control a large number of container terminals worldwide (section 2.5). A fundamental shift caused by the devolution programs, has been the fact that operations and strategic planning are no more shaped by ports, or/and local, or/and regional, interests but by independent terminals and the commercial interests of their owners/lessors as well (Slack, 2007). All these lead to the assertion that terminals rather than ports are adversaries in the competitive struggle between ports.

Scholars suggest that with ports made up of discrete terminals, each with its own operators and respective operational strategies, the unit that should be under study is the terminal rather than the port. (ibid). Olivier and Slack (2006) recognize terminals rather ports as the new spatial and operational unit. Terminals are also seen as the main focus of competitive strategy compared with ports (Heaver, 1995). Terminals have become places of modal separation that cause a change of their functional use. Terminal operators place emphasis on increasing the quality and the variety of the operations offered in order to increase their competitive position over rivals, who are usually located at a neighboring terminal (Olivier and Slack, 2006).

A number of studies during the last years have concentrated on terminal performance measurements rather than ports as a whole (for a review: Pallis et al., 2010; 2011). Lately, Rodrigue and Notteboom (2009) have introduced the concept of 'terminalization' of supply chains in order to capture the changing role of terminals as locations in supply chains (further examined by: Panayides and Song, 2008).

Terminalization, has gained the interest of scholars with a number of studies taking terminal rather than ports as a unit of analysis. In an effort to save operation and investments costs and improve operational efficiency, Yi et al (2000) suggested a conceptual model of a sharing Container Terminal Resource Management Center (CTRMC). Empty container management on terminals (Jula et al., 2006; Olivo et al., 2005) is also an issue of importance directly linked with land productivity (Chen, 1998). Berth utilization has been indentified as the most important performance determinant of Asian container terminals (with the application of a Weighted Two-Stage Least Squares econometric method) (Song and Han, 2004), while a more focused examination of the ship-berth link is provided by Dragovic et al. (2006). Technical issues are addressed by Ballis et al. (1997), who examine the operational efficiency of handling systems, Mennis et al. (2008), who estimate the risks and costs linked to machinery breakdowns in container terminals, and Choi et al. (2003) who eliminate redundancy and keep integration of terminal operating systems. Bassan's (2007) study recommended a methodology to quantify the port's quality of operations. At the same time a research stream focuses on the optimization of terminal operations (for a detailed review see: Stahlbock and Voss (2008); Steenken et al. (2004)).

In general, the vast body of models dealing with terminal efficiency contrasts with the lack of models on the effects of intra-port competition, while this effect may be important for port users and policy makers alike. This seems a relevant avenue for further research. Thus a new concept of port competition is emerging with terminals rather than ports possessing a central role. However, the impact of 'terminalization' on the port users' perspectives remains questionable and requires further research.

2.3.4.1 Intra-port competition

Intra-port competition is widely regarded as beneficial for the competitiveness of ports, for local and national economies and for consumers and exporting industries. The main benefits produced by intra port competition are that: (a) it prevents market power from port service providers and; (b) that leads to specialization (although proved that it is valid only under specific circumstances), flexible adaptation and innovation (Chlomoudis et al., 2003; De Langen and Pallis, 2006). These effects of intra-port competition have guided the (unsuccessful) EU policy initiatives to liberalize and re-regulate the market of port services (CEU, 2001; 2004). Contemporary ports are able to design policies to introduce intra-port competition while port competitiveness assessments could not be restricted to inter-port competition but also include this new emerging trend. The attempt to reduce entry barriers (De Langen and Pallis, 2007) as a practice to introduce intra-port competition further underlines the need to study the relations developed between the port users and the service providers.

2.4 THE SPATIAL CHANGES IN SEAPORTS

Manufacturing patterns have changed dramatically over the last years. The traditional system of nationally based production has been replaced by focused, single location production units servicing regions, continents, even the entire world and 'post fordism' production practices. This enables companies to exploit economies of scale but at the same time increases their dependence on transportation patterns and logistical systems. Due to the globalization, manufacturers are now competing over resources on a worldwide scale. A competitive advantage over the logistics costs contributes decisively to a better value offering. The introduction and widespread use of logistics has also been facilitated by the rise of containerization.

2.4.1 Ports embedded in supply chains

As the importance of logistics increases, so does the importance of ports. Ports stand at the interface between maritime transport and the hinterland (being a production unit, an assembly or final destination) and their capability and efficiency can greatly influence the decision on locating a plant or distribution center. Gateways are in an excellent position to stimulate intermodal transport given the scale advantages they can generate in inland transport (Van Klink and Van de Berg, 1998). Their embedment into value chains was considered in the past as a downgrade of their importance. They were largely considered as “a mere pawn of the game” of global corporate interests and intermodal networks (Slack, 1993), that lost their role as dominant players of the multimodal systems in the era of containerization and restructuring of supply chains (Sletmo, 1999) whereas many container shippers were ‘port blind’, leaving the choice of port and routing to the carrier they had chosen (Brooks, 2000; Tongzon, 2002).

Robinson (2002) argues that, currently, supply chains rather than ports are competing and chosen by shippers and logistics services providers. A port is either integrated in (and thus contributes to) a successful logistics chain, or not. Yet, considering ports as any other link of supply chain would be misleading. The added value that port activities (are perceived to) offer to the total transportation path, and the fact that those using maritime related supply chains cannot substitute or by-pass them, contribute to the influence and control they exert on the supply chain. Ports realize that they still possess a dominant role because their importance over the attractiveness and competitiveness of supply chains is decisive. Thus, the challenge for the port service providers is to relate to the needs of the supply chains. That will assist ports, either as entities or the actors involved, to improve their competitive position.

Central to the spatial analysis of seaports is the identification of port system concentration or de-concentration patterns. Notteboom (1997) concluded that de-concentration was not a result of the ‘peripheral port challenge’ (a concept

also used by Slack and Wang, 2002), while McCalla (1999) provided evidence of container traffic de-concentration in North America.

2.4.2 The need for coordination in the supply chains

Supply chains are networks of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer (Christopher, 1998). For logistics managers, improving the efficiency of individual logistics operations is useless if the efficiency of the individual functions throws the total system out of balance (Wiegman et al., 2001). In turn, improving individual logistics components is worthless if the total logistics performance worsens. With port services being part of logistics operations, the emerging challenge is to adapt effectively to the new context. Ports redefine their roles and operations towards this end.

In order to do so, ports have to facilitate continuous and rapid flow of goods. They should no more rely upon efficient cargo handling and hinterland connections, but provide efficient links in a given supply chain as well. In this vein, they may lose important customers not only due to port infrastructures, terminal operations and inland connection deficiencies, but also due to the unfolding customer's service network reorganization and its entry into new partnerships with logistics service providers, that may use different hub(s) (Carbone and De Martino, 2003). Subsequently, the competitive position of a port is not only determined by its internal strengths (efficient cargo handling and hinterland connections) only. Rather than that, it is also affected by its links in a given supply chain.

Aiming to facilitate the better performance of the supply chain, ports provide value added services. These activities add value to the product, or service, with the final customer being willing to pay for, or adjust, his networks/choices. Port authorities are aware of the need of value added activities within port areas and

seek ways to invest in logistic areas or distriparks¹² (for an analysis see: Pettit and Beresford, 2009).

Logistics platforms perform tasks like groupage, quality control, and final distribution with the proximity to port areas being desirable. The establishment, expansion and offer of quality services of distribution centers within or close to ports stands as a decisive element that adds to port competitiveness. The presence and attractiveness of distribution centers directly influences shipping lines and leads to a redefinition of their networks (Ferrari et al., 2006). "Port-centric logistics" (Mangan et al., 2008) have an increasing importance on port competitiveness.

Empirical studies suggest that ports have only recently started recognizing that higher profit margins can be achieved based on the provision of some non-core port activities. This is driving ports restructuring with the aim being to engage in activities beyond simply providing berths for ships and other core port services (ibid). Still, the attention on the integration of ports with other actors of the supply chain as a source of competitive advantage in a systematic way has been limited. Supply Chain Management (SCM) is a managerial philosophy that supports the development of partnerships between actors of the supply chain and considers the integration of activities and resources of these actors along with business processes, as sources of competitive advantage. The use of SCM practices in ports has come to interest only recently (De Martino and Morvillo, 2008).

Ports do not only aim to coordinate with other members of the supply chain, but to achieve coordination within the port community as well. Ports emerge as clusters of economic activities (De Langen, 2004) consisting of multiple actors of different core businesses (which have to be examined as such). With the number of actors operating within a port, or those associated with it increasing, the transportation of a container from the sea to outer port limits is handled by several entities. Each entity has different objectives, management structures and working practices. Coordination of their activities runs the risk of being poor, with weak management control and bureaucratic and duplicated

¹² C.f distriparks of Eemhaven, Botlek and Maasvlakte in the port of Rotterdam

administrative procedures. The activities that make up the various port operations are most frequently closely inter-related and interdependent, and therefore coordination leads to efficiency and effectiveness. The interrelationships of port operations should be recognized, so as to avoid slow operations that will interfere with and possibly delay others. The extent that these interrelations affect port performance has not been under analysis so far; and for all the above reasons such research is desirable.

A number of articles acknowledge the need to develop new theories regarding the role of ports in supply chains. The context is such that the conventional terminology for classifying seaports is problematic (Bichou and Gray, 2005). Ways to measure port/terminal integration in the supply chain have only recently been proposed (Song and Panayides, 2008; Panayides and Song, 2008). Supply chain practices have resulted in growing volumes and mounting local pressures on ports in terms of land management, infrastructure capacity, environmental impacts and road congestion. These issues were addressed mainly on a local level in Halifax and Vancouver (McCalla, 1999), German North range (Hesse, 2006), Californian seaports (Regan and Golob, 2000; Giuliano and O'Brien, 2007; Rahimi et al., 2008) and Australia (Robinson, 2006).

2.4.3 The importance of the hinterland links

As competition takes place between comprehensive transport chains -instead of between ports-, more attention turns to the quality of the hinterland services. For most ports, captive hinterlands are diminished (Haralambides, 2002) and distance alone does not explain market shares in the hinterland (Malchow and Kanafani, 2004). Improving hinterland access to seaports is, at least partially, an *inter-organisational* challenge that depends on the behavior of a large variety of actors, such as the terminal operators, the freight forwarders, the transport operators and the port authorities. These firms have "*to set collaborative initiatives with the aim to improve the quality of the hinterland access*" (defined also as 'hinterland access regimes' -HAR's) (De Langen & Chouly, 2004, p. 363).

Hinterland access has triggered the scholars' interest in analyzing the wake of the supply chains' increased importance for seaports. The role of freight corridors, such as rail (Gouvernal and Daydou, 2005; Woodburn, 2007) and barge (Konings, 2007), as well as the role of inland ports (Walter and Poist, 2004; Roso, 2008; Rahimi et. al., 2008; Ng and Gujar, 2009) has increased significantly. As the quality of hinterland access depends on the behaviour of a large variety of actors, which altogether form a 'hinterland access regime' (De Langen and Chouly, 2004), coordination problems are arising (Van der Horst and De Langen, 2008). The role of information technology in facilitating further integration of ports in supply chains is also crucial (Paik and Bagchi, 2000; Kia et al., 2000; Bagchi and Paik, 2001; Airriess, 2001; Lambrou et al., 2008).

This is not least, because the competitive position of a seaport is not only determined by its hinterland connections and efficient cargo handling. It is also affected by its links in a given supply chain. In other words, port competitiveness is increasingly dependent on external co-ordination and control of the whole supply chain. The port actors' objectives include the creation of synergies, as well as converging interests in order to guarantee reliability, continuous service and a good productivity level (Carbone and De Martino, 2003). An effective performance measurement can reveal deficiencies in those areas and lead to accordant actions.

2.4.4 Port foreland and hinterland regionalization

Even though it is to a certain extent outdated, the *Anyport model* (Bird, 1980) remains the most widely acknowledged conceptual perspective on port development. Port expansion is the outcome of evolving maritime technologies and improvements of cargo handling. The Anyport model identifies three phases of port development, namely: setting, expansion and specialization. The model remains a valid explanation of port development but does not explain contemporary trends such as the rise of terminals that primarily act as transshipment hubs in an extensive maritime hub and spoke system and/or the emerging collection, assembling and distribution networks.

Transshipment offers substantial operating and capital cost advantages compared to multiport direct call services (Baird, 2002b). The share of transshipment container volumes in the world's container traffic has risen dramatically. Competition for transshipment cargoes is extremely intense due to the nature of port investment and the existence of significant sunk costs (Haralambides, 2002). The worldwide transshipment volumes prove to be extremely elusive and mobile, as they are not directly connected with local traffic. New transshipment terminals emerge at unlikely places, far away from the immediate hinterland that historically guided port selection. The competitiveness of transshipment ports heavily relies on their ability to efficiently handle cargo and reposition it to feeder vessels and not on their hinterland connections. Hub terminals in "offshore" or island locations with limited or no local hinterlands are emerging such as in Malta or in Caribbean (McCalla, 2008).

High levels of vulnerability, due to the significant dependence on container flows, characterize intermediate hubs. Recent developments in the liner shipping industry have also revealed the weaknesses of pure hub-and-spoke systems versus multi-port itineraries (Rodrigue and Notteboom, 2010). An avenue for increasing a transshipment port's competitive position, is its ability to add value to cargo, thus functioning as a hinterland. The concept of 'foreland-based regionalization' (ibid) is grounded on the integration of intermediate hubs in regional shipping networks that enable them to look beyond their conventional transshipment role. That new paradigm provides foundations for the emergence of new types of transshipment port competition and operation characteristics.

Bird's model does not include the inland dimension as a driving factor in port development dynamics. Ports however move rapidly towards a "hinterland regionalization phase", which mirrors the increased focus of market players on logistics integration (Notteboom and Rodrigue, 2005). A higher level of integration with intermodal transport systems and inland terminals and the establishment of freight distribution centers are regarded as the cornerstones

of port regionalization (ibid). It enhances the formation of discontinuous hinterlands and thus endurances the ports' competitiveness.

Inland container terminals increasingly displace activities traditionally performed in the port. Although there is a significant availability of valuable real estate in the port area while intermodal efficiency is maximized, inland terminals divert economic activity from the local area and expand competition dynamics from distant ports¹³. Inland terminals might also reduce the port's environmental effects and harmonize flows by acting as satellite terminals¹⁴ (Slack, 1999). Services such as storage, consolidation, depot, track and trace, maintenance of containers, and customs clearance are available at inland ports (Roso, 2008). However, the quality of inland access depends on the behavior of a large variety of actors, such as terminal operators, freight forwarders, transport operators, and port authorities (De Langen and Chouly, 2004). A dry port may also serve as a depot, i.e. empty containers' storage. The distant dry port extends the gates of the seaport inland, with shippers viewing the dry port as an interface between the seaport and the shipping lines. However, the impact of inland ports on the container seaport performance and the users' satisfaction lacks attention.

Slack and Wang (2002) call for a new geography of terminals that is based upon the dynamics of terminal management as well as the operational factors that have been at the heart of traditional models. Analysis of empirical answers (Fleming, 2000), shipping patterns and flows (McCalla et al., 2005; Veenstra et al., 2005; McCalla, 2008a), site and situation factors (McCalla, 2008b); and the application of cost (Baird, 2006) and mixed integer programming models (Aversa et al., 2005) are all used to configure optimal port location and optimal network configuration. Hubs and large successful gateways also receive attention (see e.g. Frémont & Ducruet (2005) on Busan; Oosterhaven et al. (2001) on the economic spillovers of two Dutch mainports; Lee et al. (2008) on the spatial evolution in global hub port cities; and Grobar (2008) on the economic status of areas surrounding major US ports.

¹³ For the spatial characteristics of dry ports see: Ng and Gujar (2009).

¹⁴ Van Klink and Van de Berg (1998) and Cullinane et al. (2002b) analyze case studies on the same theme.

Finally, linkages between liner service design and the nature of distribution networks become more powerful due to the increased importance of supply chains. Lee and Rodrigue (2006) and Lee et al. (2006) study them on a regional level, while Ducruet (2008) underlines the absence of such integration in North Korea. The evolving role of Mediterranean ports in global liner service networks and along with it, the development of transshipment hubs in the region received quite some attention (Ridolfi, 1999; Zohil and Prijon, 1999; Gouvernal et al., 2005).

2.4.5 From economies of scale towards economies of scope

A basic driving force of change is the structural shift of the economy from Fordism to post-Fordim (Notteboom and Winkelmanns, 2001b). Production based on the concept of 'economies of scale' through standardization and mass production has been extensively replaced by 'economies of scope' and flexible organizations. It has therefore been suggested that ports should become more agile so as to be in a better position to compete successfully with each other (Paixao and Marlow, 2003). At the same time, ports are characterized by the presence of 'new worlds of port service production and provision', that is based on specialisation and interpersonal relations between service providers and users (Chlomoudis et al., 2003). The short product lifecycles and the short time-to-market affect transport flows, in the sense that the number of products to be shipped and the shipment frequency increase, whereas batch sizes are becoming smaller (Notteboom and Winkelmanns, 2001b).

Port stakeholders realize these fundamental changes and jockey to realign their strategies in that direction. Vertical and horizontal integration strategies and new forms of port stakeholders' relations and co-operations prevail. Both intra-industry as well as inter-industry partnerships emerge. Both the structures and their performance needs to be examined.

2.5 A “FOLLOW-THE-FIRM” ANALYSIS

The preceding analysis illustrated the presence of a ‘within port economic arena’ that is highly influenced by the actors of the port community. It also draws attention to the port stakeholders as a means to understand and enact organizational adaption that facilitates adjustments and adaptations. As the number and the power of private actors within a port community is increasing, a ‘follow-the-firm’ (Olivier and Slack, 2006) approach seems to be an appropriate strategy for contemporary port analysis focusing on governance, spatial development, operations, competition etc. Hall (2004) endorses that a more actor-centred approach in freight transportation studies is needed. Notteboom and Winkelmanns (2002) recognize the port as a node for contacts and contracts. Therein, every stakeholder is driven by his own interests and priorities. At the same time, interdependencies exist and deserve better attention, as stakeholders comprise a network of operations and relationships. The private actors’ strategies drive the port’s spatial and functional reconfiguration having a direct impact on port ‘regionalization’.

Land distribution operations used to be functionally fragmented with multiple actors (maritime shipping lines, shipping and customs agents, freight forwarders and rail and trucking companies) having a control over container distribution. Shifts over different segments increase costs and delays. The need to reduce logistics costs and increase inland transportation efficiency led to a removal of many intermediate steps. The level of functional integration of land distribution increased rapidly, mainly due to extensive mergers and acquisitions and the emergence of so-called mega-carriers. International Terminal Operators (ITO) and Freight Forwarders (FF) soon followed this trend and pursue the provision of integrated transportation services (or one-stop-services).

Contemporary port communities consist of players that follow vertical and horizontal integration strategies and are highly consolidated. In fact, as ports are embedded into supply chains, and the importance of the latter is

continuously increasing, stakeholders employ strategies aiming to control broader parts of these chains. Vertical integration strategies are implemented in this vein leading to the provision of the total transportation services. Extensive horizontal integration strategies (favored by the globalization of the economic activity) were adopted by the port's stakeholders as well. These strategies result in an increase of their bargaining position *vis-à-vis* other members of the port community. High levels of consolidation are pursued and achieved as a means to balance such an inequality of power.

Minimizing the operating costs by increasing the scale of operations is frequently a strategy of low margins. Larger ships, larger terminals, alliances and mergers are matching the Fordism production system. But, as in post-Fordism, differentiation and the provision of logistics services to customers are favoring economies of scope. The latter represents a strategy chosen by an increasing number of the port's stakeholders.

2.5.1 The Container Terminal Operators

Two models typify container terminal management: 1) port authorities providing cargo-handling services themselves and 2) port authorities contracting terminal and stevedoring operations to third parties (Slack and Fremont, 2005). The second model, referring to landlord port authorities, is gradually adopted by an increasing number of ports (Baird, 2002a) and its popularity is substantially rising. Globalization, economic restructuring, deregulation, and privatization contributed decisively towards a radical reorganization of the port terminal industry (Musso et al., 2001; Notteboom and Winkelamns, 2001a; Peters, 2001; Heaver, 2002; Olivier et al., 2007). Private container terminal operators dominate, on a worldwide basis¹⁵, the provision of container handling services, whereas only in a limited number of countries and ports the public sector is still involved in such operations.

¹⁵ This is not least due to the structures and details of the concession practices applied (Pallis et al., 2008)

During the past, the operations of local Terminal Operating Companies (TOC) were limited, and the opportunities for internal growth and greater profitability were increasingly constrained (Notteboom and Winkelmanns, 2001b). Local terminal operators seized the opportunity created by extensive devolution programs expanded internationally and became global players. Moreover, the need to install expensive information technology systems, the pressures to replace equipment and to operate berths at even higher levels of throughput have imposed such pressure on the traditional terminal operating firms that many were unable to meet and favored the growth of global players (Slack and Fremont, 2005). The growth of the so-called International Terminal Operators (ITOs) is an example of horizontal integration that allowed them to broaden their scale and scope (table 2.5.1). Firms such as HPH and Eurogate belong to this category. Others, like PSA International and DP World, are companies operating container terminals but at the same time they are also port authorities at their homeports. The emergence of port operating transnational corporations requires a fundamental epistemological shift in reconceptualising the port (Olivier and Slack, 2006).

The expansion of local terminal operators has followed two major strategies. The first type of these operators expanded their operations on a geographical basis, while the second wave of operators was seeking expansion internationally (Peters, 2001)¹⁶. Moreover, ITOs endorsed extensive “Mergers and Acquisitions” (M&As) practices that lead to significant levels of consolidation, not least because the industry jockeyed to face the increased bargaining power of shipping lines¹⁷. Other factors that contribute to remarkable consolidation are the high sunk costs of port investments and a number of other entry barriers (for details: De Langen and Pallis, 2007). ITOs possess substantial surplus capital (created due to extended scale of operations) that allows them to withstand an intensive competitive war and outperform competitors in bidding processes (Pallis et al., 2008). This further enforces the consolidation of the market.

¹⁶ For an analysis of the spatio-temporal evolution of global terminal networks see: Olivier et al., 2007

¹⁷ For the most notable M&As of the container port industry during the period 1997-2004 see: Olivier et al., 2007; Rodrigue et. al., 2010

Table 2.5.1. Types of Global Port Operators

Stevedores	Maritime Shipping Companies	Financial Holdings
Horizontal integration	Vertical integration	Portfolio diversification
Port operations is the core business; Investment in container terminals for expansion and diversification	Maritime shipping is the main business; Investment in container terminals as a support function	Financial assets management is the main business; Investment in container terminals for valuation and revenue generation
Expansion through direct investment	Expansion through direct investment or through parent companies	Expansion through acquisitions, mergers and reorganization of assets
PSA, HHLA, Eurogate, ICTSI, SSA	APM, COSCO, MSC, APL, Hanjin, Evergreen	DPW, Ports America, RREEF, Macquarie Infrastructure, Morgan Stanley Infrastructure

Source: Notteboom and Rodrigue, 2010, p.6

ITOs traditionally run multiple user terminals providing a range of equipment and manpower to handle vessels operated by a number of client shipping lines. That model is preferable by both port authorities and terminal management companies because (a) it is seen to use resources more effectively and (b) higher berth occupancy results in higher revenues¹⁸ (Slack and Fremont, 2005). In recent years, there have been cases in which ITOs also ran dedicated terminals (i.e. serving one specific shipping line only) in cooperation with shipping lines that have not expanded their activities in terminal operations (further analyzed in Chapter 7).

Terminal operators may also be involved in equity entry in a specific port project, without necessarily involving any physical entry. This implies an involvement strictly as an investor with those agreements being complicated by the fact that in many cases they are affiliated to larger conglomerates where the

¹⁸ Pricing issues in terminals and ports are also important and attracted the scholars' interest. Veestra and Lang (2004) develop a model that evaluates a terminal in terms of the cash flow generated, and Diaz et al. (2008) estimate a multioutput cost model. Kim and Kim (2007) develop a method for the optimal price schedule for storing inbound containers in a container yard. Psaraftis (2005b) is the only scholar to analyze pricing issues on a port level.

parent firm enters as a shareholder while its operating associated firm or subsidiary is granted terminal concession rights (Olivier, 2005). Equity entry enables terminal operators to keep existing local expertise and customers and at the same time, to mitigate foreign control concerns (Notteboom and Rodriguez, 2010).

ITOs might also set up joint ventures with port authorities for the operation of a terminal¹⁹. Moreover, most of ITOs (with the exception of PSA) tend not to cooperate with other companies when it comes to domestic investments, while abroad co-operation is a strategic option most widely used (Vaneslader, 2008) (with the exception here being DPW).

In terms of the ITO's strategic approach to a third party business, Parola and Musso (2007) recognize three groups of terminal operators: (1) *Pure stevedores* that manage terminals as profit centers and adopt an aggressive marketing strategy to attract cargo (their strategy is to spread risk by diversifying the portfolio and by investing in the most attractive regions); (2) *integrated carriers* running terminals that do not care about marketing and usually manage port nodes as cost centers; (3) *hybrid terminal operators* that are liners involved in the stevedoring business, growingly focused on third party traffic to make profits.

Empirical evidence suggests a trend towards increasing internationalization of terminal operating companies (De Langen and Chouly, 2009). Local container terminal operators are either found servicing niche markets, or are still protected by legal or economic entry barriers in specific countries.

2.5.1.1 Container Terminal Operators' vertical integration

With the transport chain being viewed as a totally integrated system, the loyalty of a port client cannot be taken for granted by terminal operators. The latter face the constant risk of losing important clients, not because of deficiencies in port infrastructure or terminal operations, but because the client has rearranged its service networks, or has engaged in new partnerships with other

¹⁹ For example PSA has formed a joint venture with the local Harbour Bureau for the operation of the Guangzhou Container Terminal (Vaneslader, 2008).

carriers (Notteboom, 2002). The largest stevedoring companies take initiatives to reduce that risk. For example they are involved in inland transport services. A number of them is transformed into logistics organizations offering warehousing, distribution, and low-end value-added logistical services. They are involved in intermodal rail transport, setting up road haulage companies, operating their own feeder services and inland terminals. For example Delta container services is a joint venture established by ECT and a company named Kramer for the development and running of a depot. ECT also fully owns and operates inland terminals such as the Venlo and Decete and a trucking company. At the same time, Eurogate offers logistics services via its subsidiary named Eurogate Intermodal, which owns trucks and operates shuttle services. DP World has launched a new program under the name “terminal operator haulage” offering hinterland transportation services. There are also cases that terminal operators offer pilotage and towage services, such as PSA in India, China and Hong-Kong. PSA has also developed a dedicated rail terminal in its newly built terminal facilities in Mersin, Turkey. Although the integration of container terminal operators in supply chains is lower than breakbulk terminal operating companies (De Langen and Chouly, 2009) their changing role is apparent. Apart from the actual vertical integration strategies, there are also “virtual integration strategies” followed by terminal operators that deserve further attention.

2.5.2 The Shipping lines

Liner shipping lines serve their customers by developing strategies that can be placed into three categories. The first one aims to meet the needs of the increasing global shippers. The second one aims to offer an expanded range of logistics services and through this, helping their customers to integrate and improve the performance of their supply chains. Finally, they might aim to simply maintain or increase profits, by either boosting revenues or squeezing costs (Heaver, 2002). Against those challenges, horizontal and vertical integration strategies are the primary choices of shipping lines.

A number of ocean carriers (MSC, Evergreen) focus their strategies on organization flexibility, market responsiveness, and decisional independency, thus not committing themselves to alliances. Alliances under the most recent changes in the shipping industry proved partially inadequate (Parola and Musso, 2007). The outlawed strategies of shipping conferences²⁰ lead to destructive competition implied by the theory of empty core that they were based on (Sjostrom, 1989). Carriers understood that when faced with unsatisfactory financial performance, action was required on the cost side rather on the revenue one. Their strategic answer was to pursue economies of scale and the formation of alliances. Alliances are not limited to a single trade line but aim at covering all major routes and extend the area of influence beyond vessel operations and towards the shared use of container terminals, joint equipment managements, intermodal transport, logistics and so on. At the time that a single carrier can achieve the economies of scale and scope that an alliance can offer, the need for the alliance disappears (Maersk in 1990s).

Another form of partnership that has not yet gained great attention is that of joined services offered by some independent carriers. Shipping lines organize joint services through vessel-sharing agreements in specific routes. Their co-operation involves vessel sharing and slot sharing agreements²¹.

A number of independent carriers pursue a global strategy without committing themselves to alliances or increased growth. An example of these is Maersk Line. They did so thanks to the organic growth of their fleet and afterwards by establishing partnerships with main freight forwarders.

Quite recently, ocean carriers have launched a number of mergers and acquisition (M&A) schemes in an effort to reduce their total cost by pursuing economies of scale. Extensive M&A's are also regarded as a means to increase bargaining power over their users (shippers, stevedoring companies, logistics services providers etc). Wider geographical coverage and rationalization of activities have also been identified as main underlying reasons for the

²⁰ Officially prohibited by the US Merchant Shipping Act 1984 and the recent EU Regulation 1419/2006.

²¹ For example, CMA-CGM and Maersk launched a new joint service linking North Asia and Black Sea on May 20 2009 (JOC, 2009).

deployment of these strategies (De Souza et al., 2003). As shown in table 2.5.2, the shipping liner industry is characterized by extreme levels of concentration. The top 5 carriers enjoy today a 43.7% market share and a respective percentage for the top 15 reaches 73.6%.

Table 2.5.2. Liner Shipping Concentration (2009)

Rank	Operator	TEU	Share
1	APM-Maersk	2.069.514	15.9%
2	Mediterranean Shg Co	1.486.825	11.4%
3	CMA CGM Group	1.008.989	7.7%
4	Evergreen Line	559.023	4.3%
5	APL	550.384	4.2%
6	Hapag-Lloyd	470.744	3.6%
7	COSCO Container L.	453.554	3.4%
8	CSCL	452.212	3.4%
9	Hanjin Shipping	436.180	3.3%
10	NYK	413.928	3.1%
Levels of industry concentration			
Top 5		5.674.735	43.7%
Top 10		7.901.353	60.8%
Top 15		9.555.840	73.6%
TOTAL		12.977.220	100%

Source: adapted from BRS-Alphaliner, Paris, France (8 December 2009)

2.5.2.1 The Shipping lines' vertical integration

Ocean carriers first entered port business in the 1960s-1970s in order to fulfill the needs for standardized facilities, which in turn derived from the advent of containers (Levinson, 2006). During the 1980s-1990s their port investments were driven by the rise of intermodality and their willingness to control larger parts of the transport chain. Finally, during the last decade the increase of transshipment volumes have created the need to defend the assets deployed on the main routes; thus, carriers continued to invest in ports (Midoro et. al.,

2005). Carriers also considered their involvement in ports as a means for controlling port costs and securing capacity. Later on though, shipping companies realized that potential profit margins in the international port sector are much higher than in the container shipping business with more or less the same element of risk involved.

Vertical integration strategies are implemented in an effort to increase the range of offered services by transforming the organization in a totally integrated supply chain enterprise able to offer shippers sophisticated value-added logistics services and control over shipments (Heaver, 2002). The development of dedicated terminals, the financing of container terminals, the replacement of traditional independent agencies with totally or partly owned liner agencies and their involvement in inland transportation are all strategies developed in this vein.

Many ocean carriers created terminal operating subsidiaries to operate the terminals they invest in. Although recently many of them have separated their terminal operating arms and created self-standing companies, such companies usually retain some form of ownership and/or operational ties to their carriers (Olivier et al., 2007). Carriers realized that terminal operations represent a more lucrative sector and thus proceeded to vertical disintegration (Olivier, 2005). Typical examples of such companies are the COSCO terminals and APM terminals.

Ocean carriers prefer dedicated terminals in order to retain the full control over operations (Harambides et al., 2002). Waiting time for berths is minimized and the particular needs of the traffic or the stacking sequences can be planned to the complete satisfaction of the carrier. The shipping lines' investments in dedicated terminals are highly dependable on port traffic. In cases of low traffic volumes, the costs of managing a dedicated terminal are high and make it uneconomic. Many port authorities are reluctant to lease terminals proposed for dedicated use because of potential revenue loss due to fewer ship calls and lower berth throughputs (ibid).

A number of shipping lines have chosen not to invest on container terminals. MSC and CMA-CGM are typical examples of global carriers that followed such a

strategy. These companies solely focused on their core business (shipping), endorsing the concept that their independence and the exploitation of their competitive advantages are of greater importance and enhance their competitiveness. As a result, they were not willing to diversify their operations and invest resources in acquiring the know-how of running container terminals. Despite their strategic choices though, lately they have realized that they cannot remain 'in the game' unless they also invest in port operations. They have done so by developing 50/50 joint ventures with stevedoring companies for the development and running of dedicated terminals. In those cases the shipping lines are not involved in day-to-day operations of the terminal, with the stevedoring company usually retaining full responsibility²².

Another type of strategic entry of shipping lines in the port industry is by acquiring minority shares of terminals (usually less than 20%). In this vein, one or a number of shipping lines participate in consortiums where a stevedoring company is usually involved, for the purpose of running the terminal. Stevedoring companies keep the control of the day-to-day operations. Shipping companies do not have a part in the revenue created except through dividends. They are actually exerting control on the terminals' long-term strategy and are obligated to use that specific terminal when they call at that specific port.

With regard to carrier involvement in terminals, the role of global alliances in port handling is of particular importance. Although alliances include strong forms of cooperation such as slot exchange and vessel sharing, they usually exclude terminal sharing. In fact, ocean carriers share mega-vessels in the main routes yet they are generally not prepared to share the port facilities called at by their ships. The main reason is that liners require a level of control over terminals in terms of stevedoring costs and schedule reliability. It is easier to share a transshipment facility rather than a gateway terminal, as the former does not include intermodal operations²³. In fact, there are some cases in which

²² Typical examples are MSC and PSA in Antwerp, MSC and Eurogate in Brementhaven, Cosco and HPH in Kwai Chung port in Hong Kong and P&O Nedlloyd and HPH in Euromax terminal in Rotterdam.

²³ Recently for example, the president of Cosco captain Wei has announced that the company will attract the shipping lines YMN, Hanjin and K-Line to call at its terminal in Piraeus port (marinews.gr, 25th May 2010).

a shared transshipment terminal among liners exist. An example of this is the Gamma Container terminal located in Pusan. The facility is operated by the major Korean ship carriers Global Enterprises, Hanjin Shipping, Korea Express and a foreign company, Hutchison Korea Terminal (HPH Group).

Another form of liner involvement in terminal handling is through special agreements with the terminal operator based on TEU throughput. The terminal operator provides berthing and crane priority and in some cases allows a cargo volume based on discount on port charges. The most illustrative example are the PSA facilities in Singapore.

Ocean carriers integrate their activities by managing port facilities and by creating intermodal companies in order to: satisfy the new needs of shippers requiring a more reliable and efficient form of transport (door to door service), improve the control (revenue increase) of freight by offering an intermodal rate (sea and land), reduce the margins in sea transport and need to reduce costs and to increase supply chain efficiency (Midoro et. al., 2005). The vertical integration strategies of shipping lines aim at filling the gap between the carrier and the shipper/receiver by eliminating the layers of intermediaries and other members in the distribution and logistics channels (Bichou and Bell, 2007).

Shipping lines also seek to increase the percentage of carrier haulage. The most common practices for increasing the range of offered services are either through the establishment of their own independent logistics companies (ex. MedLog, the logistics subsidiary of MSC), or by making agreements with third – party service providers. Regardless of the strategy deployed, shipping lines try to increase their control over the transport chain and thus pose a threat to freight forwarders/logistics providers, road hauliers and container terminal operators in terms of retaining existing business and obtaining new business. Shipping lines also acquire and develop new inland terminals or form agreements with existing ones in an effort to increase their hinterlands. The introduction of shuttle trains is also common. A good example of carrier cooperation in the rail sector is the European Rail Shuttle (ERS), a joint venture between P&O Nedlloyd, Sea-Land and Maersk. The ERS operates shuttle trains between Rotterdam and inland terminals in Germany, the Benelux countries

and Italy. A typical example of the carrier's vertical integration strategies is CMA-CGM which has the control of companies active in depots, trucking and rail services, inland barge transportation air transportation and via the CMA Logistics, offers logistics services.

Ocean carriers also issue "intermodal bill of lading" to inland points under point-to-point freight rates. Improvements in terminal and landside operations not only lower the cost burden of door-to-door transport, but also make sure that the savings achieved at sea (i.e. with the use of post-panamax vessels) are not to be lost on land. Most likely, this explains why shipping lines are expanding their scope to include terminal operations and hinterland transportation (Notteboom and Winkelamns, 2001b).

As the level of shipping lines integration increases, so does the percentage of carrier haulage. Shipping lines increasingly establish agreements directly with shippers. Usually big in size (e.g. Nike, IKEA, Walmart etc.) shippers rely on mega carriers that have developed their logistics services, for their end-to-end transportation paths. The appointment of carriers' Key Account Managers (KAM) facilitates these operations and increases the level of coordination between the two companies.

In their effort to better control the supply chain, carriers start to perform the ship agency function in-house, or form a subsidiary company to undertake the ship agent's role. This decision is reinforced by the desire to control the marketing of their services rather than risk a possible conflict of interest arising within an independent ship agency (Martin and Thomas, 2001).

In addition to the entities outlined above, there are other entities active in the port market that can be termed niche investors in terms of either geographical focus, or activity. The tendency of these entities is towards highly targeted investments, both inside and outside the container sector (Peters, 2001). The focus is on financial groups, as their involvement in financing and possessing shares in container terminals gradually evolves (for a detailed analysis see: Rodrigue et al., 2010).

Changing logistics strategies of terminal operators and shipping lines largely affects ports. Shipping lines and the stevedoring industry's efforts to adapt to the new realities of vertical and horizontal integration strategies -while the container terminals' position in vertical integration strategies and the market power of PAs are significantly changing- are at the centre of the scholars' interest (De Souza et al., 2003; Midoro et al., 2005; Bichou and Bell, 2007; Parola and Musso, 2007; Wiegmans et al., 2008; Parola and Veenstra, 2008; Vanelslander, 2008).

2.5.3 The Freight Forwarders

Freight forwarders have traditionally played an important role in international trade, acting as middlemen between the owners of the goods and the carriers. The range of services offered by forwarders has expanded as shippers have sought more sophisticated logistics services. Still, their position is challenged by the ability of shipping lines to provide more effective door-to-door services and add more value-added logistics services. Forwarders also face greater competition from stevedores that are diversifying their services (Heaver et al., 2000).

The emergence of companies which offer full service logistics solutions to major shippers contributes to the realignment of their bargaining power. These logistics service providers have substantial strength in dealing with shipping companies, terminal operators, and other port service suppliers, adding to the growing complexity of achieving a balance in port service offering negotiations. Logistics service providers meet the combined logistics requirements of many large shippers that they represent. That gives them considerable strength in dealing with shipping companies, terminal operators and other actors in the logistics channel. Freight forwarders that have achieved significant levels of vertical integration are the ones that have long enough tradition and large enough volumes to play a leadership role. Extensive M&As are also present in the forwarding industry. Companies such as Danzas, Schenker/BTL, Kuehne Nagel, DHL and UPS are now offering full logistics services.

Freight Forwarders such as DHL-Danzas, Panalpina, UPS, Kuhne & Nagel compete with ocean mega carriers, as the latter are expanding in the hinterland transportation services. They do so by establishing close agreements with independent carriers. More precisely, they buy the sea transport leg from port-to-port liners (e.g. MSC, CMA-CGM and China Shipping) and manage the overall transport chain in order to offer 'one stop shopping'. That way they are becoming direct competitors of the quality oriented door-to-door carriers such as Maersk, NYK, OOCL and APL (see: Parola and Musso, 2007).

2.5.4 The Port Authorities

Ports have traditionally been run within the principles of public administration. Nowadays they are in the process of devolution following the infusion of private money; introduced because of the greater competition, the need for higher productivity and eventually lower costs that are passed on to importers and exporters. "Landlord" and "comprehensive" port authorities are the outcome of the devolution process, each favoring private actors' investments in ports. Ports have become an interesting business, attracting the attention of large investment groups and equity fund managers. The role of financial considerations related to the allocation and management of shipping and terminal assets (called "financialization") is growing (Rodrigue et al., 2010). In this new environment, the public sector is forced to reassess its role in the port industry (Notteboom and Winkelmans, 2001a).

Given the dynamic environment that squeezes public sectors' role, governments (with few exceptions cf. DPW and London Gateway) still retain the ports' planning initiative. The Port Authority initiates port development plans and retains the power to grant concessions. They are responsibilities that largely impact and define a port's future. Most typically, public port authorities (or other public agencies) generally develop a port master plan (detailing the layout of port development, such as breakwaters and terminal areas) and invest in general port infrastructure. Afterwards, a concession call is made with the responsibility for investments differing between concessions: in some cases,

the public PA invests in the quays and the terminal area, while in other cases the private terminal operator has to make these investments. In such cases, the government usually still determines the main terminal characteristics such as size, location, and waterside and landside access (Pallis et al., 2008). Tendering and concessioning themes have triggered the academics' interest only recently. Analysis of the concession process of specific ports (Defillipi, 2004; Fernandez et al., 1999; Pallis et. al., 2008; Theys et. al., 2010; Psaraftis and Pallis, 2010) and regulation needed regarding concessioning (Van Niekerk, 2005) are the first efforts towards the theorization of the relevant economic and regulatory framework.

The Port Authority or any other managing body needs to be fully aware of the port's performance in order to develop an effective and successful master plan, to determine the main port and terminal characteristics, future strategies and plans for development. The challenges that a contemporary port faces in achieving its primary objectives as commonly outlined in its master plans are: (a) economic expansions; (b) employment; (c) the strengthening of the maritime industry; (d) the creation of value-added services; (e) the provision and upgrading of infrastructure and the development of an efficient management strategy (Moglia and Sanguineri, 2003). All five are largely related to the performance of a port. Being aware of any relevant shortcomings in combination with the desired future development, a port authority has the tools to plan an effective strategic plan. The need for performance measurement is apparent.

Port planning cannot be developed in isolation from the total supply chain. Rather than this, it is becoming the focal point of a holistic planning strategy of a multimodal transport network (for a detailed analysis of port planning see: Chlomoudis, 2005). In that respect, performance measurements have to expand and focus on the ports' connections with the supply chains in order to drive future port planning towards the improvement of the entire supply-chain. Measuring port performance is of interest to governments and relevant policy-makers who carry an influential administrative role in the sector. When they design, or implement port policies and strategies they need to know whether

the intents of previous actions have been realized and/or whether, and what, changes are needed. Besides, the efficient use of ports infrastructure increases the national competitiveness, accommodates trade and consequently enhances the competitiveness of a country's economy. Meanwhile, port service providers need to improve their market positions, while actual and potential users need to have clear indication of the available alternative.

The role of the port and port authorities is redefined in order to guarantee that the port remains a fully-fledged player in this fast evolving market (Heaver et al., 2000). Their role is also highly influenced by the new strategies deployed by shipping lines, terminal operators and freight forwarders. Under the landlord model and the increasing investments of private actors, port authorities are substantially losing their power. Quite recently they have started shifting towards acquiring a more active position in the marketplace and the logistics chain. Port authorities are rethinking and broadening their role as facilitators (Verhoeven, 2009) that actively coordinate the members of the port community leading to successive problem solving. Initiatives towards the expansion of, and better linkages with, the hinterland add to the competitiveness of a port. The port authorities' involvement in the introduction of the new shuttle train services (for example in Rotterdam) and the development of strategic relationships with other transport nodes are typical examples of such initiatives.

On the other hand, realizing the dynamics of their new role as coordinators and administrators, PAs are currently using their power to grant concessions as a useful tool to determine a port's strategy and increase its competitiveness. Nonetheless, PAs cannot rely solely on the granting of concessions. In that way they would link the future of the port to the strategic choices of global and local players alone, and that could decree the success or failure of the port on the basis of the re-designing of the distribution networks of these actors. PAs can take actions to reverse the existing 'follow-the-firm' approach in terms of governance, strategy, management, organization and competitiveness. It seems that in general, today private actors are adjusting to the changes of the port environment more efficiently than the PAs and thus determine to a great extent

much contemporary developments. Empirical studies suggest that PAs have to abandon their passive position and replace it with a more dynamic and more reactive role that will guarantee a long-term and sustainable positioning (De Martino and Morvillo, 2008).

For port authorities, dedicated terminals are another means to facilitate the development of integrated services and to bind shipping companies to specific terminals. Such terminals provide opportunities for port authorities to push for more investment and longer-term leases that might otherwise be impossible (Heaver et al., 2001). The concessioning of terminals to shipping lines has traditionally been regarded as a strategy for securing cargo and increasing the throughput of the port. Nowadays though, there are signs that this belief is challenged – an example being Maersk that operated a dedicated terminal in Constanza, Romania and chose to shut down its operations and direct its ships to DP's terminal in the same port.

2.6 CONTAINER PORTS IN RETROSPECT: THE NEED TO MEASURE PORT PERFORMANCE.

The contextual changes described are altering the port sector. New forms of stakeholders' partnerships are contributing to the evolution of new types of strategies in the pursuit of increased firm growth. Extended vertical and horizontal integration strategies, adopted mainly by terminal operating companies and liner shipping companies are leading to new relations between the port's stakeholders. In the contemporary port community the distinction between partners and competitors is blurred. The role of the Port Authorities has moved from the provision of services to administrative control due to extensive devolution programs. The embedment of ports in supply chains is such that, shippers are now interested and choose an end-to-end transportation path, instead of choosing a port. Moreover, the spatial development of ports has

changed, with foreland and hinterland “regionalization” being at the centre of interest. Extended devolution programs have resulted in a remarkable variety of governance models applied, with each port standing as a unique case.

All these technical and managerial changes have generated a highly competitive and complex framework for seaports, especially for container ports. Port actors are in need of efficient adaption. They usually endorse new strategic directions, in order to retain and even increase their competitiveness. In this vein, port performance measurement is of great importance to the whole port community, as the total of port stakeholders needs to (a) monitor how they adapt to contextual changes and, (b) whether the strategies they endorse produce the desired outcomes. Moreover, understanding in depth port performance is a valuable tool for guiding port planning and testing the extent of the success, or failure, of port policies. Measuring port performance today is more important than ever.

As a result, port performance measurement has gathered the interest of both academia and ports themselves. In the last decade, scholars have produced a significant output of studies dealing with port performance, while ports and related organizations systematically expand the monitoring of their performance as well (Chapter 3). Today, their interest is regarded as of top priority. Recently for example the European SeaPorts Organization (ESPO) in collaboration with the European Community has decided to work towards the establishment of key performance indicators that will be used to monitor European seaport performance²⁴.

Performance measurements should keep updated with the latest developments of every industry. A number of reasons justify the needs that drive the evolution of performance measurement systems, including: the need for measures that relate directly to the organization’s mission and objectives, and reflect the company's external competitive environment, customer requirements and internal objectives (Globerson, 1985; Wisner and Fawcett, 1991; Maskell, 1989; Kaplan and Norton, 1993). The question is whether the up to date produced efforts (both in practice and academia) are complete, and provide essential

²⁴ See: <http://pprism.espo.be/>

information to stakeholders towards self-improvement. Moreover, with the port industry being at the stage of transformation, it remains questionable whether currently implemented port performance measurements are keeping up with the pace of and take into account the contextual changes. As “what is measured gets done”, there is a constant risk of relying on the results of inadequate, or poorly designed, measurements, providing in the long run illusive information and, thus, lead to strategic decisions that are likely not to deliver the desired outcomes.

2.7 SUMMARY

Chapter 2 presented the contextual changes that have taken place in the port sector during the last years. The rise of containerisation has imposed new challenges on ports, as they had to handle bigger vessels more quickly. Extensive devolution programs were launched in an effort to increase the port competitiveness and led to the emergence of new governance models. In essence, the new governance practises attracted private actors that took over the provision of several port services. With ports being embedded in supply chains, new types of port development such as foreland and hinterland regionalization emerged. Furthermore, port actors pursued strategies of vertical integration in an effort to control larger parts of the supply chains and thus a “follow the firm” analysis is justified. In this vein, the strategies of terminal operators, shipping lines and freight forwarders, as well as the changing role of Port Authorities were analysed. Under the changing port environment, the need to measure port performance has been justified. Port performance measurements should be well designed and implemented in order to deliver the outcomes sought.

In the following chapter of the present thesis (Chapter 3) the analysis turns to existing port performance efforts either on the academic or on a practical level.

The aim is to conclude on whether there are efforts updated and in line with the latest developments in the sector, and the extent to which they provide comprehensive and conclusive measurement and information on port performance.

CHAPTER 3. PORT PERFORMANCE MEASUREMENT: THEORY, RESEARCH AND PRACTICE

3.1 INTRODUCTION

The need to measure port performance today is intense due to the extended changes that the sector has experienced. Chapter 2 stressed the importance of Port Performance Measurement (PPM). It also concluded on the need to keep PPM systems updated and in line with the latest trends characterizing the sector. Poorly designed performance measurement systems, or systems that focus on specific aspects of performance only neglecting other ones, might result in the lack of essential info.

Chapter 3 reviews and discusses the characteristics of contemporary port performance systems on the academic and practical level. The literature is based on an analysis of port studies published during the period 1997-2008. The starting year of this period corresponds to a literature review that spreads in a decade before the starting of the present research. The brief recap illustrates the interests and the core characteristics of this research field, including the highlighting of the importance of studying containers and calls for more internationally based research. A “state-of-the-art” analysis of scientific outputs on port competition and performance measurements is presented. The scientific tools and methodologies used, the units of analysis and research characteristics are detailed, focusing on issues that demand further research. A similar analysis on practical level developments follows. The current knowledge base on port performance measurement is outlined through this analysis. The chapter concludes on the deficiencies and shortcomings characterizing contemporary PPMs. Grounded on the analysis, it stresses that PPM is a multidimensional construct and in the light of Chapters 2 and 3, calls

for a new approach. Finally, Chapter 3 turns attention to the specific port performance components that need to be further researched.

3.2 PORT PERFORMANCE AND COMPETITIVENESS

3.2.1 The characteristics of port research²⁵

A systematic review of the content of all the academic journal papers on port economics, policy and management that were published during the period 1997-2008 in international scientific journals identified 395 papers published in 51 international scientific journals (Pallis et al., 2010; 2011). The “core” of the port research community is rather small, with a limited number of scholars publishing a large number of papers. International research collaboration remains on low levels within the research community although in the last years of the analysis there have been signs of emergence.

The growing interest in port studies signifies that it is an emerging research field associated with a focus on global approaches, the collection of international samples and a growing interest in (re)conceptualizing the port sector. At the same time, the highly localized port research requests more comparative studies. Container ports and/or terminals have concentrated the scholars’ interest throughout the period of the analysis. Surprisingly, although high volumes of non-containerized commodities are handled in ports, scholars neglect them as in total less than 4% of the sum of papers deal with cruise ports, general cargo, RoRo, vehicles and passenger ports or terminals.

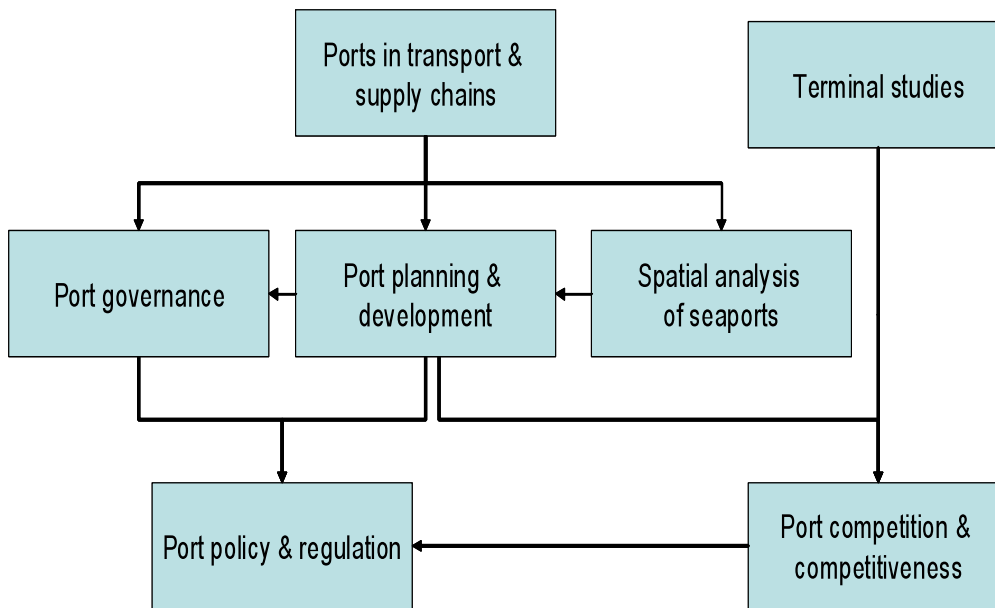
Scholarly interest in contemporary developments of the port industry, have resulted in a context of increased relevant research output. A classification of

²⁵ A more detailed analysis of the characteristics of the port research and a full list of the papers setting up the dataset can be found in two published papers co-authored by the researcher (Pallis et al., 2010; 2011).

the papers included in the dataset, in terms of their core theme²⁶, suggests that papers dealing with port competition and competitiveness have attracted the attention of the research community the most (74 papers). Notably, during the period 1997-2001 papers falling within this category were ranked sixth (9 papers) out of the seven categories in terms of number of publications. At that time, research community focused on port governance, planning and development and policy and regulation. The pace of publication of papers dealing with those themes remained high during the period 2002-2006, yet, at that time interest in competition and competitiveness rose as demonstrated by the publication of 43 relevant papers (or 25% of all relevant publications of that period). This increase is inextricably linked with the changing nature of port competition within a context of increasing complexity. The links between different types of port studies are powerful and developments in one research field yields implications for other categories of port studies. As such, port competition and competitiveness studies are influenced by terminal and port planning and development studies (in turn, influenced by studies focusing on the spatial analysis of seaports and their embedment in transport and supply chains) (figure 3.2.1).

²⁶ Leading to the identification of seven distinct categories, namely: (1) terminal studies; (2) ports in transport and supply chains; (3) port governance; (4) port planning and development; (5) port policy and regulation; (6) port competition and competitiveness; and (7) spatial analysis of seaports.

Figure 3.2.1. The Relations Between the Different Categories of Port Studies



Note: arrows based on citation to/from the different research themes
 Source: Pallis et al., 2011

As ‘port competition’ is a rather puzzling phenomenon (see: Fleming and Baird, 1999), several port studies deal with the assessment of port competition and competitiveness. These studies seek to provide solutions to ports around the globe that seek to retain and increase their competitive position. A distinction can be made between broadly defined subthemes on assessing port competition and competitiveness: (a) port efficiency, (b) port choice, (c) port competition, and (d) the port users’ perspectives measurement²⁷.

3.2.2 Port efficiency

Technological innovation processes occurring in the maritime and port industries, and changes in the organization and administration of ports, have conditioned a modification in the nature of port operations, fostering an increased specialization of the production inputs (see: Chapter 2). These are factors that have a strong impact on the productivity and efficiency of port

²⁷ The analysis provided goes beyond the 74 papers classified in the category “port competition and competitiveness” by Pallis et al. (2010; 2011). The latter provides a detail analysis of all the relevant papers since 1997.

operations. Not surprisingly, the vast majority of the studies that examine these developments and seek to assess port performance focus on the measurement of their efficiency and productivity.

The measurement of efficiency is a concept directly related to the measurement of productivity. These are not two analogous notions, even though they are occasionally treated by scholarly research as synonymous (c.f. the analytical review by Gonzalez and Trujillo, 2009). The idea behind the use of both concepts analogously is that a firm's performance improves as it becomes more efficient and productive. A terminal or a port is regarded as 'efficient' or 'highly productive' if it is able to produce a maximum output for given inputs or uses minimal inputs for the production of a given level of output (Notteboom et al., 2000). At the same time, the fact that port performance may also be improved as it becomes more effective is largely neglected in the literature.

The vast majority of the various scientific methods for measuring efficiency²⁸ that have been proposed have the concept of the frontier in common. According to this concept, efficient units are those operating on the cost or production frontier, while inefficient ones operate either below the frontier (in the case of the production frontier) or above the frontier (in the case of the cost frontier) (Cullinane et al., 2002a). The frontier approach was first introduced by Farrell (1957), as an alternative model for measuring the Total Factor Productivity (TFP). TFP is a measure of technological change in the industry with the use of either non-frontier or frontier approaches (De, 2006).

Two main approaches have been developed in order to estimate the frontier and measure port efficiency: the econometric approach, of which the main example is 'stochastic frontiers', and the non stochastic linear programming techniques, represented by the widely applied Data Envelopment Analysis (DEA)²⁹ respectively.

²⁸ For an overview of studies dealing with port efficiency see also: Gonzalez and Trujillo, 2009

²⁹ The essential difference among these methodologies is that the econometric approach is stochastic and can therefore distinguish the noise effects from the inefficiency effects, while the linear programming approach is not stochastic and deals with the noise and inefficiency together, both termed as inefficiency.

Following Farrel (1957), Charnes et al. (1978) introduced the term DEA (Data Envelopment Analysis) to describe a mathematical programming approach for the construction of production frontiers and the measurement of the efficiency of the constructed frontiers. DEA measures the efficiency of Decision Making Units (DMUs) with multiple inputs and multiple outputs in a non-parametric fashion without requiring any explicit a priori determination of relationships between the outputs and inputs³⁰. The application of DEA analysis has a number of advantages yet the method has been subject of criticism (see: Bonilla et al., 2002).

The econometric approach is divided into two different models. Either deterministic or stochastic frontiers may be specified according to the certain assumptions of the underlying data. The early parametric frontier models were deterministic. They were greatly criticized for ignoring the possibility that the observed performance of the economic unit under examination may be affected by exogenous and/or endogenous factors. On the contrary, stochastic models are motivated by the idea that deviations from the production frontier might not be entirely under the control of the economic unit studied. Stochastic frontier models suffer from two difficulties. One is the requirement for specific assumptions about the distributions underlying productive inefficiency and statistical noise. The other is the required assumption that regressors and productive inefficiency are independent. This may well be an unrealistic assumption since when a firm knows its level of inefficiency it might affect its input choices (Cullinane and Song, 2003).

Stochastic Frontier Models (SFM) have also been used systematically for assessing port efficiency. Most of these studies use the Cobb-Douglas³¹ production function, as it has the advantage of demanding few parameters and

³⁰ Charnes et al (1978) proposed a model that had an input orientation and assumed constant returns-to-scale (CRS), known as the CCR model. Alternative sets of assumptions were later considered as well, with the assumption of variable returns-to-scale (VRS) introduced by Banker et al. (1984) and known as the BCC model, being the most notable one. There are four other basic DEA models, less frequently used in the literature: the additive model of Charnes et al. (1985), the multiplicative model of Charnes et al. (1982), the Cone-Ratio DEA model of Charnes et al. (1990), and the Assurance-Region DEA model of Thompson et al. (1986; 1990). Extensions of the DEA model exist as well, such as the DEA-Malmquist model (Malmquist 1953), the DEA-allocative model and the Luenberger indicator (Luenberger, 1992).

³¹ First presented by Cobb and Douglas (1928) and widely used in empirical research.

despite the fact that it starts from very restrictive assumptions (Coto-Millan et al., 2000) and is usually combined with more flexible forms such as the translog. The Bayesian stochastic frontier model was also used but in one case only (Notteboom et. al., 2000) for measuring the efficiency of 36 major European terminals.

Hayuth and Roll (1993) were the first to suggest DEA for comparing port performance, but it took some years before other scholars picked up the technique. During the last twelve years scholars have systematically used DEA for measuring port and terminal efficiency (for relevant and recent reviews also see: Gonzalez and Trujillo, 2009; Barros, 2006; Park and DE, 2004; Ramos Rios and Macada, 2006; Tongzon, 2001).

Table 3.2.1 presents all the scientific papers that were published during the period 1997-2008 and assessed port and terminal efficiency. The methods applied, the sample chosen, the inputs and outputs used and a distinction between ports and terminals as a unit of analysis are all described.

Table 3.2.1. Efficiency Measurements in Port Studies

Papers	Unit of analysis	Method	Sample	Input	Output
Martinez Budria et al. (1999)	Port	DEA-BCC model	26 Spanish ports, 1993-1997	Labour expenditure, depreciation charges, other expenditure	Total cargo moved through docks, revenue obtained from rent of port facilities
Notteboom et al. (2000)	Terminals	Bayesian Stochastic Frontier model	36 major European container terminals (and 4 others located in the Far East), 1994	Terminal quay length, terminal surface and numbers of gantry cranes	Container throughput
Coto Millan et al. (2000)	Port	Stochastic frontier cost function. (Comparison of a Cobb-Douglas function with a translog)	27 Spanish ports, 1985-1989	Cargo handled (tons) – comprised of: employee costs, depreciation and intermediate consumption	Aggregate port output (includes total goods moved, number of passengers and number of vehicles with passengers)
Tongzon (2001)	Port	DEA-CCR and Additive model	4 Australian and 12 other international ports, 1996	Land (terminal area and delay time), labour (number of PA employees) and capital (number of cranes, berths and tugs)	Cargo throughput and ship working rate

Bonilla et al. (2002)	Port	DEA – CCR model	26 Spanish ports, 1995-1998	Available equipment	Port traffic (solid in bulk, liquid in bulk, general commodities and containers)
Cullinane et al. (2002a)	Ports and terminals	Stochastic Cobb-Douglas production frontier	15 Asian ports and terminals, 1989-1998	Terminal quay length, terminal area, cargo handling equipment	Annual container throughput
Itoh (2002)	Port	DEA- CCR and BCC model and window analysis	8 Japanese ports, 1990-1999	Port infrastructure, superstructure and labor	Import and export containers handled per year
Estache et al. (2002)	Port	Translog and Cobb-Douglas production frontier model	11 Mexican ports 1996-1999	Labour and capital	Volume of merchandise handled
Cullinane and Song (2003)	Terminals	Stochastic Cobb – Douglas frontier model	2 Korean and 3 UK terminals, 65 observations from various years	Labour and capital	Turnover derived from the provision of container terminal services but excluding property sales.
Barros (2003)	Port	DEA-Malmquist index and a Tobit model	10 Portuguese seaports, 1990-2000	Number of employees and book value of assets	Ships, movement of freight, break-bulk cargo, containerized freight, solid bulk, liquid bulk.
Estache et al. (2004)	Port	DEA - Malmquist total factor productivity index and total technical efficiency change	11 Mexican ports, 1996-1999	Capital (length of docks concessioned) and labor (number of workers)	Volume of merchandise handled

Barros and Athanasiou (2004)	Port	DEA-CCR and BCC	2 Greek and 4 Portuguese ports, 1998-2000	Labour and capital	Number of ships, movement of freight, cargo handled, container handled.
Bonilla et al. (2004)	Port	DEA-CCR and statistical tolerance	23 Spanish ports, 1995-1998	Total available equipment	Different types of traffic in each port
Turner et al. (2004)	Port	DEA and tobit regression	Top 26 continental US and Canadian container ports, 1984-1997	Total terminal land dedicated to container operations, total quayside container gantry cranes and total container berth length	TEUs handled
Cullinane et al. (2004a)	Port	DEA-CCR and BCC models	25 out of the top 30 container ports worldwide, 1992-1999	Quay length, terminal area, number of quay gantry cranes, number of yard gantry cranes and number of straddle carriers	Container throughput
Park and De, (2004)	Port	Alternative four stage DEA, CCR and BCC models	11 Korean seaports, 1999	Berthing capacity, cargo handling capacity	Cargo throughput, number of ship calls, revenue and customer satisfaction
Cullinane et al. (2005a)	Port	DEA-CCR and BCC models (intertemporal and contemporaneous	25 out of the top 30 container ports worldwide, 1992-1999	Terminal length, terminal area, quayside gantry, yard gantry, straddle carrier	Container throughput

		analyses)			
Cullinane et al. (2005c)	Ports and terminals	DEA-BCC and CCR and Free Disposal Hull (FDH)	57 selected container ports and terminals, 1999	Quay length, Terminal area, Quayside gantries, yard gantries, straddle carriers	Throughput (TEU)
De (2006)	Port	Stochastic Cobb-Douglas model	13 Indian ports, 1980-2003	Labour and capital	Port traffic
Cullinane et al. (2006)	Ports and terminals	DEA-CCR and BCC models vs. Stochastic Frontier Analysis	57 terminals or ports	Terminal length, terminal area, quayside gantry, yard gantry, straddle carrier	Container throughput
Ramos Rios and Macada (2006)	Port	DEA-BCC model	23 container ports of Mercosur (15 Brazilian, 6 Argentinean and 2 Uruguayan), 2002-2004	Number of cranes, number of berths, number of employees, terminal area, amount of yard equipment	TEUs handled and average number of containers handled per hour/ship
Wang and Cullinane (2006)	Terminals	DEA-CCR and BCC models	104 Europe's container terminals, 2003	Terminal length, terminal area, equipment costs	Container throughput
Cullinane and Wang (2006)	Terminals	DEA-CCR and BCC models	69 Europe's container terminals, 2002	Terminal length, terminal area, equipment	Container throughput
Barros (2006)	Port	DEA-CCR and BCC, cross efficiency DEA	24 Italian seaports, 2002-	Number of personnel, value of capital invested	Liquid bulk, dry bulk, number of ships, number of

		and super-efficiency DEA	2003	and size of operating costs	passengers, number of containers with TEU, number of containers with no TEU, total sales
Trujillo and Tovar (2007)	Port	Stochastic Frontier Analysis (distance function)	22 major EU ports, 2002	Capital and labour	Volumes of cargo (solid bulk, liquid bulk, general merchandise, containers, throughput, passengers)
Garcia-Alonso and Martin-Bofarull (2007)	Port	DEA-CCR and inter-port traffic redistribution	Ports of Bilbao and Valencia, 1992-2002	Work, intermediate consumption, quays and stacking areas	Solid bulk and general cargo
Lin and Tseng (2007)	Port	DEA-CCR, BCC, SCE. D&G and A&P models	10 Asian ports, 1998-2001	Area of container base, length of container terminals and number of deep-water piers.	Number of vessel arrivals and loading/unloading volumes of containers
Barros and Peypoch (2007)	Port	Luenberger indicator	10 Portuguese and 24 Italian ports, 2002-2004	Total operational costs, personnel, investment	Containers, sales, liquid bulk, dry bulk, ships.
Liu (2008)	Port	DEA-CCR, BCC and 3stage DEA model	10 ports Asia-Pacific region, 1998-2001	Container lot size, container length and number of deep-water berths	Number of port calls and container cargo handled

Out of the 29 papers identified, five of them use data from Spain, probably because Spain's port system is centrally administered and consequently detailed data for comparative analysis are available. Labor, infrastructure and capital data prevail among the inputs used, while all the studies measure the output in terms of cargo throughput³².

The vast majority of port efficiency studies deal with container cargoes and signify the importance and the dynamism of the particular trade. On the other hand, it is acknowledged that the particular research stream has limitations. Port throughput has been found to be depended not only on efficiency levels, but on exogenous market differences as well (Cochrane, 2008) and thus the need to examine them is realized. The proportion of different size containers in the market, the vessel size, the number of container moves per vessel, and the relative size of the transshipment and landed container markets contribute significantly to a port's throughput and thus disaggregate analyses of container terminal studies are needed (with reference to DEA and SFM models).

A limited number of studies do not explicitly evaluate performance based on operational efficiency, but use additional elements such as asset performance and financial performance (De and Ghosh, 2003; Pallis and Syriopoulos, 2007) and port location and inland connectivity (Pettit and Beresford, 2008). The fact that they look into other factors emphasizes the necessity for adding further perspectives. As the next sessions emphasize, efficiency measurements remain incomplete understandings of port performance.

3.2.3 Port Choice

Another stream of scientific research focuses on port selection criteria. Even though these studies cannot be considered as core performance measurement efforts, they generate knowledge and draw conclusions that shed light on performance evaluations. Several methodologies such as the Analytical Hierarchy Process (AHP), multinomial logit models, discrete choice models and

³² In a few cases this is complemented by the use of 'number of vessels arrived'

factor analysis *inter alia* are applied with the aim being to answer satisfactorily “What makes a firm choose a specific port over another”.

Multinomial logit modeling (Malchow and Kanafani, 2001; 2004; Nir et al., 2003) or discrete choice modeling (Tiwari et al., 2003) techniques use data derived from either shippers or carriers and indicate that oceanic and inland distance (and thus travel time), cost, port congestion and shipping lines fleet are the most influential factors in port selection (table 3.2.2). Logit modeling in combination with the container routing problem are used as tools for assessing port market shares (Veldman and Buckman, 2003; Veldman et al., 2005).

Table 3.2.2. Applied Modeling Techniques in order to Assess Port Choice Determinants.

Paper	Commodity	Methodology	Sample	Results
Malchow and Kanafani, (2001)	Baulk, fruit and vegetables, fabrics, manufactured good	Multinomial logit modeling	Shippers or carriers for each shipment leaving eight US pots in December 1999 (4.843 observations).	Oceanic and inland distance influence ports attractiveness (but further research deemed necessary)
Malchow and Kanafani, (2004)	Baulk, fruit and vegetables, fabrics, manufactured good	Multinomial logit modeling	Shippers or carriers for each shipment leaving eight US pots in December 1999 (4.843 observations).	Oceanic and inland distance had the greatest impact on carriers' distribution of shipments; other factors proved significant in the context of discretionary cargo; Choice behavior proved to vary significantly across carriers as well as across commodities
Nir et al. (2003)	Container	Multinomial logit modeling	Shippers located in Taiwan (309 observations).	Travel time and cost. If a shipper chooses the port once, then they will also use it for its next shipment
Tiwari et al. (2003)	Container	Discrete choice modeling	1033 shipments and covered shippers in nine provinces and six cities of China.	Shippers are largely influenced by: (a) their distance from a port; (b) distance to destination/from origin; (c) port congestion; and (d) shipping lines fleet size. Chinese shippers found to prefer the use of Chinese shipping lines whereas foreign shippers' choice is mainly based on their preferable port of import/export.

Popular among the methodologies used for assessing port choice criteria is the Analytical Hierarchy Process (AHP). The AHP is a flexible multicriteria decision-making methodology, introduced by Saaty (1977) and can be applied to any hierarchy of performance measures. In one of the most influential studies on port choice Lirn et al. (2004) combine the AHP with the Delphi technique. The results suggest that a transshipment container port's choice is based hierarchically on factors such as: the handling cost of containers, the proximity to main navigation routes, the proximity to import/export areas, the basic infrastructure condition and the existing feeder network. The AHP is also combined with fuzzy multiple criteria decision making (Lirn et al., 2003), factor analysis (Wong et al., 2008), used standalone (Ugboma et al., 2006) or even reversed in order to understand the conditions under which servicing two ports becomes a preferable alternative for shipping lines (Guy and Urli, 2006) (table 3.2.3). This group of studies has emerged in recent times and is explicitly or not, an acknowledgement of the need to look beyond productivity measures so as to conclude on port competitiveness. With the AHP studies using data derived from users, and not least, being subjective, the redirection of research establishes the importance of analyzing subjective perspectives.

Table 3.2.3. Studies Applying AHP in order to Assess Port Choice Determinants.

Paper	Commodity	Methodology	Sample	Results
Lirn et al. (2004)	Container (transshipment)	AHP with Delphi technique	Data collected from the top 20 global container carriers, the top 20 leading port authorities and the top three leading terminal operators	Handling cost of containers, proximity to main navigation routes, proximity to import/export areas, basic infrastructure condition and existing feeder network
Lirn et al. (2003)	Container (transshipment)	AHP with a fuzzy multiple criteria decision-making	Four major international container carriers in Taiwan	The most important port choice criteria found to be its geographical location. For sub-criterion that was carrier's loading/unloading cost.
Ugboma et al. (2006)	Container	AHP	Shippers using Nigerian ports (155 observations)	Efficiency, frequency of ship visits and adequate infrastructure while quick response to port users' needs turned out to be insignificant
Wong et al. (2008)	Container	AHP and Factor Analysis	Shippers from Pearl River Delta region (82 observations)	Total inland transit time and efficiency of the loading port (even if it is more costly)

The comparison of shipping lines stated and revealed preferences (Tongzon and Sawant, 2007) or triangulation (combining quantitative and qualitative) methodologies (Mangan et al., 2002) draw conclusions on port choice determinants. The results place emphasis on port costs and space availability. Other factors that were found to be important using data collected from shipping lines, exploratory and confirmatory analysis (Chang et al., 2008) are: local cargo volume, terminal handling charge, berth availability, port location, transshipment volume and feeder connection. Such studies contribute further to a shift or perhaps a parallel emphasis on perceived value.

3.2.4 Port competition

Another theme of great research interest and of importance to the port sector is the understanding of the trends, effects and the new forms of port competition. Research efforts try to provide answers to questions such as: 'who competes with whom?', 'how do ports compete today?', 'what influences port competition?'. They do so via the use and analysis of case studies that prove to provide useful conclusions on the entire sector.

Port competition is a rather puzzling expression; a fact leading Fleming and Baird (1999) to try to shed light by searching for its precise meanings. The scholars advocate that six competitive influences affect seaports: port tradition and organization, port accessibility by land and sea, state aid and their influence on port costs, port productivity, port selection preferences of carriers and shippers and the comparative locational advantage.

A theme gathering the scholars' interest is the identification of determinants that influence port competitiveness and the respective evaluation of the determinants. A wide range of methodologies has been used (including Anova, Duncan tests, AHP, Hierarchical Fuzzy Process (HFP), and factor analysis), and several criteria have been identified (table 3.2.4).

It should be noted, that beyond the theme and the research methodology (case-studies) these studies have more in common. Evaluations in these studies are based on externally generated data; that is, the port users' perspectives. The competitiveness of seaports is also assessed through the use of an extended version of Porter's diamond (Haezendonck et al., 2000; Acosta et al., 2007) so as to determine the ports' advantages and disadvantages. Internally generated data may also be used for assessing port competitiveness (Yap et al., 2006; Lam and Yap, 2008). Finally, there are also descriptive contributions that assess inter port competition largely based on case studies (Cullinane et al., 2004b; Cullinane et al., 2005b; Goulielmos and Pardali, 2002; Yap and Lam, 2006; Anderson et al., 2008).

Table 3.2.4. The Studies on the Port Competitiveness Criteria

Paper	Ports under analysis	Methodology	Criteria	Port ranked first
Ha (2003)	Fifteen world's major ports	ANOVA and Duncan tests	Ready information availability of port-related activities, port location, port turnaround time, facilities available, port management, port costs and customer convenience	Port of Singapore
Song and Yeo (2004)	China's ports (including Hong-Kong)	AHP	Cargo volume, port facility, port location, service level and port expenses	Hong-Kong
Yeo and Song (2006)	Container ports in Asia	Hierarchical Fuzzy Process	Geographical location, logistics and operational services. Results indicate that the number of liners calling at ports being the most important criterion followed by the throughput handled.	Singapore and Hong-Kong
Yeo et al. (2008)	North-east Asia	Factor analysis	Port service, hinterland condition, availability, convenience, logistics cost, regional centre and connectivity	-

3.3 THE USERS' PERSPECTIVES MEASUREMENT

The previous analysis illustrated that the need to include the users' perspectives in PPMs is progressively endorsed in academia (for a detailed analysis see: Pallis et al., 2010). Scholars highlight the need to go beyond efficiency and the port users' satisfaction is also included under different perspectives in a number of port studies.

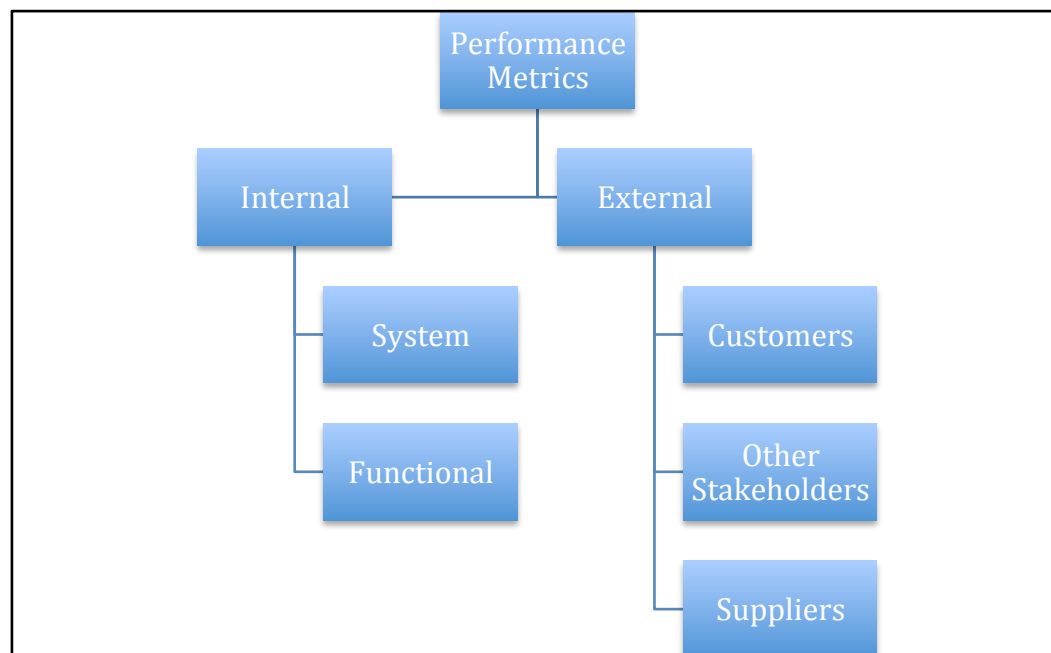
Port performance measurement may be decomposed into the two components of efficiency and effectiveness (Brooks and Pallis, 2008). In this vein user satisfaction is '*one of the critical performance indicators that must be measured in an effectiveness-focused organization*' (ibid, p. 417).

In port studies, the need to supplement efficiency measures with effectiveness ones was already noted in 1993 by Hayuth and Roll (1993) who consolidated port users' satisfaction as an output measure in the first ever DEA model applied in port studies. Park and De (2004) also considered the port customers' satisfaction as an output of their DEA analysis applied to seaports. Despite the fact that port studies using DEA are flourishing, no other efforts to include the measurement of port customer satisfaction are found. That is mainly due to two reasons. First, these studies remain focused on port efficiency and secondly, such measurements of the port users' satisfaction were considered as largely simplistic and were thus quickly abandoned.

The different types of port performance metrics may be decomposed into five broad components (Brooks, 2007). These components (figure 3.3.1) are the internal system (financial and non-financial)³³, internal functional (vessel-handling, cargo-handling, ancillary services, marketing), external customer (efficiency, effectiveness and satisfaction), external stakeholder (efficiency, effectiveness and satisfaction) and external supplier (efficiency, effectiveness and satisfaction). The need to link performance to objectives is also supported by the theory of the Matching Framework (Baltazar and Brooks, 2007). Nevertheless, practical applications of the proposed performance measurement approach have not been developed yet.

³³ In the parenthesis there are examples of metrics that can be used.

Figure 3.3.1. Types of Performance Metrics



Source: Brooks, 2007, p. 606

The thought of going beyond efficiency is suggested in order to move towards the development of lean ports (Paixao and Marlow, 2003). In such cases, there is a need to tie performance outcomes to customer requirements while emphasis should be placed on both the internal and the external integration of a port with other actors of the supply chain.

The adoption of comprehensive performance measurement tools for ports is relatively scarce, and found in only one academic study (Su et al., 2003) where the Balanced Scorecard³⁴ is applied. The factors and respective criteria to assess customers' perspectives include: carrier satisfaction (harbor infrastructure, harbor service, handling equipments, handling service, administrative service, information service and port charges), carrier retention (carrier retention) and new business acquisition (increase voyages and increase transit cargoes). The scholars did not provide a detailed reasoning for the process followed for the selection of these criteria. Furthermore, the factors used largely focus on the services related with stevedoring activities only, and thus capture mainly the

³⁴ Combined with AHP and fuzzy set theory

shipping lines' perspectives, and do not include other services provided within a port range, such as hinterland connections, warehousing etc.

Customer-oriented benchmarking is occasionally used for improving port competitiveness. Guardado et al. (2004) recognize the interaction of multiple organizations in the port community as a vital step towards this end, as the provision of port services is the result of the complex integration of multiple actors of this community. In port studies the analysis of interactions remains in short supply whereas the ways and scope of influence on service provision have yet to be researched. In the particular study for instance, the actors' relations are only measured on the level of activities, economic considerations and control powers, whereas the factors chosen refer specifically to the motives for choosing one port over another (ibid). Notably, the study concludes that the differences between ports in terms of quality³⁵ and cost of services provided can be explained by a combination of the factors: provision of infrastructures, co-ordination of logistics chains and adaptation of services to clients' demands.

For shippers, port related satisfaction is influenced by the level of port integration within supply chains. As a result, the supply chain management methodology can be employed in order to deal with the port service providers' behavior for the satisfaction of the customers' needs. Carbone and De Martino (2003) did so, concluding that the delivery of value is a major determinant of satisfaction.

The shippers' relationships with the other members of the supply chain and the level of integration among the actors also decisively influence the level of satisfaction. In this vein, the capability of a firm to create inter-organizational relationships is a crucial factor for strategic positioning (De Martino and Morvillo, 2008). *Value* is created by a joint effort of all the port actors to satisfy the needs of target customers. These innovative approaches, in terms of allocating value creation in ports, open the path for further research respecting the special characteristics of the sector.

³⁵ The quality of ports is the subject of detailed research by Chlomoudis et al. (2005) and Lambridis (2007)

The continuous and significant restructuring and rationalization in port-oriented container landside freight systems has enacted a recent rethinking of value and supply chains. By suggesting the notion of value migration and the analysis of case studies, Weston and Robinson (2008) argue that the emerging new value to be captured by chain players is that associated with the integration of chain functions. Panayides and Song (2009) also connect the integration of terminals in supply chains with higher performance and competitiveness.

Academic efforts to measure straightforward port users' satisfaction are provided by Ugboma et al. (2007; Nigerian ports) and Pantouvakis et al. (2008; Piraeus). The scholars apply SERVQUAL³⁶, that is a five dimensional (reliability, assurance, tangibles, empathy and responsiveness) instrument for measuring services quality introduced by Parasuraman et al. (1988). Ugboma et al. (2007) also develop a Customer Satisfaction Index and compare the port users' expectations and perceptions. The choice of measures is heavily based on literature review, resulting in four dimensions: core, relational, tangible, and an evaluation of the overall satisfaction. The study tends to confuse satisfaction and choice determinants as the majority of measures chosen are derived from studies that study the port users' choice characteristics. Furthermore, they collect data only from freight forwarders and shippers with other members of the port community being excluded. The study also, does not examine and adapt the applied methodology to the port's special characteristics. In general, SERVQUAL has been criticized for: (1) the potential inappropriateness of the five dimensions of choice criteria used by SERVQUAL (Cronin and Taylor, 1992; Carman, 1990) and (2) the inability of expectations to remain constant over time (Carman, 1990).

Ng (2006) on the other hand, assessed the attractiveness of ports in the north European container transshipment market using the port users' perspectives again. The significance of the factors affecting hub port attractiveness (that were identified from the existing literature) was under evaluation by major shipping lines. Port accessibility, time efficiency, delay and cost were found to be the most important factors in deciding the port's attractiveness.

³⁶ SERVQUAL is also used by Pantouvakis (2006) in order to explore the quality dimensions of a port in terms of service provision to passengers.

3.4 PPM IN PRACTICE

There are a few reviews providing evidence on the variables/measures that are collected and used by ports themselves (i.e. Port Authorities) in order to assess their performance. The most recent and notable study was published by scholars engaged in a joint port research³⁷ worldwide (Brooks and Cullinane, 2007a). This collective volume includes data collected during the period 2004-05 with 42 ports providing information on the performance measures they collect. The findings are summarized in table 3.4.1.

Table 3.4.1. Port Performance Measures - Collected by Ports³⁸

Performance Measure	Currently collect
Financial measures n=30	
Ancillary revenue as % of gross revenue	22
Average days accounts receivable	19
Capital expenditure as % of gross revenue	13
Debt: equity ratio	23
Growth in profit (before taxes)	25
Interest coverage ratio	21
Port-related profit as % of port related revenue	19
Return on capital employed	21
Terminal charges as a % of gross revenue	19
Yield % on shares, if publicly traded	10
Vessel Operations n=34	
Average turnaround time/per vessel (in hours)	24
Average vessel calls per week	29
Average waiting time at anchor	22
Hours of equipment downtime per month	14
Length of quay in meters (as capacity measure)	22
Revenue per tonne handled	19

³⁷ In the context of the Port Performance Research Network (PPRN)

Container Operations n=30	
20' TEU as % of total TEU for year	17
Average revenue per TEU	9
Average vessel turnaround time per 100 lifts (in hours)	4
Average yard dwell time in hours	10
Container port throughput (TEU/metre of quay/year)	18
Departure cut-off time (hours)	3
Growth in TEU throughput	19
Import containers as a percent of total containers	17
Lifts per crane per hour	12
Percent of containers grounded (ship to rail ops only)	5
Reliability (qualitative factor)	1
Transshipment (as % of total throughput)	9
Yard hectares to quay metres	5
Other measures n=34	
Customer complaints per month	15
Destinations served this year	21
Employee turnover rate	14
Employment (full-time equivalents) per tone handled	7
Employment (full-time equivalents) per TEU handled	5
Invoice accuracy percent	7
Number of customers served	18
Overall customer satisfaction	15
Stakeholder satisfaction	7

Source: Brooks, 2007, p.620

Note: 38 out of the 42 ports sampled chose to answer the question on the measures collected and who they reported to, and of these, 34 collect performance metrics, hence n = 34. Of the 35 ports reporting container operations, 31 chose to answer the question on measures collected and 30 collect performance metrics, hence n = 30 for these measures.

The findings suggest that extra emphasis is placed on the efficiency and financial data. Along with the financial measures, which receive an increasing attention (not least because of the trend of port corporatization), ports put major emphasis on the vessel operations' metrics as well. Adding the extent to which container operations measures are collected, it seems that ports are mostly interested in collecting data regarding their productivity, or even the terminal operators' productivity. That further supports the argument that, the evaluation

of effectiveness and the users' perspectives is rather neglected in port performance.

The empirical study of Wang (2007) also supports that terminal operators mainly focus on the efficiency and financial measures. Ten out of the 18 large European container terminals that were under study, measure performance in order to improve the efficiency and productivity of the terminal operations. The remaining operators aim to monitor capital investment decisions (8), to monitor cost levels (1) and only a single terminal operator to improve customer satisfaction.

The only measures that could be identified as fitting into the 'externally generated' data category, are the following: the customers' complaints per month; the invoice accuracy percentage; the overall customer satisfaction; the stakeholders' satisfaction; the reliability. Still, the percentage of ports that collects them is relatively small, especially when compared to the frequency of the collection of other measures. Noteworthy, whenever several of these ports were asked to report in details on the way they collect these measures, this capacity was limited and reporting was vague indeed (see: Brooks and Pallis, 2008).

Moreover, the results of the same study clearly show that comprehensive performance measurement programs are limited. Environmental management systems and quality management systems are the most widely used techniques employed by ports, as shown in table 3.4.2. The study concludes that ports show that there is little governmental interest in non-financial performance and as a result, a weak external pressure on the port authorities to examine non-financial performance other than as a way of dealing with the customers or the stakeholders.

Table 3.4.2. Port Performance Measurement Programs in Use

Strategic intent	Economic (n=11)	Non-economic (n=19)	Mixed (n=11)
Activity based costing	18%	26%	27%
Balanced scorecard	18%	21%	9%
Best practice benchmarking	18%	26%	27%
Business process re-engineering	9%	11%	9%
Environmental management systems (e.g. ISO 14000)	36%	42%	55%
Quality management systems (e.g. ISO 9000; BS5750 or similar)	36%	42%	73%
Total quality management (TQM)	9%	11%	18%
Other	0%	11%	0%

Source: Brooks and Pallis, 2008, p.423

Notes: Economic strategic intent: Ports having as only goal either to maximize profits for the shareholders or maximize return on investment for the government

Non-economic strategic intent: the ports' only goal is to maximize traffic throughput or maximize throughput subject to a maximum allowable operating deficit or optimize local economic development prospects.

Mixed: A combination of the above goals or any other non-economic goal.

In another empirical study on ports conducted in three different continents (America, Europe, Oceania), De Langen et al. (2006) conclude that throughput volume, port-related employment, and value-added, are the most widely used performance indicators in the port industry. The case of the major European port, i.e. Rotterdam, which is summarised in table 3.4.3 is illustrative. However, the scholars argue that these three indicators provide at best a partial measure of the performance and importance of a port and advocate that due to the ongoing transformation of ports and the relevant port cluster, new port performance indicators need to be developed. Such new indicators should not only satisfy the port's need for insight on port performance, but should also be

“relevant to several other stakeholders with socio-economic interests in a port” (ibid, p. 3).

Table 3.4.3. Port Performance Indicators in the port of Rotterdam

Year - period	Indicators
Beginning 20th century	Number of ships Throughput volume
1990s	Port related employment Value added Port value added as % of regional GDP
2002	Development in turnover Profitability of firms in the port
2003	Investment level of private firms in the port area
2004	Establishments of (new) companies in the port area

Source: De Langen et al., 2006, p. 4.

3.4.1 The users’ perspectives measurement in practice.

The inclusion of the port users’ perspectives in port performance measurement systems is a recent and seemingly emerging trend. In February 2008 the Global Logistics Institute (2008) and the Germanischer Lloyd Certification Agency launched the “Container Terminal Quality Indicator” (CTQI), a benchmarking system that aims to measure the terminal performance within the supply chain process from both the efficiency and the effectiveness perspectives and facilitate the satisfaction of customers and other stakeholders. It uses key performance indicators that evaluate and fall within three categories: (a) the generic indicators, (b) the operational effectiveness and efficiency and, (c) the service quality to users. The last category deals with customers and includes measures such as the ship service quality index, the road vehicle service quality index, the train service quality index, the barge waiting time, and the barge service quality

index. Despite the fact that its unit of analysis is the container terminal and not the port as a whole, it places extra emphasis on the hinterland connections³⁹.

Anecdotal evidence, and the author's discussions with PA representatives result in knowledge of the presence of port authorities and port service providers' user satisfaction measurements. Unfortunately, with the results (even the existence of the exercises) not freely published, disclosing this information is not possible. One of the few examples that some information on those measurements is freely available, is that of the port of Bilbao (EASC Committee, 2008). The port authority uses the Balance Scorecard in order to measure its performance. It employs strategic objectives indicators on four perspectives: economical, customers, processes and resources. Indicators assessing the customers' perspectives include *inter alia* a customer satisfaction degree regarding infrastructure, services and customers and inspection services. Still, no further information on the process of measurements and its constituents are currently available.

3.5 RESPONDING TO THE NEED FOR REDIRECTING PPM

The number of studies measuring port performance (either directly or indirectly) is flourishing and several methodologies and samples are used towards this end, as already presented. Still, several deficiencies and knowledge gaps seeking further research may be found.

3.5.1 Port efficiency studies in retrospect

To recap, the literature of direct port performance measurement is largely focused on the assessment of the operations' productivity, in order to conclude

³⁹ Due to the fact that the CTQI is a commercial product, further details on its constitutes of various quality indices used are not disclosed.

on port efficiency. Data used are internally generated and restricted to handling and stevedoring services. On the other hand, contemporary ports offer a wide range of services (Chapter 2) that largely influence their overall performance and are greatly neglected by frontier approaches. The Port Authorities are also highly focused and interested in efficiency measures, along with the financial outputs.

Efficiency measurements provide information that is mainly of interest to the focal port, while competition is not taken into account. For example, a port that given its resources operates extremely efficiently does not necessarily enjoy a strong competitive position vis-à-vis its competitors. Competitor ports may operate on lower levels of efficiency but possess substantially more resources, thus enjoying a competitive advantage. Moreover, scholars (Cochrane, 2008) suggest that port throughput (regularly used as an output in DEA or TFP measurements) is not only influenced by efficiency but by exogenous factors as well that are systematically neglected.

3.5.2 Port choice and competition studies in retrospect

Externally generated information is mainly used in order to assess the port users' choice criteria. These studies are focused on the determinants that influence the shipping lines or the shippers' port choice and thus indirectly assess port performance. The fact that a port may score higher on a number of choice determinants does not necessarily imply that it performs overall better than another one. Port choice studies are also concentrated either on the ocean part or the inland part of a port and rarely combine both.

Following Malchow and Kanafani's (2004) conclusions, that choice behavior proved to vary significantly across carriers as well as commodities, Chang et al. (2008) also suggest that differences exist in perceptions between the main trunk and feeder service lines. These results imply the need for developing more actor-based research where users will not be considered homogenous but their differences will be at the center of interest.

On the other hand, the choice of a destination port is imbedded in a complicated business process, which is much broader than the pure transportation decisions' scope (Garrido and Leva, 2004). The choice of the destination port and carrier is highly influenced not only by spatial (including aspects like accessibility, land use, infrastructure availability and other external features of the port surroundings) but by temporal effects as well, such as the presence of business habits, long term investments and specialization issues. No other studies are found to build on these most interesting results. Finally, Magala and Simmons (2008) call for a new framework in terms of the port choice decisions and stand critical of the fact that the port's embodiment in supply chains is not taken into account. They suggest that there is a need for a new approach of modeling port choice that acknowledges a port as an element of a chain system.

The port users' perspectives are also used in order to assess the port's competitiveness. These efforts are mainly concentrated on the ocean part of port operations and neglect the inland transportation part. Furthermore, their outcomes mainly generate knowledge on how port competition unfolds between seaports and assess port performance indirectly.

Port choice and competition studies that assess the users' perspectives do not endorse an effectiveness or satisfaction orientation. These studies are focused on efficiency or general port characteristics such as location and port management. As such, they do not provide information on the users' perspectives on the port service characteristics that they consider vital for increasing either their satisfaction or their perceived value. It is worth noting that people frequently tend to confuse choice determinants with satisfaction or value. On the contrary, the link between satisfaction and future choice is not proven; in the marketing literature, choices are often a product of other reasons (Brooks and Pallis, 2008). However, all else equal, choices tend to favor the party with whom one has a satisfactory relationship (ibid). Choice determinants provide information on the port users' decisions on selecting a specific port of use, while value or satisfaction determinants probe their views about the services they enjoy. For example, Lirn et al. (2003) found out that a port's geographical position is a

major determinant in choosing a specific port. At the same time though, the geographical position does not ensure itself the increase of their perceived value.

3.5.3 The port users' perspectives measurements in retrospect

Summarizing this literature review, a number of studies stress the need to assess the port users' perspectives but do not aim to develop tools or provide effective methodologies that would make such measurements possible. While they hint or openly suggest and recommend that port research needs to go towards an assessment of the port users' perspectives, the application of the latter remains desirable. The high levels of complexity and extended changes that have altered the traditional port operations and management (Chapter 2) make this task more demanding. Also, effectiveness is measured in relation to the objectives being sought, with the great variance of objectives and characteristics between ports increasing the level of difficulty of such efforts. The theoretical demands for assessing the port users' perspectives go hand-in-hand with the recent development on a practical level. Initiatives such as the CTQI and Bilbao's performance measurement are moving towards this need.

3.5.4 The need to assess externally generated information

Briefly restating, the assessment of the port users' perspectives for measuring port performance (either directly or indirectly) is used substantially fewer times than the assessment of internally generated information. It remains questionable whether, those efforts can be considered as a complete port performance assessment as they largely focus on efficiency and productivity measurements, neglecting effectiveness and other components of performance. On the other hand, efforts to measure port effectiveness are scarce and with limited applications. In this vein, the application of comprehensive performance measurements in ports also remains largely underdeveloped.

The analysis provided in the present chapter concludes that port performance measurements are largely focused on efficiency and financial components and

largely neglect (or partially assess) effectiveness. In this context, and with performance being a broad concept that covers almost any objective of operational management and competitive excellence of a firm and its activities (Bichou, 2007), the addition of further performance indicators, other than simply operational ones, has been a key suggestion in recent port research (i.e. Heaver, 2006; Pallis and Syriopoulos, 2007; Talley, 2007). The number of port studies moving towards this end has substantially increased during the last years. Yet, the development and practical application of these efforts remain inconclusive.

Therefore, the need to generate knowledge on measuring effectiveness by assessing externally generated information and developing accordant tools and methodologies is highly anticipated.

3.5.5 Port performance: a multidimensional construct

The majority of port performance measurement studies focuses on the specific dimensions of a given port. Given the extended changes of the contemporary port environment (Chapter 2), port performance is not a one-dimensional feature of the cargo handling productivity and the services provided by the terminal operator(s). Rather than this, it is a multidimensional feature that incorporates the sum of services (such as logistics, warehousing, information availability etc.) offered by a number of different entities (port authority, terminal operator, freight forwarders etc.) within a port's limits. Therefore, the disintegration of port related services may lead to partial assessments. In both the scholar and the industry's efforts to measure port performance, the contemporary trends that shape the new environment of a port's operations are largely neglected. The performance of the port as a cluster of economic activities (De Langen and Visser, 2005) is on several occasions ignored. Port users (whether shipping lines, freight forwarders etc.) are not solely interested in specific services but generate a more general view of the whole port. Nevertheless, as port services follow a chain approach, one service affects the other and so on. Therefore, the contemporary port performance measurement

methods have to capture and acknowledge this multidimensionality of port services.

3.6 SUMMARY

The present chapter analyzed the port research community and detailed the efforts to measure port performance on an academic and practical level. The analysis establishes that contemporary port performance measurements mostly focus on efficiency and financial outcomes and neglect the port users' perspectives. The need to include the port users' perspectives in performance measurements is progressively endorsed in academia. Yet, research efforts remain inconclusive and further research is desirable. Efficiency, port choice, and competitiveness, measurements tend to focus on specific components of performance only. A holistic approach incorporating the new operational patterns and services offered within a port is absent. Port performance is found to be a multidimensional feature but largely treated as one-dimensional construct in port studies. Given these deficiencies, the need to redesign port performance measurements is highly anticipated. Moving towards that end, the thesis generates knowledge on a methodology for assessing the port users' perspectives.

In order to develop empirical research and form a multidimensional construct for assessing port performance, the following chapter brings in the analysis of Business Performance Measurement practices. It also discusses in detail and provides information on the concept of perceived value on which the empirical research of the present thesis is based.

CHAPTER 4. MEASUREMENT OF PORT PERFORMANCE BASED ON VALUE ASSESSMENT

4.1 INTRODUCTION

Contemporary trends and changes create new challenges and opportunities for port development and imply that the need for PPM is more substantial than ever in order to reveal performance the gaps and ultimately drive efforts for improvement (Chapter 2). Chapter 3 illustrates that PPM, both on the academic and the industrial level, remain partial and one-dimensional. Responding to a recent acknowledgement for the need of multidimensional PPM constructs, it remains questionable how and if they could be applied to ports.

Scientific advancements in the field of business performance measurement signify the need to develop “balanced” performance measurement practices that incorporate *inter alia* the users’ perspectives. Chapter 4 begins with a review of Business Performance Measurement (BPM) systems and the relevant literature, discussing their components and characteristics. The importance of adopting balanced BPMs is underlined. In quest for a way to assess the port users’ perspectives, the notions of the users’ satisfaction and value are analyzed in detail. The discussion ends with emphasis on the ‘*perceived value*’. Thus, the reasons for choosing the measurement of the perceived value for assessing the port users’ perspectives in the present study are presented. The last section provides a literature review of the critical aspects for measuring the port users’ value.

4.2 BUSINESS PERFORMANCE: A BALANCED APPROACH

Performance is the result of the activities, the strategic choices, the allocation of resources, and ultimately the operations, deployed by an organisation over a given period of time. It is an integral component of how businesses do know about the way they offer their service/products, and of understanding how they can act to survive. In order to survive and succeed, firms need to set strategic directions, establish goals, execute decisions and monitor their state and behaviour as they move towards their goal. Following Bititci et al. (2002), businesses tend to measure performance in order to monitor and control; drive improvement; maximise the effectiveness of the improvement effort; achieve alignment with organisational goals and objectives; and reward and discipline users/customers.

In today's markets, which are characterized by intense competition, it is commonly anticipated (e.g. Kellen, 2003) that any business that wishes to remain effective has to develop and regularly (re)assess performance measurement systems. *Business Performance Measurement* (BPM) systems fall in that category. BPM helps monitor and control specific activities; predict future internal and external states; monitor state and behaviour relative to its goals; make decisions within needed time frames; and alter the firm's overall orientation and/or behaviour (ibid). A BPM may also be used for *benchmarking*. Benchmarking is the measurement of a company's performance in comparison to the best ones, determining how those companies achieve superior performance and using that information as the basis to decide on and implement objectives and strategies (Bemowski, 1991). The port sector is no exception to the above needs (Chapter 2).

Continuous improvement involves a dynamic process which is not restricted to making plans and doing, but calls for monitoring the outcomes of any effort. The results of this monitoring are then analysed, in order to adjust through re-acting. The widely acknowledged *Deming wheel* (Deming, 1982), a framework for

improving quality and performance, describes a four-step process: *Plan, Do, Check, Act*. Checking or measuring becomes a decisive process for improving a business - in our case the port's - performance and quality. The need and difficulty of measuring port performance becomes even more important due to the complexity of the emerging new environment. That might be a core explanation behind the observed (as demonstrated in Chapter 3) underdevelopment of holistic Port Performance Measurement (PPM) approaches that would be in line with BMPs.

4.3 BUSINESS PERFORMANCE MEASUREMENT (BPM)

Business Performance Measurement systems are multidisciplinary. Scholars working within a variety of different scientific fields such as strategy management, operation management, human resources, organizational behaviour, information systems, marketing and management accounting and control (c.f. Neely, 1999; 2002; Marr and Schiuma, 2003; Franco-Santos and Bourne, 2005) study issues of BPM systems. The number of researchers from diverse areas that contribute to the field is so extensive that results in the lack of a cohesive body of knowledge (Marr and Schiuma, 2003).

4.3.1 The Definition of the BPM

These different approaches have led to numerous definitions of a BPM system and the limited consensus regarding its main components and characteristics (c.f. Dumond, 1994). The most widely used definition (as concluded by a citation analysis of relevant papers conducted by: Franco-Santos et al., 2007) is given by Neely et al. (1995) who suggest that a performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions.

This set of metrics can be examined on three different levels (ibid);

- *Individual performance measures.* These can be analysed by asking questions such as: What performance measures are used? What are they used for? How much do they cost? and, What benefits do they provide?
- *the performance measurement system as an entity,* by exploring issues such as: Have all the appropriate elements (internal, external, financial, non-financial) been covered? Have measures that relate to the rate of improvement been introduced? Have measures that relate to both the long- and short-term objectives of the business been introduced? Have the measures been integrated, both vertically and horizontally? Do any of the measures conflict with one another?
- *the relationship between the performance measurement system and the environment in which it operates.* This relation can be analyzed by assessing: whether the measures reinforce the firm's strategies; whether the measures match the organization's culture; whether the measures are consistent with the existing recognition and reward structure; whether some measures focus on customer satisfaction; and, whether some measures focus on what the competition is doing.

Diversity and lack of consensus surrounding BPM's means that each author (Lynch and Gross, 1991; Bitici et al., 1997; Otley, 1999; Bourne et al., 2003; Ittner et al., 2003) defines and consequently uses the concept based on a perspective resulting from the specific scientific field he specialises in. That leads to the emergence of various approaches and in many cases distinctive characteristics of BPMs, corresponding to distinctive scientific fields.

Even though different characteristics derive from the endorsed definition, there are core elements that have to be included and sufficient conditions that need to exist in order to construct a BPM system and the main characteristics that have to be associated with it. According to Franco-Santos et al. (2007) the elements that have to be included in a definition are:

- a) The features of a BPM system - with the only two necessary features being the performance measures and the supporting infrastructure, while the

(strategic) goals remain problematic as they concern their necessity or sufficiency;

- b) The roles of the BPM systems - with the only necessary role being the measure of performance; and
- c) The processes of the BPM systems – with the necessary processes being information provision, measure design, and selection and data capture.

A performance measurement system definition does not exist for ports. However, the guidelines already provided stand as a framework towards this end, making it possible to define and establish a Port Performance Measurement (PPM) system – in line with the BPM systems⁴⁰. Evidently, such a performance measurement system will not be restricted only to measuring the (internal) efficiency, but will give extra attention to the users' perspectives of a port or a port system.

4.3.2 The balanced approach

During the last decades, scholars have expressed a general dissatisfaction with traditional backward looking accounting based performance measurement systems that have been based on financial evaluations. Critics suggest that they encourage short-termism (Banks and Wheelwright, 1979; Hayes and Garvin, 1982); lack a strategic focus and do not provide useful information on quality, responsiveness and flexibility to the demands of users/consumers (Skinner, 1974); encourage local optimization, without taking into account the broader view (Fry and Cox 1989; Goldratt and Cox, 1986); do not encourage managers to improve continually but rather to minimise the variances from the standard (Johnson and Kaplan, 1987; Lynch and Cross, 1991; Schmenner, 1988; Turney and Anderson, 1989); and do not assess the customers' needs and the competitors' performance (Camp, 1989; Kaplan and Norton, 1992). Financial measures are also criticized for being historically focused (Dixon et al., 1990) and not predicting future trends and outcomes.

⁴⁰ Guidelines for the development of BPM systems are also provided by: Van Aken and Coleman, 2002; Maskell, 1989; Kellen, 2003

Two out of five reasons that produce dissatisfaction are centred on customers (either quality, or 'what' customers want). In the era of post-fordism, and just-in-time production and distribution processes, many sectors face an increased competition and, thus, seek to differentiate from their competitors in terms of quality of services, flexibility, customization, innovation and rapid response (cf. Jessop, 1992; Amin, 1994; for an application in the port sector see: Chlomoudis et al., 2003). Therefore, they need information on how well they perform across these dimensions.

This information may be acquired by external measures, namely the customers/users of the firm. Besides, most businesses are now competing on the basis of value rather than price. They should ensure that value is delivered to customers, or at least is 'assessed' as delivered by the users/customers. Knowledge on whether this target is achieved is deeply related to the collection and integrated use of externally generated information.

This dissatisfaction from the status quo has led to the development and implementation of new performance measurement frameworks. These are either characterised as 'balanced' or 'multi-dimensional', because they place emphasis on non-financial, external, and future looking measures. A number of such frameworks has been developed (for example: the results and determinants framework; the SMART pyramid – see: Kennerly and Neely, 2002). The balanced scorecard (Kaplan and Norton, 1992) and the performance prism (Kennerly and Neely, 2000) are the most notable and extensively used ones, according to a citation analysis by Marr and Schiuma (2003). BPM is also used as a tool to balance five major tensions within a firm (Simmons, 2000): 1) balancing profit, growth and control; 2) balancing short term results against long-term capabilities and growth opportunities; 3) balancing performance expectations of different constituencies; 4) balancing opportunities and attention; and 5) balancing the motives of human behaviour.

The *balanced scorecard* uses a set of measures that gives top managers a fast but comprehensive view of the business they run. It complements the financial perspective with internal business, innovation and learning, and customer perspectives. The core measures of customer perspectives are market share,

customer acquisition, retention, satisfaction and profitability (Kaplan and Norton, 1992).

The *performance prism* framework consists of five interrelated facets having a different focus. The first facet is stakeholders' satisfaction which focuses on the question "who are the stakeholders and what they need". The second facet concentrates on strategies. Its starting point of analysis is the question "what are the strategies required to ensure the wants and needs of the stakeholders being satisfied". The third facet, the processes facet, asks about the processes that have to be put in place in order to allow specific strategies to be delivered. The fourth facet, namely the capabilities facet, is associated with the capabilities required to operate the processes. The fifth facet is the stakeholder contribution facet, which recognises the fact that not only do organisations have to deliver value to their stakeholders, but also that organisations enter into a relationship with their stakeholders which should involve their contribution to the organisation and its performance (Neely et al., 2001).

Both frameworks explicitly recognise the importance of customers' perspectives in the performance measurement of a specific firm. The performance prism explicitly underlines the importance of the customers' satisfaction. However, the balance scorecard framework probes the customers' satisfaction only as a component of the overall customer perceptives, supplemented with loyalty, acquisition, retention and profitability. At the same time, an adequate users' satisfaction assessment may include and reveal the important elements of the remaining components (Hill and Alexander, 2006). A complete and rigorous users' satisfaction assessment is essential for assessing the overall customers' perspective.

According to the marketing perspective (Kotler, 1984), organizations achieve their goals, that is they perform, when satisfying their customers with greater efficiency and effectiveness than their competitors. The terms efficiency and effectiveness are used precisely in this context. Effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilized when providing a given level of customer satisfaction. This is important because it identifies two fundamental

dimensions of performance, but also highlights the fact that there can be internal as well as external reasons for pursuing specific courses of action (Neely et al., 2005). Both these components have to be taken into account when balanced Port Performance Measurement systems are designed, and be combined with the use of internally as well as externally generated information; a concept that recently has been shared by some port studies (see section 3.3).

The use of both internally and externally generated information, in order to develop metrics (or performance indicators) contributes to comprehensive performance measurement approaches, by enabling ports to capture and measure more than one performance components. Performance indicators (or measures or metrics) are distinguished into these two distinctive categories, with each one having a different use. A Performance Indicator (PI) is defined as “a variable indicating the effectiveness and/or the efficiency of a part or the whole of the process or system against a given norm/target or plan” (Fortuin, 1988, p. 2). *External PIs* provide information on the way a customer/user judges his supplier. *Internal PIs* refer to the efficient usage of internal resources. When rightly organised, the collection and analysis of internally generated PIs provide information regarding the efficient usage of resources. Yet this process cannot be seen as overall performance measurement. That is because it neglects the users’ perspectives on the quality and the adequacy of the services they use and consume, as well as their overall satisfaction. *Internal* and *External* PIs are interdependent as poor internal performance is likely to cause a poor external performance. That having been said, the reverse might not be true in all cases (ibid).

The collection of externally generated information and the access of the users’ opinions on any business is important even when it is not incorporated into a BPM system. As Neely (1999, p. 219) notes “Most businesses are now competing in an environment where value, not price, is the key driver. Given these circumstances, then ensuring that value is delivered to customers becomes key, which is one of the main reasons why the use of customer opinion surveys has become so widespread”. Understanding the way a user judges and values a

service or a product is vital for achieving a competitive advantage (Graf and Maas, 2008).

Users make choices based on their perceptions. In turn, these choices determine to a great extent the market share of a port. The indicator 'quay length' that is frequently examined by both scholars (cf. Cullinane et al., 2004a; 2005; also section 3.2.2) and ports (Port of Rotterdam, 2008) provides an illustrative example. Its performance may be regarded as exceptional from a port's perspective, but at the same time it does not provide any information on its impact on the shipping companies, carriers or freight forwarders' (all of them deemed port users) strategies. There is no clear indication on whether that variable determines the amount of money these market actors are about to spend in order to use a specific bundle of port services and infrastructures, at what price these indicators denote that specific (or *all*) users would find the port satisfactory and/or exceptional, or even whether users might be careless about it or not. In other words, the use of internal PIs only does not provide information on how customers feel about the service offered, what they want from a business they are associated with and the level of effectiveness that service providers achieve. That partial assessment of performance may lead to misallocation of resources and wrong strategic and management choices.

4.3.3 The implications for (balanced) Port Performance Measurement (PPM) systems

Ports largely lack in the development and/or application of (comprehensive) balanced performance measurements (Chapter 3). The present thesis moves towards this end and contributes to the inclusion of the port users' perspectives in comprehensive PPMs. It develops and applies *inter alia* a valuable tool for measuring the port users' perceived value with the latter having a significant impact on satisfaction. It fulfills the anticipated gap of assessing the port users' perspectives and thus, makes the development of balanced PPMs possible.

In a balanced PPM, apart from the financial and efficiency measures, the customers' perspectives have to be taken into account and frequently be

supplemented with additional components, given the needs of the framework chosen. For ports, financial and efficiency measures flourish with the latter also being the subject of numerous academic efforts (section 3.2.2). On the contrary, the port users' perspectives are largely excluded or efforts remain inconclusive (section 3.3), thus being the missing link towards a balanced performance assessment.

The general characteristics that according to the researcher should be endorsed in an effort to assess the port users' perspectives, are derived from contemporary trends on port industry analyzed in Chapter 2. Extra emphasis should be placed to the port's industry contemporary characteristics, especially in the light of the extensive changes being witnessed lately. The port's embedment into supply chains must be acknowledged as well as the regionalization phase of their expansion. Also, the fact that they are now operating under post-Fordism production systems with economies of scale, being at the center of interest. Extensive vertical and horizontal integration strategies leading to increased rates of concentration should not be underestimated. Moreover, the changes on the port stakeholders' relations, the new role of the port authority and the importance of information technology are all characteristics that shape today's industry and should be considered when developing such a tool.

The methodology developed and applied in the context of the present thesis is in accordance with those characteristics. Its aim is to generate knowledge on the port users-service providers' perceived value not on a terminal but on a port level. That means taking in consideration all the members of the port community that are actively involved in container transportation, as well as the ports' structural characteristics. With contemporary ports being considered as clusters of economic activity (De Langen, 2004), interrelations between its members are close and frequent. Segregating actors and examining them as units, is thus misleading.

The need to adopt a balanced approach to performance measurement has already been anticipated in supply chains (that present multiple commonalities with ports) (cf. Gunasekaran et al., 2001). Moreover, Lee and Billington (1992)

suggest that for effective performance measurement, supply chain metrics must be linked to customer satisfaction.

4.4 THE PORT USERS' PERSPECTIVES: AN EXTENDED APPROACH.

Section 4.3 demonstrated that the measurement of the port users' perspectives is the "missing link" for the development of a balanced PPM system. Section 3.3 concluded that there is a lack of an applied methodology towards this end.

Ports are placed in a supply chain perspective with users referring to choices and satisfaction within this perspective. As a shipper executive officer states (interview conducted for the present study; see forthcoming sections):

"A port is always standing within a network where the inland part is as important as the sea part (of transportation). We always look into the whole supply chain".

This matches the academic perspective of ports as elements of value driven supply chains (Robinson, 2002). Yet, considering them as any other link of chain would be rather misleading. The added value that port activities (are perceived to) offer to the total transportation path, and the fact that those using maritime related supply chains cannot substitute or by-pass them, contribute to the influence and control they exert on the supply chain.

The empirical part of the study looks into any specific port as a system of functionally and spatially interacting regionalized units (Notteboom and Rodrigue, 2005) that are embedded in supply chains (Robinson, 2002), rather than focusing on individual terminals, warehouses, rail, trucks etc only. After all, the supply chain interactions are a *fractal*⁴¹ of which port interactions (studied in this thesis) stand as a part of. Precisely, as the broader chains, ports consist of

⁴¹ A rough or fragmented geometric shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole (Mandelbrot, 1982)

multiple layers of involved entities, with each one pursuing its own goals and strategies, in many instances unconcerned about the level of satisfaction that the port, or the supply chain, offers as a whole. These entities are frequently both competitors and co-operating partners, or both users and suppliers involved in a complex internal relationship (Lamming, 2002). The shifting interest to strategies targeting the control of larger parts of transportation paths (i.e., integration, consolidation, cooperation, coordination etc.), creates wider business portfolios that blur the classification of pairs of market players as competitors or partners. The particulars and the changes in port specific and immediately related activities (i.e. the part) have direct effects on the supply chain in which they are nested (i.e. the whole) and *vice versa*.⁴² The detailed port-specific analysis of interactions and of the derived users' satisfaction should not imply a "black box" logic but an attempt to reach conclusions on the part, while understanding better the fracture. Ports are no longer mere pawns of the game (Slack, 1993) or another common link in a value chain. They are the centre of a constellation of services, goods and modal splits. All these support this exceptionalism and justify a detailed port-specific analysis.

4.4.1 Definitional issues

From the outset, it is crucial to address two crucial terms that set the boundaries of this research (a) what is a port and which are its limits and (b) who are the port users and the port service providers. The definition of a port and its spatial and functional limits is an issue that has always been controversial⁴³.

As ports expand geographically and operationally, and governance models vary, this difficulty increases. For example, the structures of a service-port are different from those of a landlord one. With the aim of this study being to develop a systematic tool for any port through which cargo is transported, the

⁴² Assessing, for example, the overall satisfaction a shipping company receives from any given port without considering the established network of the hinterland connections would lead to an incomplete picture and inaccurate conclusions.

⁴³ These difficulties, for example, have extensively been observed in the process of developing a European Port Policy. In fact, the failure to define "what is a port" has contributed to delays in the relevant decision-making (see: Chlomoudis and Pallis, 2002).

definition endorsed is that *the limits of a port extend wherever a port authority, or a third party develops a port related commercial activity or an operational one, that is associated with the transportation of freight.*

All the plants that the Port Authority or a third party owns and leases and all the services that are offered to other parties and are directly associated with the transportation of freight, are under this definition. When the spatial and functional expansion of a port (coined by Notteboom and Rodrigue (2005) as 'port regionalization') results in the development of an inland terminal (either by a PA or a third party) far away from the 'traditional' port area, this terminal is considered part of the relevant port system. On the other hand, when the Port Authority leases a building to a company that has nothing to do with the transportation of freight, the resulting economic and operational activities are not considered as part of the present analysis.

In this context, a *'port user'* is any entity that uses (consumes) services associated with the transportation of freights within the port. Accordingly, a port service provider is any entity that offers service(s) within a port and is associated via the port with the transportation of freights. For example, a terminal operator that leases a part of the port area and offers handling services is regarded as a service provider, whereas a freight forwarder that receives the freight from the terminal operator and transfers it towards hinterland destinations is regarded as a port user. This distinction between port users and service providers is not always clear-cut, as there are entities that act in both capacities. The most obvious example is that of the terminal operators who might also be seen as port users, as they lease a port area for delivering their services. Studies usually consider the terminal operators and the port authority as service providers, thus leading to constraint views and conclusions. The port is structured as a chain of activities, with each member being a ring and acting as a service provider at the one end and the service user at the other end.

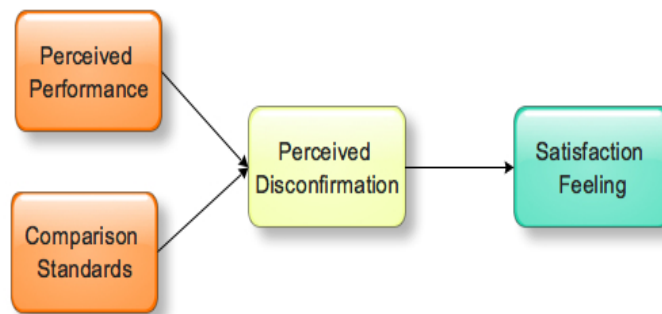
4.5 THE USERS' PERSPECTIVES: GOING BEYOND SATISFACTION

In the last two decades, the users/customers' satisfaction (hereafter referred to as 'user satisfaction') measurements have been a popular way to access user perceptions. This is because they facilitate business to understand their users' views on the services offered and hereupon take accordant actions, when differences in perceptions of importance and performance do exist between a company's management team (even within it) and the users of their services (even between them). After all, in many cases it has been proven that managers do not really know what service their customers require (Marr, 1980).

Oliver (1997, p.13) defines satisfaction as "the consumer's fulfilment response. It is a judgment that a product or a service feature, or the product of service itself, provided (or is providing) a pleasurable level of consumption-related fulfilment, including levels of under- or over- fulfilment". According to the definition, the focus is on consumers rather than on customers. Thus, in satisfaction constructs the experience or use of a product or service is required. Satisfaction is a feeling and has thresholds on both a lower level and an upper level.

Satisfaction is mainly influenced by the disconfirmation paradigm (Parasuraman et al., 1988) where the feeling of satisfaction is a result of a comparison process between perceived performance and on or more comparison standard, such as expectations (figure 4.5.1). Pre-consumption expectations are used in comparison to post-consumption experiences of a product/service so as to form an attitude of satisfaction or dissatisfaction.

Figure 4.5.1. The Disconfirmation Paradigm in Satisfaction Measurements



In satisfaction measurements, the perceived performance often differs from objective or technical performance, especially when a product/service is complex, intangible and when the consumer is unfamiliar with it. Moreover, the satisfaction feeling is a state of mind, an opinion.

Satisfaction encourages better performance, which in turn leads to higher satisfaction. Satisfaction is also positively correlated with cooperation and inversely correlated with conflict (Michle and Sibley, 1985). Achieving the higher users' satisfaction has been associated with greater loyalty, reduction of transaction costs, decreased price elasticities, minimization of the users' defection when quality falters, and cost lowering for attracting new users (Anderson and Fornell, 2000). On the other hand, dis-satisfaction may lead to a negative behavior such as switching to another supplier, reducing the percentage of purchases allocated to a supplier and producing a negative word of mouth (Woodruff and Flint, 2003).

The satisfaction's advantages remain important for every business despite its critics. Gale (1994), for instance argues that traditional customer satisfaction models rate a company's performance as perceived by the existing customers but do not integrate potential customers, non-customers or competition in the set of analysis. Critics also underline that the customer's/user's perception of price or costs should be specifically taken into account and that customer satisfaction is limited to a tactical level, providing simple product improvement and a correction of defects and errors of existing products and services (Eggert and Ulanga, 2002).

However, satisfying the customers' needs, or creating a satisfied customer, is no longer enough to win their loyalty. Rather than that, it is the offering of better value that generates the competitive advantage of a firm in industrial markets. To create this better value, managers must fully integrate their resources and use their core capabilities in order to deliver a product or service that fully satisfies their client's needs at a competitive price; which means, creating superior value for the customer (Kothandaraman and Wilson, 2001). The delivery of customer value (Woodruff, 1997) requires the extensive learning of the focal market and the target customers and also translating the customers' learning to superior performance.

4.5.1 A need for redirection: the emphasis on value

Relations developed in the port sector in essence fall within the business-to-business (B-2-B) framework. Precisely as the latter suggests (Hakansson, 1982; Turnbull et al., 1996; also: Ford, 1990), they are frequently long-term, close, involve complex patterns of interactions between and within each company and significant mutual adaptation by both parties. The great majority of business purchases do not exist as individual events, and hence cannot be fully understood if examined in isolation. In industrial markets, user satisfaction is not influenced by a single discrete transaction but also by the *relationships* developed between the two parties.

Grounded on the differences between industrial and consumer markets, Gross (1997) called for a replacement of the 'satisfaction construct' by the '*value construct*' as a better predictor of outcome variables. The emergence of relationalism shifts the emphasis from discrete transactions and short-term economic exchange to long-term interorganizational relationships (Tikkanen et al., 2000). Moreover, as purchasing managers buy for economic rather than for emotional reasons, customer perceived value should be a critical dimension in business marketing.

The answer to the following questions is at the cornerstone of value measurements: (1) what exactly do customers value, (2) of all the things

customers value on which ones should we focus so as to achieve advantage, (3) how well do customers think we deliver the value, and, (4) how will customer value change in the future (Woodruff, 1997).

Customer value has been shaped and influenced by research in many and often distinct fields, such as for example value chain, customer behaviour, quality etc. A number of definitions is found in the literature, with the most notable presented in table 4.5.1. In general, customer value models are divided into two categories: Perceived customer value and desired customer value, respectively.

Table 4.5.1. Definitions of Customer Value

Definitions of Customer Value	
Authors	Definitions
<i>Zeithaml et al., 1990</i>	The customer's overall assessment of the utility of a product on a perception of what is received and what is given.
<i>Woodruff and Gardial, 1993</i>	Ratio of perceived benefits relative to perceived sacrifice
<i>Anderson et al., 1993</i>	Perceived worth in monetary units of the set of economic, technical, service and social benefits received by a customer firm in exchange for the price paid for a product offering taking into consideration the available alternative suppliers' offering and price.
<i>Gale, 1994</i>	Customer value is market perceived quality adjusted for the relative price of your product. It is your customer's opinion of your products (or services) as compared to that of your competitors
<i>Holbrook, 1994</i>	Customer value is a relativistic (comparative, personal, situational) preference characterizing a subject's (user's) experience of interacting with some object (i.e. good, service, person, place, thing, event or idea)
<i>Flint et al., 1997</i>	The customers' assessment of the value that has been created for them by a supplier given the trade-offs between all relevant benefits and sacrifices in a specific-use situation.

Source: adapted from *Ulaga and Chacour, 2001; Graf and Maas, 2008*

Perceived customer value (PCV) is conceptualized as a trade-off between benefits and sacrifices (e.g. the total costs, both monetary and non-monetary) with an emphasis on concrete performance characteristics of the products/services (Zeitham, 1988; Gale, 1994). Customer sacrifices are the overall monetary and non-monetary costs the customer invests or gives to the supplier in order to complete a transaction or to maintain a relationship with a supplier (Lapierre, 2000). Perceived benefits are a combination of physical attributes, service attributes and technical support available in relation to the use of the product, as well as the purchase price and other indicators of perceived quality (Payne and Holt, 1999).

Desired customer value (DCV) is part of the customers' value system. It is defined as "a customer's perceived preference to and evaluation of those product attributes, attribute performances and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations" (Woodruff, 1997). Desired value seeks to explain what needs, desires and values customers seek to fulfil by using a product or service involving a higher level of abstraction. The means-end theory is the common used model applied in order to explain how an individual's choice of a product or service enables him to achieve his desired end states.

The two categories differ in their levels of abstraction and their focus, while they should not be confused with personal values that are deeply held and enduring beliefs of individuals (Rokeach, 1973) (table 4.5.2). Yet, they are not mutually exclusive. On the contrary, in many ways they overlap and several customer value approaches are a combination of both concepts (Graf and Maas, 2008). In the present study, perceived value considered as the result of a trade-off between benefits and sacrifices is under study.

Table 4.5.2. Different Forms of Values

Three forms of value			
	(Personal) Values	Desired Value	Perceived Value
Definition	Implicit beliefs that guide behavior	What customer wants to happen (benefits sought)	Assessment of what has happened (benefits and sacrifices)
Level of abstraction	Abstract, centrally held, desired end-states, higher-order goals	Less abstract, less centrally held, lower order goals, benefits sought to facilitate higher order goals achievement	Overall view of trade-offs between benefits and sacrifices actually received
Locus or source of value	Specific to customer (person or organizations)	Conceptualized interaction of customer, product/service and anticipated use situations	Interaction of customer, product/service and a specific use situation
Relationship to use	Independent of use situations	Independent of use specific experience	Dependent on specific use experience
Permanence	Enduring	Moderately enduring	Transient over occasions

Source: Flint et al., 1997, p. 168

First of all, customer value is the result of a customer's subjective judgement. This is a dynamic and higher-order construct with multiple dimensions and levels of abstraction. Second, customer value concepts are based on trade-off considerations, e.g. between benefits and sacrifices or between desired and undesired consequences. Benefits and sacrifices can be multifaceted. Third, customer value measurement is a strategic marketing tool used to clarify a company's proposition to its customers, thus creating a differential superior offering compared to the competition. The tool assesses a company's performance in comparison to its main competitors as perceived by former, present, and potential customers (Ulaga and Chacour, 2001). Organizations understand what drivers create value for customers in order to build a competitive advantage. Valued attributes are customer-preferred characteristics

of the seller's products and the service they offer (Woodruff and Flint, 2003). Fourth, value is a subjectively perceived construct, highly idiosyncratic with different customer segments perceiving different values within the same product or service. In the present thesis the focus is on the perceived rather than on the desired value.

4.5.2 The relation between customer value, customer satisfaction and behaviour intentions

Although perceived value is estimated to have a strongly positive and highly significant impact on satisfaction (Eggert and Ulaga, 2002; Spiteri and Dion, 2004), these two should be used supplementarily. The two constructs are closely linked but remain distinct. Despite the growing body of research in the area (cf. Graf and Maas, 2008; Hu et al., 2009), it is still not clear how customer perceived value interacts with customer satisfaction and overall, how the two constructs interact with behaviour intentions.

The 'value' concept is closely related to the 'satisfaction' concept. Both describe evaluative judgments on products and services, and place special importance on the conditions in which they are consumed/used. Satisfaction judgments complement the information of a value hierarchy in a very important capacity: they provide feedback on the users' reactions to the value received. Satisfaction informs on how the customer feels about the value received, i.e. how well an organization's value creation efforts are aligned with its customers' value requirements. Value, on the other hand, identifies which product dimensions are central to a customer's ability to attain desired end conditions and how these product dimensions are related to both each other and to the customer (Woodruff and Gardial, 1996). Table 4.5.3 presents an overview of the main differences between value and satisfaction on a conceptual level.

Table 4.5.3. The Conceptual Differences Between Satisfaction and Value

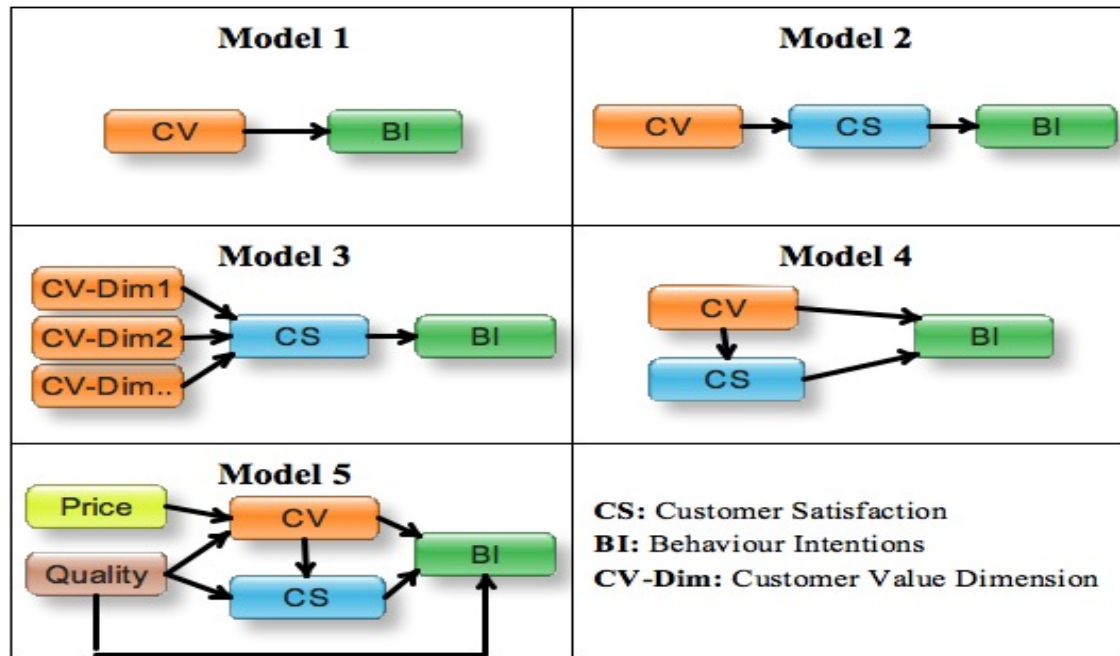
Conceptual differences between satisfaction and value	
Satisfaction	Customer perceived value
Affective construct	Cognitive construct
Post-purchase perspective	Pre-/post purchase perspective
Tactical orientation	Strategic orientation
Present customers	Present and potential customers
Supplier's offerings	Supplier's and competitors' offerings

Source: Eggert and Ulaga, 2002, p. 110

Graf and Mass (2008) provide an overview of five conceptual models on the relationship between customer value, customer satisfaction and behaviour intentions⁴⁴ (figure 4.5.1). The first model implies a direct relationship between customer value and behaviour intentions without involving customer satisfaction. The second model suggests no direct relationship between customer value and behaviour intentions, with the latter directly influenced by customer satisfaction. Here, customer satisfaction is the moderating variable for customer value. Eggert and Ulaga (2002) explicitly tested the first two models in a cross-sectional survey. The results suggest that (a) customer perceived value and customer satisfaction can be conceptualized and measured as two distinct constructs; (b) customer perceived value has a strongly positive and highly significant impact on satisfaction; (c) satisfaction is a better predictor for behavioural outcomes than customer perceived value (see also: Spiteri and Dion, 2004). Thus, they recommend Model 2 as the one providing a better fitting, suggesting that researchers should take into account both constructs when assessing the outcomes of a relationship. In that case, customers' value attributes guide satisfaction measurement attributes. The suppliers who rely only on attribute specific satisfaction measurements may not fully understand how their customers experience value consequences (Woodruff and Flint, 2003).

⁴⁴ The models and the discussion also include the dimension of quality but hereby it is eliminated, as it goes well beyond the scope of the present thesis.

Figure 4.5.2. The Conceptual Models on Customer Value, Satisfaction and Behavioural Intentions



Source: Graaf and Maas, 2008, p.12

Model 3 assumes the same relationships with Model 2 but instead considers customer value as a construct of a higher order being comprised of individual value dimensions. In Model 4, there is a close relationship between customer value and customer satisfaction and both of them directly influence behavioural intentions. According to Liu et al. (2005), these relationships are confirmed but only for long-term business relations. Instead, in short-term business relationships only customer value was found to be a critical factor influencing share allocation. Finally in the Model 5, quality is directly relevant to behavioural intentions while it also acts (along with price) as an antecedent of customer value and satisfaction. On the other hand, Hu et al. (2009) in a recent study, found out that quality does not have a positive impact on behavioural intentions. On the contrary, the customers' perceived value was found to affect satisfaction and behavioural intentions while corporate image is considered as a mediator of satisfaction towards behavioural intentions.

Value and satisfaction although distinct evaluations are inextricably tied by impacting on a customer's desire to continue a relationship (Licata et al., 2001). Research findings on the relationship of customer value with customer satisfaction and behavioural intentions remain highly heterogeneous due to the fact that, model structures appear to be highly dependent on the nature of the study (Cronin et al., 2000) and most importantly there are industry-specific factors influencing value. With the objective of the present study being to conclude on such relationships in the case of ports, in order to generate knowledge on how to measure the port users' perceived value, we ground on Graf and Maas (2008, p. 13) view that "Customer Value can be considered as an important antecedent with significant impact on Customer Satisfaction and many forms of customer behaviour".

4.5.3 The transactional (functional) and relationship value

Business markets are arenas in which buying and selling companies interact with each other. According to the interaction model (introduced by Hakansson, 1982), the purchase of industrial goods is seen as an interaction process between two parties in a certain environment. Interactions between the companies take place within the context of their relationship. It is important though to distinguish between the individual 'episodes⁴⁵' in a relationship e.g. the placing or delivering of a particular order, and the longer-term aspects of that relationship which both affect and may be affected by each episode (ibid, p. 23). Previous experience largely defines future intentions and the behaviour of both parties as a small number of purchases and/or customers are responsible for large volumes of purchases. For such relations, the perceived value is also an output of the relations that the two involved parties develop (*relationship specific*), rather than just a single discrete transaction (*transactional specific*), as it is typical in the consumer goods area (Ravald and Gronroos, 1996; Woodruff and Flint, 2003).

⁴⁵ In the present thesis the term interaction rather than episodes is used.

The transactional value lies in the customer's hierarchies centred on product availability and quality, delivery service quality, and pricing. The relationship value stems from the quality of the interactions going on between the customer and the product or service supplier. According to Gronroos (1997), in a relational context, value for the customer is not embedded in a transactional exchange of a product for money. Instead, the customer perceived value is created and delivered over time, as the relationship develops. In a long-term buyer-seller relationship, there is a need to look at the total episode value, which is a function of the episode value and the relationship value (Ravald and Gronroos, 1996). A poor episode value might be balanced with a positive perception of the relationship as a whole. So it is important for the supplier to maintain a good relationship with the customer, as this might make the customer more tolerant towards occasional inferior performance. In cases where two companies are involved in a continuous exchange, more value is added to the relational exchanges than to the transactional exchanges. Additionally, in business markets value has a strategic dimension and is regarded as the outcome of collaborative relationships that enhances partner competitiveness (Wilson and Jantrania, 1994) and can create differentiations and extra value for both (Lewin and Johnston, 1997)⁴⁶.

Table 4.5.4 presents the main characteristics of the transactional and the relational purchasing behaviour. The relationship provides the atmosphere in which characteristics such as negotiations, payments, deliveries and social contracts etc. take place (Turnbull et al., 1996).

⁴⁶ Notably, research on B-2-B relationships is still modest and lagging (Homburg and Rudolph, 2001) with a main problem being the complexity of the existing relations in these cases.

Table 4.5.4. Transactional-oriented Versus Relational-oriented Purchasing Behavior

Transactional-oriented approach	Relational-oriented approach
Many alternatives	One or few alternatives
Every deal is a new business, and no-one should benefit from past performance	A deal is part of a relationship and the relationship is part of a network context
Exploit the potential of competition	Exploit the potential of co-operation
Short-term, arm's length distance and avoids coming too close	Long-term with tough demands and joint development
Renewal and effectiveness by change of partner and chooses the most efficient supplier at any time	Renewal and effectiveness by collaboration and team effects and combine resources and knowledge
Buying products	Buying capabilities
Price-orientation, strong in achieving favorable prices in well-specified products	Cost and value orientation, strong in achieving low total costs of supply and developing new value.

Source: Axelsson and Wynstra, 2002, p.214

In order to measure business value, one needs to assess the customers' desires. Some customers might only seek functional value while others might look for a combination of functional and relational value. A tool (or process or framework) is essential for measuring the customers' value. A business should not rely on the personal interactions or the experience with customers only, as they may end up with inconclusive data.

A business relationship is defined as a process where two firms or other types of organizations "form strong and extensive social, economic, service and technical ties over time, with the intent of lowering total costs and/or increasing value, thereby achieving mutual benefit" (Anderson and Narus, 1999, p. 96). A firm's relationships are one of the most valuable resources that it possesses (Hakansson, 1987) and a source of competitive advantage. Companies in general, interact with each other and develop relationships in order to exploit and develop their resources (Turnbull and Wilson, 1989). In such cases, relationships stand as an interorganizational type of resource. In order to do this, they seek those companies, which have matching resources. Resources are of at least three

categories: the first is financial resources; the second is a company's network position and the third is the skills which a company possesses (technologies) (Turnbull et al., 1996).

Firms develop relationships due to their interdependence on other companies. The need to generate revenue from other companies, to use the knowledge and the abilities of others, or even the need to acquire knowledge or develop their knowledge through interaction with others, are major forms of interdependence (ibid). Interdependence increases when, both parties participating in the relationship deploy a strategy of cooperation willing to establish long-term relationships in order to exchange information and trust each other (Campell, 1985).

The relations in business markets range from pure discrete transactions to the emergence of highly vertically integrated organizations. In the least integrated settings, companies enjoy high levels of autonomy and pursue strategies so as to achieve individual goals. When collaborative relationships exist, the involved companies share mutual interests, with their collaboration being "purposive strategic relationships between independent firms who share compatible goals, strive for mutual benefit and acknowledge a high level of mutual interdependence" (Mohr and Spekman, 1994, p. 135).

Overtime, investments play a crucial role in the relationships' development and indicate the interest of both parties in building a strong relationship and the faith that the other party will reciprocate. Investments usually develop in satisfactory relationships and might take the form of several adaptations to the product and the process areas (Hakansson, 1982).

The emphasis on creating value is less important in conditions of regulated markets, scarce resources, controlled distribution channels or poorly acquired performing firms (Doyle, 2000). When competition increases, so does the need for better offerings to customers and users. The global competition, the changing markets and the new technologies open up qualitatively new ways of creating value. Normann and Ramirez (1993) advocate that increasingly successful companies do not just add value, they reinvent it. Gummesson (1999) suggests a movement from an industrial society to a value society.

The port sector matches these conditions, while both the transactional and the relational value exist (further analyzed and confirmed in Chapters 7 and 9). The port users', the service providers', and port authorities' relationships are rather complex, incorporating special characteristics not common in other industries. There is also a setting of relevant hybrid forms of developed relations (Chapter 6) that demands attention. Competition is largely increasing and intensifies, leading to large investments in the modernization of superstructure. This results in a decrease of differences between ports in terms of productivity and efficiency, especially when referring to ports in proximity (for example the ports in the La Havre-Hamburg range). As the core offering accounts for little variance when comparing the main supplier to the second best supplier, successful vendors have to search for new ways of differentiating themselves from competition (Vandenbosch and Dawar, 2002). Offering superior value through personal interaction and service, access to know-how, and increased time-to-market, appear as promising avenues for differentiation in today's highly competitive business markets (Eggert et al., 2006). Nowadays, a firm's differentiation and advantage stem from how its value chain relates to its customer's value (Payne and Holt, 1999).

In the port sector, the strategies deployed by service providers in order to increase their value offering remain largely under researched. As in typical industrial markets, the emphasis is on the development of relationships with the suppliers in order to match resources due to extensive interdependence. Yet, an in-depth understanding of the port service providers' relationships with the suppliers is still desirable although it contributes significantly to a further understanding of the value delivery process.

4.5.4 The Value through the relationships with the suppliers, the customers and alliance partnering

The value through relationships can be created in three domains: through the relationships with the suppliers; through the relationships with the customers; and through alliance partnering (Sharma and Jagdish, 1997). For port users, the

first two domains refer to the same actors and it is only the nature of services that differs. For example, a shipping company is the supplier of services to a freight forwarder in an export-oriented trade while the latter offers services to the first one in an import-oriented trade.

Value creation through alliance partnering is common in shipping lines that combine resources in order to offer high value services. Through alliances, they increase the number of ports they serve and provide an increased service portfolio. Lately, logistics companies also commit to alliance partnering. For example, they share block train capacity and enlarge their destination range. In general, alliance partnering gives the opportunity to involved actors to reduce their costs and thus offer more attractive services in terms of price.

The firms develop relationships with the suppliers in order to offer their customers high valued services. A strong partnership emphasizes direct, long-term association, encouraging mutual planning and problem solving efforts (Gunasekaran et al., 2001), elements that directly influence the level of satisfaction enjoyed.

The development of the relationships with the customers enables a company to focus its resources on the profitable customers (Sharma et al., 2001), or on the ones that contribute to its strategic position within the network (as discussed later on). Value creation and value sharing can be regarded as the *raison d'être* in collaborative customer-supplier relationships (Eggert et al., 2006). Focusing on the customers also makes a company less vulnerable to focused competitors. The service providers are selective on customers and try to be customer oriented in order to optimize the allocation of resources. If the inter-firm relationships are problematic, then the core capabilities cannot be combined in an efficient manner. The relations with the customers also enable a firm to understand and serve its customers' needs and develop new products and services in collaboration (Ritter et al., 2004). In this vein, it becomes of great importance for every firm to identify key customers⁴⁷. Partner selection is increasingly becoming a critical element in a firm's competitive and procurement strategy

⁴⁷ A framework for the identification of key customer is provided by Pels (1992).

and may be the most important ingredient in its ability to deliver superior value to its customer (Lewin and Johnston, 1997).

A key concept in the relationships with the customers is the importance of retaining the existing customers rather than trying to acquire new ones, as the cost of the first is in general significantly lower than the second. It should be noted though, that different customer segments have different potential profitability. Keeping a higher proportion of the most valuable customers for longer can increase dramatically a firm's profitability (Payne and Holt, 2001)

In business markets (a concept also applied to ports), the supplier faces competition not only from other suppliers but from its customers as well. For a number of reasons, the customers might decide to develop a certain activity in house, making a supplier unnecessary.

Developing and retaining collaborative relationships is not an easy task for businesses. It requires the establishment of safeguarding and coordinating mechanisms with emphasis on the information obtained from a firm's network of business contacts. Evidence suggests that information from the network influences alliance performance, inter-organizational learning, collaborative relationships, contract design, commitment and flexibility (Claro and Claro, 2010).

The users' benefits from developing a successful relationship are: less effort in processing choice information, less perceived purchase link, reduced costs, increased consumer confidence, social benefits, and special treatment benefits. For the service providers the respective benefits include: increased market share, increased revenue, reduced costs, increased employee retention and increased "customer franchises" (Licata et al., 2001).

The question that emerges is whether the port service providers develop relationships with the port users, which are their characteristics and how these impact on the users' perceived value. Providing answers to these questions facilitates the understanding of the environment in which port service delivery and acceptance takes place.

4.5.5 The ports' relationships in network constellations.

The difficulty of applying a satisfaction measurement to ports lies in the complexity, diversity, and extended scope, that characterize the relations between port service providers and users.

Ports are part of an industrial network structure whereas the latter is defined as “a specific structure which binds together actors, activities and resources in a certain pattern” (Hakansson and Johanson, 1992, p. 375). In the light of the extended vertical integration practices and cooperative agreements experienced lately in shipping and logistics, the limits of these networks are unclear. Service suppliers expect that the demanded value by its immediate user is likely to be influenced by the needs of the downstream users. Individual port related entities are embedded in the broader chain, rather than independent units. They are embedded in business networks that are conceptualized as a set of connected business relationships in which exchange in one relationships is contingent upon exchange in the other relationship (Tikkanen et al., 2000). Port service users and providers, are part of a context frequently present in industrial markets “which includes only a limited number of identifiable organizational entities (actors). These entities are involved in continuous exchange relationships with the organization. In such cases, each individual party exerts considerable influence on the organization” (Hakansson and Svehota, 1989, p. 190). The frequent presence of a large number of captive users and of long term agreements between involved parties means that port users have continuous institutionalized exchange relationships, and thus exert influence on each other⁴⁸.

In this context, the relations between two port actors cannot be seen as typical static dyadic ones. As the relevant value measurement literature suggests (cf. Woodruff and Flint, 2003), ‘every supplier has an impact upon its customer’s customer’. Focusing only in dyadic relationships does not account for the

⁴⁸ In long-term business relationships, high customer satisfaction creates bonding and commitment between interacting bodies and inevitably increases customer retention; in order to properly understand the long-term development of business relations, we also need to capture the essence of customer value in interorganizational setting more in depth (Tikkanen and Alajoutsiajavri, 2002).

complexity of interorganizational relationships in their network context and the dynamics of the value emerging in a specific setting. Industrial relations set a chain of intermediaries, with the 'end user' being difficult to be recognized by all the parts of the chain (while its actual importance also remains questionable). What is important though to every participant in the chain is to keep his customer satisfied. However this customer is satisfied when he receives services that give him the opportunity to deliver the desired services to his own customer, and so on. Within the framework of such interorganizational relationships a complex set of interdependencies gradually evolves. Activities undertaken by the parties in a relationship cannot therefore be connected without the active and reciprocal involvement of both parties (Hakansson and Svehota, 1989).

Even if a supplier and his network deliver a perfectly functioning solution from both the supplier's and the buyer's points of view, customer value in the long run might remain low if third parties in the buyer's customers, do not adapt their activities to the changed situation. For example, a delay during the sea going length of transportation has implications on the freight forwarder who might receive a container delayed. In that case, even if a freight forwarder's operations are of top efficiency and effectiveness, he will fail to deliver his customer on time due to the delay presented in a previous part of the transportation length. After all, a delivery chain is 'as weak as its weakest link' (Evans and Berman, 2001). In a different example, even if a specific terminal is the most efficient and effective, vessels still have to use additional port services to reach it, and cargoes have to use additional services to be forwarded in the hinterland. When the last two parts of the chain underperform, the effectiveness of the port decreases (as does for the terminal itself), at least from a port user's perspective. As in any satisfaction measurement (Hill and Alexander, 2006) a port measurement tool needs to take into account any element that is important for the user and not just a part of the 'port product'; besides, it is the user who has to determine what creates his own satisfaction.

In the total delivery chain, as well as in ports, each participant has his own competency which is integrated with those of the other participants within the

supply chain/port setting. It is often within this integrated link where most value is added to the chain (Barber, 2008). Discrete sites in a supply chain (or port) do not lead to an improved productivity if each is to pursue his goals independently (Gunasekaran et al., 2001). In other words, every company occupies a position in a value chain. Upstream, suppliers provide inputs. The company then adds value to these inputs, before passing them downstream to the next actor in the chain, the customer. From that perspective, strategy is primarily the art of positioning a company in the right place in the value chain: the right business, the rights services and market segments, the right value adding activities (Normann and Ramirez, 1993). In a network, mutual value is developed as a consequence of a reciprocal interactive relationship between organizations and stakeholders. Normann and Ramirez (1994) also draw attention to the role of additional, non-customer stakeholders, in the creation of value.

All business firms are part of a value-creating network. Some play important roles and have an influence on shaping the network, while others play minor roles and are shaped by the network. Understanding a firm's role in its set of networks requires detailed study, as firms normally do not think about a network position but rather think about how they compete against firms like themselves (Kothandaraman and Wilson, 2001).

An actor participating in a network of business has access to resources of other actors and a control over them, either directly or indirectly through exchange relationships (Harrison and Hakansson, 2006). Within that network, a company chooses the resources willing to combine with other actors. It also chooses the actor that it is going to combine them with. A company's bargaining position largely determines its access to scarce and valuable resources, thus contributing towards a raise of its effectiveness.

In terms of a firms' network position Turnbull et al., (1996) suggest a threefold categorization about the additional (compared to dyadic relations) resources which have been built through the interactions in a network: access to the resources of the other network members, reputation that the other network members have for the focal firm and expectations.

In the port sector, companies such as shipping lines, freight forwarders, logistics and even terminal operators, try to protect themselves from network constellations' fluctuation. Evidence from the supply chains suggests that the higher the level of integration among the actors, the more positively it influences it the level of satisfaction (Carbone and De Martino, 2003). In business relationships, the level of the relationship strength between the members of a long-term relationship has a direct and positive impact on satisfaction levels and greater performance.

On the other hand, not all inter-organizational relationships must be strong ones and efforts to move along the continuum towards a stronger relationship might be wasteful in certain instances (Hausman, 2001). The nature of industrial relations is largely determined by the product and the process technologies of the two companies. The buyer and seller market structures which exist are also important and hence the availability of alternative buyers and sellers (Ford, 1990). Moreover, closer integration brings with it, of course, the possibility that the supplier may take advantage of the situation by raising prices, reducing quality levels or providing a poorer service. Also becoming tied up with a particular port carries the risk that the port might not be an innovative supplier in the future, even if its performance is currently satisfactory (Bennett and Gabriel, 2001). Relationship strength in turn consists of levels of trust, commitment and relationalism (Hausman, 2001).

With port users and service providers being embedded in port network constellations, the perceived value is largely influenced by the functioning of the total network. It becomes of major importance though, to understand the ways that port users and service providers interact in these networks and the level that these interactions impact on the end perceived value.

4.5.6 The relationship value antecedents.

The present section presents significant contributions to value antecedents and dimensions based on the literature review (for a extensive analysis see: Lin et al., 2005; Barry and Terry, 2008). Research regarding value measurements in

business markets is still at early stages (Flint et al., 2002). The majority of studies focuses on product related issues rather than on relational dimensions of customer perceived-value (Parasuraman and Grewal, 2000).

Following a literature review, Spiteri and Dion (2004) identified sixteen customer value antecedents: market orientation, learning, competence/expertise, communication, alignment of sales compensation with value, equity/fairness in exchange, forbearing opportunistic behavior, ethical acts, shared values, promotional investments, relational investments, innovations, total quality management, seeking sustainable competitive advantage, process efficiencies and cost-cutting initiatives. Relationship value can be distinguished into three categories (Wilson and Jantrania, 1994): economic (investment quality, value engineering concurrent engineering and cost reduction), strategic (core competencies, strategic fit, time to market and goals) and behavioral value (social bonding, trust and culture).

In order to conclude on and measure the perceived value, it is essential to identify the components of benefits and sacrifices. Empirical research outputs (Anderson and Narus, 1999; Lapierre, 2000; Ulaga and Eggert, 2005; Barry and Terry, 2008) consider as benefits the following: core, sourcing, operations, economic, technical, service, social, product, relationship, know-how and time to market benefits, whereas the following elements are categorized as sacrifices: cost, switching cost, price, relationship cost and process cost.

The value dimensions presented, while not considered applicable as such to ports, are used to provide a general view of the characteristics that have to be searched for. They guide the research in order to generate knowledge on the port users' value dimensions. In terms of the outcomes of relationship value, the literature review includes affective commitment, longevity, share of purchase, willingness to invest, word of mouth and future intentions.

The identification of the elements that act as value drivers is at the core of perceived value measurements. This requires understanding the environment in which value is offered as well as the practices and strategies applied, targeting to augmented value offerings. For ports, this points towards understanding the port users and the service providers' interactions and relationships.

Once the value drivers are determined, the measurement of the port users' perceived value will further enhance knowledge on the ways that port users evaluate value offerings signifying the importance of the various value drivers. The outcomes are of interest to both port service providers and port users. The first will be able to realign their value offerings in order to match the customers' requirements, whereas the latter might re-evaluate their relationships in quest for increased perceived value.

4.6 THE RESEARCH OBJECTIVES

The aim of the present thesis is to generate knowledge on *the port users' perceived value*. In order to do so, four research objectives are set to be under study:

- 1) *The identification of the various types of interactions that take place between the actors of a port cluster.* The collected empirical data result in the development, mapping, and analysis of three distinctive port settings and an illustration of the distinctive port users and the service providers' interactions that take place within each of these settings. This enables the classification of the different types of interactions and conclusions on which parties are involved in which (crucial) port service exchanges. The impact of the port stakeholders' strategies (e.g. vertical integration) on their perceived value is also under study. This detailed holistic approach of the activities taking place in a port cluster grounds the subsequent further analysis and conclusions on the relationships developed between the port service providers and the users. It also contributes to a comprehensive understanding of the value drivers that the empirical research identifies.
- 2) *The identification and analysis of the nature and structures of the relationships developed between the port users and the service providers.* First, the study establishes that these relationships fall within a Business-to-Business (B-2-B)

framework. In such cases, the users' perceived value is functional specific as well as relational specific; and, thus, it is essential to understand and analyze the characteristics of the relationships developed between the involved parties in port service exchanges. Influenced much by the interactions that take place, port users and service providers develop relationships in order to support their strategic planning, with the structure of the port cluster and the bargaining position of each firm on a global scale largely influencing the relationships developed.

- 3) *The detection of the factors that generate value for the different types of port users.* Revealing and understanding these factors enhances the understanding of the port users' strategic decisions and the potential causes of defection. This enables a focused search on port performance gaps, and offers to the services providers the opportunity to take accordant actions. This study reveals the drivers that generate value for the main port users, as identified through the elaboration of case studies.
- 4) *The measurement of the extent to which each of the factors that generate value influences the port users' perceived value.* The fourth part of the research measures the impact of the recognized value drivers on the total perceived value. It does so through a quantitative analysis that involves the application of the Partial Least Squares (PLS) technique and concludes on the most important elements that influence the port users' perceived value during the (identified in the previous stages of the research) most vital interactions with: (1) the Terminal Operators, (2) the Shipping Lines, (3) the Inland Terminals, the (4) Port Authority and (5) the structural characteristics of a port.

4.7 SUMMARY

The present chapter discussed the potential of finding new ways for measuring port performance that would deliver more accurate and insightful results. With the development and application of balanced comprehensive performance measurement systems progressively increasing during the last years, they are considered as a possible avenue towards this end. The assessment of the port users' perspectives is the missing link for the development of *balanced* PPMs.

Perceived value is preferable to satisfaction for assessing the users' perspectives in industrial markets. Thus, the aim of the present thesis is to generate knowledge on the port users' perceived value. The literature review providing insights on perceived value measurements guides the present research and contributes to the formulation of the research objectives.

The last section of the present chapter outlines the four major research objectives of the present thesis. The methodologies and the scientific tools used are presented in Chapter 5 that follows, whereas the results of the research carried out is the subject of Chapters 6-9.

CHAPTER 5. THE RESEARCH DESIGN AND METHODOLOGY

5.1 INTRODUCTION

The analysis of the contemporary trends and challenges emerging that the port sector faces (Chapter 2), and the relevant literature review (Chapter 3), identified the underdevelopment of a balanced Port Performance Measurement (PPM) system. Assessing the port users' perceptions stands as a key, yet 'missing link' towards a balanced PPM (Chapter 4). The empirical part of the present thesis generates knowledge on the port users' perceived value and provides an analysis of the port users and the service providers' interactions and relationships. It also identifies value drivers and measures their importance for a number of key actors' interactions.

The present Chapter analyzes the research design and methodological framework applied towards this end. First, it outlines the type of the research conducted (section 5.3) and the methodological suggestions on which the research design is based (section 5.4). Then, it explains the steps followed in the research process as well as the techniques employed⁴⁹. Finally, discussion turns to the criteria and the ways that this thesis has applied in order to enhance the quality and validity of the conducted research (section 5.5).

⁴⁹ The selected methodology of the quantitative analysis is driven by the results generated on the port users and the service providers' interactions and relationship analysis (Chapters 6 and 7 respectively). Thus, in order to better understand the methodology and the reasons for choosing it, it is presented in Chapter 9 of the present thesis rather than in the present Chapter.

5.2 TYPES OF RESEARCH

According to Philliber et al. (1980), the design of a research process addresses four questions: 1) Which question(s) will be studied? 2) Which data are suitable? 3) Which data will be collected? and, 4) Which tools will be used for data analysis?

There are two major approaches to theory development, namely the inductive and the deductive research (cf. Bonoma, 1985; Parkhe, 1993; Romano, 1989). In deductive studies, observations and findings are derived from theory, whereas in inductive studies observations and findings produce theory (Bryman and Bell, 2007). Yet, “it is unlikely that any researcher could genuine separate the two processes of induction and deduction” (Perry, 1998, p. 788). This is because both prior theory and theory emerging from the data are often involved in research simultaneously (Richards, 1993). Scholars (e.g. Miles and Huberman, 1994; Parkhe, 1993) also conclude that induction and deduction are linked research approaches. This interrelation is confirmed in the context of the grounded theory research method (Glaser and Strauss, 1967) that stands at the extreme of the induction versus deduction continuum. Glaser and Strauss (ibid) refined their initial position acknowledging that in practice there is hardly a situation in which a researcher can ignore the theory accrued before commencing the research process.

Miles and Huberman (1994) also emphasize the importance of “prestructured research” for new qualitative researchers working in areas where some understanding has already been achieved, but more theory building is required before testing can be done (like the case of the present study). Alvesson and Skolberg (1994) call ‘abduction’ the process that involves a combination of both induction and deduction. The logic of abduction is that the research commutes a dialogue between theory and empirical findings (Forsstrom, 2005).

The present thesis lies at the interface between two emerging research themes: port performance and perceived value measurement studies. Both topics are still

at a pre-mature phase. There are no previous studies that deal with the port users' perceived value measurements and in general the assessment of the port users' perspectives is limited (section 3.5.3). At the same time, the port sector has special features and a high level of complexity (Chapter 2) that makes the effective adaptation of theories applied to other sectors (in the present thesis that of 'perceived value measurement') a demanding task. The literature review of port studies emphasized the special characteristics of contemporary ports (Chapters 2 and 3; also: Pallis et al., 2010; 2011). These characteristics shape the research design of the present thesis.

The literature introduction and critical review of the value measurements in B-2-B markets advanced our knowledge on these themes. Moreover, it highlighted that when attempting a value assessment, emphasis is worth being placed on the port users and service providers' interactions and relations. The lack of prior research in those fields results in the need to build new theoretical concepts. Reviewing concepts already developed in literature is the first step in the theory-building process. Then, in order to fulfill the research objectives, several theoretical advancements had to be made.

5.3 BACKGROUND TO THE RESEARCH DESIGN

The endorsed methodology determined the steps followed towards the achievement of the final research goals and objectives. Although most researchers are not as concerned with the 'how' of doing research as with the 'what', the methodology used strongly influences the output of any research process and its interpretation (Easton, 1995). Barua et al. (2001) maintain that the selection of the best research methodology should be determined within the context of research objectives, with this selection producing the quality and value of the project.

According to Zikmund (2000), there are no “excellent” methodologies but methodologies having advantages and disadvantages. The choice is based on the researcher’s desires and depends on a number of factors, the most important of which are the nature of the problem, available time, and cost (Gemmesson, 2000). Researchers need to consider the methodological underpinnings of their work, since they direct their choice of the research techniques (Ramsay, 1998).

A number of studies and efforts that measure the users’ perceived value are found in a variety of business sectors with a number of different methodological frameworks being developed and applied. Yet, the success of their application *per se* in the port sector remains questionable. The reasoning is the absence of standardization of port governance models and operations. As such, a methodology for assessing the port users’ value has to be grounded on those special characteristics.

It was thus deemed necessary to develop a comparatively novel research design, in order to reach the set research objectives. The absence of prior relevant applications played a key role. As already analyzed (section 3.3), only a limited number of port studies deal with the port users’ perspectives in general. There is neither prior published research that aims to measure the port users’ value *per se* nor the port users’ interactions and relations have been exploited in depth.

The present thesis employed the case study method and the Partial Least Squares (PLS) technique, in combination with qualitative and quantitative data collection and analysis. Semi-structured interviews and questionnaires were used at different phases of the research, increasing the validity and adding to the quality of the outcome. Grounded on insights from a number of research processes proposed or used elsewhere, an idiosyncratic research process was designed and followed.

5.3.1 Case studies

Case studies are widely used in social sciences and in applied research. According to Zikmund (2000), the aim is to retrieve information from one or more cases that are similar to those under study. Case studies “are the preferred

strategy, when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on contemporary phenomena with real-life context" (Yin, 2009, p. 13). The present thesis fulfills the three conditions placed by Yin. The aim is to generate knowledge on "how" the port users' value is formulated, on "how" to measure *the port users' value*, to understand "how" the port users and the service providers interact, and conclude on "how" their relationships develop. The researcher does not have any control over the researched events and the port users' value is placed in a real life context, while contemporary phenomena pose a central role in the present study.

Case studies generate knowledge and provide the basis for theoretical developments, especially when knowledge in respect to the questions posed is on 'a near zero basis' (ibid). Eisenhardt (1989) highlights that case studies allow the researcher to gain insights that lead to clarification of "unanswered" and "unsolved" issues and problems. Therefore, they are particularly appropriate when new fields of research emerge. The present thesis poses research questions that have not been analyzed rigorously in the past and prior knowledge is indeed limited. The results derived from the conducted case studies can be further used to build a full theory through confirmation analysis and an increase in the number of cases studied.

The objective of case studies is to conduct intensive research on a specific object that makes it possible to find out essential factors, processes and relationships (Forsstrom, 2005). Case studies are essential when investigating specific issues in depth and detail (Easton, 1995; Patton, 2002), suitable for research where the aim is to recognize complexity and ambiguity (Gummesson, 2001), and for studies in which interactions and relationships form the basic units of analysis (Dubois and Araujo, 2004). Among the objectives of the present research are the identification and understanding of the port users and the service providers' interactions and relationships; two relatively understudied topics.

Yin (2009) recommends case studies when a research aims to test the purposed theory and study complex social phenomena. Both these characteristics are found in the present thesis, increasing the suitability of applying the method of

case studies. The strength of the latter rests on its ability to capture conceptual developments (Meredith et al., 1989; Meredith, 1993).

Case studies are distinguished into three types according to their purposes: exploratory, descriptive and explanatory (Yin, 2009):

- An exploratory case study aims to define the questions and hypotheses of a subsequent study (not necessarily a case study) or to determine the feasibility of the desired research procedure.
- A descriptive case study presents a complete description of a phenomenon within its context.
- An explanatory case study comprises data bearing on cause-effect relationships – explaining how events happened.

The present thesis is a combination of all three types. First, it seeks to test the feasibility of the research procedure designed and applied in terms of the port users' value measurement (exploratory case study). An exploratory research was conducted prior to the main descriptive and explanatory case studies. Second, it aims to describe the port users and the service providers' interactions and relationships (descriptive case study). Third, it targets the identification of the most important value drivers (explanatory case study).

5.3.2 Qualitative analysis

Case studies may use both quantitative and qualitative methodologies to help the researcher comprehend phenomena, as well as why certain characteristics or effects might occur (Meredith, 1998).

The qualitative research is an adequate methodological framework used to understand the meaning and complexity of issues rather than measure predetermined variables (Denzin and Lincoln, 1994). Silverman (1993) distinguishes four different methods that might be used in this vein: observation, text and document analysis, interviews, and recording and transcribing.

In many cases, qualitative studies are more than just merely useful; they are indispensable (cf. Strauss, 1987) as in the absence of requirements for any

quantification tests for inclusion, they are suitable for the embodiment of wider factors.

As Yin (2009) recaps, the dominant modes of a qualitative analysis contain three important techniques: pattern-matching, explanation building and time-series. All these steps constitute a continuous process that increases the reliability and the validity of the case study. Bryman and Bell (2007) identify two major strategies for analyzing qualitative data: analytic induction and grounded theory, respectively.

The “Grounded theory” approach is applied to the present thesis. Exemplified in the seminal work of Glaser and Strauss (1967) this is the most widely used framework for analyzing qualitative data (Denzin and Lincoln, 1994). It begins with the theoretical sampling and continues with the coding of data. Coding is a key process in grounded theory where data are broken down into component parts. The collected data shape the emergent codes. The theoretical saturation that “relates [...] two phases in grounded theory: the coding of data and the collection of data” follows (Bryman and Bell, 2007, p. 585). In the final stage of grounded theory a constant comparison between data and conceptualization takes place to ensure that correspondence between concepts and categories with their indicators is not lost.

Critiques on qualitative studies mainly focus on the fact that they are very subjective, and difficult to replicate. There are also problems of generalization and a lack of transparency (ibid). This research avoids these problems by using a combination of qualitative and quantitative data towards the fulfillment of its research objectives. Moreover, a research protocol was maintained throughout the research, while the endorsement of grounded theory works against any unnecessary generalizations.

5.3.3 Quantitative analysis

Rossmann and Wilson (1985) suggest that linking quantitative with qualitative data enables the confirmation or the corroboration of each other (via triangulation), elaborates or develops analysis by providing richer details, and

initiates new lines of thinking through attention to surprises or paradoxes. The benefits of combining qualitative and quantitative data have been acknowledged in several research sectors, including logistics (Mangan et al., 2004).

A qualitative-quantitative linkage can be found on three levels (see: Miles and Huberman, 1994). The first is the “quantizing” level, where qualitative information can be either counted directly or converted into ranks or scales. The second level is the linkage between distinct data types, where qualitative information is compared to numerical data. The third level is that of the overall study design, such as the multimethod approaches that involve combinations of case study, survey, experiments etc. The present thesis lies on the third level as quantitative research complements the conducted case studies in order to provide a better understanding of the themes under study.

The use of different research approaches, methods and techniques in the same study is known as triangulation (Hussey and Hussey, 1997) and achieves an in-depth understanding of the examined phenomenon and avoidance of subjective outcomes. Triangulation overcomes the potential bias and sterility of single method approaches and it is an alternative to validation (Denzin, 1989; Fielding and Fielding, 1986; Flick, 1992). Easterby-Smith et al. (1991) identified four different types of triangulation: data triangulation; investigator triangulation; theory triangulation; and methodological triangulation. The present thesis falls in the methodological triangulation research due to the use of both qualitative and quantitative data in order to implement the methodology proposed.

Quantitative research can be construed as a research strategy that emphasizes quantification on the collection and analysis of data. There are three main reasons for occupying measurement in quantitative research (Bryman and Bell, 2007):

- Measurement allows to delineate fine differences between attributes and characteristics;
- Measurement is a consistent device allowing to make such distinctions;
- Measurement provides the basis for more precise estimates of the degree of relationship between concepts.

The present research quantifies the importance of perceived value attributes with the use of PLS.

5.4 THE METHODOLOGICAL FRAMEWORK

5.4.1 The process of the conducted research.

The design of a research process connects the collected data (and allows conclusions drawn by their analysis) with the research objectives and questions (Yin, 2009). Four influential frameworks proposed by scholars in the fields of port studies, value measurement research, and case studies guided the design of the process applied to the present thesis.

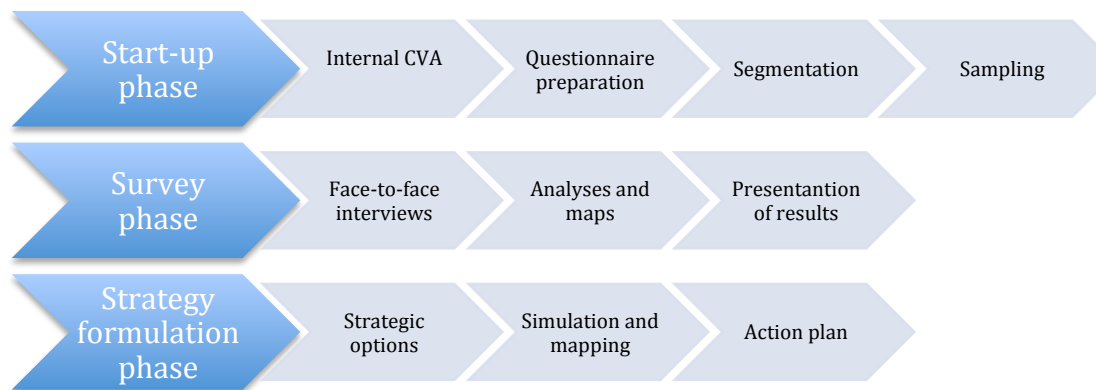
5.4.1.1 The four foundations

A four-step process for evaluating effectiveness in ports has been proposed by Brooks and Pallis (2008). The process begins with the definition of the customer, moves to the identification of important attributes and ends with the evaluation of attributes by both the supplier and the user. The authors recognize that although scholars regularly quote carriers as a port's customers, whoever has the responsibility for making purchase choices should also be included in that category (the manufacturer, the freight forwarder etc.). Those that are actively involved in the supply chain by providing port-related activities may also be considered as another group of customers. The second step is about indentifying the attributes of importance to the user/buyer. The weighting of attributes is crucial during that phase as there is always the danger of reflecting the desired attributes of only a particular user sub-group. During the third step, the supplier evaluates its own performance on the attributes. The data are used in order to measure performance against the importance of the buyer so that performance gaps can be indentified for improvement. A port's performance can be measured

against the performance of other ports so that strategic responses may be developed. During the fourth step the buyers/users evaluate the port's performance. The final part is to collect an overall satisfaction score.

Uлага and Chacour (2001) introduce the 'Customer Value Audit' (CAV), a three-stage methodology for measuring customer value. These stages include (figure 5.4.1) the start up, the survey and the strategy formation phase. The start-up phase assesses the supplier's view of the customer perceptions about the product or service value. The interviews of the survey phase reveal the purchasing criteria. A double scale approach (where the importance of criteria is ranked first and the evaluations of the main suppliers are assessed afterwards) is used in order to measure the customer's value based on the difference between the client's expectations and the perceptions of performance. The results are used in order to formulate value maps. During the third phase, the strategic options are analyzed and accordant action plans are developed.

Figure 5.4.1. Phases of the CVA process

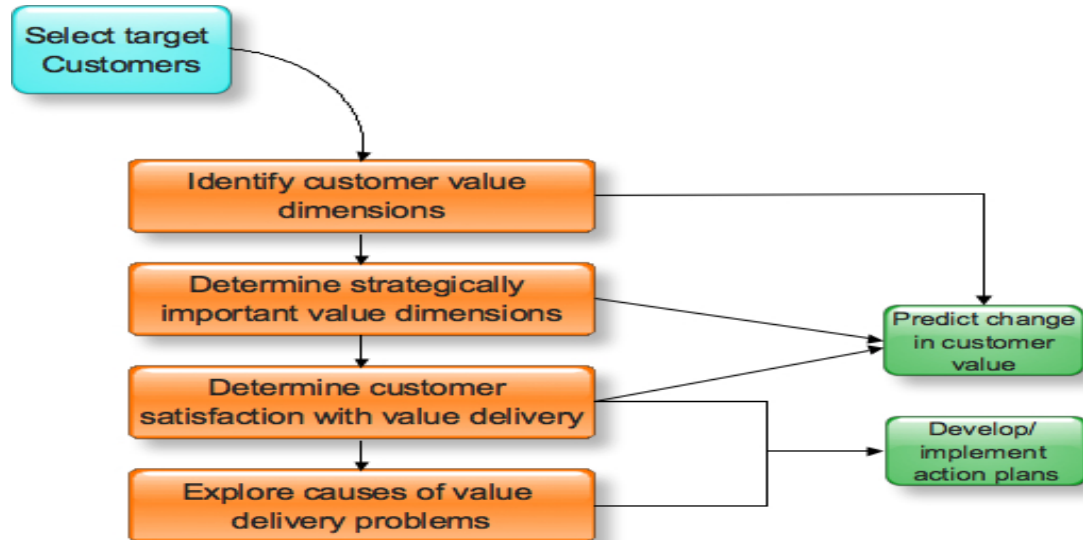


Source: Uлага and Chacour, 2001, p. 532

A broader methodological framework targeting the formation of efficient value delivery strategies was proposed by Woodruff and Gardial (1996). The "Customer Value Determination – (CVD)" process (figure 5.4.2) combines value with satisfaction measurement and includes a stage for predicting future value change. Its implementation reveals what customers want and provides an analysis of how well they think that the focal business is delivering value to

them. CVD is broader than just value measurement in business markets, and provides useful methodological insights.

Figure 5.4.2. The Customer Value Determination Process



Source: Woodruff and Gardial, 1996, p. 14

Finally, in case studies the research process is very similar to those used in other (empirical) research (Yin, 2009; McCutcheon & Meredith, 1993). One of the most common used processes is the one proposed by Stuart et al. (2002) and includes five steps (figure 5.4.3).

Figure 5.4.3. The Five Stage Research Process Model

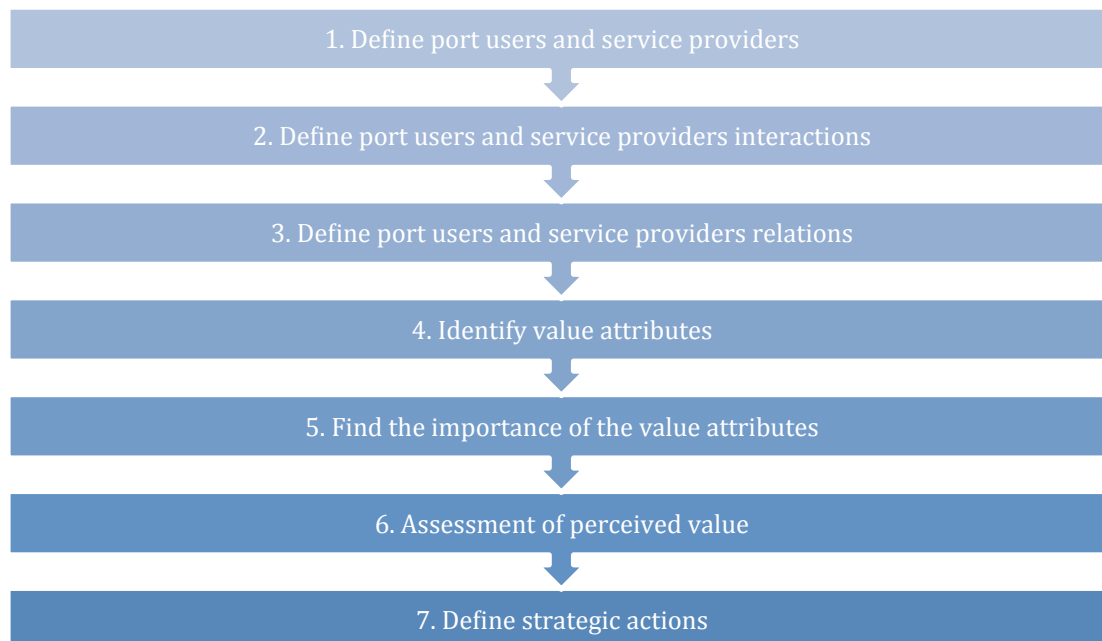


Source: Stuart et al., 2002, p. 420

5.4.2 The 7-stage adopted research process

The aforementioned concepts guided the designing of the seven stage research process adopted and applied by this study (figure 5.4.4). Notably, the empirical research conducted in the context of this study ends with the conclusion of step 5. Although stages 6 (assessment of perceived value) and 7 (define strategic actions) are included in the framework, they are not subject to empirical examination. This is due to the fact that each port user should design its own strategic actions, which in turn are subject to other research outcomes and analysis. The scope and actual potential for generalizations as regards these stages are still to be examined in further research. A short description of each stage is provided.

Figure 5.4.4. A Seven Stage Research Model for Assessing the Port Users' Perceived Value



Stage 1: Defining the port users and the service providers

Dubois and Araujo (2004, p. 225) maintain that “What constitutes the phenomenon of interest and its boundaries is often the outcome of the study rather than the decision that can be firmed up prior to conducting the study”. As

discussed in section 4.4.1, this study endorses the definition that *a port user is any entity that uses (consumes) services associated with the transportation of freights within the port. Accordingly, a port service provider is any entity that offers service(s) within a port and is associated via the port with the transportation of freights.*

The identification of all possible port users and service providers is beyond the scope of the present research. Moreover, within a view of ports as clusters of economic activities, such a task inhibits significant complexity. In any port setting, numerous actors might offer or use port related services, and are therefore qualified for inclusion in value measurement assessments. With port limits being most frequently questionable, defining which users and service providers will be included in the analysis is apparent. In other words, there has been a need to draw boundaries to what is studied.

Stage 2: Defining the port users and the service providers' interactions

There is neither a standard format of ports in terms of actors present nor a common template of their characteristics and relationships. Even within the same port, two or more actors providing the same services may largely differ in terms of the ways they operate, the scope of the operations undertaken, the level of integration, their relations with other actors, management practises and strategies. This adds to the complexity of ports and consequently port studies.

Due to the difficulties outlined, there is a need to start with the identification of the port users and the service providers' interactions on a port level. This enables the researcher to explore in a later phase which users receive services from which providers, and the services that are the subject of each interaction that takes place within a port. The identification of interactions that follows, guides and enables a better understanding of the port users and the service providers' relationships.

Stage 3: Defining the port users and the service providers' relationships

Section 4.5.3 outlined the importance of relationships on value measurements in B-2-B markets. Thus, there is a need to further explore the port users and the services providers' relationships. An understanding of the crucial aspects of such

relationships enhances the knowledge on, and guides through the selection of relationship value attributes to be explored at a later stage. The exploration of relationships facilitates the interpretation of the results in terms of value drivers of the present research and enhances understanding on strategies applied by port actors in order to increase their value offerings and/or their perceived value.

Stage 4: Identifying value attributes

As analyzed in section 4.5.1, perceived customer value is conceptualized as a trade-off between benefits and sacrifices (Zeitham, 1988; Gale, 1994). Section 4.5.3 stresses the need to look not only on episode value but on relationship value as well. Therefore, stage 4 of the research allocates benefits and sacrifices to both episode and relationship level that have an impact on the port users' perceived value.

Stage 5: Finding the importance of the value attributes

The identification of value drivers, albeit valuable, is inconclusive towards a complete understanding of the generation of the port users' perceived value. It becomes essential to weigh the various value attributes in order to understand the extent to which each of them influences the total perceived value.

Stage 6: Assessment of the perceived value

Following the in-depth understanding of the generation of the port users' perceived value, the port service providers' aim is to assess the extent to which they manage to deliver value to their users. Such a measurement facilitates to conclude on the level of value received from the port users and to define the extent to which a service provider keeps his clientelle satisfied.

Stage 7: Defining strategic actions

The measurement of the port users' perceived value will reveal unexploited information on their perceptions on the services they enjoy. Value and consequently performance gaps will be identified. Focal firms and actors willing to increase their competitiveness may use this information to guide

future strategic planning. The analysis of strategic planning falls beyond the scope of the present thesis but can generate future research attempts.

5.4.3 The implementation of the methodological framework

The selected type of cargo under analysis is containers. Container trade represents 25,4 percent of the total dry trade (UNCTAD, 2008). The level of standardization and typology of container related operations is higher in comparison to other cargoes (bulk, liquid, general cargo etc.). This study benefits from this feature, reaching an advanced understanding of the port users and the service providers' interactions, relationships and value attributes. These are all issues in which the level of knowledge was on a "near zero" basis. Second, during the last years, the expansion of containerization has led to a remarkable focus of port (performance) studies in this type of trade (Pallis et al., 2010; 2011). The findings of the present research contribute to this debate. At the same time, they generate knowledge on the port users' perceived value assessment that enables its confirmation and expansion through applications to other types of cargoes.

Every research applying the case study method has to decide on the number of cases to be studied. This depends on the relationship of the current state of knowledge with the existing theory: when there is still little theory even one case can be enough to begin a theory building process (Easton, 2007). Yin (2009) suggests that a single case can serve as a critical example: (1) if it forms an extreme or unique case, e.g. if not many cases are available; (2) if it forms a typical or representative case, standing as an example of a wider group of cases; (3) if it is a revelatory case, where the investigator has an opportunity to observe and analyze a phenomenon so far inaccessible to scientific investigation; (4) if it provides a longitudinal case studying two or more points in time; (5) if it stands as a pilot in a multi-case setting. However, evidence from multiple case-designs is more compelling and makes the overall study more robust (Johnston et al., 1999). Sudman (1976) maintains that confidence in the generalisability and robustness of the research findings of a case-study design increases with the

number of cases covered, with the greatest gain achieved when the number increases from one to two.

This research adopted Patton's (1990, p. 181) proposal that "The underlying principle that is common to all case selection strategies is selecting information-rich cases, that is cases worthy of in-depth study". Four case studies were selected for analysis resulting into two settings of interest. The four case studies refer to the number of different ports under study (during the first two phases of the research). The two port settings of interest are: a) a landlord port with a common user terminal, and b) a landlord port with a dedicated terminal. This selection fulfils Yin's second and third criteria.

It should be noted that the initial intention was to include a third setting in the analysis, that of a comprehensive port as well. This idea was abandoned when the analysis of the data collected during the first phase of the research proved valuable towards a better understanding of the themes under study and demonstrated that such a case was not qualified as an "information rich" one. Interactions and relationships developed in comprehensive ports are limited and typical due to the presence of a dominant Port Authority that is involved in numerous capacities. Moreover, the number of comprehensive ports is declining worldwide with the trend being towards their transformation into landlord ports. The decision was to concentrate on the two selected cases that are extensively present in contemporary ports.

Yin (2009) advises that regardless of the type of case study, investigators must exercise great care in designing and doing case studies to overcome traditional criticisms of the method. The scholar suggests that a case study researcher should:

1. Clarify precisely the nature of his study question
2. Develop propositions about the question, or the researcher may be tempted to collect "everything" which is an impossible task
3. Use a formal process to select the case(s) needed
4. Think about the data analysis before it is done
5. Think about theory development.

These suggestions guided the process of the present study that was conducted in three phases.

5.4.4 The first phase of the research

During the first phase of the research, the aim was to complete stages 1 and 2 of the research process (define the port users and the service providers; identify and analyze their interactions).

5.4.4.1 Sample selection

Zikmund (2000) purposes a seven-step procedure for selecting a sample. This includes the definition of the target population, the selection of a sampling frame, determining if a probability or nonprobability sampling method will be chosen, planning a procedure for selecting sampling units, determining the sample size, selecting the actual size, selecting the actual sampling units and, finally, conducting fieldwork.

In the present study, the definition of a target population was a rather difficult task due to the limitations generated at the first stage of the research process (definition of the port users and the service providers under study). In other words, the first step set the boundaries to what was studied. The paradox is that there is a need to draw a sample that will define the boundaries of what is studied. But at the same time, without knowing what is studied how is it possible to draw a sample?

To overcome that paradox, this study drew a sample from the most important users and service providers of container ports. These are:

1. the terminal operators,
2. the shipping lines,
3. the freight forwarders,
4. the shippers, and,
5. the Port Authority.

Their qualification as the most important users and service providers was based on the literature review (see Chapter 2) and the experts' knowledge of the sector to be studied. At the same time the study developed considering that, based on the outcomes of the first step of the research process the target population could change. If one of the users initially under study identified as his major service provider another member of the port community, the latter could be included in the target population at the second stage of the research.

Sampling can be based on either probability or nonprobability methods (Glaser and Strauss, 1979). Probability sampling is any method of sampling that utilizes some form of random selection. Nonprobability sampling is regularly used in social research where random sampling is not feasible, practical or theoretically sensible. Nonprobability sampling is either: accidental or purposive. The present study used a purposive method with the sampling approached with a specific plan in mind. During the interview stage, the intention was to reach companies that could provide rich information. Besides, port users defined during the first step of the sampling procedure are characterized by a great variety in terms of size and operational characteristics. For example, shipping lines may or may not have a dedicated terminal, may or may not offer services on a worldwide basis, may or may not also offer logistics and freight forwarding services. Therefore, in order to include in the sample at least one company of every possible combination of characteristics, the sampling procedure was purposive. After all, Glaser and Straus (ibid) argue that the examination of multiple cases does not need to be an attempt to follow a 'sampling' logic but selection may rely on 'theoretical sampling'.

The sampling frame was decided based on the technical and economic limitations of the present doctoral study. Therefore the users located in the two biggest Greek ports (Piraeus and Thessaloniki) were included in the sampling frame due to the location proximity with the researcher's institutional affiliation and place of residence. Due to the global nature of the sector though, international sampling was regarded more appropriate as "information rich" cases. Moreover, the outset of the Greek ports does not follow a model typically developed on a European or even global level. The port of Piraeus has only

recently awarded a concession to a private terminal operator, while the port of Thessaloniki is governed under a comprehensive model. Therefore, it was deemed necessary to expand the sample and include international ports and port users that operate under the most common landlord models.

A research visit in Antwerp took place in order to expand the sampling frame. Antwerp, was selected on the basis of personal contacts and the willingness of the Institute of Transport and Maritime Management (ITMMA) to host the researcher for a period of time. Moreover, the ports of Antwerp and Zeebrugge both have common user and dedicated container terminals, meeting a condition, which makes them suitable for the two settings being under study. The sampling frame of the present thesis consisted of users located in the ports of Piraeus, Thessaloniki, Antwerp and Zeebrugge.

For the Greek ports, the selection of sampling units was based on the researcher's knowledge. The limited number of global shipping lines that use the ports of Piraeus and Thessaloniki makes their identification a relatively easy task. Moreover, shipping lines that offer regional or feeder services are also relatively easily identifiable and known to the researcher. Efforts to arrange meetings with those considered as "information rich" took place during the research and was enhanced by personal contacts.

For the Belgian ports, catalogues including all the companies located in the ports of Antwerp and Zeebrugge were derived from the respective port authorities' websites. All the shipping lines, freight forwarders and terminal operators were identified from these catalogues. Moreover, based on the researcher's knowledge, a number of shippers that use the ports regularly was also selected while the respective Port Authorities were included in the sample, as well.

All the terminal operators and the Port Authorities were included in the sample as were all the shipping lines that operate a dedicated terminal. The number of companies with these characteristics is relatively small in most ports, therefore they are easily identified and no selecting procedure needs to be followed. For the remaining shipping lines and freight forwarders a distinction was made between international and regional companies. Five companies were selected from each category. The selection was based on the researcher's view and

information was collected on the potential that these companies would provide useful data for the conducted research.

The number of shippers using a port is regularly high, therefore there was a need to set criteria for their selection. During the last years shippers have been characterized by a ‘port blindness’ (Brooks, 2000). More and more, they assign the transportation of their products to freight forwarding or logistics companies and remain unconcerned about the operations followed until the container has reached its final destination. Therefore, shippers that have an actual involvement in port related operations had to be selected as sampling units. The relevant information proved to be not easily accessible as, to the best of our knowledge there are no official sources for such information. For this reason, during the interviews conducted with the terminal operators, the shipping lines, and the port authorities, the interviewees were asked to name shippers with the specific characteristics. Four shippers regularly involved in port operations were identified and included in the sample. The final sample is presented in table 5.4.1.

Table 5.4.1. The Final Selected Sample in the Belgian ports (phase 1)

	Sub categories	Number
Terminal Operators		All
Port Authorities		All
Shipping lines	With dedicated terminals	All
	International	5
	Regional	5
Freight Forwarders		5
Shippers	Shippers that use the port on a weekly basis	4

Following the finalization of the sample, a letter requesting an interview was sent via e-mail to all the selected companies. The e-mail (Appendix I) stated the theme of the research and the main axes that would be under discussion during

the interview. It also stated that a confidentiality clause would apply. An effort was made to contact executives at the highest end in the administration hierarchy. Therefore when possible, the CEOs and managing directors were contacted. The e-mails were sent in mid October 2008 for the Greek companies and mid November 2008 for the Belgian ones. Four days after the first e-mails were sent, a second e-mail followed to the ones that had not answered. If no answer was received after the second e-mail, a phone call was made in order to ask whether the e-mails were received and to request an answer. Finally, ten positive answers were received. Three of them were from companies located in Greece (two global shipping lines and one feeder shipping line), while the rest were from companies located in Belgium (a PA, three global shipping lines, a feeder shipping line, a freight forwarder and a shipper). Collecting data from these companies concluded the empirical research of the first, exploratory, phase of the study.

5.4.4.2 The data collection method: The semi structured interviews

The collection and use of data in case studies, as in any research effort, is crucial towards the validity of its outcomes. Stake (1995) and Yin (2009) identified at least six sources of evidence that can be used in case studies. These are:

- Documents,
- Archival records,
- Interviews,
- Direct observation,
- Participant-observation,
- Physical artifacts,

In the present study, a combination of interviews, documents, and archival records found on the internet sources was used.

The choice of the data collection instrument is also crucial. The determination of the suitable data collection process should examine factors such as: the complexity or sensitivity of the topic, the response rate required and the time or the money available for the survey. Traditionally, the most common used

methods have been personal interviews, telephone surveys, mail surveys. Lately web based surveys are gaining the researchers' interest.

Balancing the advantages and disadvantages of the aforementioned methods, and given the research aims, semi-structured face to face interviews were chosen as the proper method for that phase of the research. The Interview is probably the most widely employed method in qualitative research (Bryman and Bell, 2007). Furthermore, the selection of semi-structured interviews as the means for collecting data, pointed towards face-to-face interviews.

Due to the descriptive nature of the first phase of the research, there was a need to employ long questionnaires, complex and open ended questions. Often, the need to rearrange the sequence of questions was raised. This was because information rich phenomena were scrutinized in depth. With these characteristics, the face-to-face collection of data has an advantage over mail or telephone surveys. The disadvantages of face-to-face interviews are that it is difficult to minimize socially desirable responses, avoid distortion due to the interviewer's characteristics and avoid subversion. The collection of data through mail or internet sources perform better with those characteristics but both fail to perform over complex and open ended questions when such questions are essential for the present study. The face-to-face interviews also tend to increase the cost and decrease the speed of data collection, while finding the suitable staff is relatively difficult. Due to the data richness that face-to-face contacts provide, it was decided to take over the disadvantages of that technique⁵⁰.

Semi-structured interviews are a verbal interchange where the researcher, attempts to elicit information from another person via interviews that "involve the implementation of a number of predetermined special topics but allow the interviewers' sufficient freedom" (Berg, 1989, p. 16; also: Longhurst, 2003) and enables the collection of a large amount and a wide variety of information, while at the same time safeguard the coverage of all topics. The objective is to understand the respondent's point of view rather than make generalizations on

⁵⁰ For advantages and disadvantages of data collection techniques see: De Vaus (2001) and Zikmund (2000)

attitudes. Open-ended questions were posed and a list of questions on fairly specific topics were used which acted as an interview guide. The interviewee has a great deal of leeway in how to reply. Unlike the questionnaire framework, in semi-structured interviews questions not included in the list may be posed at any time as the interviewer picks up on things that the interviewee said. Therefore, semi-structured interviews allow for immediate follow up questions, clarifications and omissions (Marshall and Rossman, 1989). During the semi-structured interviews, the researcher also has the opportunity to search deeply and discover new clues and dimensions of a problem (Burgess, 1982).

The first phase of the present research had the character of an exploratory study, and the aim was to make the interviewees talk briefly about the questions posed in order to deeply understand their views. As Taylor and Bogdan (1984, p. 88) state, "The hallmark of in-depth qualitative interviews is learning about what is important in the minds of informants: meaning, perspectives and definition; how they view, categorize, and experience, the world". Interviewees were given the freedom to explain their beliefs and thoughts and to highlight areas of particular interest and expertise that they had. Silverman (1993) comments that the use of 'open-ended' questions is believed to be the most effective route towards authenticity. Moreover, that way the researcher had the opportunity to question in depth certain aspects of the studied themes and in particular to bring out and resolve apparent contradictions. Therefore, the interviews made it possible to understand in depth the phenomena under study. Through the use of the semi-structured interviews, the interviewees were the ones that in essence set up the boundaries of the present study.

5.4.4.3 The interviewing process

Two different question guides were used during the interviews (Appendix I). The first concerned the shipping lines, the terminal operators, the freight forwarders and the shippers. The second one concerned the port authorities. Following Taylor and Bogdan (1984), these guides were used as a list of general areas to be covered with each informant, rather than as a structure schedule or protocol. The researcher, following the needs of the interview decided at that time the sequence of the questions to be posed. Before the interviews, knowledge on each

company was derived from collection of information (i.e. websites) in order to be able to expand, or limit as applicable, discussions on the questions to be asked.

The interviews with the companies located in Greece took place in October 2008. The collected data from these interviews were used as pilot work before contacting the companies in Belgium, in November-December 2008. They provided a 'feel' of the problem under investigation and advanced the re-conceptualization of the key aims of the study. This benefited the data-collection that followed, through adjustments that enabled an even better design, ultimately providing more accurate and useful data.

The average length of the interviews was approximately one hour and a half. The interviews were complemented with other sources of information (documents and archival records) found on the companies' websites. A recording device was used in order to record the interviews. That way the interviewer did not have to take notes during the interviews and was totally focused on the answers provided. Therefore, he had the time and the ability to intervene and pose more questions when needed. The interviews were transcribed in detail in order to avoid any loss of information⁵¹.

5.4.4.3.1 The Semi-structured Interviews with the port users

The semi-structured interviews with the port users focused on six main themes:

1. The general characteristics of each port user;
2. The interactions of each user with other members of the port community;
3. The criteria for choosing a port;
4. The characteristics of each services provider and the port authority that increased their perceived value;
5. The existing performance measurement practices; and
6. The process of communicating their problems to the port authority and the service providers they use.

⁵¹ The data was compiled and indexed so that the material can be retrieved at any time from everyone interested. That way, also, the interpretation of the study can be checked (cf. Yin, 2009; Hakim, 1987).

5.4.4.3.2 The interviews with the port authorities

The interviews with the port authorities had things in common with the ones of the port users. The PAs were also asked about (a) the ways they measure performance and (b) the value criteria they think are important for the members of the port community.

Moreover, the port authorities were asked to talk about their major users and their characteristics. The interactions and relations they maintain with them were also under study and a large part of the interview was devoted to these themes. Finally, the port authorities were asked about any practices they currently implement in order to learn about the level of value their users enjoy.

5.4.5 The second phase of the research

The second phase of the research covered stage 3 and stage 4 of the designed research process. Various overlaps on themes covered during the interviews of the two phases of the research can be found. Findings derived from the first phase guided the design of more detailed questions that would further enhance our understanding on themes deemed necessary. Moreover, the second phase of the research allowed the confirmation of the findings of the first one.

Findings on the port users and the service providers' interactions and relationships were further confirmed during that phase of the research by the interviewees. Furthermore, additional and more detailed questions on their relationships enriched the findings and understanding.

The value drivers identified during the first phase of the research were used in order to design a questionnaire on the port users' perceived value measurement. Criteria included in the questionnaire and used to evaluate perceived value were discussed during the interviews of this phase. The interviewees were asked to talk broadly about their value drivers in connection with specific port elements. Afterwards, they were given a list of criteria and they were asked to evaluate them in terms of importance and perceived value. Following the evaluation, the interviewees were asked whether any criteria they regarded important were not included in the list. The results of the interviews confirmed that further

adaptations to the port users' value drivers were not necessary, as they had already covered all the critical aspects reported by the port users. Thus, it was confirmed that the value attributes could be the subject of a quantitative research with reference to an increased number of port users (third phase of the research).

The second phase of the research replicated to a great extent the procedures and tools used during the first phase.

5.4.5.1 The sample selection and the interviewing process

The procedures followed in selecting the sample replicated the ones analyzed in section 5.4.4.1. Semi-structured interviews were also used for data collection. The process and research protocols followed during the first phase were also used during the second phase of the research.

The sample was also theoretical and nonprobabilistic. The final selected sample for the Belgian ports is presented in table 5.4.2. The shippers were not included at that stage of the research. Instead, subcontractors were contacted as the need to retrieve information about them was anticipated during the first phase of the research. In the second phase of the research, no contacts were made with the port users and the port authorities of the Greek ports. As the two case studies analyzed in the present thesis do not find application to the Greek ports, it was deemed unnecessary to conduct interviews in Greece at this phase of the research. Therefore, the sample included only users and service providers located in the ports of Antwerp and Zeebrugge.

When the sample had been finalized, an e-mail (Appendix I) was sent to all the companies included in it (April 2010). The e-mail stated the theme of the research study, the main axes that would be under discussion during the interview and finally stated that a confidentiality clause would apply. An effort was also made to contact the people in the highest possible position of the administration hierarchy. On April 28th, 2010 a second e-mail was sent to the companies which had not replied and finally, on May 3, a phone call followed. Finally, eight positive answers were received. A respective number of interviews were conducted with three shipping lines, three freight forwarders, one

subcontractor and one port authority. The average time of the interviews was one hour.

Table 5.4.2. The Final Selected Sample in the Belgian ports (phase 2)

	Sub categories	Number
Terminal Operators		All
Port Authorities		All
Shipping lines	With dedicated terminals	All
	International	5
	Regional	5
Freight Forwarders		5
Subcontractors		4

5.4.5.1.1 The Semi-structured Interviews with the port users

The semi-structured interviews with the port users focused on four main themes⁵²:

1. The general characteristics of each port user;
2. The interactions of each user with the other members of the port community;
3. The relationships of each user with the other members of the port community;
4. The elements that impact the port users' perceived value in each interaction/relationship with the other members of the port community.

During the interviews conducted, the question posed to each interviewed port user in order to assess the attributes that generate his value was “*What creates value for your company as a port user?*”. Answering this simple straight forward question, the interviewee was encouraged to talk freely and express his thoughts without any guidance.

⁵² An analysis of these themes is provided in Appendix I.

Time constraints for the answer as well as the general framework in which each interviewee could develop his thoughts were self-posed. The absence of guidance by the interviewer (at least during the early stages of each interview) led to making each interviewee express his spontaneous thoughts on the theme. Furthermore, the literature review and the analysis of the port users' interactions and relationships signified that the port users' perceived value is a rather complex construct. The aim of the interviewer was not to lead the interviewee think about this complexity, as it was believed that it could distort and leverage the answers. Yet, the researcher could use the answers in order to validate and further understand the ways that the port users' value is formulated.

Following the initial spontaneous answer by the interviewee, a series of targeted and more detailed questions by the interviewer followed. This group of questions was an attempt to retrieve more detailed information on the generating process of the port users' perceived value and to further understand and if possible to simplify its complexity. During the interviews a top-down⁵³ approach was adopted, starting with the identification of desired end-states and moving down to the desired attributes.

The attributes revealed during the interviews of the first phase of the research, were also the subject of the ones conducted during the second phase. Initially, the interviewees were also asked to speak broadly about what generates the value they receive from a port. Any new attributes identified were marked down and became the subject of a more detailed analysis.

Later on, a questionnaire including all the attributes identified during the first phase of the research, as well as the ones identified during the second one⁵⁴ was given to the interviewees. They were asked to rate the attributes' importance using a Likert 7-scale, anchored with "not important at all" and "extremely important". The results of this measurement were used for internal validation of the attributes selected.

⁵³ In accordance with the means-end theory proposed by Woodruff (1997)

⁵⁴ No new attributes were identified during the second phase of the research. Changes referred to definitional and expression issues and were made only during the first two out of the eight interviews. For the rest of them, no changes were deemed necessary following the absence of the interviewees' comments.

5.4.5.1.2 The interviews with the port authorities

The port authorities were asked about the ways they measure their performance and whether they have formal ways of measuring the port users' perceived value or satisfaction. Initiatives to promote the cooperation between the port users in terms of increased value offerings were also under study. The PAs were also asked to talk about the activities they use in order to increase their value offering toward their users. Finally, another theme under discussion was the relationships that the PA develops with the other members of the port community.

5.4.6 **The third phase of the research**

Following the first two phases of the present research, a third one was deemed necessary in order to fulfill the research objectives initially set. Stage 5 of the proposed research process was under study. This phase was carried out with the use of questionnaires rather than interviews, a choice guided by the need to derive data in order to conduct a quantitative analysis.

In the third phase, there was a need for a broader sample that would make it possible to assess the port users' perceived value through the development of a formative construct with the use of the *Partial Least Squares* technique (implementation is further analyzed in Chapter 9). It was therefore decided to launch a survey and generate more data in less time compared to the interviews and increase the validity of the analysis. Furthermore, the data needed were evaluations on specific value attributes rather than general information that describe the phenomena under study. Therefore, the questionnaires were the adequate means to retrieve sufficient information.

The use of questionnaires through internet or mail, minimizes socially desirable responses while distortion due to the interviewer's characteristics and opinions is largely avoided (Zikmund, 2000; De Vaus, 2001). Therefore, they are essential for evaluations and rating of attributes as is the case of the present phase of the research.

5.4.6.1 The sample selection

Based on the results of the analysis of the port users and the service providers' interactions (Chapter 6) and relationships (Chapter 7), the perceptions of two types of port users were assessed in the third phase of the research. These were: the shipping lines and the freight forwarders. It should be noted that, the aim was also to include the terminal operators in the sample. This was not possible due to two reasons. First, due to the limited number of terminal operators operating in the ports under study and second, due to their unwillingness to provide data during the first two phases of the study. As such, it was decided to exclude the terminal operators from the third phase of the present research.

Sample selection followed a nonprobabilistic method. The port users located in the ports of Antwerp, Zeebrugge and Piraeus⁵⁵ were targeted during that phase as well. The port users located in the port of Thessaloniki were excluded due to the comprehensive character of the port. In order to increase the sample and thus increase the potential number of responses (that would directly increase the validity of the study), it was also decided to include the port users from the ports of Rotterdam and Hamburg. Other major European ports could be included as well (such as Le Havre, Amsterdam, Bremen etc.) but that would substantially increase the cost and time required for the implementation of the research. It was thus decided to expand the sample with the addition of the two ports.

The catalogues provided by the port authorities of Antwerp, Zeebrugge, Rotterdam and Hamburg were used to identify all the shipping lines and the freight forwarders located in or using the respective ports. The analysis identified, 158 freight forwarders of which 73 were located in the Belgian ports (Antwerp and Zeebrugge), 72 in Rotterdam and 13 in Hamburg. In terms of the shipping lines, 117 were identified of which 57 were located in the Belgian ports, 33 in Rotterdam and 27 in Hamburg. All of them were included in the sample.

A different procedure was followed for the users located in the port of Piraeus due to the absence of formal relative information from the port authorities.

⁵⁵ The port users from these ports comprised the sample of the first two phases of the present research.

Access to internet based databases⁵⁶ and personal contacts enabled the identification of the port users located/using the Greek port under study. The fieldwork identified 44 freight forwarders and 17 shipping lines, all included in the sample. In total, 336 companies comprised the sample (202 freight forwarders and 134 shipping lines).

Following the finalization of the sample, a letter requesting the participation in the survey was sent via e-mail (Appendix I) to all the selected companies. An effort was made to contact executives at the highest end in the administration hierarchy. The e-mails were sent in early June 2010⁵⁷. One week later, a second e-mail followed to the ones that had not replied. Finally, a phone call to all the companies followed a week later in case that no answer had been received by then.

Two alternatives were given to the responders. They could either fill in the questionnaire on-line⁵⁸ or fill in the electronic questionnaire that was attached to the sent e-mails.

In total 39 responses were received, providing a response rate of 11,6%. The response rate is quite low⁵⁹. Out of the 39 responses received, 9 were incomplete and were thus excluded from further analysis. In total 30 questionnaires were used during the quantitative analysis of the present thesis. The methodology followed during the quantitative analysis is provided in Chapter 9⁶⁰.

5.4.6.2 The questionnaires

Two different questionnaires were used, each one addressing a different type of port user under study.

⁵⁶ www.ship.gr

⁵⁷ In case that the e-mail addresses were not valid (thus returned) a phone call to the company followed in order to ask for valid e-mail addresses. E-mails were then re-sent.

⁵⁸ The specialized website www.surveymonkey.com was used for on-line questionnaires

⁵⁹ This is due to the period that the research was conducted. During the phone contacts with the companies, many stated that due to summer vacations, offices operated with less than usual human resources and thus there was no time available to fill in the questionnaires. Another reason was that many companies belong to large conglomerates and they had to apply for permission to the head quarters in order to participate in the research.

⁶⁰ The selected methodology is driven by the results generated on the port users and service providers' interactions and relationships analysis (Chapters 6 and 7 respectively). Thus, in order to better understand the methodology and the reasons for choosing it, it is presented in Chapter 9 of the present thesis.

All the questionnaires followed a common format (Appendix III). A small introduction stated the aim of the survey, the scope of the research and called the responder to think about a specific “port use situation”⁶¹ throughout the questionnaire⁶².

The first part of the questionnaire collected personal information, the size of the company (TEU’s handled and number of employees) and the level of vertical integration of the company.

The second part included questions that enable to evaluate the users’ perceived value by a number of service providers (depending on the type of the company). Shipping lines and freight forwarders evaluated their perceived value by terminal operators, inland terminals, shipping lines (also feeder ones if used), the port authority and the structural characteristics of the port in use.

The procedure for selecting the perceived value criteria to be assessed is analyzed in Chapter 8. Port users were asked to think about the best supplier used in terms of perceived value for each type of service provider and to compare alternative buyer-supplier relationships. A list of items tapping the different criteria of perceived value dimensions had been identified during the first and second phase of the research and were included in the questionnaire. Responders compared their best supplier to the second best alternative of a specific service on a 7-point rating scale (1=strongly disagree; 7= strongly agree). Each supplier evaluation was followed by questions on the relationships between the user and the provider and the length of it.

⁶¹ Replicating Ulaga and Eggert (2005) approach

⁶² Moreover, the treatment of answers in the strictest confidence was clearly stated and personal data of the researcher were provided.

5.5 ENHANCING THE QUALITATIVENESS OF THE RESEARCH

5.5.1 The criteria for judging case studies

Although case studies are an extremely useful, widely used research tool, the researcher needs to overcome problems of generalizability and intersubjectivity of the results (Yin, 2009). The intersubjectivity may be present as the observations, the interactions, the interviews, or the content analysis of a particular case involve interpretations based on the opinion of the individual researcher. With each researcher making decisions and judgments based on his own individual view, it is mighty that the latter influences the final results as well. To rule out this potential, the empirical part of the present thesis data consists of data collected by a number of different sources (i.e. actors). Interviews based on semi-structured questionnaires provided the time length and the opportunity to analyze in depth the phenomena under investigation whereas, the use of both qualitative and quantitative data minimizes further the presence of any intersubjectivity.

Generalizability issues of case studies, due to a limited number of cases, are a second challenge that any researcher needs to address. In the port sector, that problem is even more intense as every port can be seen as a unique case. Both the conceptual framework and the empirical findings of the present thesis support the notion that the “one size fits all” approach is not feasible and work further in presenting knowledge, understanding and tools that contribute to approaches that respect the need for case-based adaptation. At the same time, the present research provides new conceptual and applied frameworks to port users’ value measurement, interactions and relationships with service providers, that through the analysis of more cases, can turn into a meso- or even macro theory of industrial organization and (trans)port economics⁶³.

⁶³ For an analysis of the differences of micro/meso/macro theories see: Liljenstrom and Svedin (2005).

5.5.2 The criteria for judging qualitative analysis⁶⁴

Reliability and validity are important criteria in establishing and assessing the quality of any research (Kirk and Miller 1986). The present study had to address the 3⁶⁵ out of 4 different reliability and validity issues (Bryman and Bell, 2007) that are present in the qualitative research⁶⁶:

- External reliability refers to the degree to which a study can be replicated, as it is impossible to 'freeze' a social setting and the circumstances of an initial study (LeCompte and Goetz, 1982).
- Internal validity refers to the matching between researchers' observations and the theoretical ideas they develop.
- External validity refers to the degree to which findings can be generalized across social settings.

The detailed research design and the selection process of the sample followed scientifically established methods (sections 5.4.4.1, 5.4.5.1 and 5.4.6.1) so as to ensure the external reliability. Materials were indexed on a case-study database so that they can be retrieved for checking the interpretations offered in the final analysis. The recordings of the interviews, as well as the transcripts, are filed and available for cross-checking.

The use of two sources of qualitative data (interviews and documents) and the use of a combination of qualitative and quantitative data contribute to the construct validity of the study. In addition, the data collected during the first phase of the research which led to conceptualizations were further verified during the second phase. A number of academic papers regarding the process of the study was published in referred academic journals and books and presented in international conferences thus enabling the testing of their validity from experienced scholars and any industry representatives (Pallis and Vitsounis, 2008; 2009; 2011; Vitsounis and Pallis, 2010). Finally, the comprehensive

⁶⁴ The criteria for judging the quantitative analysis are presented in Chapter 9.

⁶⁵ Internal reliability refers to whether members of the research team agree on the outcome of the observations and is not valid in the present thesis as only one researcher is involved.

⁶⁶ Yin (2009) suggests a more complex set of criteria and puts forward the notion of construct validity (the necessity to establish correct operational measures for the concepts being studied).

literature review (Chapter 3) further enhanced the validity and reliability of the present study, as it was possible to compare the findings with outputs of prior research.

5.6 SUMMARY

The present chapter discussed the foundations and detailed the 7-stage research process designed to complete the present doctoral study. It also discussed the methodology applied for conducting the empirical research. The conducted research is a combination of inductive and deductive studies. Case studies were selected as a means of analysis mainly appropriate for studies in which knowledge is at a 'near zero' basis, and allow for a ground theory approach. Combinations of qualitative and quantitative data involving interviews and questionnaires and qualitative and quantitative interpretations respectively are the endorsed means to answer the research questions. Both "research methods" account and the nature of the industry implied an international sampling and a multistakeholders' analysis. Both parameters were respected during the collection of data from the field. The research was carried out in three phases. Each of them validated the findings of the previous one and generated further knowledge, having always in mind practices that enhance the quality of the conducted research discussed in this chapter. The next chapters (Chapters 6-9) present the results of each stage of the empirical research carried out.

CHAPTER 6. THE PORT USERS AND SERVICE PROVIDERS' INTERACTIONS: IDENTIFICATION, CLASSIFICATION AND MAPPING

6.1 INTRODUCTION

As the previous chapter established, in order to develop a tool for assessing the port users' value, it is crucial to be aware of the interactions taking place between the port users and the service providers.

The first stage of the conducted empirical research aims to identify, classify and map interactions taking place within a port range involving the port users and the service providers. This is a fundamental stage towards the development of a port users' value measurement tool (Chapter 5). The detailed analysis of the findings leads to the building of two distinctive port settings each referring to different container port characteristics; with common user and dedicated container terminals respectively. The characteristics of the port users and the service providers' interactions are detailed, whereas the findings signify the existence of direct, indirect and internal interactions. Interactions also consist of a commercial and an operational dimension. Finally, hybrid types of interactions are found in port settings and are thoroughly analysed in the present chapter.

6.2 THE PORT USERS' INTERACTIONS

6.2.1 Background for understanding the findings

Before proceeding to the analysis of the identified interactions it is worth discussing briefly two key background concepts, which facilitate the understanding of the empirical findings. Fundamental changes in ports characteristics and operations have caused an enlargement of the scope of the port services offered. The basic constituents of port services are nowadays the transportation of cargo to the hinterland, warehousing, information exchange, the provision of value added services and many more. With ports being viewed as clusters of economic activities (De Langen and Visser, 2005), port users are not solely interested in specific services but generate a more general view of the whole port.

The extended port devolution programs have led to new allocations of port activities between public and private bodies. Brooks and Cullinane (2007b) recognise nine different groups of port activities that imply 1.953.125 possible combinations of governance-activity structures for the management and control of port activities. Their analysis assumes five forms of governance along the private-public continuum and emphasis is given on different forms of public bodies carrying out these activities, whereas private companies are treated as a homogeneous group.

Yet, the generalization of private bodies in a single group may be regarded as rather general. In accordance with a 'follow-the-firm' approach (section 2.5), a more detailed analysis of different private firms offering port services is sufficient. Vertical and horizontal integration strategies pursued mainly by shipping lines, terminal operators and freight forwarders (Chapter 2) have extended the scope of services offered by each port actor. The core business of a single company is not sufficient to depict the services offered. Shipping lines, terminal operators and freight forwarders are largely involved in the provision

of services beyond shipping, cargo handling and forwarding respectively. Moreover, the scope of service provision by each company largely varies from port to port. As such, a shipping line may also provide stevedoring and forwarding services in a specific port and focused only on shipping services on another one. Thus, the homogeneous group of private companies may be subdivided into several combinations of private firms offering different ranges of port related services. Such an approach enlarges the different possible combinations of private and public bodies offering port related services. That leads to a further increase of port complexity.

The absence of standardization and typology of service provision within a port range does not cause problems only for the identification of service providers but of service users as well. As the level of privates' vertical integration varies from port to port, it remains fluid which services are in need by each firm in a given port. For example, a shipping line with a dedicated terminal in a port is not in quest of a stevedoring service supplier in that port. Rather than that, it considers stevedoring as an internalized service (further analyzed in section 6.5.3).

6.2.2 The different types of interactions

Each port can be viewed as a unique case (Chapter 2) and this poses major difficulties on a port users' perceived value measurement. According to the interaction model (introduced by Hakansson, 1982), the purchasing of industrial goods is seen as an interaction process between two parties within a certain environment. Thus, in order to evaluate the perceived value in industrial markets there is a need to fully understand first the industrial good and second the two parties involved in the interaction. Although in most industrial markets these two are easily identifiable, in the case of ports there is a need for a detailed analysis. This is because both of them remain under a large variance between different ports. The delivery of a given service may involve two types of firms in a port and two different types of firms in another one, while in a third port they may not be provided at all. So far, the way that the members of a container port

community interact and the services being subject of each interaction have not been detailed by any port study.

Four elements are exchanged in any industrial market relationship: a) the product or services, b) the information exchange, c) the financial exchange and d) the social exchange (ibid). The findings of the first phase of the present research signify that an alternative approach is sufficient in ports and provides the essential information. The information, financial and social exchange can be grouped together as elements that are subject of one exchange only. In this vein, two types of interactions take place between port users and service providers in ports: The *operational interactions* and the *commercial interactions*, respectively.

6.2.3 The Operational Interactions

The operational are the first type of the identified interactions. They involve the physical interaction between two port actors on an operational level. That includes the exchange of a service, for example the loading of a container into a truck or wagon, the storage of a container etc. In container ports, an operational interaction always involves the movement of a container, with the latter being the core of these exchanges. Thus, a 'follow-the-container' analysis through the different movements taking place within a port, emerges as the best way for mapping and further analyzing the operational interactions that take place within the various port settings.

6.2.4 The Commercial Interactions

The commercial are the second type of the identified interactions. They refer to all other interactions besides the operational ones that develop between different actors such as communications, payment, agreements etc. These involve the financial, social, and information exchanges, with the financial exchange prevailing in every service provision.

In these cases, information is transferred between the involved parties by either personal or impersonal means. Impersonal communication is usually used to

transfer basic technical and/or commercial data. Personal channels are mainly used for the exchange of 'soft data'; such as supportive information, modification etc. The development and extended use of EDI systems cover a significant proportion of the exchange of impersonal information. Moreover, the extended importance of information exchange leads to the development of various internet-based platforms that facilitate the impersonal exchange of information (i.e. 'Inntra' for major shipping lines, 'Portbase' for the ports of Amsterdam and Rotterdam etc.).

The importance of the social exchange graduates as the relationship between the two parties evolves. In the long run, various aspects of the agreements between a provider and a user are neither formalized nor based on legal criteria and contracts. Rather, they are based on the social and relationship bonds developed between the two parties.

6.3 TWO DISTINCTIVE PORT SETTINGS

The first phase of the conducted research provided information on the movement of a container, starting from its entrance in a port area until its final exit and enhanced a "follow-the-container" analysis. The latter identifies the various interactions that are found in container ports as well as the involved port actors. Moreover, the findings conclude on the identification of three distinctive port settings. When detailed, these settings reveal the various types of interactions between port users and service providers. These findings were further confirmed during the second phase of the research.

The first port setting is that of a landlord port with the presence of a common user terminal (named hereafter '*the common user terminal setting*'). The second one is that of a landlord port with the presence of a dedicated terminal (hereafter '*dedicated terminal setting*'). The third setting identified, is that of an operating port, with a dominant port authority remaining responsible for the

provision of port services. Due to the fact that during the last years this operating port model is progressively reformed, the scientific and practical interest in it is gradually declining. Thus, it was decided to exclude the third setting from the analysis that follows.

The 'confidentiality clause' involved in the conducted interviews poses restrictions in the ways that the qualitative research findings are presented. Codenames are used in the forthcoming analysis for the identification of each stakeholder. The list includes port authorities (PAs), international terminal operators (ITO), freight forwarders (FF), shippers (SH), global shipping companies (GSL) and those operating on a local/regional scale (RSL). Reference is also made to dockworkers' professional organizations (DPO), depots (DEPOT), inland terminals (IT) and subcontractors (SUB).

The port settings that are further analysed in the forthcoming sections are the dominant ones in the sector, though not unique. Benefited from this dominance the port settings were constructed having in mind the objective of the present analysis, that is the port users' perceived value. The interactions analyzed are the ones that the users regarded as the most important in terms of their perceived value. This vein sets the limits of the settings and the interactions under analysis. For example, it is worth being aware that freight forwarders have constant and multiple interactions with numerous subcontractors. Yet, these interactions do not necessarily take part in a port. Subcontractors are not regarded as typical port users or port service providers, and thus do not impact the forwarders' port perceived value. For this reason, these interactions are not detailed in the analysis that follows.

6.4 THE COMMON USER TERMINAL SETTING

The first setting is characterized by the presence of a global shipping line (GSL.1) with its subsidiary company (i.e. SL) offering logistic/forwarding services. An

International Terminal Operator (ITO.1) operates the container terminal under a common user principle. Terminal Operators have only recently started to expand their offered services and get involved in the provision of merchant haulage of containers to the hinterland. That activity is usually carried out by a subsidiary company (FITO).

A hybrid relation might develop between the shipping line and the international terminal operator (ITO.1). The GSL.1 can be involved in financing the development of the terminal and being part of its general management council⁶⁷. Though, it does not enjoy any special treatment (i.e. rates, priorities etc.) when it comes to operational issues. Rather than that, the shipping line will possibly have the obligation to use the specific terminal when it reaches the specific port.

Freight Forwarding companies (FF) offer forwarding services in the port setting. They are appointed by shippers and for reasons of simplicity they act as a proxy for shippers throughout the remaining of the present analysis. Inland Terminals are operated by either a private independent Inland Terminal Operator (IT.1), a container terminal operator (IT.2), the global shipping line (IT.3) or even freight forwarders (IT.4)⁶⁸. Independent Inland Terminal Operators (InTO) may use their own means of transportation to organize and carry out the transportation of containers from the container terminal to the inland one. They may also offer forwarding services to other destinations. All the companies in this setting that are involved in forwarding services own and/or charter means of transport such as barges, trains, or trucks from a number of subcontractors (SUB). Finally, a number of regional shipping lines (RSL.1-3)⁶⁹ are possibly found in the setting.

⁶⁷ This was also recently confirmed by Notteboom and Rodrigue (2010).

⁶⁸ Relationships developed between the various companies in the port setting largely impact their interactions. Those relationships are the subject of analysis in chapter 7.

⁶⁹ Three codenames (RSL.1-3) are used for indicating regional shipping lines in order to enhance the easiness of understanding the different use situations when it comes to commercial interactions.

6.4.1 The Operational Interactions

Figure 6.4.1 describes the operational interactions that take part in the common user terminal setting⁷⁰. Global shipping lines use navigation services provided by the PA (e.g., the harbour office) until the vessel is safely moored. This involves the provision of tugs, pilots and locks (if any). Private companies can offer towage services as well. For reasons of grouping, customs are included in this type of interaction, though it must be acknowledged that this is not a classic 'deep-sea' procedure.

Global shipping lines maintain indirect operational interactions with all types of forwarders and the regional shipping lines. GSL.1 transports containers to the port in order to be handled by forwarding and regional shipping line companies. The interactions are indirect as the stevedoring company always intervenes. Terminal operators use services by local dockworkers professional organizations (DPO), as they are commonly obliged by the port rules. A terminal operator provides stevedoring services to the shipping company and delivers the containers to forwarders (of all types) in order to direct them to the hinterland. It also provides stevedoring services to the regional shipping lines.

Companies offering forwarding services, whether subsidiaries of the GSL.1, ITO.1 or InTO or not (FF) receive the container from the terminal operator. Then, they either forward it to an inland terminal or deliver it to another destination (usually the final destination imposed by the shipper). Notably, here a number of different combinations emerge. The FF may forward the container to an inland terminal operated by the GSL.1, ITO.1, InTO or even itself. The same applies to other forwarders and the respective interactions between the various inland terminal operators and the forwarders that take place. In cases though, where the various forwarding companies move the containers to the inland terminal that they operate themselves, the interactions take the form of 'internal interactions' (denoted by arrows in the same colour). That is due to the fact that, the two parties are members of the same conglomerate (in case they are both

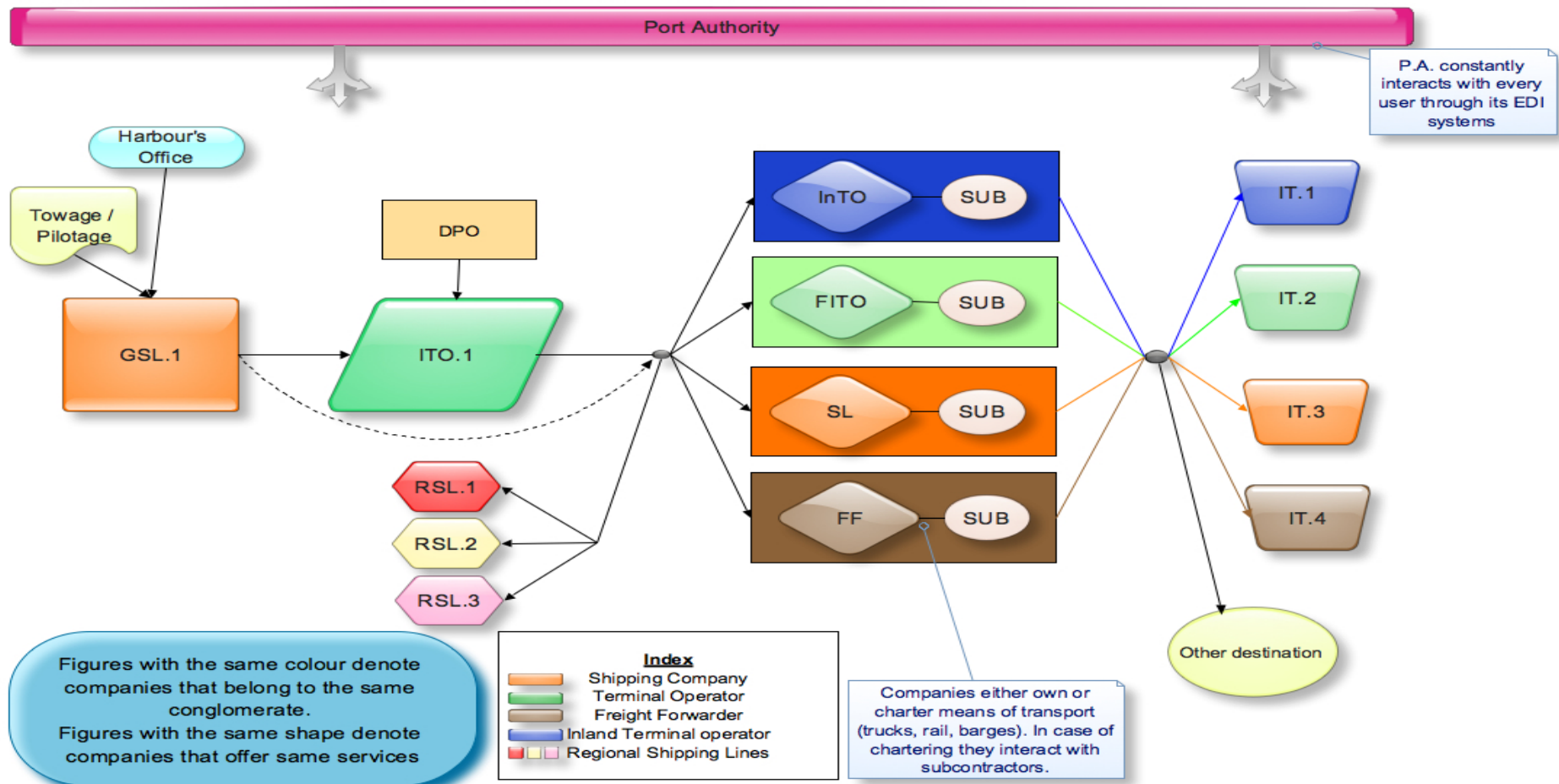
⁷⁰ The description follows an importing route of containers. For exporting, the order is reverted. Any found differences during the two routes are explicitly analyzed.

subsidiaries of a larger conglomerate or one of them is the other's subsidiary) or may even be the same company. In either of these options, there are no actual interactions present, as there is no purchasing of services that involves the two parties, in the way described in industrial marketing literature (see: Hakansson, 1982). As the term 'party' may be the subject of different definitions and interpretations, hereafter these interactions are named 'internals' and will be the subject of special attention.

Assuming that the PA is not involved in cargo handling, operational interactions are developed between the PA and all port users via the controlled by the PA Electronic Data Interchange (EDI) systems.

Figure 6.4.1. The Operational Interactions - The Common User Terminal

Port Setting 1: Common user terminal - Operational Interactions



6.4.2 The Commercial Interactions

The commercial interactions that take place in the Common User Terminal setting are portrayed in figure 6.4.2 and supplement the operational ones. On a commercial level, GSL.1 interacts with the PA, as it pays port dues for the services provided by the Harbour's Office. It also develops regular commercial interactions with the ITO.1 for the supply of stevedoring services. The shipping line has commercial interactions with the inland terminals so as to use the latter as storage areas in the hinterland. Additionally, GSL.1 interacts directly on a commercial level with forwarding companies. The latter buy services for container transportation. In cases where the shipping lines' subsidiaries⁷¹ run the forwarding or the inland terminals, the commercial interactions are 'internal' and their volatility diminishes.

Forwarding companies (SL, FITO and FF) have direct commercial interactions with subcontractors. They may also have commercial interactions with the inland terminals. In an export orientation, they use the inland terminals to pick-up empty containers that are stored by the shipping lines. In that case, the commercial interaction takes part between the shipping line and the inland terminal (as already analyzed). In an import orientation though, forwarders may use the inland terminals either because they are places of final delivery or because they are used as transshipment points. In those cases, commercial interactions between the forwarders and the inland terminals are present. Notably, 'internal' interactions may also be found in case that inland terminals are operated by a forwarder's subsidiary.

FF may also develop commercial interactions with InTO and ITO.1 (FITO) subsidiaries that offer logistics services. Although such interactions are rare, freight forwarders may use these companies in order to move containers to a hinterland destination. In that case, FITO and InTO are acting as subcontractors and FFs retain the overall responsibility of container transportation.

⁷¹ Various types of participation in inland terminal operations may be found by companies such as shipping lines, freight forwarders and terminal operators. These themes are further analyzed in chapter 7.

The commercial interactions between the forwarding branch of InTO and shipping lines are also rare. InTOs use or charter means of transportation, mainly to move containers from a port terminal to their own inland terminal. Rarely though, they might develop a broader activity servicing other destinations as well. Consequently, they tend not to have commercial interactions with other inland terminals. As the aforementioned commercial interactions of the inland terminal operators are rare, they are not portrayed in figure 6.4.2.

There are three different RSLs in the present port setting each of one representing a different use situation. RSL.2 is chartered by the global shipping line in order to tranship containers to another port. This is usually the case when the GSL.1 does not have sufficient capacity to serve specific destinations. It therefore charters independent shipping companies. Alternatively, RSL.2 may use the global shipping line in order to bring containers to the port and then forward them to another port. Although regional shipping lines do not have the required capacity and vessels to operate on a global scale, they might still offer global services to their clients. They do so by outsourcing specific parts of the seagoing movement to other shipping companies usually of bigger size (see also Chapter 7). Direct commercial interactions (both ways) are developed between the RSL.2 and the global shipping line. RSL.3 is chartered by a FF in order to deliver containers to another port and accordant commercial interactions between the two are present. Finally, RSL.1 is not chartered by any other company but rather operates autonomously. All the regional shipping lines (RSL1-3) also have direct commercial interactions with ITO.1 for the provision of stevedoring services.

The relations between GSL.1 and FF and inland terminals operated by individuals (IT.1) are of hybrid nature. These entities maintain commercial but not operational interactions, as a terminal operator carries out the operational part. A detailed discussion of these hybrid forms of relations is found in section 6.6.

Table 6.4.1 presents all the interactions and their characteristics that have been identified in the common user port setting and have been discussed in this section.

Figure 6.4.2. The Commercial Interactions – The Common User Terminal

Port Setting 1: Common user terminal - Commercial Interactions

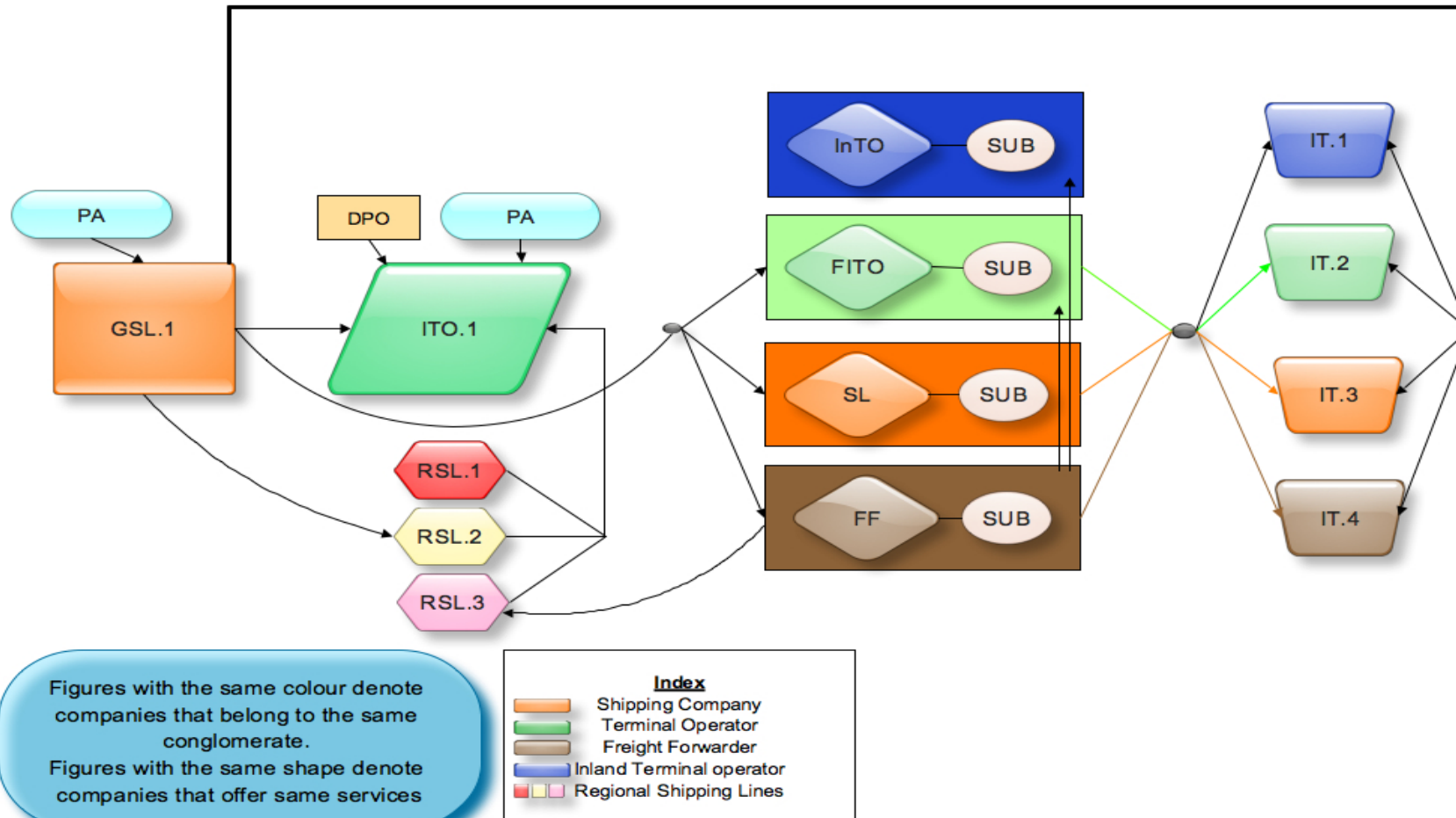


Table 6.4.1. The Characteristics of Interactions in the Common User Port Setting

Interactions Between		Operation	Type of Interaction	Special characteristics
GSL.1	P.A.	Harbor's Office (towage, pilotage etc.) and customs clearance	Direct Operational Direct Commercial	
GSL.1	ITO.1	Container Handling	Direct Operational Direct Commercial	Hybrid interaction - Type 3. GSL.1 finances the terminal operated by ITO.1. GSL.2 is a client and a shareholder of the terminal at the same time and does not enjoy any special treatment.
GSL.1	InTO / FITO / FF	Deep sea transportation	Indirect Operational Direct Commercial	The interaction is hybrid - Type 1 (indirect on an operational level but direct on a commercial level). The relation is hybrid as GSL is at the same time a FF/InTO/FITO service provider and competitor (through SL)
GSL.1	SL	Container transportation to the hinterland	Indirect Operational Internal Commercial	SL is a GSL's subsidiary and their commercial interactions are internal
GSL.1	IT.1 / IT.2 / IT.4	Storage, consolidation of containers (Container repair services may also be provided)	Indirect Operational Direct Commercial	Hybrid interaction - Type 1
GSL.1	IT.3	Storage, consolidation of containers	Indirect Operational Internal Commercial	IT.3 is a GSL's subsidiary and their commercial interactions are internal

GSL.1	RSL.1 / RSL.3	Deep sea transportation	Indirect Operational	
GSL.1	RSL.2	Deep Sea transportation and delivery to another port	Indirect Operational Direct Commercial	Hybrid interaction - Type 1
ITO.1	P.A.	Concession Agreement / lease of cranes	Direct Operational Direct Commercial	
ITO.1	DPO	Dockworkers' operations	Direct Commercial Direct Operational	
ITO.1	InTO/ SL/ FF	Releasing container	Direct Operational	
ITO.1	FITO	Releasing container	Internal Operational	FITO is a ITO's subsidiary.
ITO.1	RSL.1 / RSL.2 / RSL.3	Container Handling / Container release	Direct Operational Direct Commercial	
FF	RSL.3	Container transportation to another port	Direct Commercial	
FF	FITO / InTO	Container transportation to the hinterland	Direct Operational Direct Commercial	In that case, FITO and InTO are seen as FF's subcontractors.
FF	IT.1 / IT.2 / IT.3	Storage, consolidation of containers	Direct Operational Direct Commercial	

SL	IT.1 / IT.2 / IT.4	(Container repair services may also be provided)		
FITO	IT.1 / IT.3 / IT.4			
InTO	IT.2 / IT.3 / IT.4			
FF	IT.4	Storage, consolidation of containers (Container repair services may also be provided)	Internal Operational Internal Commercial	
SL	IT.3			
FITO	IT.2			
InTO	IT.1			
PA	All port users	Information Exchange	Direct Operational	

6.5 THE DEDICATED TERMINAL SETTING

The second port setting is characterised by the presence of a dedicated terminal. A Global Shipping Line (GSL.2) participates in a joint venture with an International Terminal Operator (ITO.2) for the development and operation of a dedicated terminal. Operational responsibility lies with the ITO.2, whereas GSL.2 uses the specific port as a main hub for the region and consolidates large volumes of containers. A sister company of GSL.2, (SL.2), offers logistics services mainly by chartering means of transportation from subcontractors and, rarely, by possessing means of transport itself. Freight forwarding companies are also present, as the responsible PA. In the present setting depots are present as well. They are operated either by the global shipping line (Depot.1) or individuals (Depot.2). Inland terminals, FITO's, and regional shipping lines, are not included in that port setting.

6.5.1 The Operational Interactions

Figure 6.5.1 describes the operational interactions taking place in the dedicated terminal setting. The shipping company uses services provided by the Harbour's Office controlled by the PA. It also maintains indirect (denoted with dotted arrows) operational interactions with forwarding companies as the latter receive and forward containers transported by GSL.2. The global shipping line has internal operational interactions with the ITO.2 for the provision of stevedoring activities. Internal indirect operational interactions are also developed between the GSL.2 and its subsidiary SL.2.

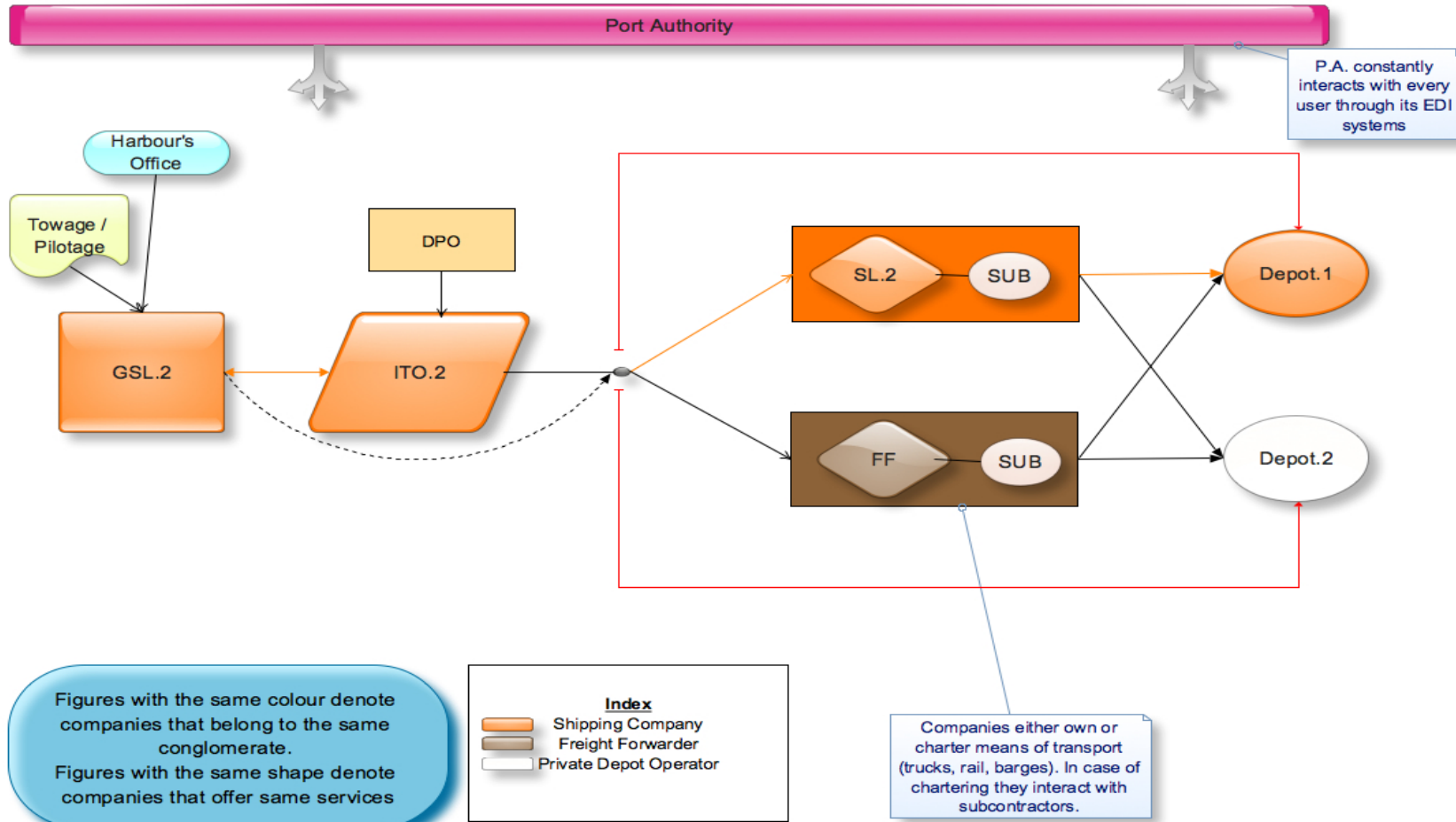
ITO.2 uses the services of the local dockworkers' professional organizations (DPO). It delivers the containers and has direct operational interactions with the forwarding companies (FF). Direct internal interactions are developed between the ITO.2 and the SL.2 as both parties are members of the same conglomerate.

ITO.2 may also have direct operational interactions with the Depots in cases that containers are stored there before being forwarded to the hinterland. In this case, depot services are provided right after the containers' unloading at the terminal (denoted by red arrows), with depots being responsible for their movement to the storage points⁷². In that case, depots also maintain direct operational interactions with the SL.2 and FF, as they release the stored containers to them. In an export orientation, depots also have direct operational interactions with the SL.2 and FFs. They do so by picking up empty containers being stored there by the shipping lines. The interactions between the SL.2 and Depot.1 are regarded as 'internal'. Finally, operational interactions are developed between the PA and all port users present, via the PA controlled EDI systems.

⁷² The movement of containers from the terminal to the depots may also be carried out by other companies but as these cases are rare they are excluded from the analysis.

Figure 6.5.1. The Operational Interactions – The Dedicated Terminal Port Setting

Port Setting 2: Dedicated user terminal - Operational Interactions



6.5.2 The Commercial interactions

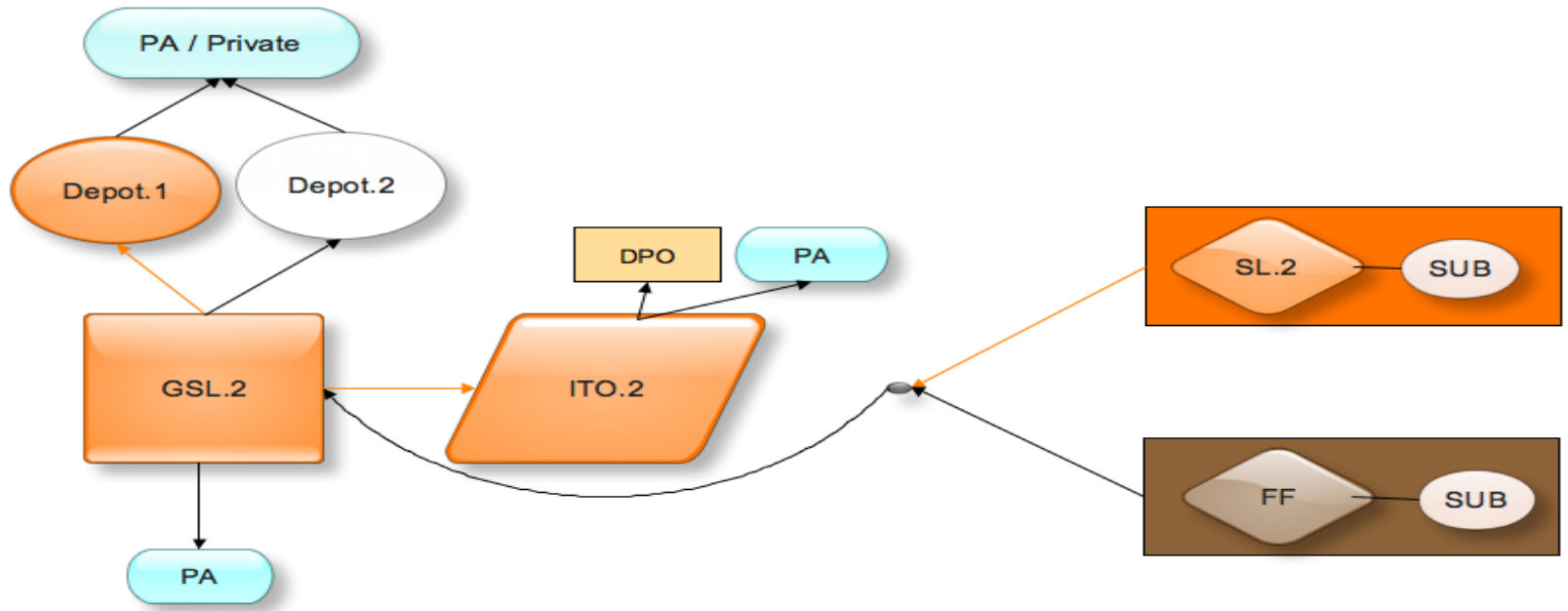
The commercial interactions developed in the dedicated terminal port setting are presented in figure 6.5.2. The global shipping line interacts commercially with the PA for the provision of services offered by the Harbour's Office. The joint venture established between the shipping line and the terminal operator for the development and the operation of the dedicated terminal, signifies the presence of 'internal' commercial interactions between the two parties. It should be noted that dedicated terminals may also operate without the establishment of joint ventures. 'Internal' commercial interactions also develop between the ITO.2 and the SL.2 and the Depot.1, all operated by the global shipping line. The same applies to the GSL.2 commercial relations with SL.2 and Depot.1. If the depot is operated by a private entity, (Depot.2) then GSL.2 usually retains long-term direct commercial agreements with it for the storage of containers. FFs have direct commercial interactions with the global shipping line for the transportation of containers to the port.

ITO.2 maintains commercial interactions with the PA, as it leases the terminal area and in some cases cranes and the DPO as it employs its members. Finally, depots are involved in commercial interactions with the owner of the land they lease. This owner might be either the PA or a private entity.

Table 6.5.1 presents all the interactions and their characteristics that have been identified in the dedicated terminal setting and discussed in this section.

Figure 6.5.2. The Commercial Interactions – The Dedicated Terminal Port Setting

Port Setting 2: Dedicated user terminal - Commercial Interactions



Figures with the same colour denote companies that belong to the same conglomerate.
 Figures with the same shape denote companies that offer same services

Index	
	Shipping Company
	Freight Forwarder
	Private Depot Operator

Table 6.5.1. The Characteristics of Interactions in the Dedicated Terminal Setting

Interactions Between		Operation	Type of Interaction	Special characteristics
GSL.2	P.A.	Harbor's Office (towage, pilotage etc.) and customs clearance	Direct Operational Direct Commercial	
GSL.2	ITO.2	Container Handling	Direct Internal Operational Direct Internal Commercial	The two parties have developed a joint venture for the development and operation of the terminal.
GSL.2	FF	Deep sea transportation	Indirect Operational Direct Commercial	Hybrid Interaction – Type 1 & 2 The relation is hybrid as GSL is at the same time a FF service provider and competitor (through SL)
GSL.2	SL.2	Deep sea transportation	Indirect Internal Operational Direct Internal Commercial	SL is a GSL's subsidiary and their commercial interactions are internal
GSL.2	Depot.1	Storage, consolidation of containers (Container repair services may also be provided)	Indirect Internal Operational Direct Internal Commercial	
GSL.2	Depot.2	Storage, consolidation of containers Container repair services may also be provided)	Indirect Operational Direct Commercial	Hybrid interaction – Type 1
ITO.2	DPO	Dockworkers' operations	Direct Commercial and Direct Operational	

ITO.2	P.A.	Concession Agreement / lease of cranes	Direct Operational Direct Commercial	
ITO.2	FF	Releasing container	Direct Operational No Commercial	Hybrid interaction - Type 1
ITO.2	SL.2	Releasing Container	Direct internal Operational	
ITO.2	Depot.1	Releasing Container	Direct Internal Operational	
ITO.2	Depot.2	Releasing Container	Direct Operational No Commercial	Hybrid interaction - Type 1
FF	Depot.1 /Depot.2	Pick up of containers	Direct Operational No Commercial	Hybrid interaction - Type 1
SL.2	Depot.1	Pick up of containers	Direct internal Operational	

6.5.3 The Internal transportation channels

A notable feature in the dedicated terminal setting is the presence of a number of companies (GSL.2, ITO.2, SL.2 and Depot.1) linked with 'internal' interactions and being part of the same conglomerate. The outcome of vertical integration strategies results in the formation of an *internal transportation channel* that is identifiable in figures 6.5.1 and 6.5.2 and consists of companies with the same orange colour.

The formation of such channels enables the involved companies to downgrade the level of influence the connected networks would have on them. This generates a process that might transport a container to its final destination with extremely limited external interactions. Actually, the external interactions are with institutional bodies such as the PA or DPOs that cannot be either bypassed or internalized. Anyhow, the impact on freight transportation by any 'not in the channel' company, and consequently its impact on the level of value generation, are both eliminated.

The formation of internal transportation channels influences the views of its members on the factors that have an impact on their perceived value. Although a more detailed discussion follows in Chapter 8, the statement by a representative of a company that is a member of such a channel (interview conducted during the first stage of the present research) is illustrative:

"We only care about the existing socioeconomic conditions within which a port operates and some of the port structural characteristics, such as the geographical location and connection with the hinterland. The rest is our responsibility; we will take care of it ourselves, and decide which are the best ways to develop our activities".

Notably, the level of integration of two firms belonging to the same conglomerate largely varies. In many cases, the two firms may only be connected in terms of equity sharing and not implying the integration of

their operational patterns. In such cases, the formation of internal transportation channels is hardly achieved and the patterns that such relationships impact on the final value-offering, deserve further research.

6.5.4 The development of additional port settings

The two port settings may be present in combination and one might claim that this way they might create additional port settings. In both settings for instance, some additional players could have been present and included in the analysis. This presence could be one reminding the other setting and *vice versa*. For example, in the dedicated terminal setting inland terminals are not included in the analysis, although they are systematically used by shipping lines and freight forwarders. This is done for avoiding repetitions; interactions are already analyzed in the common user setting and thus, all the essential information has already been provided. The analysis of the two port settings, provides the ground to create additional port settings by combining specific port users and service providers in mixed ways. For example, a port setting that includes a global shipping line, a common user terminal, a private depot, a freight forwarder and a regional shipping company chartered by the freight forwarder is easily constructed based on the blending of analysis already provided⁷³.

6.5.5 The dynamism of perceived value in port settings

Corresponding to the conceptual discussion in Chapter 4, configuration is static in neither of the two settings. There is a flow of value streaming throughout an end-to-end path of a port chain. To give an example, the value that the global shipping lines exert is not limited to the services offered by the terminal operator only, but reaches the end of the chain

⁷³ An extensive presentation of possible additional port setting falls beyond the scope of the present thesis, especially as the combined situation needs empirical verification by further case studies.

albeit evaporated. Eventually, the (dis)satisfaction of a company is the outcome of its direct supplier's activities, and to a lesser extent of its supplier's suppliers, and so on. For instance, a freight forwarder might enjoy high levels of value, but this does not necessarily mean that directly interacting entities produce it. Value might be produced by a distant entity, like the shipping company, the actions of which spill over the chain.

6.6 HYBRID FORMS OF INTERACTIONS (AND RELATIONS)

The analysis of port users and service providers' interactions facilitates the identification of a number of interactions and relations not common in other industries. These hybrid forms of interactions add to the complexity of the port sector (whereas, they also confirm the methodological need to identify and analyze interactions towards a perceived value measurement tool). In total, three different types of hybrid interactions were found and the codenames Type 1-3 are given in order to facilitate their identification.

6.6.1 Hybrid interaction - Type 1.

A hybrid relation develops when a port user maintains a commercial interaction with a specific entity but the operational interaction involves a third party.

The most common example is the interaction between a freight forwarder (FF), a shipping line, and a terminal operator. The FF maintains a commercial agreement with the shipping line that governs issues like rates, number of containers that are transferred, the port of delivery/arrival, and every other aspect of the seagoing container transportation. Communication channels are developed to ensure constant exchange information throughout the various stages of the process. Still, these entities

are not involved in any direct operational interaction. The operational part of the agreement is executed by the terminal operator, without the freight forwarder having any type of agreement with him. Rather than that, the FF delivers the containers to the terminal operator in order to be forwarded to the shipping line without any choice regarding which terminal operator the shipping line is going to use. Thus, the FF does not retain any bargaining power, i.e. quality, or price demands, vis-à-vis the terminal operators.

From the freight forwarder's viewpoint, further complexity exists in terms of value, as he seeks the fulfilment of specific demands by the terminal operator. For example, the actual in-terminal waiting time for the delivery of a container time and its reliability, might be the causes for shifting to another shipping company, even though dissatisfaction is not caused by the initially used shipping company. Therefore, when assessing a port user's perceived value in such interactions, it is not sufficient to consider only its direct counterparts. Low levels of perceived value may be also caused by companies that are indirectly linked with the focal company.

6.6.2 Hybrid interaction – Type 2

A second hybrid relation was identified in the common user setting, with the two involved actors being a shipping line and a freight forwarder. These parties develop a port service user-provider relationship, while at the same time act as competitors. The shipping line directly competes with its customers. i.e. the freight forwarder, for the movement of containers through its sister company that offers inland transportation services. Any shipping line's sister company will, or at least is expected to, enjoy a preferential treatment compared to an independent third party. These hybrid interactions have further implications on the two parties' developed relationships (thus further analyzed in Chapter 7).

6.6.3 Hybrid interaction – Type 3

A third commonly observed hybrid relation takes place when the global shipping line finances the company operating a concession of a common user terminal and at the same time, acts as a user of that terminal. In terms of value measurement, there is no further complexity when the financing of the terminal stands as a distinctive business activity. However, the specific financial activity typically goes hand-in-hand with additional obligations for the shipping company, like using the specific terminal if one of its ships reaches the port.

6.7 SUMMARY

The analysis of the collected data discussed in the present chapter concluded on the identification and mapping of two distinctive port settings; the common user terminal and the dedicated terminal. The participants in each setting, their interactions, and the services being the subject of each of these interactions were detailed. Port users and service providers' interactions consist of two parts. These are the operational and the commercial part, respectively. These interactions are also classified as either direct or indirect. 'Internal' interactions are also regularly found in port settings as a consequence of the port actors' vertical integration. Vertical integration is also the main reason for the emergence of the 'internal transportation channels'. Finally, three types of hybrid interactions are present in port settings with the analysis of their characteristics provided in the preceding discussion.

The next Chapter discusses the findings on the relationships that develop between port actors within the different settings, based on the types of interactions that take place.

CHAPTER 7. THE PORT USERS AND THE SERVICE PROVIDERS' RELATIONSHIPS

7.1 INTRODUCTION

The preceding analysis of the port users and service providers' interactions (Chapter 6) is a fundamental step for the assessment of the port users' perceived value. It generates information on which two parties are involved in, and the characteristics of, a service exchange in a port. In B-2-B markets, the perceived value is not dependent only on transaction(s) of services. Rather than that, users and service providers tend to develop close and frequently long-term relationships. Thus, to fully understand the ways that perceived value is generated, research also needs to focus on the evaluation of these relationships. *Relationship value* complements *functional value* in the formation of the *total perceived value*.

The present chapter presents the findings of the second phase of the conducted research that examines the port users and service providers' relationships that develop over time within a port context. The characteristics, patterns, and trends of those relationships are detailed and form a ground that enables their evaluation in a perceived value assessment. The latter is developed in Chapters 8 and 9. The analysis of the findings illustrates the ways that '*port value chains*' emerge and compete for the users' preference in a container port. Thus, the concept of port value chains is also analyzed in detail along with '*virtual integration*' strategies. As the emergence of port value chains favours the co-creation of value between two or more port firms, the concept of *value co-creation* in ports is also discussed.

7.2 'PORT VALUE CHAINS' AND 'VIRTUAL INTEGRATION' STRATEGIES

7.2.1 Interdependencies and the impact on the port users and the service providers' relationships.

The interdependencies found in a port are *serial, pooled* or *reciprocal*⁷⁴. In serial interdependencies in ports, the output of one activity is the input of another one. Pooled interdependencies are present when two activities use the same resource, or two resources are used in one activity. Reciprocal interdependencies refer to a mutual exchange of inputs and outputs between two parties. Interdependencies favor the development of synergies between port firms that could ultimately lead to joint efforts towards the co-creation of value for their clients.

Interdependence⁷⁵ is a relationship specific variable that models the different relationship situations (Wilson, 1995). Dependence is the product of the importance of a given input or output to a particular organization, and the extent to which this is controlled by relatively few organizations (Pfeffer and Salancik, 1978). Anderson and Weitz (1989) define power imbalance as the ability of one partner to get the other partner to do something he would not normally do, with power inversely influencing dependence.

Based on the various levels of dependence and power, business relationships can be categorised as *followships, leaderships, or mutual relations* (table 7.2.1); a categorization also applicable to relationships developed between port stakeholders. *Followship relationships* are found

⁷⁴ For an analysis of interdependencies see: Thompson, 1967. For an analysis of port related interdependencies see: Vitsounis and Pallis, 2010

⁷⁵ The other relationship specific variables are: power imbalance, commitment, trust, cooperation, mutual goals, performance satisfaction, comparison level of alternatives, adaptation, non-retrievable investments, shared technology, summative constructs, structural bonds and social bonds

where one firm (A) is highly depended on the other one (B). The depended firm (A) becomes a follower and adapts the wishes and the operations of the more powered one (B). From the perspective of the firm that posses higher power (B), the relationship is a *leadership*. If that is the case, then firm B may freely choose the partner it will transact with and exert considerable influence on the whole relationship. In *mutual* relationships no firm is clearly more powerful; both are depended on each other for important resources and collaborative relationships may unfold. Each relationship is unique and its characteristics determine the allocation of power between the involved parties. When both A and B firms have a low dependence on the other, no relationship can be developed. Port stakeholders' relationships can be analyzed based on their power differences (an analysis that follows in the present Chapter). In many instances, the substantial imbalances in terms of power and dependencies emerging among the members of the port community stand as major barriers for the development of close relationships and synergies.

Table 7.2.1. Three Types of Relationships Based on Power and Dependence

		B's perceived power over A		
		A's perceived dependence on B		
A's perceived power over B	B's perceived dependence over A		Low	High
		Low	No relationship	Followship relationship Ex. 'Small' traditional FFs when developing relationships with Global shipping lines
		High	Leadership relationship Ex. Terminal Operators when operating a terminal with specific characteristics (ex. depth) demanded by a Shipping line and developing relationships with the latter.	Mutual relationship Ex. Global shipping lines when developing relationships with integrated FFs in order to serve big in size shippers

Source: Adapted by: Ritter et al., 2004

The market structure is also relevant to the types of relationships developed. This is because it influences the bargaining position of each firm. An example is the common user port setting that was presented in Chapter 6. In an export-orientated process that takes place in this case, the shipping line and the dockworkers' professional organizations are the suppliers of international terminal operators. The relationship between the ITO and the shipping line is mutual whenever these actors set up a joint venture for the running of a terminal. When the ITO is the single operator in a port, or it operates a terminal along specific characteristics demanded by a shipping line, the ITO is the leader. On the contrary, when several terminal operators exist, the shipping line that consolidates a high proposition of containers becomes a leader in any relationship that is involved. Other combinations in this setting lead to accordant relationships.

In general, the power of port actors varies substantially. This power imbalance increases the difficulty of the development of long term and close

relationships between port actors. In such cases, one actor has to willingly commit to a relationship with the status of the follower in order to develop co-creating value strategies.

7.2.2 The concept of the 'port value chains'

Due to the presence of interdependencies, port actors are embedded in 'port value chains' in order to generate value for their users. Contemporary business models are such that, in a port there are not only single actors that compete with each other. An illustrative example is a container shipped from the departure point A to a destination B via a given port. The container is handled by multiple companies throughout its journey (serial interdependencies), starting from the inland terminal and moving towards the freight forwarder, shipping line, the terminal operator and so forth. The efficiency and effectiveness of the container's movement is thus subject to coordination and collaboration and relies on the efficient "matching" resources of the involving actors. This also gives rise to the multidimensional character of ports performance (Chapter 3).

'Port value chains' refer to a system of functionally and spatially interacting regionalized units, rather than to individual terminals, warehouses, rail, trucks etc. only. Port firms are in need of and always use, services offered by other port stakeholders. Thus, it is a competition between the various 'port value chains', to which various port actors belong, that takes place. Subsequently, putting together a network of firms in order to build the set of capabilities necessary to deliver high value to the customer, becomes a major strategic thrust. In line with literature suggestions, in these cases partner selection is a critical element in competitive strategy. A firm's procurement strategy may be the most important ingredient in its ability to deliver superior value to its customers (for a similar concept in a non-port context: Lewin and Johnston, 1997).

Advancing the theoretical argument put forward by Robinson (2002) that ports are embedded in supply chains and thus their competition takes place

in this vein, it was identified that in a given port, competition also takes place between 'port value chains' (figure 7.2.1) and not only between stand-alone firms. It is not sufficient anymore for a port stakeholder to deliver services of high value to its clients. This has to be combined with services offered by other firms and add up, or at least sustain, this value. The end user ultimately evaluates the value offered by the whole 'port value chain'. It is thus in the interest of individual firms to be embedded in 'port value chains' that have the capability of producing and offering superior value to their users.

The existence of a supply chain presupposes the development of synergies among the "players" of the supply chain. This can lead to a competitive advantage (in line with: De Martino and Morrillo, 2008). Port stakeholders take advantage of these synergies that are also present in 'port value chains' and pursue the co-creation of value aiming to offer an augmented value to their customers.

The members of port value chains might choose to follow two different strategies: (a) either to remain fragmented or (b) to take advantage of the potential network dynamics.

In the context of the first strategy, the relations developed follow an arm's-length logic⁷⁶. They are not long-term, thus do not involve mutual adaptation or customized services, and thus do not promote the collaboration of actors. 'Port value chains' consist of multiple layers of involved entities that pursue their own goals and strategies, in many instances unconcerned of the value that the port offers as a whole. The total value offered by the relative 'port value chain' is the sum of the various value offerings of the participating actors. In those cases, fragmented actors usually develop a limited number of close relationships and are mostly concentrated on their core business. They hardly commit to relationships that require mutual adaptations and long-term commitments, but develop relationships only if that is essential in order to offer their core services.

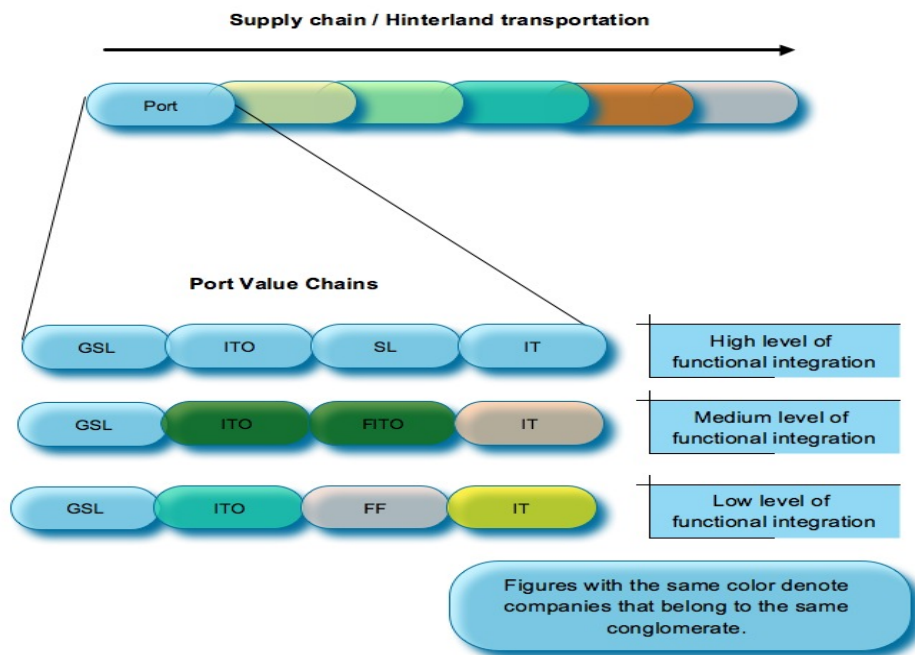
⁷⁶ A transaction in which the buyers and sellers of a product or service act independently and have no relationship to each other. Both parties in the deal act in their own self-interest and are not subject to any pressure or duress from the other party.

In the presence of the second strategy, exchange relationships frequently develop. Actors develop closer relationships taking the form of formal agreements. That way they have access to the resources of other actors and, consequently, exert (directly or not) a certain level of control on these actors (in line with: Harrison and Hakansson, 2006). In such cases, the main themes under consideration are (a) which resources to combine with others, and (b) with which actor they are going to combine these resources. Port firms develop long-term relationships and get involved in mutual adaptations that co-create value and increase their value offering. The value delivery capacity of an actor depends on its efforts and services but also on its fitting and the capacity of its suppliers. Thus, the competency of a focal actor has to be integrated with that of its counterparts in order to move towards a superior value offering.

Taking into account the strength of relationships developed in a 'port value chain' along with the number of actors involved in the relevant relations, a distinction can be made as regards the level of functional integration. Long-term and close relationships increase the level of functional integration, with a differentiation between high, medium or low level of functional integration being present according to the number of companies developing such relations (figure 7.2.1). Whenever all the involved actors maintain such relations, the port value chain is highly integrated. Conversely, whenever such relations do not exist, the value chain is not integrated at all⁷⁷.

⁷⁷ Evidence from supply chains suggests that the higher the level of integration among the actors the more positively it influences the level of satisfaction (see: Carbone and De Martino, 2003).

Figure 7.2.1. Port Value Chains and Different Levels of Integration



7.2.3 “Virtual integration” in the port value chains

Nowadays, more and more port stakeholders, irrespectively of their core business, are aiming to offer door-to-door services to their clients. They are opting for such offerings with two principal strategies pointing towards treating suppliers as in-house partners. A first strategy is the development of vertical integration strategies, in an effort to become so called mega-carriers. For example, shipping companies exploit strategies of vertical integration via the formation of joint ventures, the establishment of subsidiaries or acquisitions. The end value offering for shipping lines is directly influenced by the companies belonging to the same conglomerate. Shipping lines exert full control on the total length of door-to-door transportation and can regularly take initiatives to eliminate conflicts throughout the journey.

Second, companies that do not have the size, or the sufficient amount of volumes in specific regions to develop vertical integration strategies, offer

one-stop solutions via the formation of relationships with other port actors. For example, shipping companies that have not exploited strategies of vertical integration in a port can still offer door-to-door services in the region. That is due to the development of agreements that they retain with a number of companies offering a range of services. They are trying to achieve a 'virtual integration' with other members of the port community and emerge as a one-stop solution for their clients (usually shippers). Freight Forwarders have traditionally operated that way. Other members of the port community (shipping lines, container terminal operators and inland terminal operators) have developed such operations mainly during the last years. Thus, they have gradually become competitors of FFs. Shipping lines for example, may virtually integrate stevedoring, forwarding, warehousing services via the establishment of agreements with terminal operators, freight forwarders and depot operators respectively.

Not all the relationships developed between port stakeholders and their subcontractors are the same. These various relationships largely differ between them in terms of closeness, mutual investments, and whether they are arranged by contractual agreements or not. Based on the closeness of these relationships, different levels of 'virtual integration' between the various port stakeholders may be found. For example, a shipping line that develops close, contractually based relationships with FFs, terminal operators etc., is highly 'virtually integrated' compared to another shipping line that follows an arm's-length approach for its relationships. The highly 'virtually integrated' shipping line is expected to direct large volumes of cargo to the members of the port community that it sustains close relationships with. Ultimately, port actors' offering substantially relies on the efficiency of the agreements and the cooperation that is achieved with other members of the port community.

Three special characteristics are to be noted:

- 1) Empirical research identified that FFs have different perceptions on which of the port stakeholders implementing strategies of 'virtual integration' are regarded as competitors (further analyzed in section

- 7.3). At the same time, a number of FFs now invest in operations that are used to subcontract (such as inland terminals, trucks, rails etc.).
- 2) Port stakeholders usually adopt a mixture of actual and 'virtual' integration strategies. The choice between these two options is related to each firm's strategies but also to the competition, existence of alternatives, the perceived value of services they enjoy and many more, detailed in section 7.4.
 - 3) The relationships developed by each port stakeholder largely impact its commercial interactions and thus, its value drivers. For instance, the value drivers of a shipping company that invests and develops a dedicated container terminal differ from the ones of a shipping line that uses a common user terminal.

The analysis that follows, examines port users' relationships under the prism of the three special characteristics outlined and is based partially on the outcomes of the first but mainly the second phase of the conducted research.

Beforehand, it should be noted that this analysis on the port stakeholders' relationships does not conclude on the superiority of certain practises, nor it has aimed to do so. Actually, it is doubtful whether "codes" of efficient relationships may be developed in any case. Furthermore, the analysis does not imply that relationships that pursue the co-creation of value between the involving parties may *a-priori* be considered superior to others. The efficiency of relationships is situation specific and subject to multiple attributes that deserve further and focused research. The analysis that follows aims to further understand the general context of the relationships developed between port users' stakeholders and what creates value for them.

7.3 THE FREIGHT FORWARDERS' RELATIONSHIPS WITH THE PORT STAKEHOLDERS

7.3.1 The different types of Freight Forwarders

Two major types of Freight Forwarders can be distinguished depending on the extent of actual vertical integration strategies adopted. Major differences in terms of strategies employed exist between these two types of FFs. These differences have a significant impact on the patterns of their relationships with other port stakeholders and subcontractors.

7.3.1.1 The Traditional Freight Forwarder

The first type of Freight Forwarder is the one that does not invest in, or does not adopt strategies of, actual vertical integration. Rather than that, he operates through the 'virtual integration' expansion of his operations and remains mainly focused on his core business. These entities regard as their core business the art of coordinating the flow of goods through coordinating his subcontractors (hereafter called 'traditional' Freight Forwarder).

The 'traditional' FF considers the independence of his operations as one of his main competitive advantages that he wishes to safeguard. For this reason, he avoids developing close and long term relationships with other port stakeholders, except in those cases that such relationships are deemed necessary. He also avoids investing in relationships in monetary or mutual adaptation terms. Furthermore, the 'traditional' FF does not invest in expansion projects in collaboration with other firms. This is because he considers that such investments increase his dependence on other port stakeholders and cause a decrease of his competitive advantage.

The 'traditional' FF does not possess any means of transportation and does not invest in inland terminals, depots etc. Thus, he is more dependent on his relationships and interactions with subcontractors and suppliers. His main

task though, is to find the right supplier and co-operator for delivering his services. In this vein, it could be expected that the 'traditional' FF would desire to develop stable relationships with subcontractors and suppliers targeting to secure a minimum level of quality offered to his clients. However, this is not the case. The 'traditional' FF regards the possession of transport means, the investment in port related services and the commitment to close relationships as factors that increase his dependence on others. His aim is to be able, at any time, to change his service suppliers and subcontractors. At the same time, the 'traditional' FF states that it is of major importance to safeguard his image as an independent FF that is not involved in close collaboration with port stakeholders, as this may raise the aversion of the other members of the port community.

It should be noted that, usually, FFs that do not invest in port operations are considered to be the ones that do not control sufficient volumes of cargo. Therefore, their bargaining power is relatively low. Although this stands true in several cases, it is a rather abstract conclusion that cannot be generalized. Conversely, there are plenty of FFs that control sufficient volumes of cargo, enjoy a relatively high bargaining position but still do not try to integrate their operations vertically through investments (interviews conducted during the present research indicated that). This is a central strategic choice. These companies do not want to be locked in 'specific use' situations. Rather than that, they prefer always being able to look for, and evaluating alternatives, so as to take advantage of the market dynamics and competition and then develop advantages, that they can pass on to their clients. These differences in terms of bargaining power have an impact on the relationships that 'traditional' FFs develop. Therefore, a distinction between 'small' and 'major' (referring to their bargaining position) 'traditional' FFs exists in practise (this valid distinction is used by this thesis when deemed appropriate).

7.3.1.2 The 'Integrated' Freight Forwarder

The second type of FF is the one that pursues strategies of actual vertical integration (hereafter called the 'integrated' Freight Forwarder). This type

of FF principally invests in port related operations beyond his core business. An 'integrated' FF usually owns and operates a number of barges, trucks, even small feeder ships. He also establishes rail connections and invests in inland terminals. Moreover, a latest trend observed is that highly 'integrated' FFs have also started to invest in container terminal operations.

The strategic aim of the 'integrated' FF is to handle containers to the largest length of supply chains and 'port value chains' by his own means rather than being dependent on other members of the port community and subcontractors. Still, it is rather unusual to own sufficient capacity to serve all the clients by his own means and thus, he also employs subcontractors. The 'integrated' FF seeks to develop close relationships with other members of the port community and subcontractors. He invests greatly in close relationships and wishes to commit to interdependencies that could increase his value offering and lead to co-creation of value schemes.

Like the 'traditional' FF, the 'integrated' FF advocates that among his objectives is to be independent from the other members of the port community. Notably, the strategies employed by this type of FF in order to fulfill their common objective are fundamentally distinct from the one developed by the traditional one. The 'integrated' FF considers that his independence may be achieved by having a sufficient control throughout his operations. Investments in vertical integration schemes and the development of close and long-term relationships are seen as means that secure the desired control over 'integrated' FF's operations and thus, as a means to increase the level of independence he retains on other port stakeholders. The aim is to limit the use of subcontractors as much as possible and thus invest in buying and operating means of transportation. He also invests mainly in essential port related operations that he needs in order to deliver his services (such as depots, inland terminals and even container terminals). When it comes to developing relationships with other members of the port community, the 'integrated' FF seeks relations to be close, long-term and stable. Towards this end, he invests to a great extent on these relationships in both monetary and mutual adaptation terms. He also

seeks to commit to expansion programs in collaboration with other port stakeholders, through initiatives involving mutual investments.

7.3.2 The Freight Forwarder's relationships with the inland terminals⁷⁸

The 'traditional' FF does not invest in inland terminals but aims to use them as much as possible to carry out his operations. He also aims to establish steady traffic flows to inland terminals in order to enhance the exploitation of economies of scale. The use of the same inland terminals for long periods of time is also desirable as *"each relationship that goes longer is more interesting"* (CEO of a freight forwarding company; interview conducted during the present research). The willingness to use a number of inland terminals for longer periods of time is not combined with the development of contractual long-term agreements. Such agreements are pursued by the 'traditional' FF only upon request of clients -with a sufficient bargaining power-, and they are thus limited. Following the aversion of close relationships, the 'traditional' FF rarely has special requests from inland terminals operators.

The 'integrated' FF invests significantly in the development and operations of inland terminals. Investments range from the possession of a number of shares that secure their participation in the management board to full ownership. The aim of the 'integrated' FFs is to have a sufficient control over the inland terminals they use and minimize the use of inland terminals that they do not invest in. Whenever the latter is the case, the development of close contractual agreements with inland terminal operators is a preferred avenue, and is regarded as an alternative means of gaining control over operations. In the cases that the 'integrated' FF has to use a number of inland terminals only a few times per year for moving low volumes of containers, an arm's-length approach is adopted.

⁷⁸ Table 7.3.1 recaps the total of the relationships described in the present section.

'Integrated' FFs opt to develop mutual relationships with inland terminal operators in order to pursue the co-creation of value and ultimately increase the value that they themselves offer to their clients. Backed-up by their high bargaining position, they are eager to allocate inland terminal operators that can add to their value offering.

7.3.3 The Freight Forwarder's relationships with the shipping lines

Three distinctive practices are identified as regards relationships developed between FFs and shipping lines. The first one is between 'small traditional' FFs with a limited bargaining power and shipping lines. This type of relationships usually follows an arm's-length approach. The FF's final decision varies according to shippers' wills, freight rates and operational characteristics (i.e. days of departure, direct connection or transshipment etc.). Due to his low bargaining power, the 'small traditional' FF cannot establish close relationships with the shipping lines. This is mainly due to the fact that, the latter are not willing to make any special offers to the FF. Therefore, in most times 'small traditional' FFs remain independent and have to put efforts on allocating every shipment they possess to the most competitive offer. In this framework, the opportunities for co-creating value along with shipping lines are limited.

The 'major traditional' FFs are, in general, averse on developing long-term, close, contractual relationships with other port stakeholders. When it comes to shipping lines however, they are willing to do so. Usually arranged on a central level, agreements are developed with a limited number of global shipping lines, creating a pool of preferred carriers. Special rates and secured capacity are the outcome of those relationships. These relationships are arranged between the headquarters of the two parties rather than their regional/local offices. On a regional level, contractual relationships with smaller shipping lines servicing niche markets are developed, and typically involve standard rates for one year or so.

The 'traditional' FFs that are not willing to commit to close relationships with port service providers in order to secure their independence, act differently when it comes to global or regional shipping lines. This attitude results in a major contrast, in terms of strategies followed. When asked to comment on that major difference, the interviewed executives stated that this is due to the major differences in terms of market structures between port services and shipping services. In more detail, interviewees stated that no matter how much they try to take advantage of the market dynamics and competition, in the shipping market they will hardly find services that increase their value proposition against their clients. A major reason for the latter is the extended consolidation and, thus, the limited choices in the market. Moreover, due to the high levels of competition in the shipping market, FFs are also in need to secure capacity in vessels in order to be able to move their containers. On the other hand, contractual agreements on capacity levels and rates cannot be considered as close relationships that involve mutual adaptation, coordination and ultimately the co-creation of value.

'Integrated' Freight Forwarders also use a global sourcing, that is a pool of preferred carriers with whom they develop close contractual agreements. A number of them try to create a buying pattern and reduce the number of carriers used, as much as possible. The aim is to enjoy a great level of adaptation of services. The shipping lines can be termed as 'dedicated' ones. Except from guaranteed capacity and low rates, the 'integrated' FF also enjoys highly customized services and adaptation to his needs; with all these forming an avenue to increase their value proposition towards their clients.

A very distinctive strategy, in terms of relationships developed, is present in this case. 'Integrated' FFs try to control every container by their own means. In other words, they seek to develop an 'internal transportation channel', precisely as analyzed in Chapter 6. At the same time, they lack the most fundamental means of transportation in order to do this; the seagoing vessels. Their efforts to develop extremely close relationships with shipping

lines, -to an extent that they can be regarded as dedicated ones- points to the presence of a virtual integration of that crucial part of the 'port value chain'.

Another interesting point is that shipping lines develop more and more strategies of vertical integration. In that respect, they become competitors of FFs in parts of the supply chain and/or 'port value chain'. Notably, FFs commented that this expansion influences their own relationships with shipping lines. They keep on developing close relationships with shipping lines being active in forwarding services as *"if we exclude a number of them from our portfolio it will affect our competitiveness"* (CEO of a forwarding company). At the same time, FFs limit their relationships with those shipping lines that develop an aggressive strategy in order to seize clients. It is indicative that three interviewees named the same shipping line as a typical example of a firm that they are not willing to work with anymore, due to the shipping line's extensively aggressive strategy in forwarding markets. On the other hand, they also stated a number of examples where shipping lines *"still have our respect and our relationships are not affected at all"*; with this standing true despite the fact that, they also offer forwarding services.

7.3.4 The Freight Forwarders' relationships with the rail, truck and barge companies

'Traditional' FF's relationships with rail, truck, and barge companies follow a common pattern. The FFs try to use to the greatest extent possible, the same firms for long periods of time. Pools of preferred companies are used consistently, involving firms which have proved that they can deliver services of the desired value. A slight preference to forwarding services offered by the terminal operators is also reported. This is because of the belief that, terminal operators can accommodate the traffic from the terminal to the hinterland more efficiently due to a better knowledge and assess terminal operations. FFs may be found in situations where they have

to use rail, truck and barges companies that offer services of low value having limited if any alternatives. In those cases, they put efforts on adding more value to their offering. That way, they counterbalance the low value received by their subcontractors, ultimately resulting in a final offering on an adequate level of value. The 'traditional' FFs do not develop close or contractual agreements with trucking, rail and barge companies and their efforts to co-create value are limited.

'Integrated' FFs possess their own means of transportation so their needs and dependence over rail, trucking, and barges companies is relative smaller. They also use a pool of preferred companies for long periods of time, and with a number of them develop contractual agreements. Via those agreements, 'integrated' FFs attempt to have a control over the subcontractors' operations and to pursue the subcontractors' adaptation, pointing into co-creation of value schemes.

7.3.5 The Freight forwarder's relationships with the terminal operators

The analysis of port users' interactions provided in Chapter 6 detailed that, between freight forwarders and terminal operators, there are only operational and no commercial interactions. However, (as it will be further analyzed in Chapter 8) FFs regularly report that for them one of the main causes of low levels of perceived value by a port is caused by terminal operators. Any kind of contractual agreement between the two parties is not possible, whereas collaboration and coordination efforts are relatively rare. It is not uncommon that a FF enjoys low levels of perceived value by a shipping line, with this happening due to the particular terminal operator that the latter uses. Ultimately, FFs may choose to defect to another shipping line due to this phenomenon. In such cases, practices that enhance an open dialogue between the FFs and the terminal operators might increase the value offering of the total 'port value chain'. Apart from being a

plausible profitable investment, the ‘integrated’ FF’s investments in terminal operations, might also lead to this end.

Table 7.3.1. The FF’s Relationships with the Port Stakeholders

	Shipping lines	Inland terminals	Rail, trucking, barge companies
‘Small traditional’ freight forwarder	No contractual agreements	No contractual agreements	No contractual agreements
	No co-creation of value	No co-creation of value	No co-creation of value
‘Major traditional’ freight forwarder	Agreements on rates and capacity	Limited contractual agreements (following shippers will)	No contractual agreements
	Limited co-creation of value efforts	No co-creation of value	No co-creation of value
Integrated freight forwarder	Contractual agreements, efforts to limit the number of companies used	Investments and Contractual agreements	Contractual agreements
	Co-creation of value	Co-creation of value	Co-creation of value

7.4 THE SHIPPING LINE'S RELATIONSHIPS WITH THE PORT STAKEHOLDERS⁷⁹

7.4.1 The Different Types of shipping lines

Four different types of shipping lines may be distinguished for the purposes of the present research, with each one developing different strategies of vertical integration that in turn, largely impact their relationships with other members of the port community.

7.4.1.1 Regional or feeder shipping lines

Regional or feeder shipping lines are the ones that specialize in servicing niche markets. Usually small in size, these carriers enjoy a high bargaining position only in the niche markets they serve, due to the limited competition and through knowledge of the local market, given their size. They rarely employ strategies of vertical integration.

Regional or feeder shipping lines (R/FSL) regard their own flexibility as the core advantage they possess. Mainly based on personal contacts, they do not formulate operations based on strict or inflexible rules. This practice provides the opportunity to be adaptive and flexible to clients' needs and thus increase their own value offering. R/FSL do not invest in, or develop, strategies of vertical integration. They do not offer hinterland transportation services regularly. Nevertheless, when a client asks them to take over the delivery of a container to a hinterland destination, they are willing to do so. As such cases happen only limited times per year, R/FSL lines are flexible enough to arrange such a service. They take over the negotiations and interactions with freight forwarding or truck, rail and barge companies and offer their clients a one-stop solution (via virtual integration strategies). They provide these complementary services because

⁷⁹ Table 7.4.1 recaps the total of relationships described in the present section

they aim to be service-minded companies and not least, because this practice is profitable.

7.4.1.2 Non-integrated global shipping lines

Non-integrated global shipping lines offer ocean carriage services on a global scale but do not invest in vertical integration strategies. They only offer limited freight forwarding services following their clients' requests. In these cases, they follow the operational pattern of R/FSL; they are responsible for the arrangements with forwarding companies and employ strategies of virtual integration. Clients that ask for hinterland transportation services are usually of small size. Non-integrated GSL may enjoy a high bargaining position, even when the volumes of cargo they handle in the focal port are relatively low. The global coverage and the high volumes of cargo handled in other ports provide them with significant power when negotiating with the other port stakeholders.

7.4.1.3 Semi-integrated shipping lines

Semi-integrated shipping lines are those offering services on a global scale and launch strategies of vertical integration on a small scale. Their vertical expansion does not aim to seize cargo from the freight forwarders or to be involved in direct competition with them but to support their core business (offering of ocean carriage services). Towards this end, they complement their ocean carriage services with services that increase the total value offered to their clients.

Semi-integrated shipping lines are mostly interested in the flow of cargoes from inland terminals to inland terminals. They also provide door-to-door services but do so on a minor scale. A significant part of hinterland transportation is regarded as the prolongation of the deep-sea transportation. Controlling that part of the supply chain, secures their core activities. The decisions to invest in complementary port services such as inland terminals, barges, trucks, rail connections and container terminals follow that particular strategy and aim to increase the value proposition towards their clients.

Another strategy followed by the particular type of stakeholders is to use to a large extent inland terminals in order to deliver containers and expand their role from a 'port-to-port' carrier to an 'inland terminal to inland terminal' carrier. With the intense use of inland terminals, the focus of freight forwarders and shippers choices and evaluations of shipping lines moves from the 'port' to an 'hinterland' point, where the focal line enjoys (or not) a favorable position and limited competition. Semi-integrated shipping companies do not aim to exclude FFs from the supply chain but to reduce the scope of their operations in 'port value chains'. Within these strategies, they can seize segments from the supply chain, facilitate their collaboration, and develop good relationships. Semi-integrated shipping lines aim to dominate 'port value chains'. FFs still possess a crucial role in the supply chain as they are the ones that mainly contact the shippers.

7.4.1.4 Integrated shipping lines

Integrated shipping lines are those trying to extend as much as possible the scope of services they offer in order to control the entire port value and supply chain. For these shipping lines, the development of 'internal transportation channels' is desirable so their strategies point towards this end. Integrated shipping lines have a straight and clear objective: to become mega carriers and produce internally all the required operations in a door-to-door transportation path. They invest largely in forwarding services and run dedicated container terminals. The aims are to seize cargo from freight forwarders and directly develop relationships with (usually big in size) shippers.

In order to develop and operate 'internal transportation channels', integrated shipping lines have to consolidate large volumes of cargo at the focal ports, where they enjoy a high bargaining position. Their objective is to develop in extent strategies of vertical integration controlling, either directly or via subsidiaries, a container throughout a door-to-door transportation. This includes terminal operations, hinterland forwarding, feeding services and even inland terminals. Integrated shipping lines try to avoid, to the greatest extent possible, external influences on their

operations. Apart from those operations where private entry is prohibited - due to policy restrictions (e.g. port authorities, harbor's office and dockworkers' organizations)- container related operations are carried out by their own means whenever possible.

In any case, it is not feasible for a shipping line to carry out all operations by its own means. In other words, it is not feasible to develop 'internal transportation channels' for every container handled. The reference to integrated shipping lines is for those cases that shipping lines develop and operate a number of 'internal transportation channels' in a port. Commonly, a large proportion of container volumes is transported via those channels. For the rest of the containers to be handled, external influences and collaborating with a number of port stakeholders becomes a necessity.

It is noteworthy, that a regional dimension exists when referring to shipping lines. The distinction made is not applicable on a global level but rather on a regional one. A shipping line that pursues vertical integration in a port region may not do so in another port region, where it may remain and act as a non-integrated one. Nevertheless, small in size shipping companies rarely have the capability to develop alternative strategies from port to port e.g. a regional shipping line may not pursue its vertical integration in another port.

7.4.2 The Shipping lines' relationships with the terminal operators

The central managerial board of the R/FSL makes decisions on which terminal operator to use. In this vein, a long-term contractual agreement regulates the relationship between them and the terminal operator. R/FSLs are eager to obtain a sufficient bargaining power over port stakeholders, in order to commit to close relationships. That gives them the ability to pursue their counterparts to adapt to their needs and coerce required changes on an operational and relationship level. Therefore, they usually choose terminal operators with at least equivalent levels of bargaining power in order to develop long-term relationships with. Mutual relationships develop

between the two, and co-creation of value is potentially achieved. The relationships of R/FSLs with the global terminal operators are more difficult to be achieved. This is because the latter pursue the development of close relationships with the global shipping lines handling high volumes of freight (and provides operational advantages such as lower rates and secured capacity only to these global shipping lines).

Non-integrated global shipping lines develop mid-term (usually for a period of 5 years) contractual agreements with terminal operators. Subject of these agreements are guarantees of (a) standard rates and (b) a minimum capacity on a yearly basis. These agreements might also include clauses of a limited number of moves per year to be offered/consumed. Non-integrated shipping lines report that they retain close relationships and have daily contacts with the terminal operator. These agreements and relationships develop irrespectively of the volumes of containers that the shipping line transports through the focal port. That is due to the fact that, agreements are arranged between the headquarters of both companies and not between regional or local offices. Thus, the bargaining power of the shipping line on a global scale is such that it enables it to achieve agreements leading to mutual relationships.

Semi-integrated global shipping lines are interested in investing in the development and running of container terminals. These investments usually take the form of participation in a consortium of companies including shipping lines, terminal operators and, lately, financial institutions. Shipping lines aim to secure access to the management of the terminal and thus take part in the decision-making process. That way, they pursue the strategic alignment of the terminal operator with their needs and ultimately increase their total perceived value. This is a typical case of co-creation of value. Based on the collected information during the interviews, it remains questionable in which cases these investments also yield operational advantages for the shipping line; for instance, advantages like guarantee of entrance or lower rates. Commonly, the use of that terminal is obligatory when calling at the focal port. In those ports where the semi-integrated

global shipping line does not invest in container terminals, he seeks to develop close and contractual agreements with a terminal operator. Due to his relatively high bargaining power⁸⁰, mutual relationships may be achieved, pursuing the co-creation of value between the two firms.

Integrated shipping companies have an additional type of access to terminal operations, by setting up and operating dedicated terminals. This is done via either specialized subsidiaries or the formation of joint ventures with terminal operating companies that have the knowledge and technological expertise to operate container terminals. With the use of dedicated terminals, shipping lines adapt terminal operations to their needs, enjoy decreased port costs and waiting times and have access to crucial information. This way, they gain a significant competitive advantage over their competitors. It remains questionable though, whether an increased efficiency of the terminal is also among these advantages. According to two shipping lines' executives (interviews conducted for the purposes of the present thesis), the productivity of the dedicated terminal is regularly equivalent to the productivity of the common user terminals. In the case of dedicated terminals, shipping lines regard the terminals part of their own business. Such a close collaboration between the shipping line and the terminal operators also leads to co-creation of value practices.

In a number of cases, integrated shipping lines are willing to invest and develop dedicated terminals, yet this is not viable due to the lack of available space or due to the fact that they do not qualify as candidates in the tendering process. Thus, when the establishment of 'internal transportation channels' is not feasible, shipping lines pursue the development of a close contractual agreement with a terminal operator, with the aim of this agreement being to co-create value.

Apart from the analyzed cases, there are also container terminals where no contractual agreements between the shipping lines and the terminal

⁸⁰ In most of the cases, terminal operators possess a high bargaining power as their numbers in ports are given. Moreover, technological requirements may reduce the number of terminal operators that a shipping line may use, thus further increasing their bargaining position.

operators take place. This is mainly due to two reasons. First, the volumes of the containers that the shipping line transports are relatively small or without a steady flow. Therefore, contractual agreements are difficult to be achieved. Second, due to policy restrictions, as in some ports, such agreements are forbidden by law. This is mainly the case in service ports but not the case in landlord ones.

7.4.3 The Shipping lines' relationships with the freight forwarders

Regional or feeder shipping lines maintain a pool (usually consisting of a limited number) of freight forwarders with whom they keep daily contacts. These shipping lines are the ones that regularly ship cargoes to the niche markets serviced by the aforementioned FFs. Commonly, long-term contractual agreements are not developed. Rather than that, special rates and bonuses are on offer, depending on whether specific targets are met. R/FSL are willing to develop close relationships only with a number of FFs that handle significant volumes of cargo and possess equivalent power. The aim is to develop mutual relationships that lead to co-creation of value. R/FSL are willing to develop such relationships, as their bargaining position is powerful due to the specialization and comprehensive knowledge of niche markets. R/FSL are also averse in putting efforts on developing close relationships with FFs that transport small volumes of cargo. This is because they regard that any efforts on such relationships do not result in adequate and desired outcomes.

Global shipping lines follow a common pattern in developing relationships with FFs. They do so irrespectively of their level of integration. In particular, they develop contractual agreements with selected and limited number of FFs that had directed substantial volumes of cargo with the focal global shipping lines during the previous years. These are usually the major FFs which offer services on a global scale and for this reason possess a significant bargaining position, in turn equivalent to that of global shipping lines. These contractual agreements regulate rates and capacity on a yearly

basis while they do not presuppose the development of close relationships between the two parties.

Global shipping lines develop close relationships only with a limited number of FFs. These are the FFs that offer services to major shippers and are in need of the shipping lines' assistance and support to do so. Whenever both types of companies remain fragmented, then they do not have the capability of offering services of desired value to the shipper. Both of them are confronted with reciprocal interdependencies that lead to joint efforts in order to co-create the value offered to the shippers. Customization of services and frequent communication between the two are commonly developed in such close relationships. Notably, both FFs and shipping lines reported that in such cases they tend to consider each other a partner rather than a supplier, or a user of their services. These agreements, as well as the development of close relationships, are extremely difficult to develop between the global shipping lines and the small in size FFs. The reason is the great power imbalances that exist between these two parties. Global shipping lines also reported that they lack the interest in developing such close relationships with small freight forwarders. This is because the latter do not handle sufficient volumes that could justify extra efforts towards adaptation.

Beyond the commonly endorsed approach in the terms of relationships with FFs, the interviewees pinpointed the existence of differences in the global shipping lines' perceptions of these relationships. Non-integrated shipping lines consider FFs their main clients. Semi-integrated shipping lines do not consider themselves straight competitors against FFs. As they do not offer door-to-door services, they always leave room for FFs to maintain a level of control over the transportation of the cargo in 'port value chains'. Semi-integrated shipping lines are just in the process of expanding the scope of their operations from ports to inland terminals. In turn, FFs in many cases consider that integrated shipping lines are their straightforward competitors. Given this consideration, FFs are more reluctant to develop close relationships with them (as already analyzed in section 7.3).

7.4.4 The relationships of the shipping lines with the inland terminals

R/FSL retain a limited activity in moving containers in the hinterland. For this reason, their interactions with inland terminal operators are scarce. In most cases, there are no long-term, close or contractual relationships developed between the two parties.

Non-integrated shipping lines commonly use inland terminals for long periods of time, in order to avoid the movement of empty containers from the hinterland to the port. This is a movement that increases the running cost of the shipping line. At the same time, their agreements with the FFs include clauses for inland terminals where containers can be released. Therefore, the selection of inland terminals that a shipping line uses is largely dependent on their geographical location and is influenced by the FF's needs. Non-integrated shipping lines usually use a limited number of inland terminals for long periods of time. Despite the fact that the subsequently developed relationships are not controlled by formal contractual agreements, the two parties cooperate closely and jointly try to increase the value of services offered. Joint efforts are based on the good personal relationships that develop over time.

For semi-integrated shipping lines, a major strategic aim is to develop efficient, and increased, value transportation services between inland terminals. In this vein, they invest substantially in developing and running their own inland terminals. This is in essence a practice to control inland terminal operations in order to match to the greatest possible extent the inland terminal operations with the other operations that they produce. Whenever this particular strategy is not possible, they seek to invest in inland terminals operated by third parties, in order to gain control over their operations and management. In the cases that the aforementioned options are not feasible, semi-integrated shipping lines target to develop close, long term and contractual relationships with inland terminal operators with these relations leading to co-creation of value. The development of such contractual agreements targets to secure a sufficient

capacity and to develop constant flows of containers between the inland terminals and the port. All these are considered means to increase their competitive power in certain areas. These agreements secure that the shipping line has the ability to reciprocate to FFs' needs at any time. Actually, such agreements are seen by semi-integrated shipping lines as a strategic option for increasing their value proposition towards their clients. Moreover, the use of a number of inland terminals is largely influenced by FFs' wills. Semi-integrated shipping lines are eager to use these inland terminals in order to serve those FFs irrespectively of the perceived value of services they experience in the focal inland terminal. Collected data suggest that one-year contracts are usually applied to such cases, regulating a minimum capacity and rates for semi-integrated shipping lines.

Relationships of integrated shipping lines with inland terminals follow a similar pattern with the ones developed by semi-integrated shipping lines. Integrated shipping lines heavily invest in the development and running of their own inland terminals. They also pursue close and contractually based agreements with the aim being the co-creation of value.

Global shipping lines commonly commit to close relationships with inland terminal operators. In these relationships they usually act as 'leaders' due to their higher bargaining position over inland terminal operators. Still, a number of these relationships can also be characterized as mutual relationships. That is due to the fact that, in certain regions, a limited number of inland terminals may be found, thus the bargaining position of inland terminal operators increases. Moreover, inland terminal operators who are able to offer specialized services also enjoy a high bargaining position and may opt for mutual relationships with global shipping lines.

Notably, both semi-integrated and integrated shipping lines aim to use the smallest number of inland terminals possible in order to consolidate large volumes of cargo and achieve economies of scale. At the same time, shippers or FFs impose the use of inland terminals while the same parties frequently remain careless about the port used. As a result, the use of a number of

inland terminals neither follows the carriers' wills nor it implies that high levels of value are received by shipping lines.

7.4.5 The shipping lines' relationships with the rail, truck and barge companies

R/FSL rarely use rail, truck or barge companies to move containers to the hinterland. Therefore, their relationships with these companies are scarce.

The non-integrated shipping line develops a number of relationships, mostly with trucking and rail companies, in order to support their relationships developed with the FFs. Although these relationships are not formulated by contracts, the non-integrated shipping line uses the same trucking and rail companies for long periods of time so as to move empty containers to points specified by the FF. Such relationships develop with a very limited number of companies (usually one or two). As they last for long periods of time, adaptations on both sides in order to meet each other's needs are regular.

For the semi-integrated shipping lines, it is crucial to control and increase the effectiveness and efficiency of the transportation from ports to inland terminals. In order to set-up "pipelines" of containers on these routes, their strategy is first to control sufficient flows of containers and, second, to secure sufficient capacity and rates for the hinterland movement through rail, truck and barges. Investing in acquiring, or in setting up, rail, truck and/or barge (RTB) companies is not among their top priorities. The justification for adopting this approach is the lack of know-how of managing such companies. Furthermore, shipping lines do not want to assume the extra administration and managerial responsibilities and problems that such investments yield. In this vein, they focus on developing long-term, close and contractually based agreements with RTB companies as the mean to secure the constant and efficient movement of containers between the port and the inland terminal. These agreements commonly enclose rates and guaranteed capacity clauses and are renewable on a yearly basis. Semi-

integrated shipping lines rely on RTB companies' experience and expertise to increase the total value they offer, whereas they possess the capacity to pursue the adaptation to the needs of these relations due to their power and bargaining position. The flexibility and knowledge of the local market that RTB companies have are the main attributes that generate the value proposition. For semi-integrated shipping lines, finding firms that can deliver services of acceptable levels of value is not however always the case. In regions where the services offered are of low value and adequate alternatives cannot be found, semi-integrated shipping lines most possibly pursue an expansion of their services alone. Through the establishment of subsidiaries they produce the additional needed operations that are fully adapted to the needs and levels of value expected by their customers. For example, if in a given country the rail connectivity between a port and an inland terminal is of low value, and alternatives do not exist, the semi-integrated shipping line will seek to set up its own rail connections. The primary objective for these subsidiaries is not to offer services to other companies and if possible to work exclusively for the interest of the semi-integrated shipping line only.

Integrated global shipping lines might offer forwarding services with the use of their own means. That gives them a control over the operations and the ability to align these services with their overall strategies and operational patterns. At the same time, there are cases where the integrated shipping line does not have the sufficient capacity to handle all the volumes of cargo on its own means. Cases that the integrated shipping line does not possess its own means of transportation also exist. Based on the high levels of his bargaining power, the integrated shipping line pursues in these cases the development of close and contractual agreements with RTB operators. Due to the large volumes of cargo that he handles, his power position within any port is high. Thus, he has the advantage to either commit to relationships maintaining the status of leader or even to mutual relationships. RTB companies are willing to adapt to the shipping lines' needs and wills so as to collaborate and ultimately augment the end value they offer.

Shipping lines reported that their contractual agreements with trucking companies do not regularly yield reduced rates. Due to the overcapacity of trucks in most ports, great opportunities of finding trucks at low prices arise. Yet, shipping lines are in a need to have a secured capacity of trucks available on a daily basis or so, a variable that leads to an increased cost. Similar opportunities might arise for rail and barges but this happens on a relatively more limited scale.

The size and the bargaining position of the global shipping lines are not comparable with that of the RTB companies. Therefore, the relationships developed between them bring to the shipping lines the status of the 'leader'. Mutual relationships may be developed only in those cases where the RTB companies offer specialized services, or operate under conditions of limited competition.

Table 7.4.1. The Shipping Lines Relationships with the Port Stakeholders

	Terminal Operators (T.O.)	Freight Forwarders (F.F.)	Inland terminals	Rail, truck, barge companies
Regional or feeder shipping lines	Close, contractual agreements towards value co-creation with T.O. of equivalent power.	No contractual agreements Offering special rates to a number of them Close, long-term relationships towards co-creation of value only with a limited number of FF of equivalent power.	Limited if no relationships with inland terminals.	Scarce use and limited relationships
Non-integrated global shipping lines	Close, contractual agreements towards value co-creation with T.O. mainly due to their power derived from their global operations	No relationships with small freight forwarders. Agreements on rates and secured capacity to a selected number of freight forwarders.	Non-contractual agreements. Use of inland terminals for long periods of time. Adaptation to needs based on personal relationships. Use of inland terminals mainly to store empty containers picked up by FF	Use of a limited number of them for long-periods of time. No contractual agreements. Adaptations based on personal relationships.
Semi-integrated shipping lines	Investments in Terminals or close, contractual agreements that aim to control operations in order to co-create value	Close relationships and co-creation of value with FF that service big-in size shippers.	Development and running of their own inland terminals. Also investment in inland terminals to gain control in management. If not feasible, then development of contractual, close relationships leading to co-creation of value. One -year contracts with inland terminals imposed by the freight forwarders.	Development of close, contractual agreements towards co-creation of value. In cases that services offered do not have sufficient value then they start operating subsidiaries offering truck, rail and barge services.
Integrated shipping lines	Development and running of dedicated terminals. If not possible, then development of close, contractual agreements towards co-creation of value.			Employment of their own means or development of close contractually based agreements.

7.4.6 The shipping lines' relationships with depots and other shipping lines

Shipping lines traditionally develop relationships between themselves. Alliances have prevailed for many decades as a major tool that enhanced the shipping lines' collaboration towards increasing their value offering to their clients. Analysis of the complex relationships between shipping lines in alliances falls outside the purposes of the present research (for an overview see: Slack et al., 2002; Soppe et al., 2009). Apart from alliance partnering, global shipping lines may also develop relationships with a number of other global shipping lines or with feeder or regional ones. In the first case, relationships include the employment of slots on each other's vessels. In those cases that a shipping line does not offer services to a certain destination, it may still provide such services to its clients in particular via the development of 'virtual integration strategies'. It selects another shipping line that employs ships in the desired route and loads the containers to its vessels. During the last years, a number of shipping lines have started to launch common services in a number of routes as well. These services may include fierce competitors⁸¹. It remains questionable though, whether such relationships lead to co-creation of value schemes and thus deserve further analysis. Irrespectively of size, shipping lines regularly develop relationships with depots operators. All the interviewees reported that the impact of depot operations on their perceived value is relatively small. Given this marginal role, an in depth analysis on these relationships falls beyond the scope of the present study.

⁸¹ Such as the one developed between MSC, CMA-CGM and Maersk to a route connecting Taiwan, Honk-Kong, China and US West coast (CMA-CGM, 29Feb 2008)

7.5 SUMMARY

Expanding the analysis of the collected data beyond the identification of the existing port users and service providers' interactions (Chapter 6), this Chapter detailed the identified relationships developed in a port setting between port users and service providers.

The key findings of the empirical research suggest that the formation of 'port value chains' and the emergence of interdependencies between their participating actors, favors the development of close relationships. Port stakeholders regularly use the suppliers that keep them satisfied and efficiently adapt to their needs. A number of these relationships are controlled by formal agreements, while there are also close relationships leading to the collaboration between the two parties and to the co-creation of value schemes. The great imbalances in terms of power and bargaining position being present in port settings, make the development of close relationships more difficult and in many cases limit the number of relationships leading to co-creation of value. Relationships are also relative to the actors' strategic patterns. Different types of the same category of actors develop different types of relationships. Two different types of freight forwarders are recognized with the one being averse of developing close relationships and the other standing at the other end. On the contrary, four different types of shipping lines are found. In general, shipping lines are more favorable to developing close relationships mainly due to the fact that they possess a significant power position in port settings.

The next Chapter presents the results of a qualitative analysis of the elements (drivers) that influence the port users' perceived value. Value drivers, for a number of port users and service providers' relationships, are identified and classified as benefits or sacrifices.

CHAPTER 8. THE PORT USERS' VALUE DRIVERS

8.1 INTRODUCTION

The analysis of the port users' interactions in different port settings detailed the existing patterns in which port stakeholders interact between each other in any given port. These interactions are grounded on and are supplemented by the development of the detailed, in Chapter 7, complex relationships between the several parties (users and providers). All these form the micro-environment in which supply and receiving of port related services takes place. Its knowledge has facilitated the unveiling and identification of the attributes that generate perceived value for port users.

The present chapter provides an analysis of the major port users' value drivers. This is an analysis of the qualitative research on the outcome of 18 semi-structured interviews with port users in major European ports (for methodological issues see: Chapter 5). The elements that generate perceived value for each port user are identified. Each value driver for the port users' major interactions and relationships with service suppliers and ports' structural characteristics is analyzed in detail. The value dimensions included in the quantitative analysis (Chapter 9) were developed precisely on the basis of the results of this qualitative analysis.

8.2 THE PORT USERS' VALUE DRIVERS

Port users⁸² reported a number of attributes that influence their perceived value and which are desirable in every interaction they sustain with other members of the port community. These are operational specific attributes, wherein extra emphasis is given on relationship specific attributes. A number of the identified value drivers explicitly refer to specific port stakeholders. Furthermore, value attributes refer to the port's structural characteristics and also contribute significantly to the port users' perceived value.

8.2.1 The value drivers related to the terminal operators, the inland terminals and the feeder shipping lines.

All the interviewees constantly made reference to comparisons between the *benefits* and *sacrifices*, confirming the importance of generating knowledge and measuring the perceived value. It is remarkable that whenever asked to comment on the importance of a benefit, they most often advocated what one of the interviewees explicitly stated: *it depends on the sacrifice that goes with it*.

Port users reported that nowadays *time* spent in a port becomes more important than the total *cost* of visiting a port. The latter remains important, but users are willing to pay more, on the condition that they enjoy considerable time reductions. After all, they claimed that they always have the ability to pass a proportion of the increased cost on to their clients. Still, in order to do this, they have to make sure that time reductions also pass on to the final user and are not lost within the port value chain⁸³. The total cost of using a port and interacting with a port stakeholder is not only counted in

⁸² Hereafter, the term *port users* refers to shipping lines and freight forwarders that were included in the analysis.

⁸³ This demands an efficient collaboration between the port users consisting the port value chain.

absolute monetary terms but also expressed in terms of *administration cost*, as well. Another important element that is considered as a sacrifice is the 'rate of cargo damage' and 'coordination efforts'.

The ways that time is anticipated varies according to the particular stakeholder that the port users interact with. For example, when using a terminal operator time sacrifice takes the form of idle and waiting time (for shipping lines), or that of waiting time to pick-up a container for freight forwarders. For the use of a shipping line this variable takes the form of delays, and of time to reach the destination port. For interactions with the Port Authorities, it is mainly dependent on the manoeuvring time (for shipping lines). Interestingly, port users reported that when using an inland terminal, time sacrifices are not important and do not contribute to their overall perceived value. Port users did not report any time sacrifices that could be related with structural port characteristics. In sum, port users consider (a) cost, (b) time, and (c) service sacrifice (damage and coordination efforts) as the main sacrifices when using a port.

Time is negatively correlated with *productivity*. The latter is considered as a decisive factor contributing to the port users' perceived value when interacting with terminal operators, shipping lines and inland terminals. *Productivity consistency* is an additional factor, as great fluctuations create problems for port users (mainly causing a deviation from the initial planning) and thus decrease perceived value. The *technical competencies* of supplier and service quality are also attributes that contribute to the increase of the suppliers' productivity. Although productivity characteristics are very similar between terminal operations and inland terminals (at least in the port region studied), the same does not hold true for shipping lines. In that case, productivity attributes are substituted by *service attributes* such as direct calls, the age of ships, guarantee of entrance in the destination port, etc.

The port users emphasized the importance of sustaining an excellent *relationship* with the members of the port community that they interact with. As they tend to use the same service suppliers for long periods, they

seek to develop relationship bonds that facilitate service exchange and also lead to a better performance of their relationships as a whole. Two CEO's reported that one of the main reasons they stopped using a supplier, has been the fact that they were unable to sustain good levels of their relationship. One of them emphasized: *It is not possible to keep on using a terminal operator or an inland terminal if you do not feel that they are trustworthy or reliable.* For example, with pieces of crucial information being exchanged in every interaction, each party seeks to be handled with *confidentiality* and does not wish this information to be disclosed to their competitors. *Efficient communication* between the involving parties is also considered as a basic element characterizing a good relationship. The *customization* of services and the *adaptation* to the users' needs are additional core attributes towards sustaining a productive relationship that ultimately increases perceived value.

Port users explicitly stress the importance of resolving *communication* and *coordination problems*, like those emerging between freight forwarders and terminal operators. The *quality* and *availability of information* exchange is regularly quoted as a vital value driver. Representatives of different companies including shipping lines of all sizes, freight forwarders, and shippers, maintain that their own business advantage is in practice transformed and relies on the information management business that is coordination, exchange, handling, and diffusion of information. Day-to-day responsibilities on operational aspects are increasingly more automated and standardized, but they have to handle quite a large amount of information in order to provide services that keep their own users satisfied. The following statements are indicative:

"Information is becoming the key driver in our community. Ports are driven more and more by that info element and are investing in hiring big info handling systems" (CEO of a shipping line)

"Actually, nowadays we are selling information. We are selling a certain kind of feasibility and our business is more and more relied on communication and getting the right data" (Executive of a freight forwarder company)

A *good image* of each firm or organization that port users interact with is also desirable. Attributes such as *experience* and *reputation*, formulate a good image of any supplier. It should be noted that, these attributes could also be mistakenly connected with the development of good relationships. Rather than that, experience and reputation form the image of a company against all the members of the port community irrespectively of whether they interact with it or not. For instance, a shipping line may interact with a terminal operator whose reputation within the port community is low, although he is extremely satisfied with the relationship they sustain.

A major value driver is also the *network position* of a port stakeholder (especially in the light of the emergence of 'port value chains'). Due to the formation of port value chains, port users seek their suppliers to be *well connected* with other members of the port community and also to *keep their customers satisfied*. Reference here is made to the hybrid interactions Type 1, as recognised in Chapter 6.

A number of value drivers reported by the port users explicitly refers to specific port service providers. Interviewees stated that, in case the terminal operator moves containers to the hinterland there is a positive impact on their perceived value. Reference was also made to the *dockworkers' qualifications* with desired attributes being their *competence* and *flexibility*. The *geographical location of inland terminals* is regularly quoted as well, as is the *safety conditions* of shipping lines.

8.2.2 The Value drivers related to the Port Authorities

Port users (shipping lines, freight forwarders, shippers and terminal operators) reach a consensus regarding the PA's characteristics that act as value drivers. PAs create extra value via activities that attract additional users and cargo volumes. Developing and leading *marketing and promotion* that improves the image of the port are such activities. When developed in cooperation with the existing port users, these activities are conceived to

produce win-win situations via economies of scale that ultimately increase the relevant port hinterland.

The coordination of the port activities is in close reference to the *information exchange*. It is also part of a strategy that creates communication channels between the various service providers, in turn resulting to a more efficient use of available resources by the actors involved. The PA's ability to orchestrate this coordination, and through this maximize the performance of the overall setting, is vital. After all, the Pas' position within port networks enables them to be regarded as business ecosystems that facilitate port operations by using critical assets and having both the ability and the incentive to promote the development of value creating activities (a finding in line with: van der Lugt et al., 2009). In this vein, the role of *Harbour's Office* is also catalytic. It enhances a "chain approach" of port operations until a vessel is safely moored at berth. Additionally, the PAs contribute to *collective action problem resolving* (via for example, initiatives to further increase hinterland connections) to increase value added services offered within the port range. In this vein, one might add initiatives to increase the port's hinterland connections, value added services provided within a port range or to attract more cargo to the port.

Port users reported that they also desire the efficient implementation of *safety rules* and the *environmental management* of services to contribute to the increase of their perceived value. As expected, one of the fundamental aims of any PAs should be (according to the port users' views) to take over the necessary initiatives to provide adequate *infrastructure* and sufficient *depth*.

Additional attributes that remain important in the case of the Port Authorities relate to the relationship, image, information exchange, cost and time characteristics (as already analyzed).

8.2.3 The Value drivers related to the ports' structural characteristics

Apart from the interactions with the other port stakeholders, the perceived value of port users is influenced by the structural characteristics of a given port. These are the characteristics of a port that are not directly controlled by one single firm, or an organization, or even by anyone (the geographical location is one such example).

The importance of the *geographical location* of a port remains fundamentally important for both gateway or transshipment ports. In the first case, proximity to the major markets and industrial areas is desirable. In the second case, the important issue is the small deviation from main routes that increases the shipping lines' perceived value. A geographical location that combines these two characteristics further adds to the port users' perceived value. All the shipping lines reported that it would be impossible for them to remain satisfied, or keep their customers satisfied, if calling to a distant from the major relevant markets port. This statement holds irrespectively of the cost and time reductions, the productivity gains, and the quality performance, efforts that might be developed by other market players. At the same time, all freight forwarders emphasized that the geographical location of a port contributes significantly to the efficient planning of their logistics and supply chain activities and thus, contribute to their overall value.

The quality of the port's *hinterland connections* is also ranked high in terms of its contribution to the port users' perceived value. Nowadays, the presence of trimodality (combining three modes of transport to the hinterland: road, rail and sea or river transport) alone is not sufficient but has to be accompanied by the available capacity and a number of alternatives towards/from existing hinterland connections.

The quality and the structure of the *port cluster* is another characteristic highlighted by port users. Port users are in need of a sufficient number of port stakeholders being present and active within a port setting, in order to be able to carry out their operations. The desired number of alternatives

varies remarkably for each port user and is highly related to the relationships already developed, the vertical integration, and not least, the size of the user in scrutiny.

For the port users that seek to invest in certain ports (in container terminals, warehouses etc.) the existing *socio-economic and political conditions* of the country or the region are an important factor. These value drivers fall out of the operational or the relational context and are connected with the sustainability and viability of the port users' investments in the long run. Moreover, port users that do not opt for investments in ports are highly interested in the political, social and economic conditions as well. This is because they desire to operate in a stable and equal playing field with the absence of frequent and unexpected changes (new laws, strikes, economic depression etc.).

Congestion both at sea and at the land side leg is aversely correlated with the port users' perceived value. Congestion cannot be linked directly to the terminal operator. Nor it is linked with the port authority's performance. Rather than this, it is usually the combination of the PA's and the terminal operators' efforts that influences the increasing or decreasing trend. For that reason, port users regard congestion as a structural port characteristic.

Finally, port users reported that the efficiency of *customs clearance* procedures as vital attributes towards an increase of their perceived value. It is acknowledged that customs efficiency is not a typical port structural characteristic. Yet, because of its significance, it is important to be under study and included in the present research. For reasons of simplicity and lack of alternatives, customs procedures are included and considered within this category.

8.3 ASSESSING THE PORT USERS' VALUE DIMENSIONS AND ITEM-QUANTITATIVE ANALYSIS

The qualitative analysis of value drivers as identified by the major port users (shipping lines, freight forwarders and shippers) makes evident that perceived value is mainly derived from three components:

- 1) The commercial interactions with other port stakeholders and the port authority
- 2) The operational interactions with other port stakeholders and the port authority
- 3) The structural characteristics of the port

This outcome further confirms the results of the port users' interaction analysis (Chapter 6) and establishes the necessity for detailing interactions when assessing the port users' perceived value.

The conducted qualitative analysis identifies the most important port users' value drivers. It fails though, to provide information to the extent that each value dimension influences the overall port users' perceived value. In order to conclude on this, a quantitative analysis is necessary.

One of the most critical components of a quantitative analysis is the choice of variables under examination. In port studies, it is often the case that the same variables are used to examine two largely distinctive themes, such as the port choice criteria and the users' satisfaction or even port competitiveness (Chapter 3). To overcome such shortcomings, the selection of variables under study of the present research is based on the outcomes of detailed and targeted empirical research. As such, the output of the second phase of the conducted research (value drivers) is used as input for the third phase of the conducted research (presented in Chapter 9).

In the remainder of the present Chapter the variables that are used for the quantitative analysis of the port users' perceived value are presented. Value

dimensions for the five most important port users' interactions are developed. These are the interactions with the terminal operators, the shipping lines, the inland terminals, the PA and the structural characteristics of the port. A distinction between value dimensions treated as benefits and sacrifices is made. A number of items are used to tap the identified value dimensions and are also presented. Each item is represented by a question included in the questionnaires used to collect data (the questionnaires are presented in Appendix I).

Tables 8.3.1 to 8.3.5 present the value dimensions used to assess the port users' perceived value on their interactions with the terminal operators, the shipping lines, the inland terminals, the PA and the structural characteristics of the port. The number of items tapping each dimension and a short description of the items are also provided. Finally, for every interaction the overall perceived value was under evaluation with the use of four items (not presented in the following tables).

Table 8.3.1. Value Dimensions – Interactions with the Terminal Operators⁸⁴

Benefit Dimensions	Codename	Number of Items	Short description (Items)
Productivity	P	4	Efficiency of the TO, quality of services offered, consistency of performance and technical competence.
The Dockworkers' Quality and Flexibility	DOCK	2	The dockworkers' skills and flexibility
Image of the Terminal Operator	IMG	2	Reputation and experience of the TO
Network Position	NET	2	Connection of the TO with other members of the port community and whether the TO keeps the port users' clients satisfied.
Information & Technology	IT	1	Efficiency of the information systems used by the TO
Relationship	REL	5	Adaptation to the port users' needs, flexibility, confidence, reliability and offering of customized services.
Sacrifice Dimensions			
Price Sacrifice	PS	3	Tariffs, administration cost, cost of use
Service Sacrifice	SS	2	Rate of cargo damage, coordination efforts
Time Sacrifice	TS	1	Idle time (SL)/waiting time (FFs)

⁸⁴ Codenames are provided and used to interpret the results of the quantitative analysis

Table 8.3.2. Value Dimensions – Interactions with the Inland Terminal Operators

Benefit Dimensions	Codename	Number of Items	Short description (Items)
Productivity	P	3	Consistency of performance, quality of services and technical competence.
Geographical location	GEO	1	Geographical location of the Inland Terminal
Image of the Inland Terminal Operator	IMG	2	Reputation and experience of the InTO
Network Position	NET	2	Connection of the TO with other members of the port community and whether the TO keeps the port users' clients satisfied.
Information & Technology	IT	3	Efficiency of the information systems used by the InTO, accuracy and on-time provision of information
Relationship	REL	5	Adaptation to the port users needs, transparency, confidence, reliability and offering of customized services.
Sacrifice Dimensions			
Price Sacrifice	PS	2	Administration cost, rent (SL)/transportation cost (FFs)
Service Sacrifice	SS	1	Rate of cargo damage

Table 8.3.3. Value Dimensions – Interactions with the Shipping lines

Benefit Dimensions	Codename	Number of Items	Short description (Items)
Service Characteristics	SER	6	Consistency of performance, use of efficient TO and guarantee of entrance in the destination port, serving multiple destinations, technical competence, direct services
Safety	Safety	2	Safety standards, age of fleet
Image of the Shipping Line	IMG	2	Reputation and experience of the Shipping line
Network Position	NET	2	Connection of the SL with the other members of the port community and whether the SL keeps the port users' clients satisfied.
Information & Technology	IT	2	Efficiency of the information systems used by the SL and accuracy of information
Relationship	REL	6	Adaptation to port users needs, communication, transparency, confidence, reliability and offering of customized services.
Sacrifice Dimensions			
Price Sacrifice	PS	2	Tariffs, administration cost
Service Sacrifice	SS	2	Coordination efforts, rate of cargo damage
Time Sacrifice	TS	2	Delays, time to reach destination port

Table 8.3.4. Value Dimensions – Interactions with the Port Authorities

Benefit Dimensions	Codename	Number of Items	Short description (Items)
Promotion and Marketing	PM	2	Efficient promotion of the port, efficient marketing initiatives
Collective action	COL	5	Involvement in problem solving, facilitating coordination, initiatives to increase hinterland connections, increase value added services provided within the port range and attract cargo.
Image of the Shipping Line	IMG	2	Reputation and transparency of the Shipping line
Infrastructure	INFRA	2	Provision of adequate infrastructure and depth
Information & Technology	IT	3	Efficiency of the information systems used by the PA, accuracy of information provided and quality of EDI systems
Relationship	REL	4	Easiness of communication, reliability, trust and ease of transactions
Safety & Environment	SE	2	Implementation of safety regulations and environmental management initiatives
Harbor's Office	HO	2	Efficiency of services and easiness of communication
Sacrifice Dimensions			
Price Sacrifice	PS	2	Port dues, administration cost
Service Sacrifice	SS	1	Coordination efforts

Table 8.3.5. Value Dimensions – The Structural Characteristics of the Port

Benefit Dimensions	Codename	Number of Items	Short description (Items)
Geographical Location	GEO	2	Geographical location and generation of cargoes
Cluster	CLU	5	No of FFs, SLs, TOs and industrial units located close to the port
Connectivity	CON	5	Quality of multimodal connections, rail, road and barges connectivity
Customs	CUST	2	Rapidness and bureaucratic problems
Socio-economic and political conditions	S-E-P	3	Social, economic and political conditions of the country/region
Sacrifice Dimensions			
Price Sacrifice	PS	2	Investment cost, administration cost
Service Sacrifice	SS	1	Coordination efforts
Congestion	CONG	2	Sea and land congestion

8.4 SUMMARY

The present chapter presented the shipping lines and the freight forwarders' major value attributes as derived from a number of semi-structured interviews. The port users' perceived value is mainly influenced by their operational and commercial interactions with other members of the port community and the ports' structural characteristics. The results of the analysis were further used in order to conclude on the port users' value dimensions in a number of their interactions with the major port stakeholders and the ports' structural characteristics. A number of different items tapping each dimension was also recognized and used in the final phase of the present research. That is the quantitative analysis the results of which are presented in the forthcoming chapter.

CHAPTER 9. THE PORT USERS' PERCEIVED VALUE: MEASUREMENT AND RESULTS

9.1 INTRODUCTION

The final stage of the present research, measures the port users' perceived value. The qualitative analysis (Chapter 8) focused on the critical aspects that influence the port users' perceived value in their major interactions with the other port stakeholders. Despite its merit, a qualitative analysis is unable to conclude on the extent to which each value dimension influences the overall port users' perceived value. A quantitative analysis complements the qualitative one, completing a process that elaborates the validity of the conducted research towards this end.

In the present thesis, the port users' perceived value is conceptualized as a formative second-order construct. To process the data collected during the third phase of the empirical research, the specialized software Smart PLS 2.0 is used and the Partial Least Squares analysis is drawn. Data were gathered from 30 shipping lines and freight forwarders located in major European ports (Antwerp, Zeebrugge, Piraeus, Rotterdam and Hamburg). The results of the analysis reveal the attributes that generate the shipping lines and freight forwarders' perceived value, in their interactions with the other port stakeholders (terminal operators, inland terminals and shipping lines), the port authorities and not least the structural characteristics of a port.

9.2 MEASURING THE PERCEIVED VALUE AS A MULTIDIMENSIONAL CONSTRUCT

Woodruff (1997) puts forward that the generation of higher value for the customer is a major source of competitive advantage, and highlights the organizations' current lack of operational tools to manage value. In order to manage value, firms also have to deeply understand what creates value for their customers and put extra efforts towards the improvement of deficiencies. Business organizations should become value oriented in order to differentiate themselves from competitors, improve their results and increase their future possibilities of survival (Peterson, 1995; Butz and Goodstein, 1996; Hunt, 1997; Lapierre, 2000; Callarisa et al., 2002).

As already analyzed in Chapter 4, the present thesis adopts Zeithaml's (1988, p. 14) definition of customer value, "consumers' overall assessment of the utility of a product based on perceptions of what is received and what is given", that is also used in most studies that conceptualize the construct (Ruiz et al., 2008). Such conceptualization implies that perceived value is a construct configured by two parts. The first is benefits received and the second is sacrifices made by the customer/user of the products/services (see: Grewal et al., 1998).

Despite the wide interest in perceived value, the empirical conceptualization of the construct remains unsettled (Parasuraman and Grewal, 2000). Many scholars employ a unidimensional approach and operationalize perceived value through a single item (e.g. Bolton and Drew, 1991; Cronin et al., 1997) or multiple item measures (e.g. Teas and Agrawal, 2000) (for an overview see: Lin et al., 2005). The unidimensional approach though has raised critics as it is claimed that it cannot capture the complex nature of perceived value (Lam et al., 2004; Wang et al., 2004). In this vein, Sweeney and Soutar (2001, p. 207) note that "a more sophisticated measure is needed to understand how consumers value products and services".

Multidimensional approaches have been adopted in order to capture the complexities inhibited in perceived value and recognize its consistency of many distinct components. A number of instruments such as EVS (Mathwick et al., 2001), SERV-PERVAL (Petrick, 2002) and PERVAL (Sweeney and Soutar, 2001) have been developed towards this end and along with a number of studies focusing on services rather than products (e.g. Lappierre, 2000; Flint et al., 2002; Tam, 2004), gave rise to the treatment of perceived value as a multidimensional construct.

When treated with structural equation modeling, multidimensional constructs can be either reflective or formative. In order to conclude on which of them is preferable, attention turns to the conceptual approach. Ruiz et al. (2008) claim that, most examinations of service value specified with reflective components fail to conceptualize the construct correctly. Diamantopoulos and Winklhofer (2001, p. 274) maintain that reflective specifications of latent variables in the marketing literature often mistakenly prevail while Jarvis et al., (2003) found out that 29% of the studies published during a 24-year period improperly specified formative and reflective constructs. The measurement perspective and thus, the use of formative or reflective indicators should derive from theory and be based on the “auxiliary theory” (Costner, 1969; Diamantopoulos and Siguaw, 2006) with the focus being on the structural paths between the constructs and the relationships between the constructs and the measures (Edwards and Bagozzi, 2000). A blind adherence to a reflective or formative specification without assessing the logic of a model’s conceptualization is dangerous. According to Wilcox et al. (2008), the same list of items can be formative or reflective depending on the measurement conceptualization. From a behavioral science viewpoint, the choice between formative and reflective indicators has been recently raised by a number of authors (c.f. Law et al., 1998; Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003; Diamantopoulos and Siguaw, 2006).

9.2.1 The Formative and Reflective measurement models

Constructs define the unobservable and are also known as latent variables. They are research abstractions that cannot be measured directly. That dictates that they have to be measured indirectly through several items in a research instrument (Campbell and Fiske, 1959; Bagozzi, 1977; Churchill, 1979; Anderson and Gerbing, 1988). Measures are defined as observed scores gathered through various means (Edwards and Bagozzi, 2000) and are also called indicators or scale items. They can be either reflective or formative (Bollen and Lennox, 1991).

Reflective and formative measurement models differ in their approach of casual relationship between the latent variable and its manifest indicators⁸⁵. Their main difference is that reflective indicators depend on the construct while formative ones cause the formation of or changes in an unobservable variable⁸⁶ (ibid). Table 9.2.1 provides an overview of reflective and formative constructs.

⁸⁵ Indicators are measured as the different types of unobserved variables that cannot be measured directly (Bagozzi,1984).

⁸⁶ For an overview of differences between formative and reflective constructs see: Howell et al., 2007; Bagozzi, 2007; Bollen and Lennox, 1991; Dimantopoulos and Winklhofer, 2001

Table 9.2.1. Reflective and Formative Constructs

	Formative Construct	Reflective construct
Casualty	Formative indicators are causes of constructs	Constructs are causes of reflective indicators
Interchangeable	Not-interchangeable	Interchangeable
Validity	Correlations are not explained by the measurement model	Validity of indicators may be assessed through the measurement model
Antecedents and Consequences	Each dimension has its own antecedents and consequences	Shared antecedents and consequences
Measurement error	Considered at the construct level	Considered at the item level
Internal Consistency	Internal consistency is not implied	Indicators should possess internal consistency
Correlations	Not expected	Should be high

Source: Adapted from Roberts and Thatcher, 2009; Lin et al., 2005; Freeze and Raschke, 2007

Reflective indicators are a function of the latent variable (figure 9.2.1). Thus, changes in the latent variable are reflected in changes in the observable indicators (Diamantopoulos and Siguaw, 2006) or, in other words, observed indicators are assumed to be caused by the latent variable (Churchill, 1979; Bollen, 1989). Reflective indicators are widely used in inter- and intra-organizational relationships (for an overview see: Diamantopoulos and Siguaw, 2006). On the other hand, formative indicators are considered to cause changes in the value of the latent variable (figure 9.2.2); that is, constructs are formed by their indicators (Bagozzi and Fornell, 1982; MacCallum and Browne, 1993; Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003). High correlation between the indicators in formative constructs is not expected, required or causes concerns, whereas dropping an indicator is similar to dropping a part of the construct (Bollen and Lennox, 1991).

Misspecification of constructs as either reflective or formative increases the potential of declaring a path significant when it is really nonsignificant (Type I error), and vice versa (Type II error) (Mackenzie, 2001). Despite the

fact that a false choice between reflective or formative indicators results in significant deviation of results, researchers were more likely to miscategorize formative constructs as reflective rather than the opposite (Jarvis et al., 2003) and, thus, the use of formative constructs has been scant until only recently⁸⁷.

Figure 9.2.1. The Effect Model (Reflective indicators)

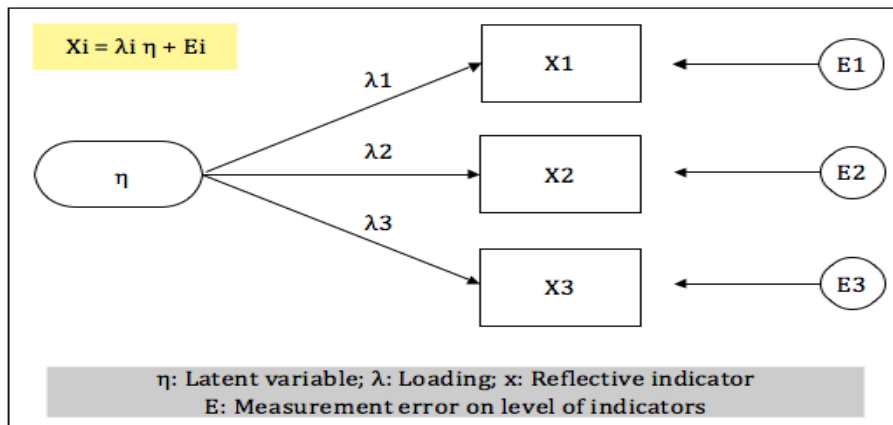
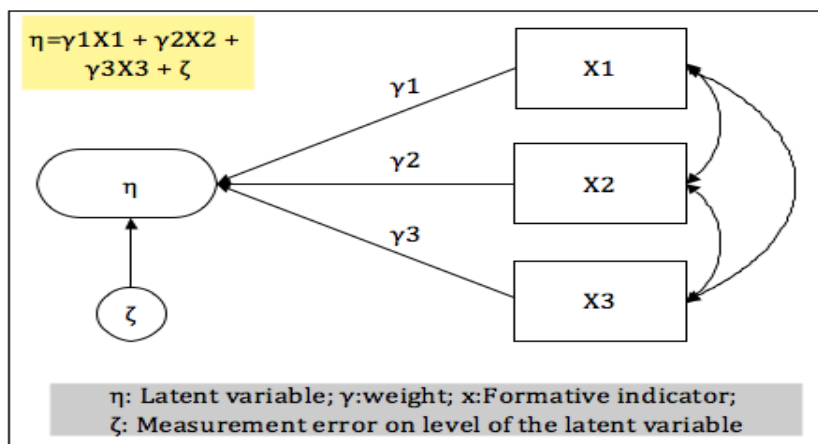


Figure 9.2.2. The Causal Model (Formative indicators)



In formative indicators, the internal consistency criterion is not valid (Bollen, 1984) and dropping an indicator may alter the meaning of the construct. Also, the measurement error can be estimated only on the construct level (Bollen and Lennox, 1991).

⁸⁷ For an analysis of the reasons see: Roberts and Thatcher (2009)

The choice between a formative and a reflective construct should be primarily derived from theoretical consideration of the relationships between the indicators and the latent construct (Cohen et al., 1990; Edwards and Bagozzi, 2000; Fornell et al., 1991). Jarvis et al. (2003), recommended four decision rules in order to identify whether a construct should be treated as a reflective or a formative one⁸⁸. The first rule assesses the theoretical causal direction from construct to measure being implied by the conceptual definition; the second rule is about examining the interchangeability of the indicators; the third is to see whether indicators covary with one another; and the fourth is on whether indicators have the same antecedents and consequences.

When applying these rules to the port users' perceived value, the latter is a formative construct. First, dimensions such as relationship, price and productivity are not manifestations of the port users' perceived value but define characteristics of it. Changes in the indicators cause changes in the port users' perceived value (construct) rather than the opposite. Port users begin with benefit and sacrifice evaluations, then make trade-off calculations, and arrive at a conclusion that is the perceived value. Second, the indicators are not interchangeable. Relationship, productivity, price and network position do not share a common theme⁸⁹. Moreover, benefits and sacrifices are clearly distinguishable. With respect to co-variation among the indicators, the variation in indicators like 'network position' is not necessarily linked to variation in indicators like 'productivity'. Finally, indicators do not share the same antecedents and consequences.

Applying the Law et al. (1998) taxonomy to the port users' perceived value, also concludes that the latter can be modeled as a formative construct. First, the port users' perceived value exists at the same level of abstraction as the second order dimensions, namely the port users' benefits and sacrifices. Benefits and sacrifices are an aggregate model with benefits having a

⁸⁸ Lately Gudergan et al. (2008) proposed a statistical test of the suitability of reflective or formative indicators based on the PLS method.

⁸⁹ Correlations between productivity and time could be found in the port users' perceived value but according to Roberts and Thatcher (2009), high correlations between formative indicators are possible but not generally expected.

positive contribution and sacrifices a negative one. Second, the first order dimensions (relationship, productivity, image etc.) are also in the same level of abstraction with the second order dimensions (sacrifices and benefits).

In line with Lin et al., (2005) it is concluded that perceived value is a second order formative construct (further confirmed by Ruiz et al., 2008). Finally, a number of studies published, especially during the last years, model perceived value as a formative construct (c.f. Ulaga and Eggert, 2005; Roig and Garcia, 2006); still a large number of ones considering perceived value as a reflective one can also be found (see: Ruiz et al., 2008). In the present study, the port users' perceived value is modeled as a second order formative construct. Higher order constructs consist of multiple dimensions with each of them representing an important aspect of the construct (Bollen and Lennox, 1991) and are suggested for use when treating complex constructs (Podsakoff et al., 2006).

9.2.2 The Partial Least Squares method

Hsu et al. (2006), recommend the proper Structure Equation Model (SEM) technique that should be applied to measuring customer satisfaction and, *inter alia*, concluded that, when measuring formative indicators, a component-based SEM technique should be adopted. The SEM-based method combines an econometric emphasis that focuses on prediction but also a psychometric one where concepts are indirectly inferred from multiple observed indicators. Unlike the covariance structure analysis, which assumes reflective measurement models, the Partial Least Squares (PLS) analysis (which is a component based SEM and a variance-based method) incorporates both reflective and formative models. PLS is in contrast with maximum-likelihood based methods such as LISREL or AMOS. The first is prediction oriented, whereas the second is parameter oriented (Chin, 1998a). Formative constructs can in principle be estimated with the use of covariance structure analysis yet specific identification problems are caused that are not an issue when using PLS (e.g. MacCallum and Browne,

1993; Chin, 1998b). Moreover, PLS has a favorable behavior in light of multicollinearity (Gustafsson and Johnson, 2004).

The Partial Least Squares method was designed by Wold (1974)⁹⁰ and is a family of alternating least squares algorithms. PLS focuses on maximizing the variance of the dependent variables explained by the independent ones (Haenlein and Kaplan, 2004). It consists of three parts with the first being a structural part reflecting the relationships between latent variables, the second a measurement part on relations between latent variables and their indicators and third, the weighting part used to estimate case values for the latent values. PLS understands the latent variables as weighted sums of their respective indicators (Chin and Newsted, 1999) and predicts values for the latent variables with the use of multiple regressions (c.f. Chin, 1998b).

PLS path modeling is recommended for use during the early stages of theoretical development as it allows the testing and validation of exploratory models, while it is also suitable for prediction-oriented research (Henseler et al., 2009). It is especially suitable for exploratory studies and model testing (Chin, 1998b; Gefen et al., 2000).

PLS path models are defined by two sets of linear equations: the inner and the outer model. The outer model specifies the relationships between latent and manifest variables, while the inner model specifies relationships between the latent variables.

According to Henseler et al. (2009), the main characteristics of PLS and the derived advantages are summarized as follows:

- PLS delivers latent variables scores, measured by one or a number of indicators
- PLS can be applied when sample sizes are small
- PLS estimates very complex models with many latent and manifest variables

⁹⁰ Significant extensions were also developed by Lohmoller (1989).

- PLS assumptions on variables distribution and error terms are less stringent
- PLS can handle both reflective and formative constructs.

Focusing on PLS required sample size, scholars highlight that one of its main advantages is that the method can handle and provide accurate and reliable results with the use of extremely small samples (see: Tenenhaus et al., 2005; Wold, 1989; Barclay et al., 1995). According to Chin and Newsted (1999), the reliable sample can be as low as 20.

Another reason for choosing to use the PLS in the present research, is that it is appropriate when the theory is untested in an application domain (Gopal et al., 1992) and thus has an exploratory nature.

9.2.3 Assessing reliability and validity

One of the main reasons that limited the application of formative constructs during the past has been that the validation methods applied were limited. In order to validate formative constructs, a two- step process should be followed (Henseler et al., 2009), encompassing: 1) the assessment of the outer model and 2) the assessment of the inner model. The criteria for testing and establishing the reliability and validity of reflective and formative constructs when PLS is used are presented following Henseler's (ibid) suggestions.

9.2.3.1 The Reflective Constructs

Construct validity is also known as factorial validity and tests whether a good theoretical basis is used to develop the construct. If that is the case, then clear operational definitions involving measurable indicators are established. In order to establish the construct validity, both convergent and discriminant validity should be assessed. In order to assess convergent validity, the internal consistency reliability is usually checked. Traditionally the Cornbach's α (Cronbach, 1951) is used, as it provides an estimate based

on the indicator inter-correlations. According to many scholars though (c.f. Chin, 2010), the composite reliability ρ_c (Werts et al., 1974) is preferable as Cornbach's α may over- or under- estimate scale reliability. For both reliability coefficients, values above 0.7 in early stages of the research and above 0.8 or 0.9 in more advanced stages are considered satisfactory (Nunnally and Bernstein, 1994; Hock and Ringle, 2006). Values below 0.6 indicate a lack of reliability.

The reliability of each indicator should be assessed as well and the latent variable should explain a significant part of each indicator's variance. The correlation between a latent variable and its manifest variables should be higher than 0.7. Comrey and Lee (1992), recommend that factor loadings of 0.71 are considered excellent, 0.63 very good, 0.45 fair and finally loadings below 0.32 poor.

The convergent validity is used in order to show that a construct is more strongly related with its own measures rather than any other construct. The aim is to clarify that the constructs are clearly distinctive and to reflect the average communality for each latent variable. To test this, Fornell and Larcker (1981), suggest using the Average Variance Extracted (AVE) with values above 0.5 considered adequate (Gotz et al., 2009).

The discriminant validity is tested in order to examine how each item relates to each construct. Each measure should have strong relations with the construct that it attempts to reflect and at the same time, weak relations with other constructs. Otherwise, it is not clear whether the measure belongs to the right construct. In order to test the discriminant validity, the correlations of each item with cross loadings and its loadings are screened. The loading of each indicator has to be greater than its cross loadings (Chin, 1998b). The Fornell-Larcker criterion (Fornell and Larcker, 1981) is used complementary to the cross-loading criterion. According to this, a given latent variable shares more variance with its indicators than with other latent variables. The AVE of a factor should be greater than the variance shared between the construct and the other constructs in the model. The

shared variance between two constructs is also expressed by the squared correlation between the two constructs.

9.2.3.2 The Formative constructs

According to Bollen (1989) and Bagozzi (1994), the reliability and validity measures for assessing reflective constructs are not adequate when testing formative constructs. According to Rossiter (2002), an examination of the validity of formative indicators should use theoretical rationale and expert opinion. Due to the extended use of qualitative semi-structured interviews conducted with the port users, both the criteria are met. Additionally, Henseler et al. (2009) suggest testing additional criteria (such as nomological validity, external validity etc.). Due to the exploratory nature of the present research they are not applied in order to generate knowledge even if models are problematic during their implementation. Signals for pure specification of the constructs are given with the assessment of the structural models.

The essential criterion in order to evaluate the structural model of formative constructs is the coefficient of determination (R^2) and the estimates of the path estimates. The R^2 assesses the predictive power of the structural model and represents the amount of variance of the construct that is explained by the model. According to Chin (1998b), values of 0.67, 0.33 and 0.19 are described as substantial, moderate and weak respectively. Finally, apart from the assessment of the values of the path coefficients (that have to algebraic behave according to expectations) there is a need to test their significance. Resampling techniques such as bootstrapping (Tenehaus et al., 2005) are used towards this end.

9.3 DATA ANALYSIS AND RESULTS

In order to further enhance knowledge on the ways that the shipping lines and freight forwarders' perceived value is constructed, second order formative constructs for each of their interactions with the major port stakeholders are developed. The items that were identified through the qualitative analysis (Chapter 8) are used as manifest variables of the first order latent variables, with the latter also identified in the same Chapter. Further, according to the nature of each latent variable, they are correlated with the second order latent variables that are benefits and sacrifices. The overall perceived value is measured through 4 reflective items. In order to develop the second order models, a two- step process was applied. First, latent values for the first order constructs were calculated and then used as formative direct indicators for the second order construct (Chin, 2010). Following this, the repeated indicators method was used⁹¹ (also known as the hierarchical component model) (Chin et al., 2003; Kleijnen et al., 2007). According to Chin (1998b), standardized paths should be around 0.20 and ideally above 0.30 in order to be considered meaningful. Due to the exploratory nature of the present path modelling, emphasis is also given on paths with lower values. The significance of the parameters estimated was calculated on the basis of 1000 bootstrapped samples (Chatelin et al., 2002; Brown and Chin, 2004).

⁹¹ The second order factors could not be directly measured by observed variables for all the first order factors, as this method is appropriate only for Type I and Type II constructs. If used for Type IV constructs (as it is the case in the present thesis), then factor loadings would be influenced by the number of the manifest indicators attached to them. Therefore, the two- step approach is adopted here. Moreover, according to Wold (1984, p. 40), the approach with the repeated indicators is correct, even in Type IV constructs, but the 2nd order latent variables should be used just as an exogenous variable, because its variance is explained by its indicators (cause indicators) and "the specification of an additional source of variation (i.e., an antecedent construct) is conceptually questionable" (Diamantopoulos et al., 2008, p. 14). Another alternative method would be to use the means of the original manifest variables as manifest variables of the 2nd order LVs. However, when such an approach is adopted the results are found to be very close to the ones of the two-step process followed in this thesis. In any case, it should be noted that the calculation of Type IV formative constructs is the subject of an ongoing debate in the scientific community and a number of scholars were consulted before concluding on the process adopted here.

During the last years, the number of dedicated PLS path modeling software has emerged. Here the software SmartPLS 2.0 beta (Ringle et al., 2005) is used following the consideration of the strengths and weaknesses of other alternatives (Temme et al., 2010). Missing values are substituted using the procedure implemented in SmartPLS, that is, values missing on the item level are replaced by the mean of all indicators belonging to the same factor. In order to report the results, Chin's (2010, p. 669) suggestions are followed. According to them, enough information needs to be provided in order to understand:

- a) the population from which the data sample was obtained
- b) the distribution of the data in order to determine the adequacy of the statistical estimation procedure
- c) the conceptual model in order to determine the appropriateness of the statistical models analyzed
- d) the statistical results in order to corroborate the subsequent interpretation and conclusions.

Before the presentation of the results, it should be noted that each relationship in the models could be also seen as a research hypothesis with their significance being subject to confirmation. Such a view generates a significant number of hypotheses that are tested in the present research.

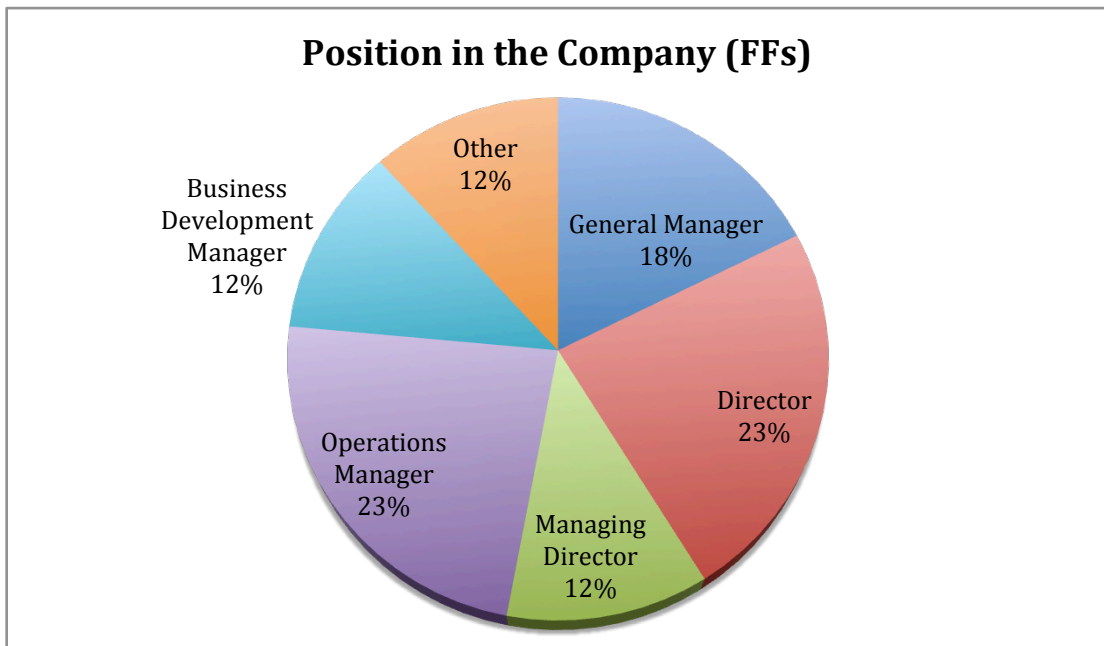
Moreover as already established, the port users' value is a rather complex construct as port users generate value from their multiple interactions with the other port stakeholders. As such, port users derive a complete value from the port of use with every counterpart having a certain amount of influence, with the latter remaining unknown. As the port users' perceived value research is at early stages, it is unfeasible to move towards complex conceptualizations that will model the real world without first deeply understanding its parts. Therefore, the quantitative analysis is restricted to dyadic relations.

9.3.1 Description of the dataset

A high level of difficulty commonly characterizes the collection of data from the shipping lines and the freight forwarders. Firms are reluctant to share information, especially when it comes to themes that they consider as crucial for their competitiveness. In order to collect as much data as possible from targeted companies, the opportunity to overpass the evaluations of the port stakeholders during the completion of the questionnaire was provided. For example, a shipping line unwilling to evaluate the terminal operator that it interacts with could be willing to evaluate the port authority. Therefore, the number of evaluations used during the path modelling varies among the different port stakeholders. As such, the equivalent sample used is as follows: the ports' structural characteristics (30), the port authority (29), the shipping lines (26), the inland terminals (27) and the terminal operators (21). The relatively low number of questionnaires used for the evaluation of the terminal operators is also due to the responders' unwillingness to share information on their cost and time sacrifices. Eight questionnaires were returned in which, although the terminal operators' characteristics were evaluated, questions referring to cost and time were left blank. As such, they were dropped from further analysis.

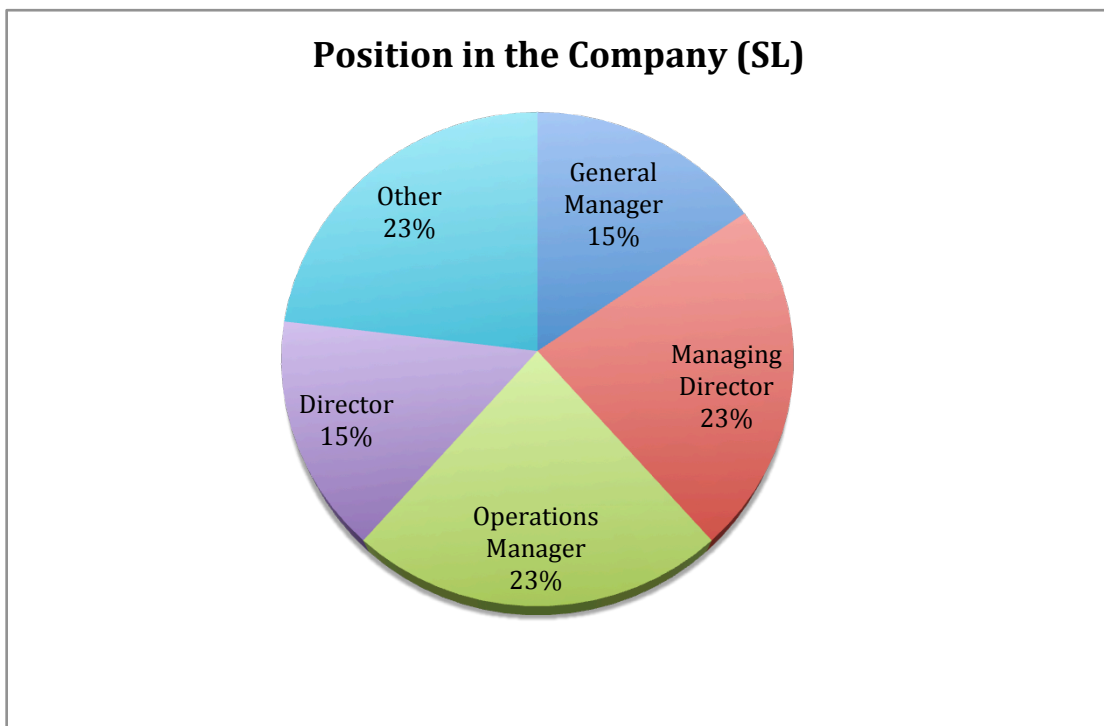
The dataset includes 30 port firms, 13 of which are shipping lines and 17 are freight forwarders. Directors and operation managers from freight forwarding companies account for 23% of the responders, respectively. General managers are 18% of the responders, while two business development managers (12%) and two managing directors (12%) also provided valid questionnaires (figure 9.3.1).

Figure 9.3.1. The Responders' Position in the Company (freight forwarders)



For the shipping lines, the managing directors and operations manager filled in 56% of the valid questionnaires (3 responders respectively), while the general managers and directors accounted for 30% of the responders (2 responses respectively) (figure 9.3.2).

Figure 9.3.2. The Responders' position in the Company (shipping lines)



The size of the companies included in the dataset is assessed by two criteria. The first one is the number of full-time permanent employees on a global scale (figure 9.3.3). The second one is the number of TEU's handled during the last year before the collection of data (year 2009) (figure 9.3.4). Twelve companies with less than 100 employees are included in the dataset, followed by companies with more than 1.000 employees (9 companies) and the ones having a workforce between 100-500 (8 companies). Only one company having between 500 and 1.000 employers is found in the dataset.

Companies that handled relatively low volumes (up to 15.000) of TEUs during the year 2009 account for 33% of the dataset (10 valid questionnaires). Five companies (17%) handled between 15.000 and 100.000 TEUs, while seven handled 100.000 and 1 million TEUs (23%). Finally, companies handling more than 1 million TEUs accounted for 27% of the sample (8 companies).

Figure 9.3.3. The Number of Full-time Permanent Employees (global scale)

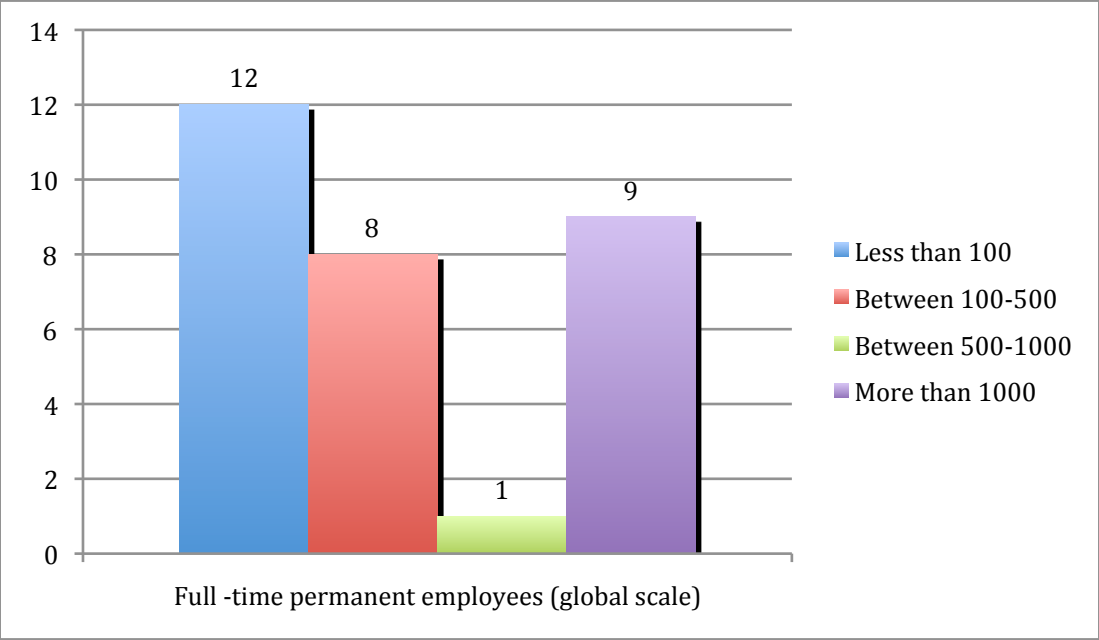
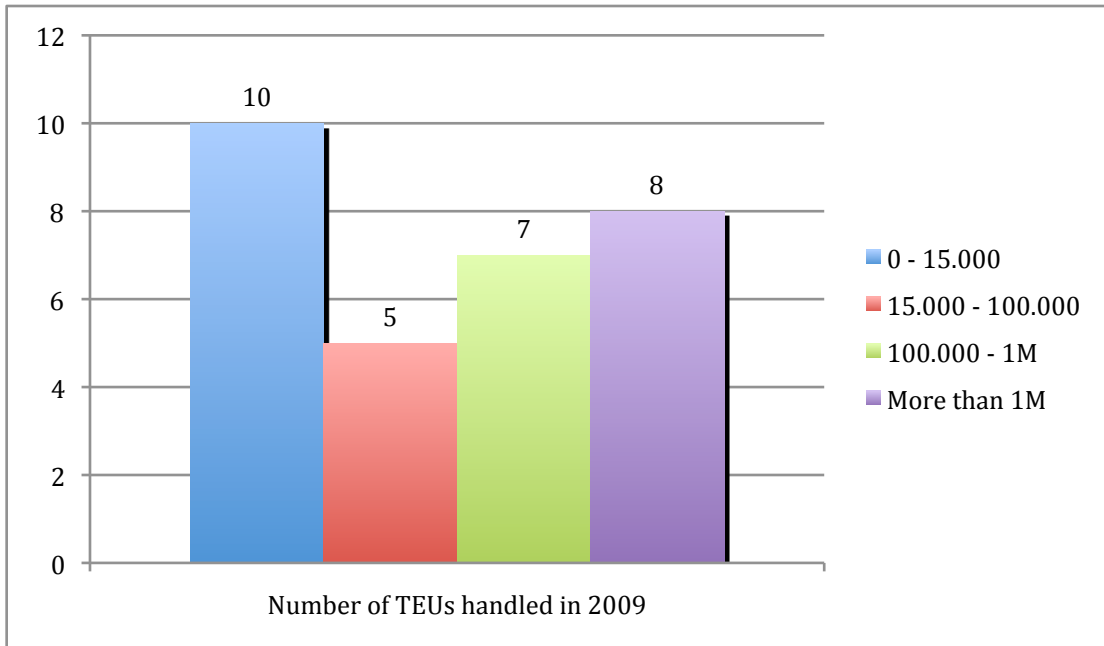


Figure 9.3.4. The Number of TEUs Handled in 2009



Finally, both the shipping lines and the freight forwarders were asked about the additional port related services that they offer their clients, and whether they do so through subsidiaries or not. Only two freight-forwarding companies that do not offer trucking services are found. Shipping services are offered by 10 out of the 17 freight forwarding companies included in the dataset, while 9 companies offer rail and barge services and 8 companies offer inland terminal services. Finally, only 6 offer stevedoring services (figure 9.3.5). A great share of the shipping lines is involved in the provision of forwarding (door to door, port to door and port to inland terminals) services and, barge, trucking and rail services. Almost half (6 out of the 13) of the shipping lines also offer stevedoring services while 4 of them are involved in inland terminal operations. Notably, only one out of the 13 shipping line companies included in the dataset is solely restricted to the provision of shipping services (figure 9.3.6).

Figure 9.3.5. The Provision of Additional Services (freight forwarders)

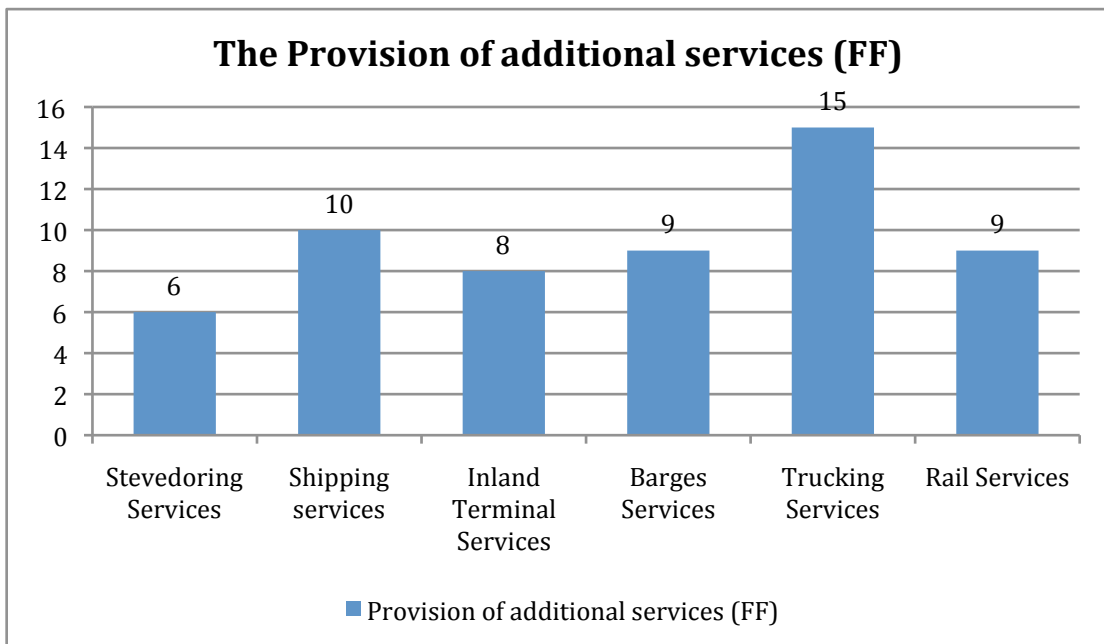
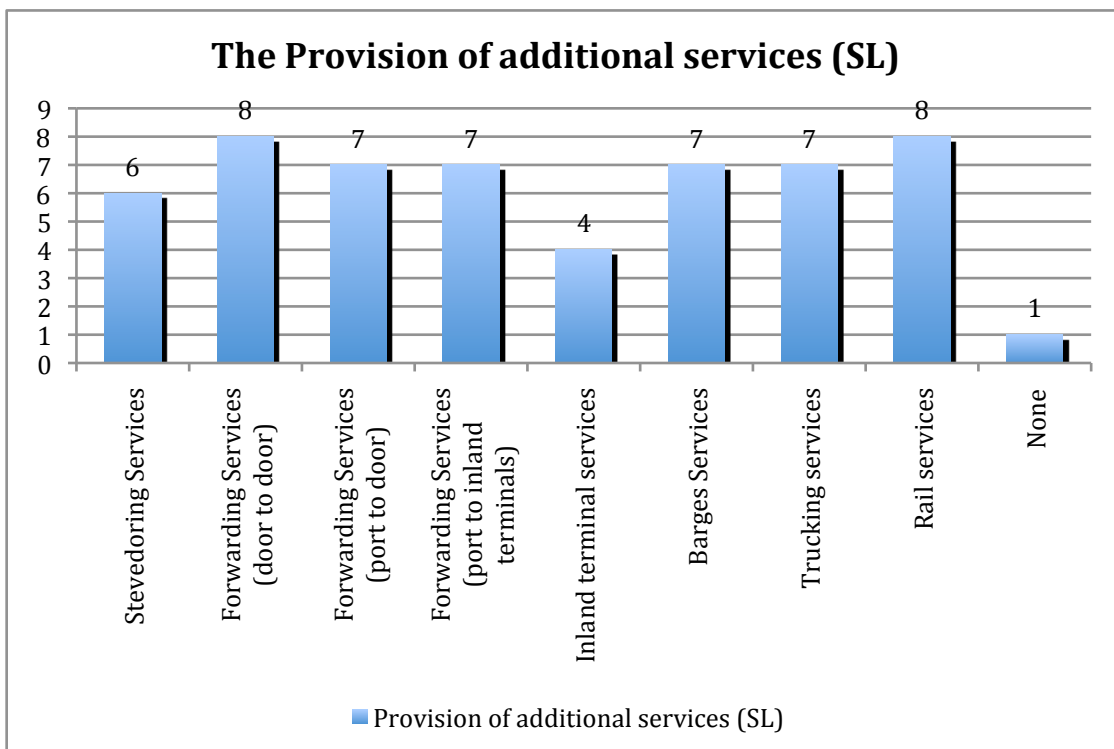


Figure 9.3.6. The Provision of Additional Services (shipping lines)



9.3.2 The port users' perceived value from the port structural characteristics (Construct 1)

The port users' benefits derived from a port's structural characteristics are influenced by five latent variables, namely: the geographical location of the port, its hinterland connectivity, the socio-economic and political conditions, cluster characteristics, and finally customs. Sacrifices on the other hand are influenced by the overall cost, the congestion (sea and land) and "service" sacrifices (i.e. coordination efforts).

During the initial application of the PLS to the path model, low loading values (below 0.7) of one manifest indicator (related to socio-economic conditions) were returned. Literature on how to handle low manifest loadings is quite diffusing with scholars (c.f. Little et al., 1999) who even suggest keeping the maximum number of manifest variables despite low loading values. As widely acceptable solutions cannot be found, we proceeded with the estimation of both models: in the first, the manifest variables were kept despite their low loadings while in the second, they were excluded. Notably, the results between the two constructs were quite similar with limited differences that do not alter the interpretation of the theorization. Moreover, both constructs showed significant levels of validity and reliability. Here a construct where the one manifest variable is not excluded from the analysis is presented, as the aim is to explore the concepts rather than test them. Moreover, the item loadings were very close to the limit of 0.7 (0.67) and further contributed to the decision of their inclusion.

The conceptualization of the port users' perceived value from a port's structural characteristics is presented in figure 9.3.7. The structural model gives information as to how the theoretical model predicts the hypothesized paths. The results provide the squared multiple correlations (R^2) for each endogenous construct in the model and the path coefficients (β) that indicate the strengths of relationships between constructs. The figure reports the parameter estimates.

The formative value scale shares 62.5% of its variance with the global indicators of the users' perceived value. Benefits are positively correlated with the users' perceived value (0.610), whereas sacrifices are negatively correlated (-0.246) as expected. The socio-economic and political conditions of the port have the highest contribution to the users' benefits ($\beta=0.275$), followed by the hinterland connectivity ($\beta=0.274$). The characteristics of the port cluster ($\beta=0.266$) and the geographical location of a port ($\beta=0.221$) follow. Notably, customs is the variable showing the lowest contribution to the users' benefits, although it is regularly quoted as a major cause of low value ($\beta=0.189$) during the conducted interviews.

The monetary cost of using the port has the highest contribution to sacrifices ($\beta=0.419$) even surpassing the port's congestion ($\beta=0.388$). Service sacrifices also have significant contribution that cannot be neglected ($\beta=0.397$). Service sacrifices are correlated with one manifest variable (coordination efforts). According to the results obtained from the bootstrap methodology, all the paths are significant at $\rho < 0.01$ (Appendix II presents t-values) except for the connection of the sacrifices with the perceived value that is significant at $\rho < 0.1$. Therefore, if the various model paths are seen as a hypothesis, they are all confirmed.

Table 9.3.1 presents the AVE and composite reliability of the construct. All AVE measured above the threshold of 0.50 and composite reliability above 0.70. Table 9.3.2 assesses the Fornell-Larcker criterion. The square root of the AVE (diagonal in table 9.3.2) is compared with the correlations between the constructs (off-diagonal elements) and is higher in every case. Furthermore, the cross-loadings criterion is also fulfilled (Appendix II) and thus discriminant validity is established.

Figure 9.3.7. The Perceived Value From the Structural Characteristics of the Port (Construct 1)

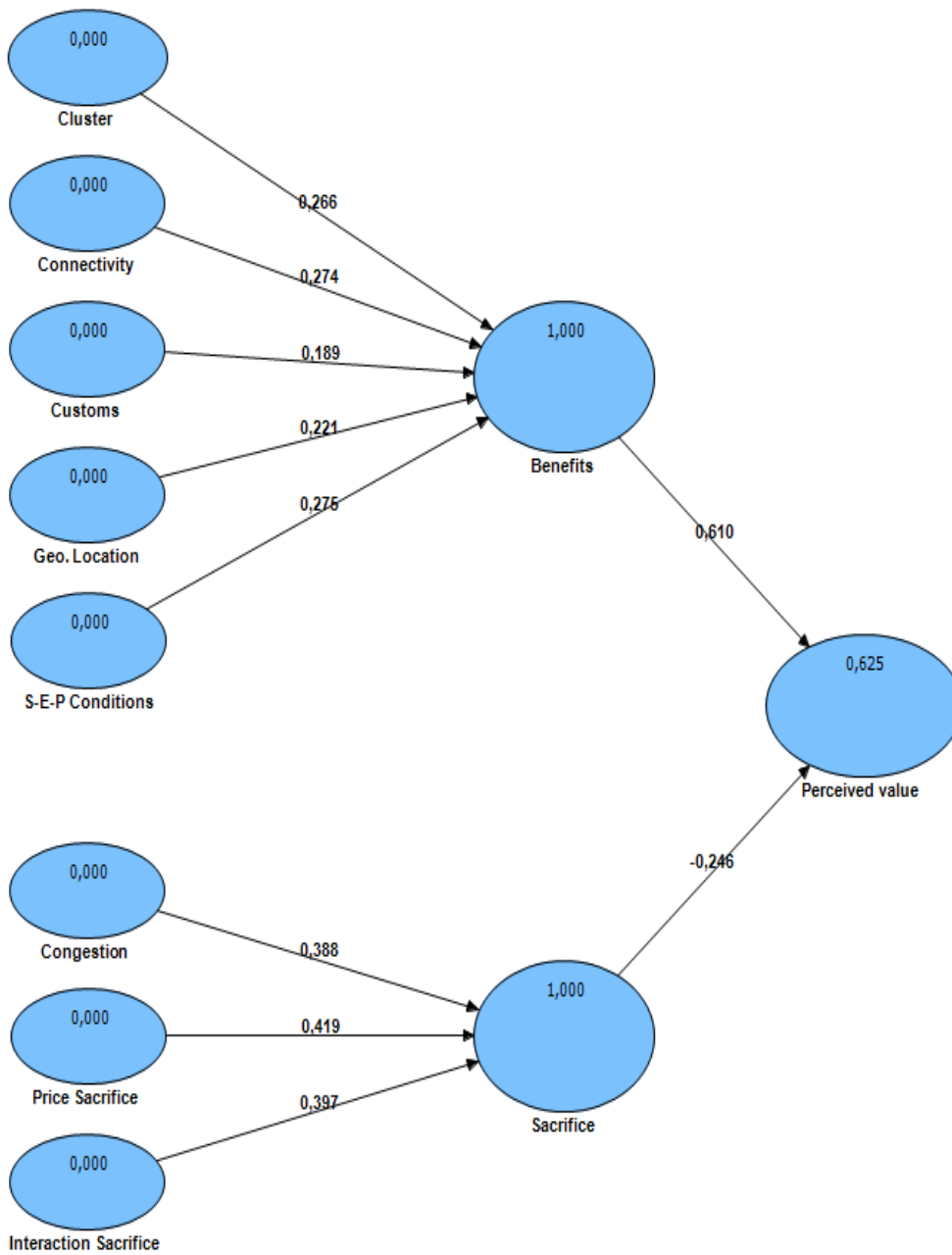


Table 9.3.1. AVE and Composite Reliability (Construct 1)

	AVE	Composite Reliability
Cluster	0.559400	0.863566
Congestion	0.625750	0.768852
Connectivity	0.686352	0.916092
Customs	0.823617	0.903276
Geographical location	0.828948	0.906324
Price	0.759064	0.863016
SEP Conditions	0.667725	0.855802
Service Sacrifice	1.000000	1.000000

Table 9.3.2. The Fornell-Larcker Criterion (Construct 1)

	Cluster	Congestion	Connectivity	Customs	Geo. Location	Interaction Sacrifice	Price Sacrifice	S-E-P Conditions
Cluster	0.7479							
Congestion	-0.4387	0.7910						
Connectivity	0.6092	-0.4650	0.8284					
Customs	0.3700	-0.1814	0.6287	0.9075				
Geo. Location	0.5136	-0.3293	0.6318	0.2036	0.9104			
Interaction Sacrifice	-0.5677	0.4588	-0.5514	-0.3165	-0.5281	1.0000		
Price Sacrifice	-0.4992	0.5240	-0.5623	-0.2549	-0.2892	0.6152	0.8712	
S-E-P Conditions	0.6957	-0.4174	0.7734	0.6289	0.5186	-0.5217	-0.4313	0.8171

9.3.3 The port users' perceived value from the Port Authority (Construct 2)

The following dimensions influence the benefits that port users derive when interacting with a port authority: information, promotion and marketing, collective action, safety and environment, image, relationship, infrastructure and the harbour's office. Sacrifices are influenced by the cost of their interaction and interaction sacrifices (coordination efforts). The results of the PLS analysis are presented in figure 9.3.8.

The construct shares its 65% ($R^2=0.65$) of variance with the global indicators of the port users' perceived value from the port authorities. As expected, benefits ($\beta=0.662$) are positively correlated with the perceived value whereas sacrifices have a negative influence ($\beta= -0.215$).

The port authorities' initiatives aiming to increase collective action planning and problem solving ($\beta=0.162$), along with the image of the PA ($\beta=0.163$) are regarded by port users as the most important elements that contribute to their benefits. The characteristics of the relationship that the port users have established with the port authority, such as good communication between the two or ease of transactions, also have a significant impact on their perceived value ($\beta=0.157$). Minor changes in terms of importance are present between the infrastructure conditions ($\beta=0.149$), the Harbour's Office ($\beta=0.145$) and information sharing ($\beta=0.142$). Promotion and marketing ($\beta=0.131$) and safety and environmental management ($\beta=0.119$) follow in terms of importance. The monetary sacrifices ($\beta=0.550$) are regarded more important compared to interaction sacrifices ($\beta=0.523$), although their difference is only minor. All manifest variables show a correlation above the threshold of 0.70, while all path coefficients are significant for $p<0.01$ (Appendix II). The exception here is the path coefficient between sacrifices and the perceived value that is nonsignificant ($p=0.32$). Thus, the port users' perceived value from the PA is not influenced by their sacrifices.

The validity of the construct is assessed through AVE scores that are far above 0.50 and composite reliability scores that are above 0.80 (table 9.3.3). The Fornell-Larcker criterion is presented in table 9.3.4, while cross loading tables are provided in the appendix along with t-statistics (Appendix II). Notably, the Fornell-Larcker criterion is not met, as the correlation between the latent variable image and the collective action is bigger than the square root of AVE for collective action. However, the cross loadings criterion⁹² is met and also both latent variables show significant loading of their manifest variables. Therefore, the discriminant validity of the construct is met, as two out of three criteria are met.

⁹² The cross-loading criterion is not met for a manifest variable of the variable 'Relationship', as another one loads higher for the variable 'Image'. However, the difference is minor (less than 0.01), the Fornell-Larcker criterion is met for these variables, while the loading is also high. Therefore, in that case, two out of three criteria of discriminant validity are met.

Figure 9.3.8. The Port Users' Perceived Value from the Port Authority (Construct 2)

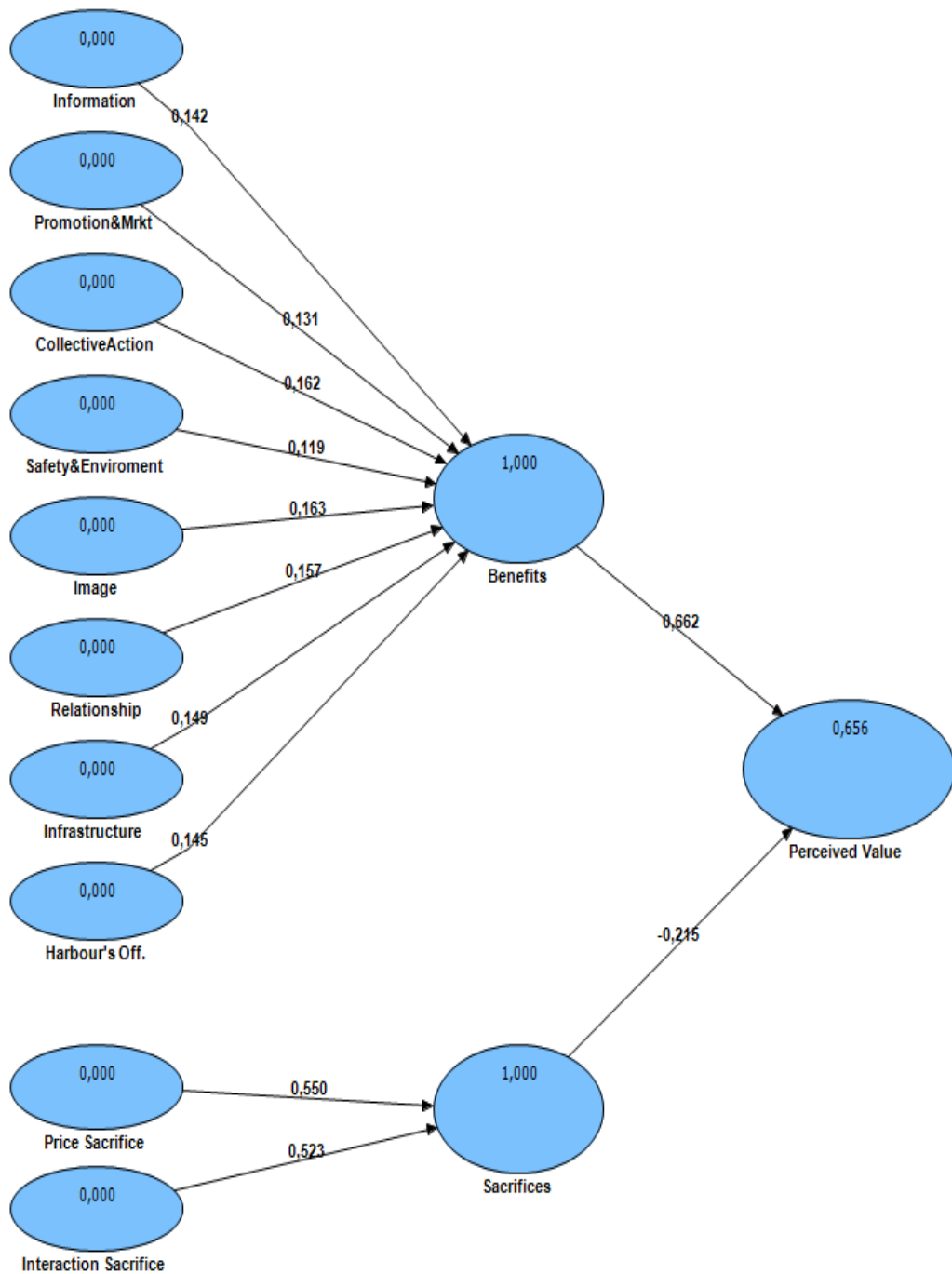


Table 9.3.3. AVE and Composite Reliability (Construct 2)

	AVE	Composite Reliability
Collective Action	0.7032	0.9221
Harbor's Office	0.9157	0.9560
Image	0.8439	0.9153
Information	0.7913	0.9192
Infrastructure	0.8162	0.8988
Price Sacrifice	0.8391	0.9125
Promotion & Marketing	0.9054	0.9504
Relationship	0.7846	0.9357
Safety & Environment	0.8910	0.9423
Interaction Sacrifice	1.000	1.000

Table 9.3.4. The Fornell-Larcker Criterion (Construct 2)

	Collective Action	Harbor's Off.	Image	Information	Infrastructure	Interaction Sacrifice	Price Sacrifice	Promotion & Mrkt	Relationship	Safety & Environment
Collective Action	0.839									
Harbor's Off.	0.637	0.957								
Image	0.878	0.719	0.919							
Information	0.628	0.912	0.697	0.890						
Infrastructure	0.781	0.573	0.787	0.571	0.903					
Interaction Sacrifice	-0.438	-0.749	-0.369	-0.694	-0.274	1.000				
Price Sacrifice	-0.394	-0.583	-0.370	-0.507	-0.307	0.736	0.916			
Promotion & Mrkt	0.758	0.675	0.761	0.731	0.517	-0.458	-0.348	0.952		
Relationship	0.723	0.842	0.857	0.798	0.627	-0.634	-0.591	0.720	0.886	
Safety & Environment	0.577	0.527	0.555	0.524	0.557	-0.496	-0.543	0.624	0.587	0.944

9.3.4 The port users' perceived value from the shipping lines (Construct 3)

When the port users interact with the shipping lines their benefits are caused by a good relationship developed between the two: the image and the service characteristics of the shipping line, its operational safety standards, its position within the port community and the wider supply chain and finally, by the adequacy and quality of information that they provide to their users. In turn, sacrifices are derived by the cost of use, the overall time needed to be serviced and sacrifices such as rate of damage and coordination efforts (service sacrifices). All factor loadings were above the threshold of 0.7, except for one related to 'relationship'. In line with the first construct, two models were calculated, one including the manifest variable while the other excluding it. Differences between them were not observed. The validity and reliability of both constructs are established and the loading of the variable is close to the limit (0.69). Therefore, the manifest variable is not excluded from the model.

The R^2 of the overall perceived value is significantly high and equals to 0.777. That means that, 77% of the port users' perceived value from the shipping lines is explained by the construct. Benefits influence positively the overall perceived value and the path coefficient is significantly high ($\beta=0.781$). Sacrifices influence negatively the overall perceived value ($\beta=-0.120$), as expected (figure 9.3.9).

Benefits are mainly influenced by the image of the shipping line ($\beta=0.229$) and the relationship ($\beta=0.224$) retained between the port user and the shipping line. Adaptation to the users' needs, confidence, reliability, customization of services, flexibility and good levels of communication between the two are regarded as elements of top priority, along with the experience and the reputation of the shipping line. Service characteristics are also very important to port users ($\beta=0.214$). The same applies for the quality of information provided by the shipping line ($\beta=0.207$). The correlations of the remaining latent variables with benefits are relatively

smaller: network position ($\beta=0.177$) and safety and environmental conditions ($\beta=0.146$).

In terms of sacrifices, the differences between the three latent variables are relatively small. The most important among them is the time sacrifice ($\beta=0.395$), followed by service sacrifices ($\beta=0.357$). Notably, the monetary cost ($\beta=0.354$) is the least important sacrifice to the port users. All manifest variables loading exceed the threshold of 0.70.

All path coefficients are significant at level $\rho < 0.01$ except for the path between the sacrifices and the overall perceived value that is significant at $\rho < 0.2$, which is relatively high. Given the small size of the sample though, it would be rather simplistic and misleading to consider that this hypothesis is not supported. The t-values of the path coefficients are presented in Appendix II.

In table 9.3.5, the AVE and the composite reliability of the construct are presented. The lowest value of AVE is 0.639, which is far above 0.50 while values of the composite reliability exceed 0.8. Further, the Fornell-Larcker criterion is met (table 9.3.6), as well as the cross-loading criterion⁹³ (Appendix II).

⁹³ The cross-loading criterion is not met as one service variable presents a higher loading on the latent variable 'Image'. The difference is relatively small (0.02), the Fornell-Larcker criterion is met and loading is significant. Therefore, two out of three criteria of discriminant validity are met

Figure 9.3.9. The Port Users' Perceived Value from the Shipping Lines (Construct 3)

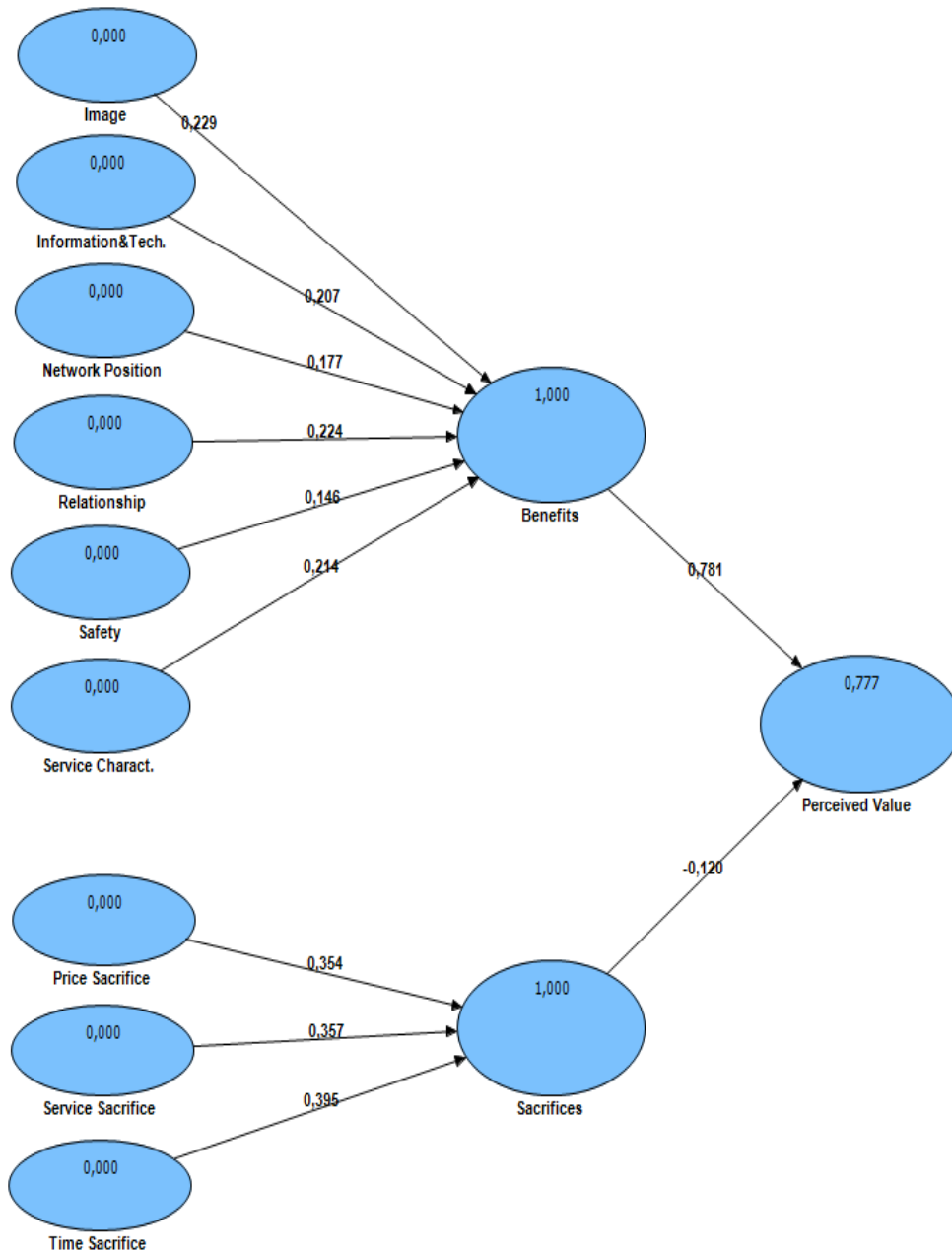


Table 9.3.5. AVE and Composite Reliability (Construct 3)

	AVE	Composite Reliability
Image	0.755	0.860
Information	0.880	0.936
Network position	0.740	0.851
Price	0.943	0.971
Relationship	0.688	0.929
Safety	0.821	0.902
Service Characteristics	0.640	0.914
Service Sacrifice	0.737	0.848
Time	0.734	0.846

Table 9.3.6. The Fornell-Larcker Criterion (Construct 3)

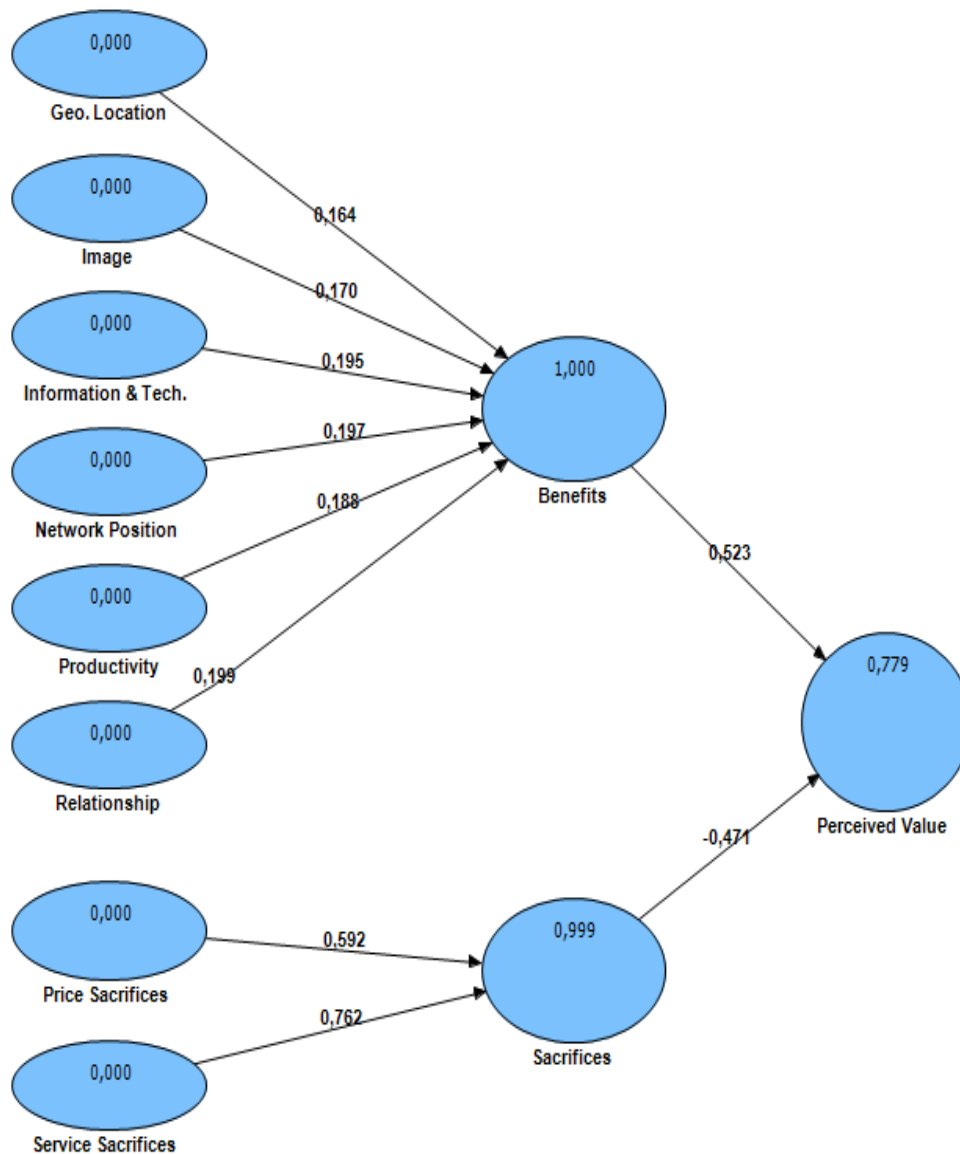
	Image	Information & Tech.	Network Position	Price Sacrifice	Relationship	Safety	Service Charact.	Service Sacrifice	Time Sacrifice
Image	0.869								
Information & Tech.	0.788	0.938							
Network Position	0.531	0.527	0.860						
Price Sacrifice	-0.606	-0.437	-0.465	0.971					
Relationship	0.757	0.700	0.604	-0.736	0.829				
Safety	0.690	0.610	0.131	-0.349	0.464	0.906			
Service Charact.	0.751	0.702	0.693	-0.353	0.678	0.576	0.800		
Service Sacrifice	-0.684	-0.716	-0.450	0.618	-0.769	-0.728	-0.724	0.858	
Time Sacrifice	-0.721	-0.538	-0.663	0.786	-0.795	-0.448	-0.704	0.758	0.857

9.3.5 The Port users' perceived value from the inland terminals (Construct 4)

In order to assess the port users' perceived value from the inland terminals, six latent variables contributing to benefits are used, while two latent variables affect sacrifices. In total, 21 manifest variables were correlated with the latent variables. The loading of two manifest variables (correlated with productivity and service sacrifices), did not exceed the value of 0.7 (0.67 and 0.52, respectively). The manifest variable linked with the sacrifices is well below the threshold of 0.7. In line with constructs 2 and 3, two models (one including the manifest variables and the other excluding them) were calculated. Notably, the construct where the manifest variables were not dropped, showed significant problems of validity and reliability. Therefore, it was decided to drop the two variables.

The R^2 of the construct is 0.779, while benefits prevail over sacrifices in their impact on the total perceived value ($\beta=0.523$ and $\beta=-0.471$, respectively). The most important elements that add to total benefits occurred are the relationship developed between the port users and the inland terminal operator ($\beta=0.199$) and the network position of the inland terminal ($\beta=0.197$). The quality of information that the inland terminal operator provides to its customers ($\beta=0.195$) is also highly correlated with benefits and followed by the productivity of the inland terminal ($\beta=0.188$). Finally, the image ($\beta=0.170$) and the geographical location of the inland terminal ($\beta=0.164$) also impact the port users' perceived value. For sacrifices, the service sacrifices of using the inland terminal ($\beta=0.762$) are more important than the monetary cost ($\beta=0.592$) (figure 9.3.10).

Figure 9.3.10. The Port Users' Perceived Value from the Inland Terminals (Construct 4)



Following the results of the bootstrap analysis, all paths are significant at $\rho < 0.05$. T-values are presented in Appendix II.

AVE and composite reliability are presented in table 9.3.7. Referring to the Fornell – Larcker criterion (table 9.3.8), it is not met in the case of the network position and the latent variable relationship. However, all loadings are higher than 0.70 and the cross-loadings criterion is met. Therefore, the discriminant validity of the construct is met, as two out of three criteria are fulfilled.

Table 9.3.7. AVE and Composite Reliability (Construct 4)

	AVE	Composite Reliability
Geo. Location	1.000	1.000
Image	0.899	0.947
Information & Tech.	0.832	0.937
Network Position	0.754	0.859
Productivity	0.805	0.925
Relationship	0.801	0.953
Service Sacrifices	1.000	1.000
Price Sacrifices	0.898	0.946

Table 9.3.8. The Fornell-Larcker Criterion (Construct 4)

	Geo. Location	Image	Information & Tech.	Network Position	Productivity	Relationship	Service Sacrifices	Price Sacrifices
Geo. Location	1.0000							
Image	0.7480	0.9479						
Information & Tech.	0.5858	0.7381	0.9123					
Network Position	0.7281	0.6616	0.8361	0.8681				
Productivity	0.5504	0.7564	0.8692	0.8177	0.8970			
Relationship	0.7244	0.8376	0.8868	0.8971	0.8222	0.8950		
Service Sacrifices	-0.1399	-0.4075	-0.5690	-0.4027	-0.4898	-0.4056	1.0000	
Price Sacrifices	-0.4760	-0.2136	-0.2356	-0.5478	-0.1359	-0.3943	0.0763	0.9473

9.3.6 The port users' perceived value from the terminal operators (Construct 5)

The conceptualization of the port users' perceived value from a terminal operator is presented in figure 9.3.11. The formative value scale shares 73.2% of its variance with the global indicators of the users' perceived value. Benefits ($\beta=0.647$) are positively correlated with the perceived value, whereas sacrifices ($\beta=-0.261$) are negatively correlated, as expected.

Notably, the establishment of a good and functioning relationship ($\beta=0.262$) with the terminal operator, accounts more for the port users' perceived value in comparison with the latter's productivity ($\beta=0.221$). The image ($\beta=0.228$) of the terminal operator is also an important element and equals to the quality and flexibility of the dockworkers ($\beta=0.228$). Finally, the network position ($\beta=0.200$) of the terminal operator, as well as the provision of adequate information (0.126) are regarded as less significant attributes. In terms of sacrifices, the time sacrifice ($\beta=0.456$) is more important than the service sacrifice⁹⁴ ($\beta=0.430$), while monetary cost only comes third ($\beta=0.407$) in terms of importance. Following the results of the bootstrap analysis, all paths are significant at $p<0.05$. T-values are presented in appendix II.

The validity of the construct is established as AVE, Composite reliability (table 9.3.9), Fornell-Larcker (table 9.3.10) and the cross loading (Appendix II) criterion are established.

⁹⁴ The loading of one manifest variable for service sacrifice is lower (0.57) than the threshold of 0.7. Given the fact that validity and reliability of the construct are established, the variable is included in the model.

Figure 9.3.11. The Port Users' Perceived Value from the Terminal Operators (Construct 5)

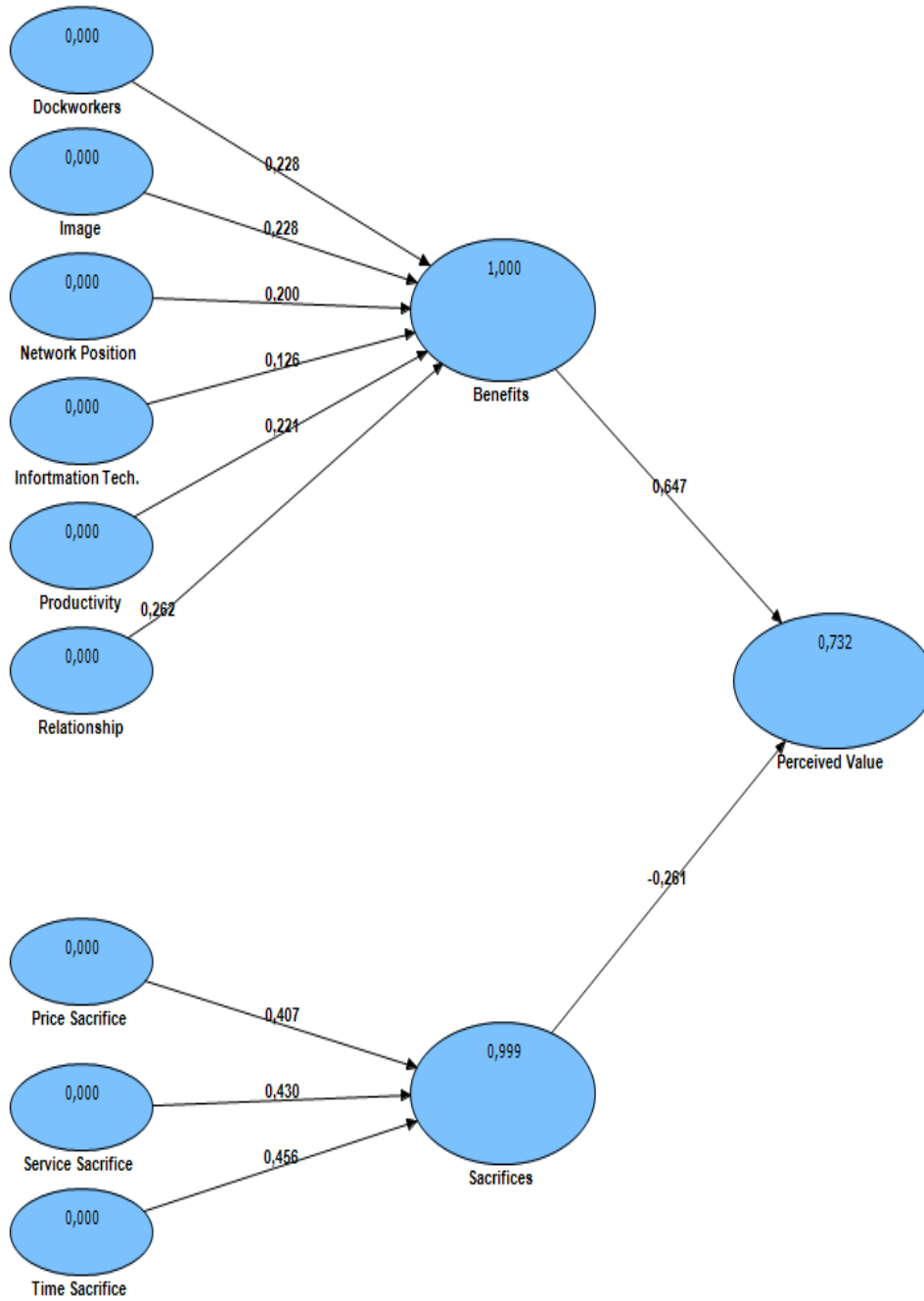


Table 9.3.9. AVE and Composite Reliability (Construct 5)

	AVE	Composite Reliability
Dockworkers	0.6221	0.7665
Image	0.7984	0.8879
Information Tech.	1.0000	1.0000
Network Position	0.5612	0.7187
Price Sacrifice	0.7005	0.8749
Productivity	0.7704	0.9301
Relationship	0.6553	0.9042
Service Sacrifice	0.5644	0.7125
Time Sacrifice	1.0000	1.0000

Table 9.3.10. The Fornell-Larcker Criterion (Construct 5)

	Dockworkers	Image	Information Tech.	Network Position	Price Sacrifice	Productivity	Relationship	Service Sacrifice	Time Sacrifice
Dockworkers	0.7887								
Image	0.7507	0.8935							
Information Tech.	0.2762	0.5609	1.0000						
Network Position	0.3468	0.6498	0.3615	0.7491					
Price Sacrifice	-0.3452	-0.0598	-0.1377	-0.1369	0.8369				
Productivity	0.6015	0.6859	0.5810	0.3506	-0.2593	0.8776			
Relationship	0.5309	0.6019	0.3059	0.6489	-0.4506	0.6245	0.8095		
Service Sacrifice	-0.4301	-0.4354	-0.6814	-0.2208	0.4356	-0.7220	-0.5546	0.7512	
Time Sacrifice	-0.4996	-0.5730	-0.3930	-0.5478	0.1725	-0.5924	-0.7009	0.5681	1.000

In all five models, only two correlation paths proved to be insignificant. Thus, the dimensions identified during the qualitative analysis and used to

conceptualize the port users' perceived value are further confirmed by a statistical point of view. The model also provides information on the importance of each value dimension. The differences between the various dimensions proved to be very low (usually well below 0.1). This is mainly due to the process followed for the selection of the indicators. The selection was not based on picking indicators that are already used in other relevant studies, but derived from a number of semi-structured interviews with the port stakeholders. The most important indicators for the port users' perceived value were screened, identified and ultimately selected for further quantitative analysis. Therefore, the importance of the indicators was expected to be high and the slight differences in terms of importance rather low. Furthermore, the small differences in terms of importance among the value dimensions signify that the port users are becoming more demanding. Their perceived value is not highly correlated with only a number of dimensions but the port users seek all the elements to be in place and perform well in order to be satisfied.

9.4 SUMMARY

The present chapter provided a quantitative analysis on the port users' perceived value in their interactions with the various port stakeholders, such as the shipping lines, the inland terminals, the terminal operators, the port authority and also with the ports' structural characteristics. Value attributes generated during the qualitative analysis of the present thesis have been used. Data collected from various shipping lines and freight forwarders active in the ports of Antwerp, Rotterdam, Hamburg and Piraeus were inputs of formative second order constructs. The Partial Least Squares method has been used along with the specialized software Smart PLS.

The results of the analysis signify the importance of the various value attributes on the port users' perceived value. The level that each latent variable influences the total perceived value has been identified.

CHAPTER 10. CONCLUSIONS

10.1 INTRODUCTION

The intention of the present study was to generate knowledge on *the port users' perceived value* and contribute to the development and application of balanced Port Performance Measurement (PPM) practises. The contextual changes that take place in container ports justified the need to measure the ports' performance (Chapter 2). The critical review of port performance measurement practises conceived at an academic level, and those implemented in practice (Chapter 3) underlined the deficiencies of contemporary PPMs. The discussion and realisation of the advantages of balanced performance measurements, resulted in a discussion and positive validation of the efforts to generate knowledge on the port users perceived value, as a mean to advance the development of a balanced PPM (Chapter 4).

The three phases of the conducted empirical research, combined a qualitative case-study research, which involved semi-structured interviews, with a quantitative research, which involved the development of formative constructs with the use of the Partial Least Squares technique (Chapter 5). The sample of the researched ports selected was international and the focus was on container ports. The generated findings led to the development and analysis of two distinctive port settings that accurately portray the different configurations of the interactions that take place in container ports between the port users and the service providers (Chapter 6). Port actors develop several types of relationships that impact decisively on the port users' perceived value (Chapter 7). The different elements that generate the port users' perceived value were the subject of the subsequent analysis (Chapter

8). The final phase of the research concentrated on the modelling of the extent to which each of the identified value element impacts on the port users' overall perceived value (Chapter 9).

The concluding chapter discusses the findings and the theoretical advancements that this research has generated. The chapter returns to the research hypotheses initially set, and provides answers based on the findings. It also analyses the theoretical contribution of these findings to the general context of port studies. The study concludes with suggestions for further research.

10.2 KEY QUESTIONS

Ports are marked by radical changes altering the traditional styles of management, strategies and operations. The rise of containerization posed new challenges. Inter-port competition is fierce, with ports aiming to increase their value offering to shipping lines and supply chains. The provision of technological advanced infrastructure and equipment, and sophisticated and efficient information systems, become *inter alia* core elements of a ports' competitiveness.

As port competition intensifies, the extensive introduction of port reform practices that favour the participation of the private sector in the provision of port services, or in the financing of port infrastructure, emerges. In order to conclude on whether the widespread port devolution programmes deliver the objectives initially set, the measurement of port performance is necessary. At the same time, the Port Authorities are transformed from institutions in charge of all port activities to the administrators, coordinators, or regulators of these activities.

In this vein, the actors of the port community increase their influence on port organization, management, governance and operations. Shipping lines, terminal operators and freight forwarders implement strategies of vertical and horizontal integration, aiming to be involved in and, if possible, control larger parts of the supply chain. Yet, the extent that these strategies actually impact their performance and their *value offering* remains unknown.

Spatial changes in seaports pose challenges and call for accordant actions, in order to sustain and increase competitive position. Ports are embedded in supply chains (Robinson, 2002) and possess a dominant role that influences the competitiveness of the whole supply chain. They have thus to increase the number and the quality of the hinterland links, provide value added services, and efficiently coordinate other members of the supply chain. The ports' foreland (Notteboom and Rodrigue 2010) and hinterland (Notteboom and Rodrigue, 2005) regionalisation also cause new challenge, such as the ability to add value, and to achieve of high levels of logistics integration (with emphasis here placed on inland terminals). As the scope of port related operations expands, the interrelations in a given port increase. Yet, with the extent to which these interrelations affect port performance not being subject to any detailed analysis, it was realised at the early stages of this doctoral study that such research is desired.

The contextual changes generate a highly competitive and complex environment for container seaports, within which port actors seek to adapt efficiently. In this vein, Port Performance Measurement (PPM) is of great importance. This is not least because the total of the port stakeholders need to monitor (a) how they adapt to contextual changes; and (b) whether the strategies they endorse produce the desired outcomes. Moreover, port performance guides port planning and policies, with the latter being instruments used to diagnose causes of success or failure. PPMs should be well designed and implemented in order to deliver the outcomes sought. They should be updated with the latest developments, as the high levels of dynamism of the port sector increase the need for frequent updates.

The detailed review of the scholarly research, and an extensive overview of the industrial practices (Chapters 3) concluded that PPMs, both at an academic and a practical level, largely focus on the assessment of the productivity of (terminal) operations in order to conclude on port efficiency. The second component of port performance (Brooks and Pallis, 2008) is effectiveness, and is largely neglected. The frontier approach prevails as the most widely adopted methodology for assessing port efficiency, although it is restricted to using data linked with handling and stevedoring services (internal generated information) and does not take into account a wide range of services offered in contemporary ports. Yet, even in this context, it is acknowledged (cf. Cochrane, 2008) that even port throughput (regularly the output of frontier approaches such as DEA and TFP) is influenced by exogenous factors as well.

The review of port studies also concluded that externally generated information is mainly used to assess the port users' choice criteria that indirectly assess port performance. These efforts rarely combine both the maritime and the landside part of a port. More actor-based research was found wanted; especially as great differences exist between different types of port users' perceptions (cf. Malchow and Kanafani, 2004; Chang et al., 2008). The ways that port choice is a much broader concept than the pure transportation decisions (Garrido and Leva, 2004), as well as the ways influenced by port embodiment in supply chains (Magala and Simmons, 2008) are still themes that remain relatively unexploited.

Port choice and port competitiveness studies tend to be mistakenly confused with or regarded as satisfaction and/or perceived value assessments. The link between the two issues is not proven. Choice determinants provide information on the port users' decisions on selecting a specific port of use. Value, or satisfaction, determinants probe their views about the services enjoyed. Although a number of studies stress the need to go towards comprehensive assessments of the port users' perspectives, with these assessments evaluated within a satisfaction and/or perceived value context, such applications remain wanted. The extended changes and

the subsequent high levels of complexity, in terms of operations, management and governance, make this task more demanding. Port performance is a multidimensional feature that incorporates the assessment of the sum of services offered by a number of different entities within a port's limits. Thus, disintegrating port related services might lead to partial assessments. The measurement of the port users' assessments contributes to the development and application of balanced PPMs, as they are the 'missing link' towards this end - when such balanced approach is adopted by the most widely used non-port related comprehensive Business Performance Measurement systems.

In order to increase the relevance and the accuracy of the results of the present thesis, the contextual changes of the last years, have been vital. Embodiment in supply chains, regionalization, the actors' vertical and horizontal integration strategies, the new roles of the PAs, and the variety of the port governance models adopted, were all taken into account and shaped the conducted research. Moreover, the port was not regarded or treated within 'black box' logic. Rather than that, the focus was on the interrelations of the port actors.

The relations developed in ports fall within the B-2-B framework (Chapter 4). Therefore, *the perceived value* is preferred to satisfaction measurements as a better predictor of outcome variables. This study embarked in answering the question *how the port users' perceived value could be measured*. A number of related questions had to be answered towards this end: Where is the port users' perceived value extracted from? Which are the strategies of the port service providers towards the increase of their value offering? Which are the strategies of the port users in order to enjoy an increased perceived value? How can the PAs facilitate the co-creation of value? What creates value for port users? What influences the generation of the port users' value and to what extent?

In business markets, where relationships between buyers and sellers are usually long-term, value is influenced by the transaction of the two parties (*transactional specific*), as well as the relationships developed between

them (*relationship specific*). Relationship value stems from the quality of the interactions going on between the customer and the supplier of the product or service. Companies, in general, interact with each other and develop relationships in order to exploit and develop their resources (Turnbull and Wilson, 1989). Relationships are developed in industrial markets due to interdependencies of users and service providers, and stand as an interorganizational type of resource.

In port research it remained unknown how port users and service providers interact with each other, and how they develop relationships. Still, these are essential elements in order to understand what creates the port users' value and, thus, to identify value drivers and ultimately measure their importance.

As a result, the four objectives that the present thesis set were as follows:

1. The identification of the various types of interactions that take place between the actors of a port cluster.
2. The identification and analysis of the nature and structures of the relationships developed between port users and service providers.
3. The detection of the factors that generate value for the different types of port users.
4. The measurement of the extent to which each of the factors that generate value influences the port users' perceived value.

10.3 FINDINGS

10.3.1 Where the port users' perceived value is extracted from

The complexity of the inner-port environment blurs the distinction between port users and service providers. Patterns of service exchanges are complicated. Confirming this trend, the conducted research provided evidence of two distinctive port settings. The detailing of the latter facilitated the identification, analysis and mapping of the various port stakeholders' interactions and, subsequently, the identification and measurement of the port users perceived value.

The '*common user terminal setting*' is that of a landlord port characterized by the presence of a common user container terminal, whereas the '*dedicated terminal setting*' is one where, a dedicated container terminal is present. A "follow-the-container" analysis delineates the various types of services and operations, and the various port stakeholders that have an impact on each container. This following begins at the entrance of the container in a port area and ends with its final exit. As detailed (Chapter 6), an extended number of different interactions involve different types of port stakeholders with distinctive characteristics. The analysis of the two port settings provides the grounds to explore whether additional port settings exist, or whether they have the potential to be present via the combination of specific port users and services providers in mixed ways.

The interactions found within port settings are of two types: 1) *operational*, and 2) *commercial*. Operational interactions involve the physical interaction between two actors at an operational level, which includes the movement of a container. Commercial interactions refer to all other interactions than the operational ones, such as the financial, social and information exchanges.

The port users' perceived value mainly derives from three components:

- 1) The commercial interactions with other port stakeholders and the port authority
- 2) The operational interactions with other port stakeholders and the port authority
- 3) The structural characteristics of the port

The number of operational and commercial interactions of each port actor in a given port setting, varies considerably and depends on its level of vertical integration and the scope of services that he offers to its clients. The particular stakeholders that each user interacts with, also varies considerably. The PA is the only port stakeholder that every single port user interacts with in all cases, yet the services that are the subject of these interactions differ^{95,96}. The perceived value of each port user is highly idiosyncratic and considerable variations might be present among the port users using the same port.

These findings enhance the validity of the actor-based approaches of port operations, while they substantiate that within such approaches, or at a practical level, port users should not be regarded, or treated, as homogenous. In essence, they add to Hall's (2004, p. 143) advocacy that "firm-specific factors, specifically differences in the way in which port processing operations are organised and in which access terminal space is secured, are a key factor in explaining the resulting geography". With Hall's study focusing on automobile importers and the geography of the port users, the present research extends the findings in two respects. First, to another type of trade and market served by ports (from automobile to containers) and, second, from the examination of the geography of users to the analysis of the value these users perceive to enjoy.

⁹⁵ The structural characteristics of the port are the only element that all port users interact with in precisely the same way, with no deviation and differences found.

⁹⁶ For example, a shipping line might interact with one terminal operator, a given number of freight forwarders and inland terminal operators, while another shipping line may interact with a different terminal operator, different freight forwarders and inland terminal operators.

Each service exchange involves both an *operational* and a *commercial* interaction. Notably, in any of the port settings, the two types of interactions for the same service might involve more than just two port actors. It is often the case, that a port user maintains a commercial interaction with a specific entity for the movement of a container, whereas a third party carries out the operational interaction^{97,98}. Interactions in any port setting are also distinguished as *direct* and *indirect*. When assessing a ports user's perceived value in such interactions, considering only its interactions with the direct counterparts it is not sufficient. Companies that are indirectly linked with the focal company might also cause low levels of perceived value. These findings establish the proposition that ports stand as *business networks*.

The port users do not regard, or consider in practice, ports as a black box. Rather than that, they construct their perceived value based on the inner-port environment wherein various port stakeholders interact. At the same time, the interactions between the port users and service providers influence decisively this inner-port environment. Relying solely on the evaluation of specific components, and neglecting the combination and matching of all of them, would be misleading.

Subsequent to the acknowledgement that port performance is a multidimensional feature, the present thesis also establishes that the port users' perceived value is a multidimensional construct⁹⁹; confirming Guardado et al. (2004), that the provision of port services is the result of the complex integration of multiple actors of the port community. In any of the

⁹⁷ This is a hybrid type of interaction (type 1); one of the three found in port settings.

⁹⁸ The most common example is the interaction between a freight forwarder (FF), a shipping line (GSL), and a terminal operator (ITO). The FF maintains commercial interactions with the GSL for the transportation of containers, but interacts operationally for the same service with the ITO. No direct operational interactions are present between the GSL and the FF. The two parties interact operationally only indirectly as the ITO always intervenes between them. In the same vein, no direct commercial interactions are developed between the FF and the ITO. As such, freight forwarders perceived value, for example, might be lower, due to their interactions with terminal operators although the two parties do not have any commercial relationship and interaction. Freight forwarders regularly quoted that a main reason for receiving a low value from a shipping line and ultimately from the relevant port, is the decreased performance of operating terminal operators.

⁹⁹ This multidimensional character of the port users' perceived value should not be confused with the multidimensional character of perceived value in terms of operationalizing its measurement (see Chapter 9).

identified port settings, the perceived value is highly dynamic and streams throughout an end-to-end path of the port chain. Port stakeholders might enjoy high levels of perceived value, but this does not necessarily mean that they interact directly with the particular entities that produce this value. Perceived value might also be produced by a distant entity, whose actions spill over the chain.

All these confirm that the port stakeholders are embedded in business networks that are a set of connected business relationships, whereas the exchange in one relationship is contingent upon the exchange in the other relationship. In other words, *port stakeholders' networks* exist. This calls for major port re-conceptualizations within a new research stream that views and studies ports as business networks. Moreover, it generates major implications for port users' strategies so as to enjoy an increased value from the services they use. These strategies do not need to be interested in the immediate counterparts of the specific actors only, but in the entire business network that the specific actors are connected to. From this perspective - and in line with Normann and Ramirez (1993) suggestions for business networks - the strategy for port stakeholders is primarily the art of positioning a company in the right place in the value chain: the right business, the right services and market segments, the right value adding activities.

10.3.2 The strategies of the port service providers towards increased value offering

In any port setting, the various port stakeholders are found to be interdependent in three different ways. Their interdependencies are *serial*, *pooled*, or *reciprocal*. The efficiency and effectiveness of a container's movement is subject to the stakeholders' coordination and collaboration and relies on the efficient matching resources of the involved actors. Port firms are in need of, and always use, services offered by other port

stakeholders, giving rise to the formation and emergence of *port value chains*.

Port value chains refer to a system of functionally and spatially interacting regionalized units, rather than to individual terminals, warehouses, rail, trucks etc. only. In a given port, single actors compete with each other, and, at the same time, competition between the various port value chains takes place. Therefore, a major strategic issue for port firms is to allocate their position in port value chains and, based on this allocation, to put efforts towards the increase of the value offered by the port value chain in which they interact.

It is also to their interest to be embedded in those port value chains that have the capability of producing and offering superior value to their users. This has a major impact on the elements that generate the port users' perceived value.¹⁰⁰ The same fact influences, in large, the strategies of the port service providers. These strategies have to be fit and perform within a business network constellation. Port users are not only interested in their immediate counterparts. Rather than that, they are interested in the entire port value chain. In this vein, it is also to their interest to acquire and safeguard the position that they hold in these chains. In order to protect their position, they have to develop accordant capabilities and strategies.

Supply chains were confirmed to be a *fractal*¹⁰¹ of which port value chains stand as a part of; a finding substantiating the Carbone and Morvillo (2003) approach that supply chain methodology can be employed in order to deal with the port service providers' behaviour for the satisfaction of the customers' needs.

The concept of port value chains however, goes beyond Robinson's (2002) suggestion that ports are embedded in value-driven chains. Ports themselves are organized as value-driven chain systems - the port value

¹⁰⁰ The importance of sustaining a good relationship and the network position of a port firm are both recognised as elements that influence to a great extent the port user's overall perceived value

¹⁰¹ A rough or fragmented geometric shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole (Mandelbrot, 1983)

chains' concept - and are embedded in greater value-driven chains with several overlaps between the two occurring that deserve further attention. Port value chains also elaborate the maritime logistics value, recently put forward by Lee and Song (2010). It does so, by providing a more detailed and focused analysis on the process that maritime logistics value is developed and delivered to port users. The findings extend suggestions to study the integration of seaport container terminals in supply chains (see: Panayides and Song, 2008), whereas they result in the realisation of the need to also study the level of integration of port value chains and supply chains.

The functional integration of port value chains largely differs. This differentiation depends on the level of vertical integration of the participating actors, as well as on the strength of the relationships developed between them (which results in their 'virtual integration'). Given the strategic focus of each port stakeholder, the latter picks to develop strategies of actual vertical integration¹⁰², or to develop relationships with the other members of the 'port value chain' (virtual integration). The strength of these relationships varies significantly, ranging from very close contractual based agreements *to* relationships following an arms' length approach.

Internal interactions take place between two firms, with one of them commonly being a subsidiary of the other. For example, in cases where a shipping line owns and operates a firm that offers forwarding services, then the interactions between these two are 'internal'. The presence of internal interactions in a port setting, gives rise to the formation of *internal transportation channels*. Being the outcome of extensive vertical integration strategies employed by port firms, these channels involve the transportation of a container from its entrance in a port area until its final exit by firms belonging to the same conglomerate.

¹⁰² Although it is hardly possible that any port stakeholder can be relationship-free in any port setting.

The firms that are parts of transportation channels integrate their operational patterns, coordinate with each other and enjoy high levels of adaptation. As an executive of such a firm reported, he is unable to define the boundaries between the firms being parts of such an internal transportation channel (being at the same time subsidiaries of the firm he is working for). Although certain port services cannot be internalized (such as, for example, services offered by the port authorities and the harbour's office), the impact on freight transportation by any 'not in the channel' company, and consequently, its impact on the level of value generation, are eliminated. The formation of internal transportation channels influences decisively the views of its members as regards the factors that have an impact on their own perceived value. Notably, the level of integration of two firms belonging to the same conglomerate varies, and this variation might be considerable. In many cases, the two firms might only be connected in terms of equity sharing. This does not necessarily imply the integration of their operational patterns. In such cases, the formation of internal transportation channels is hardly achieved - while the pattern of how such relationships impact the final value offering deserves further research.

The existence of port value chains signifies the emergence of a new trend largely adopted by port stakeholders; that of *virtual integration*. Virtual integration refers to the development of relationships between two or more port stakeholders and enables the offering of one-stop solutions to their clients. Following Robinson (2002), shipping lines opt to control larger parts of the supply chain by employing strategies of vertical integration. The research findings suggest that port stakeholders opt to control larger parts of the port value chain. They do so through strategies of actual vertical integration but also through 'virtual integration' strategies. Port firms that employ strategies of virtual integration are straight competitors with the ones that develop internal transportation channels. The efficiency and effectiveness of the one-stop offering of the latter relies on its own ability to produce and offer additional services (through subsidiaries or not). The efficiency and effectiveness of the former relies on the proper selection of counterparts and the establishment of efficient relationships with them. In

turn, the value offering of a port service provider is determined to a substantial extent by its positioning in the port value chains and the relationships that develops with upstream and downstream counterparts.

10.3.3 The strategies of the port users in order to enjoy an increased perceived value

Relationships do not only influence the provision of value from a service provider's point of view. They also influence the port users' perceived value, as they greatly impact their commercial interactions. Partner selection and relationship management are crucial elements for the competitive strategy and a firms' ability to deliver superior value to its customers.

Based on the different levels of dependence and power they maintain in the port chain, port stakeholders develop different types of relationships. In particular, the analysis identified three different types of such relationships *followership*, *leadership*, and *mutual* relationships. *Followership* relationships are the ones where one party (e.g. party A) is highly depended on the other (e.g. party B) or enjoys low levels of power over this other. In that case, the dependent party A has to adapt to the wishes of the more powered party B and does not have the bargaining position to coerce the adaptation of the latter. On the other hand, for the powered party B the same relationship is seen as a *leadership* relationship where he can exert considerable influence over the whole relationship. In *mutual* relationships, no firm is clearly more powerful; both are dependent on each other for important resources and, thus, collaborative relationships might unfold. In mutual relationships, the two parties may seek to actively collaborate and combine resources in order to co-create value. These relationships impact both the perceived value of the port users and the value offering of the service providers, with the business network relationships being central.

The conducted field research results in the categorization of port users. This categorisation is grounded on the different strategies as regards the developing relationships and effectively generalises the differences

observed, even with the same type of port stakeholders. In the case of freight forwarders (FF), two types of actors are found present: (a) the *traditional FF*, with a sub-distinction referring to size, i.e. 'small' and 'major' ones; and (b) the *integrated FF*. On the same grounds, four types of shipping lines are found: (a) the *regional or feeder shipping lines*; (b) *non-integrated shipping lines*; (c) *semi-integrated shipping lines*; and (d) *integrated shipping lines*.

The port users' relationships are largely influenced by (a) the involved actors' strategic patterns; (b) the market structures and (c) the number of case-specific factors. Based on their main strategies, port users choose to *develop close relationships* with other port stakeholders, or to remain *fragmented*. Through the development of close relationships, they aim to the co-creation of value by becoming more tied with specific service providers. Via this close cooperation, these actors jointly increase their value offering. Close relationships also increase the stability of the port users' micro-environment, as they guarantee that port users are not confronted with cases of constrained supply, that in turn can lead to a significant rise of prices. This decreases the vulnerability of the particular actors vis-à-vis market dynamics.

A number of port users develop strategies aiming to take advantage of these market dynamics. These port users remain fragmented and maintain limited bonds with specific service providers. As such, they are able to take advantage of the market opportunities that arise and enjoy the accompanied benefits. In such cases, the co-creation of value is rather unfeasible. In cases of constrained competition though, the allocation of opportunities is limited and this coerces the port users to develop close relationships. This happens, even in contradiction with their initial strategic aims (which had not been to commit to close relationships). For example, consider a shipping line that wishes to remain fragmented. When it operates in a port with multiple terminal operators, this line will be able to sustain its strategic pattern. In the cases though, where the number of terminal operators is small, the desired market dynamics are hard to emerge. As such, the shipping line will be coerced to develop close and stable relationships with terminal

operators. This is also the case of the traditional FF. Although the safeguarding of their independence is at the core of their strategies, traditional FFs commit to relationships with shipping lines, even though these relationships are not usually qualified as very close ones. This deviation from the initially set main strategic pattern (safeguarding independence) is caused by the shipping line's market structure. No matter the extent to which they had tried to take advantage of the market dynamics and competition, they would have hardly found services that increase their value proposition over their clients in the shipping market. Thus, the development of contractual agreements is among their strategic options. The empirical findings conclude that shipping lines regularly develop mid- and long-term stable relationships with terminal operators, as in most ports the number of terminal operators is limited.

Notably, even in those cases where two port users share a common strategic objective, they might pursue the fulfilment of this objective through largely distinctive strategies. Illustrative examples are the traditional and integrated FFs that share the common objective of *independence maintenance*. The 'traditional' FF regards its independence as the result of having the ability to choose between alternatives, while the integrated FF regards it as the result of having sufficient control in every container transported via various firms. Integrated FFs were found to largely develop close, contractual based agreements and relationships with shipping lines, inland terminal operators and rail, trucking and barges operators. They were also found to invest heavily in those relationships, both in monetary and mutual adaptation terms, aiming to the co-creation of value practices.

The differences between the port users' absolute and bargaining power affect the ports' market structures, while they stand as averse factors towards the development of close relationships. As a result, some port users are willing to develop mutual relationships but are unable to do, so due to their limited power¹⁰³ over other port stakeholders. This signifies the need for re-conceptualizing which factors create simultaneously a good inner-

¹⁰³ Power and bargaining power in ports is not only dependent on the firm's size but on whether they serve niche markets.

port environment for port users and new opportunities for ports. Mistakenly, it is believed that in bigger ports, port users enjoy a higher perceived value. In bigger ports, port users and service providers of sufficient size, power, and bargaining position usually exist. In such cases, it is hard for a port user of small size will perceive high value as it always enjoys a low bargaining position. Moreover, when this port user is willing to develop close relationships in order to co-create value with other members of the port community, it can hardly do so. This is because it cannot find counterparts with the desired characteristics (size and power). This also stands true for the big port users present in ports, where most service providers are of small size. In any case, for port users that are willing to develop relationships towards the co-creation of value, a port environment that is not marked by great differences in terms of bargaining power is favourable and desirable. In this vein, ports that are of small size can increase the perceived value of port users that are of small size. This validates Magala's (2008) concept that ports can outperform competitors via the development 'capture value' strategies that address unmet needs via discovery and exploitation of relevant opportunities.

The *reciprocal interdependencies* in ports favour the development of close relationships between port stakeholders (commonly shipping lines and freight forwarders). This is usually the case when freight forwarders serve a major shipper. Freight forwarders have to offer increased value to these major shippers, and depend on the shipping lines' cooperation towards this end. Nonetheless, it is of the interest of the shipping lines to serve these major shippers, thus they are also willing to cooperate with freight forwarders. The power differences between the two parties possess a significant role, whereas each party seeks partners of equivalent power.

There are also cases of *derived relationships* between two port stakeholders. Such relationships usually develop between either shipping lines or FFs with inland terminals. Clients (i.e. shippers) might ask shipping lines and FFs to deliver containers to specific inland terminals. Even when the shipping line is unwilling to work with these specific inland terminals, it will have to

collaborate with them and in these cases the sustaining of good relationships is difficult to be achieved.

In essence, port stakeholders that are willing to develop close relationships with other members of the port community are confronted with a major dilemma. On the one hand, they seek to increase the number of relationships developed, to as many as possible with the aim being to allocate risks and increase their own choices. On the other hand, the aim is to enjoy customized services that require the direction of large volumes of cargo to specific firms. Pooled interdependencies thus, evolve with the port stakeholders looking for the best alternative.

To recap, the port users' relationships with the service providers are influenced by multiple and frequently case-specific factors. This limits the analytical capacity to understand and conclude on a pattern of relationships developed by port stakeholders. In line with Hall (2004), actor-based approaches, like the present one are valuable, whereas considering port stakeholders, as a homogenous group is misleading. In any case, the findings verified that relationships in port business networks are extremely significant and deserve attention. Relationships are at the core of both offering and receiving value in ports, and their deep understanding is a starting point towards studying the port users' perceived value. Furthermore, the port users and service providers' efforts to co-create value are in line with the De Martino and Morvillo (2008) finding, that the capability of a firm to create inter-organization relationships is a crucial factor for strategic positioning.

10.3.4 The PAs' Strategies to facilitate the co-creation of value

As established, most of the relationships between port actors are of a long-term nature. Port users find a pool of preferred service providers that match their needs and keep them satisfied, thus they use them systematically. Despite that plenty of port users do not follow an arms-length approach when using a port service provider, the development of mutual relationships

between the two that could lead to the co-creation of value is limited in port settings. This is mainly due to the great imbalances in terms of the firms' power that can be found in port settings.

Extreme levels of consolidation mark both liner shipping and container terminal operation markets. This leads to an increased bargaining position for the limited number of companies that dominate the respective global markets. Conversely, in freight forwarding, inland terminal, trucking, rail and barge markets the level of consolidation is lower and many small in size regional companies prevail in local markets. Lately though, there is a trend towards the development of global freight forwarders of increased size and bargaining position. It is with those freight forwarders (such as for example Panalpina, Excel, DHL, Danzas etc.), that shipping lines started to develop close relationships and pursue the co-creation of value. Even though these relationships account for a small proportion of total relationships and further increase the imbalance in terms of power in port settings, a new potential role for port authorities arises.

Being a public body, the port authority might act in a 'neutral' way insofar as the involved parties are concerned, over the other members of the port community. The port authority does not develop close relationships that might lead to interdependence, and is not able to co-create value with specific members of the port community only. Its 'neutral' role might be used in order to develop initiatives, aiming to increase the value offered to all the members of the port community. In recent years, several port authorities have tried to enhance the hinterland connections of the port. They did so, bringing together users that in several other respects are competitors, and would not have collaborated with each other. The port authority secures the confidentiality of information and the absence of preferential treatment over the various users. That leads to effective initiatives that increase the value offering of all port users. In other words, the port authority is able to diminish (a) the power imbalance, and (b) the competition among port users, two parameters acting as barriers towards

co-creating value strategies deployment and collaboration in a particular port.

10.3.5 How the port users' perceived value can be measured

The qualitative analysis of the present study concluded that the port users' perceived value in any given port, is not the output of dyadic relations only. Rather than that, port users also derive value from the whole *port stakeholders' network*. Yet, the performed quantitative analysis focused on dyadic relations. As the port users' perceived value research is at early stages, it is unfeasible to move towards complex conceptualizations that model the real world without first profoundly understanding its core parts.

The findings suggest that the port users' perceived value is a multidimensional construct formed by a comparison of perceived benefits between perceived sacrifices. It can be conceptualized as a second order formative construct, and measured with the use of PLS technique. The results of the first ever performed quantitative analysis of the port users' perceived value provide information on whether the correlation paths of the constructs are statistically significant or not, and quantifies their importance. This is an analysis that concludes on whether the dimensions used are indeed significant for conceptualizing the port users' perceived value and to what extent they influence it.

10.3.6 Creating value for the port users

The identification of the port users' value drivers followed a two-step process; with these steps being a qualitative analysis and a quantitative one, respectively.

A remarkable finding of the qualitative analysis is the diversification of the perspectives that stakeholders put forward, with different port users prioritizing different elements when asked '*what generates your value from*

the use of a port? The mentioned elements have been in conflict¹⁰⁴ in terms of importance, with even the same type of port users giving emphasis on different value generators, depending on the settings variations. This is not to say that there are not groups of users sharing the same thoughts, or identifying common value drivers. In essence, the findings are in line with the matching framework theory (put forward by: Baltazar and Brooks, 2007) and support the view that different settings and objectives result in the demand of a different port strategy-structure environment fitting. The confirmation of this finding through the quantitative analysis was not possible due to the small sample size used. With the use of larger samples, the identification of port users' segments that will further confirm this finding is possible.

In all five models, *benefits* have a greater impact on the port users' perceived value than *sacrifices*. In two models, sacrifices proved to be even statistically insignificant. As such, the port stakeholders' efforts to increase the benefits of their offerings have a greater and more immediate impact on the port users' perceived value than a decrease of their sacrifices¹⁰⁵. This is a finding that signifies a major re-direction of the port users' strategies. Studies that were conducted prior to 2004 dealing with the port choice criteria and competitiveness, regularly quoted cost as an element of high importance (Lirn et al., 2003; Nir et al., 2003; Ha, 2003; Song and Yeo, 2004). On the other hand, recent studies maintain that high efficiency is desirable even if it is more costly (Wong et al., 2008) or that the logistic cost rather than the port cost is important to ports' competitiveness (Yeo et al., 2008). The findings of the present research further confirm that the importance of port costs is substantially decreased, with the port users emphasizing the benefits they enjoy from each port. This is partly explained by the extended vertical integration strategies that the port users have adopted. As they increase the offering of door-to-door services, they are able to reallocate the cost in the supply chain. Gaining a larger control over

¹⁰⁴ It should be noted though, that in sum the value drivers quoted were largely common.

¹⁰⁵ The only exception here are the relationships developed between port users and inland terminal operators.

the entire supply chain, they also enjoy higher margins. This increases their tolerance over a higher cost, given that the associated benefits are also high. It also substantiates a major re-conceptualization as port users are transforming from cost-driven entities into value-driven organizations.

The intensified inter-port competition leads to a decrease of differences between ports in terms of productivity, efficiency, and cost of use. This is particularly true when referring to ports in proximity, as is mainly the sample of the present thesis. Given this, port users seek additional elements that would increase their perceived value. Thus, their attention moves substantially from productivity and cost to other dimensions that cause port differentiation, with the latter dimensions including the image of the PA, initiatives to increase collective action and the ports' hinterland and foreland regionalization. This signifies that the achievement of high efficiency is no longer sufficient to increase the port users' perceived value. Attention and emphasis is given on more subjective elements that can ultimately lead to efficient collaboration of the two parts. This is a main reason for the rise of the users' complaints even when efficiency is achieved (see also: Farrell, 2009). The port users that develop close relationships with the port stakeholders, direct large amounts of cargo towards them. To collaborate with their partners, they need more than just the offering of efficient services, such as elements that facilitate this collaboration. Moreover, whenever such relationships lead to the co-creation of value, the overall operational gains are such that the increased cost is counterbalanced. At the end, the total value that the port user enjoys is such, that its margins will be higher even if he collaborates with suppliers of increased cost (compared to other potential service providers). In this vein, the port value has a strategic dimension and it is the outcome of collaborative relationships that enhances competitiveness and can create differentiations and extra value for both - a concept that extends the non-port related findings of Wilson and Jantrania (1994) and Lewin and Johnston (1997) on manufacturing in port markets.

As established, the port users regularly interact with a number of port stakeholders in a given port setting. The relationships that they sustain with these counterparts, have a major impact on the port users' perceived value. Port users seek to work with entities that they sustain good relationships with. Elements such as adaptation to needs, offering of customized services, confidence, reliability, and flexibility shape to a great extent the perceived value of port users. These elements are frequently overlooked in scholarly research, because they are not directly, or clearly, linked with port productivity and efficiency. Yet, it was found that they largely influence the port users' perceived value. The latter is transactional specific, as well as relationship specific

The present study establishes that the relationship value is part of the port users' overall perceived value. The particular finding calls for a major re-conceptualization of the port service providers and, not least, for scholarly research. The port users' relationship value is a significant part of the total port users' perceived value, so it should not be overlooked. As such, the port users' perceived value measurements that are constrained only to transactional value evaluations, while they do not take into account the relationship value present, are only partial assessments of the overall perceived value.

This further establishes the presence of 'new worlds of port service production and provision' that are based on interpersonal relations between service providers and users (Chlomoudis et al., 2003). In turn, a port user might enjoy low levels of perceived value in those cases that he cannot allocate port stakeholders to develop good relationships with. For example, a major shipping line that aims to co-create value with its suppliers and clients through the formation of close and contractual based agreements might be active in a port setting, where other stakeholders are unwilling to commit to such relationships, or do not have the sufficient size and capabilities to do so. Ultimately, this results in a major decrease in the port users' perceived value.

10.3.7 Influencing the port users' perceived value - the extent of this influence

The port users' perceived value generated by the structural characteristics of a port is influenced by five variables related to benefits and three variables related to sacrifices. All the paths between these different dimensions are significant and this establishes the reliability of the construct. The differences in terms of importance between both benefit and sacrifice dimensions are very limited. This implies that all dimensions should be considered important, while it becomes very difficult to prioritize some of them. Having said that, the socio-economic and political conditions of the port stand as the most influential benefit dimension, followed by the connectivity of the port and the quality of its cluster. The geographical location of the port and the quality of customs are less influential than the remaining elements, albeit they remain important.

A dimension that is often overlooked but proved to be the most important contributor to the port users' perceived value is the socio-economic and political conditions of a given port¹⁰⁶. The port users are averse of unstable conditions, as these conditions cause major performance fluctuations, deviations from initial planning, while they increase the risk of investments related to the port. The port users are interested in, and seek, a minimum level of security for their investments in any port. Stable conditions also enable them to implement long-term planning and ensure an equal level playing field in which port users can develop their strategies. The port users' substantial interest in the hinterland connections of ports (rail, barges and road) further confirms the importance of the ports' regionalization (Notteboom and Rodrigue, 2005) and explains the (identified in the literature review – see: Chapter 2) scholars' high interest in relevant themes. With the port users gradually increasing the offering of one-stop solutions to their clients, their attention turns to the ports' hinterland connection as well.

¹⁰⁶ And consequently of the regional and national socio-economic and political conditions

With the port users' integration in port value and supply chains increasing substantially, the elements that affect the perceived value enjoyed in a port are considerably connected to a port's embedment in the port value and supply chains. Another dimension of great importance for port users is the composition of the port cluster. Port users seek a given number of freight forwarders, shipping lines, terminal operators, and industrial units being active in the port area. Yet, this does not imply that the higher the number of these port stakeholders the higher the influence on the port users' overall perceived value; especially when it comes to direct or indirect competitors, port users might seek a reduced number of competitors (thus enjoying lower competition) instead of an increased number of potential partners-users.

The geographical location of the port also impacts the port users' perceived value. The fact that it comes only fourth in terms of importance, further confirms that port choice studies should not be confused with satisfaction or value assessments. In port choice studies, the geographical location of the port is top priority (Lirn et al., 2003; 2004). Port choice decisions are made before the actual use of the port, while perceived value is based on evaluations of the port users' actual experience when using the port.

In terms of sacrifices related with the structural characteristics of a port, *monetary cost* is found to be the more influential variable, followed by *interaction sacrifices (coordination efforts)* and then by *sea and hinterland congestion* (with the difference between the last two elements being limited). Congestion ultimately leads to increased costs for the port users. More importantly, for a port user (especially when it turns to a service provider as well) an increased congestion impacts its value offering towards its own clients. That might cause a decrease of his clients' perceived value, yielding great effects for the port user in the long run. In total, the impact of benefits on the port users' overall perceived value derived from the structural characteristics of a port is high and compensates for any sacrifices.

Eight benefit dimensions influence the port users' perceived value from a port authority (PA). The sacrifices related to the interaction with a PA are found to be insignificant for the port users' perceived value. Port dues and relevant costs (administration cost and coordination efforts) derived from the port users' interactions with the PAs, account for a small proportion of the total costs for using the port. As such, port users remain focused on the benefits that they can enjoy from the PA and ignore the sacrifices attached.

Port users were found to put extra emphasis on the port authorities' initiatives that aim to increase collective action planning and problem solving, as these are initiatives that influence significantly their perceived value. This finding further confirms the need for a 'renaissance' of the PAs' role to broaden and enforce their role as facilitators (Verhoeven, 2009). Moreover, it extends the importance of collective action, not only in improving the quality of the hinterland access (De Langen and Chouly, 2004) but also in problem solving among the members of the port community. Initiatives to increase the port actors' coordination, the efficiency of hinterland connections, the value added services provided within the port range, and to attract cargo to the port, are moving towards that direction. The image of the PA, along with the relationship that it develops with the port users, is of high importance as well. The PA should be transparent and with a good reputation, in order to provide a minimum level of security for port users.

The relationships developed between the PA and the port users differ from the ones developed between port users and private port stakeholders. The PA has to ensure that it remains neutral in all cases and does not develop preferential relationships with a number of port stakeholders. The PAs can radically increase the port users' perceived value by implementing actionable initiatives but also by making sure that they are reliable and trusty, and port users can efficiently communicate with them and easily compile transactions when interacting with the PA.

The port users realise the importance of possessing reliable information and gradually increasing their interest in this possessing. They seek from a

Port Authority to provide on-time, updated, adequate information, and operate efficient EDI systems that will ultimately facilitate their further integration in supply chains (Paik and Baghi, 2001; Airriess, 2001; Lambrou et al., 2008). The efficiency of the Harbour's Office, the provision of adequate infrastructure, initiatives to foster a port's promotion, marketing and the safety, security and environmental conditions of the port, are all elements that follow in terms of importance. Notably, the importance of the implementation of safety and security regulation and environmental management practices is the least influential element on the port users' perceived value. This is mainly due to the fact that, the PAs are greatly obliged to implement specific safety and security regulations and thus, the related with these issues port differentiations are relatively small. In this vein, social awareness on environmental protection has influenced the PAs and they are putting extra efforts on implementing efficient environmental management practices.

The port users' perceived value from the shipping lines proved not to be influenced by the associated sacrifices. This is a rather expected finding, as the cost of seagoing transportation is only a small proportion of the total transportation cost of a container. On the other hand, port users place more emphasis on the sacrifices associated with stevedoring services, or on the use of inland terminals that account more on the total transportation cost. Especially when referring to the use of inland terminals, sacrifices account for almost half of the total perceived value. This is due to the fact that, inland terminals offer port users limited value added services. In other words, the benefits that they can offer their clients are by default limited and cannot create a competitive advantage for the port users. As a result, the only relationships that were found to be cost driven in a port setting are those developed between the port users and the inland terminal operators. This increases the port users' interest in limiting the associated cost of using an inland terminal. Notably, the importance of service sacrifice (rate of cargo damage) is significantly higher than the overall monetary cost, with the latter remaining important in all cases. The sacrifices associated with the use of the terminal operators consist of the time, service and price

sacrifices. In that case, the most influential element is time sacrifice. This is mainly due to the fact that, delays during the stevedoring services create additional problems during the forwarding of the container, cause major deviation from initial planning and, in turn, increase the total transportation cost. Moreover, delays also decrease the satisfaction of the port users' clients.

When focusing on the port users' interactions with the shipping lines, the terminal operators, and the inland terminals, some common elements have a significant influence on benefits. Surprisingly, these elements are not associated with the productivity or service characteristics, albeit the latter remain important. The quality of interactions developed between the two respective actors is in all cases very important. The characteristics of the relationship between the port user and the service provider, along with the image of the latter are the top two dimensions of importance, in terms of the perceived benefits (with the exception here being the interaction with the inland terminal operator where the image is ranked only fifth). This signifies that the port users seek to interact with the service providers that are trusty, reliable, adapt to their needs, offer customized services etc., rather than interacting with the ones that can offer more efficient services (although the latter remain important in any case). This finding further confirms the notion put forward by this research that port users turn out to be value-driven (and, in this vein, relationship-driven).

When it comes to the use of the inland terminals, port users place extra emphasis on their network position. In particular, they seek inland terminals that are well connected with other members of the port community and have the potential to keep the port users clients' satisfied. This approach is associated with the role of the inland terminals as places where, the responsibility for transportation is exchanged between two parts. For example, a shipping line will store a container in an inland terminal so that, a freight forwarder can pick it and further forward it to the hinterland. The shipping line is interested in using these inland terminals

that other port stakeholders can easily access and keep them satisfied with the services they enjoy.

As expected beforehand, the productivity of a terminal operator along with the quality and flexibility of the dockworkers contribute substantially to the port users' benefits. The conducted research suggests that port users always seek for efficiency, yet today they are more demanding insofar as the associated benefits that might be associated with the given efficiency are concerned.

The identification of the elements that generate the port users' perceived value signify a clear distinction from the study of port choice or competitiveness determinants. In the case of port studies, choice and competitiveness should not be confused with satisfaction or perceived value measurements. The port users' satisfaction or perceived value measurements when using port choice or competitiveness determinants, may result in misleading results the reliability of which is questionable. The present thesis overcomes this problem by identifying the value determinants through empirical research.

10.4 SUGGESTIONS FOR FURTHER RESEARCH

The thesis identified the underlying dimensions of the port users' perceived value. Future empirical research can start with this set of common dimensions, while additional dimensions might be necessary in order to capture the value perceptions. When conducting a research in specific ports, or for specific port users, researchers should probe for port/actor-specific value dimensions that complement the ones identified in the present thesis.

As established in the literature review, port effectiveness remains a rather under researched scientific field that deserves further attention. The

anticipated scientific gaps are numerous and thus, an accordant number of suggestions could be made. At the same time, the present study realizes a new research stream in which ports can be studied; this is the field of *business network research*. These elements give potential to a number of research paths. Hereby suggestions are limited to four but the most important ones.

It emerges of major strategic thrust for a port stakeholder to be part of a port value chain that is efficient and delivers increased value to its clients. At the same time, the coordination of the various port stakeholders in port value chains is a difficult task. Moreover, an upgrade of value offering, or the implementation of innovative practises, is more difficult in the developing port value chains, as the adaptation of the other members of the chain is a needed precondition in order to realize the potential advantages. In this vein, the port stakeholders might take advantage of the fact that they are also embedded in the port stakeholders' networks. The better understanding of the port stakeholders' networks has the potential to lead to conclusions on innovative strategies, especially insofar as the transferring of attributes through the members of the network is concerned. In their study referring to social networks, Christakis and Fowler (2009) maintain that, in order to disperse an attribute in a social network, an essential step is to understand which people hold central positions in this social network. Then if the attribute passes to this people, they will effectively diffuse it to the entire network due to their central positions. As such, it is not needed to target the whole network. It remains unknown however, whether such characteristics may be found in the port stakeholders' networks as well. To answer this, research is needed so as to achieve the required deep understanding of the various positions that the port stakeholders possess in the network, the characteristics yielded in every position, and what influences them. The findings of such a research, could lead to innovative strategies for passing attributes to the port stakeholders' networks, such as the implementation of value added services that would increase the total value offering, or the implementation of new port policy initiatives (including safety and security regulations).

As already established, the port users' perceived value is not only influenced by the dyadic relationships that these entities maintain with their immediate counterparts. It is also the matching of all the other stakeholders that are embedded in port value chains, that influences the perceived value of the port users. The value drivers identified in the present thesis, mainly focus on the dyadic relations, although they have a view to the whole port value chain. As such, they realize the importance of dimensions such as the 'network position' of a firm. It would be of added value to develop research that focuses on 'the port value chains' delivery of value to their clients.

The identification of the value dimensions for the port value chains could be compared to the value dimensions of the present study. Such a comparison would unveil the differences between the two sets of value dimensions and would contribute to a more detailed understanding of the value delivery process in port settings. Moreover, such a research can also conclude on whether a port value chain value offering is the sum of its participants' value offerings, or it is an augmented value offering that derives from the interactions of the various participants, and to what extent it does so. A detailed understanding of the value delivery of the port value chains will provide the grounds for the port stakeholders to redefine their strategic patterns, in order to maximize the perceived value of their clients. To develop such a research, extra emphasis should be placed on the relationships developed between the members of the port value chains, with the scope being to conclude on the elements that contribute to the co-creation of value.

Finally, the precise extent to which the port users' perceived value influences their behavioural intentions, such as repurchase, investments in the port, or else, remains unknown. The fact that the port stakeholders usually enjoy great sunk costs (also: De Langen and Pallis, 2007) is expected to influence their behaviour intentions. As does the development of close, contractual based relationships between the various port stakeholders. Yet, the extent to which these characteristics actually influence the port users'

behaviour in port settings remains unknown. The findings of the research on this issue would be exceptionally interesting to all port stakeholders, as it will enhance a better understanding of the future behaviour of their counterparts.

Finally, a better understanding of the themes being under research in the present thesis can derive from increasing the number of case studies analysed. Choosing case studies with a different geographical dimension can also enlarge the scope of, and further confirm the conclusions drawn in the present study. An increase of the number of valid questionnaires under analysis, can also facilitate the identification of different groups of the port users with common characteristics and value elements.

10.5 EPILOGUE

The present thesis establishes that port performance measurements should go beyond efficiency and productivity evaluations, towards models that emphasise more balanced approaches. It also establishes that, these approaches need to incorporate the users' perspectives in order to conclude on port performance. In addition, the thesis filled the anticipated gap of actionable measurement of the port users' perspectives, by bringing in the discussion the concept of the users' perceived value, and by designing and implementing a novel methodology for measuring it. All these generated knowledge on the port users' perceived value.

From a port users' perceived value perspective, each port stands as a unique case. Different port settings were identified, based on the port users and service providers' interactions. These interactions are not homogeneous but are categorised as direct, indirect, and internal. They are also categorised as operational or commercial. The port users' perceived value is found to be rather idiosyncratic. This is mainly because the port

users' interactions largely vary in both nature and numbers. In this vein, the port users' perceived value is a multidimensional feature.

Ports are organized as business networks (the port stakeholders' networks); ignoring this, leads to major re-conceptualizations. From this perspective, a new research field for studying ports is realized. Due to the ports' network structure, the port value chains are formed and emerge in port settings. The port users develop new strategic options, such as that of virtual integration.

Relationships are vital when referring to the port stakeholders' networks" This is because they largely impact on both the service providers' value offering and the port users' perceived value. The port stakeholders' relationships are influenced by numerous elements and this stands as a major burden towards generalizations. More actor-based approaches are needed. At the same time, this also creates new opportunities for ports, which can outperform competitors via the deployment of 'capture value' strategies. As in several themes, a 'one size fits all ports' approach is misleading.

The differences of the powers that the port actors maintain in a given port setting, limit the development of efficient relationships between them. A new role for the PAs emerges. That is, that of facilitating the development of the port stakeholders' relationships through initiatives that virtually diminish power imbalances and competition among the port stakeholders.

The port users' perceived value is a multidimensional second order formative construct and may be analysed with the use of the Partial Least Squares technique. The Port users' perceived value goes beyond efficiency and productivity, with subjective elements that facilitate the coordination and collaboration of the port stakeholders (mainly through the development of good relationships) holding a significant place. Finally, the influence of sacrifices on the overall port users' perceived value is limited and this signifies the move from a cost-driven towards a value-driven world of production.

The present research broadens the relatively neglected discussion on port effectiveness. It generates knowledge on the port users' perceived value but also on the port users and service providers' interactions and relationships. Its findings provide the grounds to build further theoretical contributions to port effectiveness. The findings contribute to the existing port research literature as they either add to (Hall, 2004), confirm (Chlomoudis et al., 2003; Guardado et al., 2004; Notteboom and Rodrigue, 2005; Martino and Morvillo, 2008; Verhoeven, 2009), substantiate (Carbone and Morvillo, 2003), go beyond (Robinson, 2002; Lees and Song, 2010), extend (De Langen and Chouly, 2004; Panayides and Song, 2008), and validate (Paik and Baghi, 2001; Airriess, 2001; Baltazar and Brooks, 2007; Magala, 2008; Lambrou et al., 2008) existing theories and knowledge of port research.

Evidently, the research conclusions can provide a useful background to the researcher who will seek to shed further light on these issues and enhance the maturity of an emerging research field, that of port economics, management and policy. They might also be helpful on a practical level as ports might use this analysis for understanding their performance and take corrective actions, and increase their competitiveness.

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APPENDIX I

I.1. Cover Letter sent to a selected sample (first phase of the research – Antwerp and Zeebrugge)

Department of Shipping Trade and Transport University of the Aegean

Dear Sir,

I am writing to seek your help in connection with my doctoral research, which is undertaken at the [Department of Shipping, Trade & Transport \(STT\), University of the Aegean](#), Greece, and assisted by the Institute of Transport and Maritime Management (ITMMA), University of Antwerp.

This research focuses on ports services providers and users relations, in particular on the measurement of port users' perceived value. In today's extremely competitive environment, the measurement of port performance is vital. Several studies have examined port performance measurement but the vast majority neglects issues of port effectiveness and users' satisfaction/perceived value. How port users perceived value can be measured, which are the port users needs, and under what conditions a port user might be satisfied, are among other the questions that the research seeks to answer.

As part of this study, I am conducting interviews with key actors of the port community, in particular users and service providers in the major Belgian and Greek ports. Through these interviews it is intended to gain new insights from those actively involved in port services processes on how their perceived value is defined, emerged and shaped.

It would therefore be greatly appreciated if you could assist this research by agreeing to a short interview to discuss these issues. It is understood that you have many commitments to fulfill but it would be of great assistance if, given your position, you could find a small amount of time for an interview.

As I am currently in Antwerp, as part of a research visit hosted by Professor Theo Notteboom, I would be grateful to hold this interview before the 18th of December.

I also send you in advance the main axes of the semi-structured open type discussion interview.

All your answers will of course be treated in the strictest confidence if you so wish, and the research output could be communicated to you in due course if wanted.

I would like to thank you in advance for your interest and cooperation and I am looking forward to hearing from you.

Yours Sincerely

Drs Mr. Vitsounis Thomas

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

The exploratory research is assisted by
The Institute of Transport and Maritime Management (ITMMA), University of Antwerp, Belgium

I.2.Cover Letter sent to a selected sample (first phase of the research – Pireaus and Thessaloniki)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

Department of Shipping Trade and Transport University of the Aegean

Dear Sir,

I am writing to seek your help in connection with my doctoral research, which is undertaken at the [Department of Shipping, Trade & Transport \(STT\), University of the Aegean](#), Greece, and assisted by the Institute of Transport and Maritime Management (ITMMA), University of Antwerp.

This research focuses on ports services providers and users relations, in particular on the measurement of port users' perceived value. In today's extremely competitive environment, the measurement of port performance is vital. Several studies have examined port performance measurement but the vast majority neglects issues of port effectiveness and users' satisfaction/perceived value. How port users perceived value can be measured, which are the port users needs, and under what conditions a port user might be satisfied, are among other the questions that the research seeks to answer.

As part of this study, I am conducting interviews with key actors of the port community, in particular users and service providers in the major Belgian and Greek ports. Through these interviews it is intended to gain new insights from those actively involved in port services processes on how their perceived value is defined, emerged and shaped.

It would therefore be greatly appreciated if you could assist this research by agreeing to a short interview to discuss these issues. It is understood that you have many commitments to fulfill but it would be of great assistance if, given your position, you could find a small amount of time for an interview.

I also send you in advance the main axes of the semi-structured open type discussion interview.

All your answers will of course be treated in the strictest confidence if you so wish, and the research output could be communicated to you in due course if wanted.

I would like to thank you in advance for your interest and cooperation and I am looking forward to hearing from you.

Yours Sincerely

Drs Mr. Vitsounis Thomas

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I.3. Main Discussion Themes with the Port Stakeholders (first phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

**Department of Shipping Trade and Transport
University of the Aegean**

Exploratory Research on “port users’ perceived value” Themes for Discussion

The Proposed themes for our discussion are as follows:

Company Interactions.

- Which are the day to day operations of the company?
- Describe the handling process of the cargo from your company during export/import.
- With which companies (TOC’s, logistics, FF etc.) there is any kind of interaction during these processes? Could you describe this interaction?
- Which is the interaction with the PA?

Do you measure the performance of your company?

- Which ways are used?
- Do you measure it on firm-level or extended-level? To what extend?
- What is actually measured via these measurements?
- How are the results handled?

Choice of ports to be used

- Which are the 5 most used ports?
- Why have you chosen these ones?
- How do you choose a port of call?
- Are there any kind of collaborative relationships with other players of the port?
- Is it easy to change port of choice? Are there alternatives?
- Key characteristics of the top-5 ports of call

Which are the company’s “values”?

- Which are the specific functional and relationship value dimensions desired from a port that you use?
- Which of these values are of strategic importance?
- How satisfied is the company with the performance of the port on each of the desired value dimensions?

Does the company communicate with ports (either PAs or relevant authorities)?

- Is your company in constant contact about your desired values?
- Please assess the key value added services offered within a port?

Does any operation within a port have more importance than others?

Please describe what generates value for your firm
Please rate the overall perceived value of the ports that you use

Please note that

- (a) all your answers will be treated in the strictest confidence and, if you so wish, your companies name will not be disclosed.
- (b) The research output could be communicated to you in due course if wanted.

Thank you for your participation,
Yours Sincerely
Thomas Vitsounis

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

The exploratory research is assisted by
The Institute of Transport and Maritime Management (ITMMA), University of Antwerp, Belgium

I.4 Main Discussion Themes with the Port Authorities (first phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

**Department of Shipping Trade and Transport
University of the Aegean**

Exploratory Research on “port users’ perceived value” Themes for Discussion

The Proposed themes for our discussion are as follows:

Company Interactions.

- Which are the day to day operations of the PA?
- With which companies (TOC’s, logistics, FF etc.) there is any kind of day-to-day interactions? Could you describe this interactions?

Do you measure the performance of your port?

- Which ways are used?
- Do you measure it on firm-level or extended-level? To what extend?
- What is actually measured via these measurements?
- How are the results handled?

Major port users

- Which are the 5 most important port users.
- Are they recognized as “key clients”?
- Which are ports relations with these “key clients”?
- Are there any kind of collaborative relationships with port users?

Does the port communicate with its users?

- How does the Port Authority learn about its users desired values?
- Is Port Authority in constant contact about users desired values?
- Please assess the key value added services offered within the port?

Does any operation within a port have more importance than others?

Please describe what generates value for port users.

Please rate the overall satisfaction that you think that port users enjoy when using your port.

Please note that

- (a) all your answers will be treated in the strictest confidence and, if you so wish, your companies name will not be disclosed.
- (b) The research output could be communicated to you in due course if wanted.

Thank you for your participation,

Yours Sincerely

Thomas Vitsounis

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

The exploratory research is assisted by
The Institute of Transport and Maritime Management (ITMMA), University of Antwerp, Belgium

I.5. Cover Letter sent to a selected sample (second phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

Department of Shipping Trade and Transport University of the Aegean

Dear Sir,

I am writing to seek your help in connection with my doctoral research, which is undertaken at the [Department of Shipping, Trade & Transport \(STT\), University of the Aegean](#), Greece.

This research focuses on ports services providers and users relations, in particular on the measurement of port users' perceived value. Understanding how port users perceived can be measured, which are their needs, and under what conditions a port user might be satisfied, are among the questions that the research seeks to answer.

Completing this study, I am conducting interviews with key actors in the port community, in a sample of European ports including the major Belgian ports. These interviews are intended to gain insights by those actively involved in port services processes on how their perceived value is defined, emerged, shaped and how specific attributes are evaluated.

It would therefore be greatly appreciated if you could agree to a short interview to discuss these issues.

It is understood that you may have many commitments to fulfill but it would be of great assistance if, given your position, you could find a small amount of time for an interview.

I have scheduled to visit Antwerp for a week starting from May the 10th in order to conduct these interviews. Still, in case you will have some time for an interview during the period 17th to 21st of May, I am willing to extent my visit in order to meet you.

All your answers will of course be treated in the strictest confidence if you so wish, and the research output could be communicated to you in due course if wanted.

You might find references and details about my previous port studies/research on two websites that I have founded together with other European colleagues: www.porteconomics.gr & www.porteconomics.eu.

I would like to thank you in advance for your interest and cooperation and I am looking forward to hearing from you.

Yours Sincerely

Drs Mr. Vitsounis Thomas

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

I.6. Main Discussion Themes with the Port Users (second phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

**Department of Shipping Trade and Transport
University of the Aegean**

Exploratory Research on “port users’ perceived value” Themes for Discussion

The Proposed themes for our discussion are as follows:

Interactions

- With which members of the port community does your company interact with.
- Directly and Indirectly.
- Commercial and operational interactions.
- Effects of direct and indirect interactions on perceived value (does indirect interactions have the same importance as the direct ones)
- How does an interaction with a member of the port community influences the choice and the value received from another one in a latter of former step of the chain?

Relationships.

- Does your company have close relationships with some members of the port community?
- On what basis? – Contract, formal agreement, mutual investments, exclusivity...
- For how long?
- Why? Which are the goals of these relationships?
- On these relationships are there efforts to co-create value? Which are they?
- Choice of relationships based on: network position, lowering costs, ease of operations, increase of total value perceived, guarantee of capacity?
- How do these relationships impact the perceived value from those companies? More value on relational or transactional interactions?
- What is the level of cooperation?

Perceived Value

- On the basis of perceived value, what is important: the players in a port of the port itself?
- How could the members of the port community increase your perceived value?
- Strengths and weaknesses of the port and port stakeholders.
- Which are the sources of perceived value? Benefits and sacrifices.
- Please describe what generates value for your firm

Please note that

- (a) all your answers will be treated in the strictest confidence and, if you so wish, your companies name will not be disclosed.
- (b) The research output could be communicated to you in due course if wanted.

Yours Sincerely,

Tomas Vitsounis

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

I.7. Main Discussion Themes with the Port Authorities (second phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

**Department of Shipping Trade and Transport
University of the Aegean**

Exploratory Research on “port users’ perceived value” Themes for Discussion

The Proposed themes for our discussion are as follows:

Performance Measurement

- How does your PA measure its performance?
- At what extent does it so? On a PA level or on a Port Area level?
- Do you use soft data and quality measures?
- How are you keeping informed about port users problems?

Cooperation and Promotion

- How do you promote the Port?
- How do you promote the cooperation of the port stakeholders?
- Are you involved in problem solving? When?

Perceived value

- What creates value for your port users?
- Which are your initiatives to increase port users perceived value?
- Do you put efforts towards developing relationships with port users?

Please note that

- (a) all your answers will be treated in the strictest confidence and, if you so wish, your companies name will not be disclosed.
- (b) The research output could be communicated to you in due course if wanted.

Yours Sincerely,

Tomas Vitsounis

This doctoral research is financed by the Greek Ministry of Development and is conducted in the Department of Shipping Trade and Transport, University of the Aegean, Greece

I.8. Cover Letter sent to a selected sample (third phase of the research)



ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ
ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΣ &
ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΥΠΗΡΕΣΙΩΝ

Department of Shipping Trade and Transport University of the Aegean

Dear Sir,

I am writing to seek your help in connection with my doctoral research, which is undertaken at the [Department of Shipping, Trade & Transport \(STT\), University of the Aegean](#), Greece.

This research focuses on ports services providers and users relations, in particular on the measurement of port users' perceived value. Understanding how port users perceived value can be measured, which are their needs, and under what conditions a port user might be satisfied, are among the questions that the research seeks to answer.

Completing this study, I am conducting a survey on key actors in the port community, in a sample of European ports including the major Belgian, Dutch, German and Greek ports. Through the survey I intend to gain insights by those actively involved in port services processes on how their perceived value is defined, emerged, shaped and how specific attributes are evaluated.

It would therefore be greatly appreciated if you could assist me by participating in the survey.

You can take part in the survey by pressing [here](#) (it will redirect you to the on-line questionnaire found in the url: <http://www.surveymonkey.com/s/G75WF6Z>). Alternatively you can also fill in the attached questionnaire and send it back to the e-mail address: vitsounis@aegean.gr

It is understood that you may have many commitments to fulfill but it would be of great assistance if, given your position, you could find a small amount of time for filling the survey. According to pre-tests it takes approximately 15 minutes to fill in the questionnaire.

All your answers will of course be treated in the strictest confidence and the research output could be communicated to you in due course if wanted. The survey is for academic purposes only.

You might find references and details about my previous port studies/research on two websites that I have founded together with other European colleagues: www.porteconomics.gr & www.porteconomics.eu.

I would like to thank you in advance for your interest and cooperation.

Yours Sincerely

Drs Mr. Vitsounis Thomas

APPENDIX II

Tables II.1 to II.10 present the t-values and cross loading criterion for constructs 1 to 5 as derived in the analysis presented in Chapter 9.

Table II.1. T-values (Construct 1)

	T Statistics
Benefits -> Perceived value	4.546390
Cluster -> Benefits	8.510594
Congestion -> Sacrifices	10.899369
Connectivity -> Benefits	6.815338
Customs -> Benefits	4.999935
Geographical location -> Benefits	7.223616
Price -> Sacrifices	9.471972
SEP Conditions -> Benefits	8.309799
Sacrifices -> Perceived value	1.815388
Service Sacrifices -> Sacrifices	12.148735

Table II.2. Cross-loadings (Construct 1)

	Cluster	Congestion	Connectivity	Customs	Geo. Location	Interaction Sacrifice	Perceived value	Price Sacrifice	S-E-P Conditions
CLU1	0.76	-0.36	0.64	0.32	0.49	-0.44	0.67	-0.62	0.60
CLU2	0.70	-0.36	0.57	0.47	0.56	-0.53	0.46	-0.26	0.49
CLU3	0.79	-0.35	0.41	0.22	0.22	-0.30	0.61	-0.44	0.62
CLU4	0.78	-0.34	0.34	0.19	0.29	-0.47	0.55	-0.31	0.50
CLU5	0.70	-0.16	0.13	0.05	0.26	-0.35	0.51	-0.11	0.30
CON1	0.51	-0.37	0.83	0.57	0.57	-0.52	0.43	-0.34	0.71
CON2	0.46	-0.49	0.89	0.67	0.46	-0.42	0.47	-0.40	0.78
CON3	0.48	-0.16	0.77	0.62	0.47	-0.43	0.49	-0.54	0.62
CON4	0.48	-0.49	0.81	0.40	0.43	-0.42	0.63	-0.48	0.58
CON5	0.60	-0.41	0.83	0.33	0.69	-0.48	0.66	-0.59	0.50
CONG1	-0.38	0.73	-0.42	-0.28	-0.43	0.36	-0.64	0.29	-0.42
CONG2	-0.33	0.85	-0.33	-0.04	-0.13	0.37	-0.26	0.52	-0.26
CUST1	0.37	-0.23	0.50	0.90	0.22	-0.26	0.38	-0.20	0.53
CUST2	0.30	-0.10	0.64	0.91	0.15	-0.31	0.36	-0.26	0.61
GEO1	0.38	-0.35	0.43	-0.01	0.87	-0.39	0.46	-0.31	0.29
GEO2	0.53	-0.27	0.67	0.32	0.95	-0.55	0.58	-0.23	0.60
OVER1	0.72	-0.64	0.64	0.34	0.51	-0.50	0.93	-0.65	0.68
OVER2	0.70	-0.61	0.64	0.43	0.54	-0.46	0.96	-0.64	0.63
OVER3	0.61	-0.34	0.48	0.36	0.38	-0.21	0.91	-0.30	0.57
OVER4	0.68	-0.27	0.53	0.33	0.65	-0.66	0.80	-0.30	0.53
PS1	-0.25	0.54	-0.41	-0.13	-0.11	0.39	-0.28	0.86	-0.32
PS2	-0.61	0.38	-0.57	-0.31	-0.38	0.67	-0.65	0.88	-0.42
S-E-P1	0.69	-0.21	0.48	0.23	0.56	-0.51	0.52	-0.42	0.67
S-E-P2	0.56	-0.45	0.74	0.64	0.48	-0.52	0.60	-0.32	0.91
S-E-P3	0.47	-0.34	0.66	0.64	0.24	-0.25	0.52	-0.33	0.85
SS1	-0.57	0.46	-0.55	-0.32	-0.53	1.00	-0.52	0.62	-0.52

Table II.3. T-values (Construct 2)

	T Statistics
Benefits -> Perceived value	3.982449
Collective Action -> Benefits	9.504740
Harbor's Office -> Benefits	8.113507
Image -> Benefits	7.321257
Information -> Benefits	9.548244
Infrastructure -> Benefits	6.856369
Price Sacrifice -> Sacrifices	21.231829
Promotion & Marketing -> Benefits	6.571317
Relationship -> Benefits	8.659659
Sacrifices -> Perceived value	0.986677
Safety & Environment -> Benefits	5.470877
Interaction Sacrifice -> Sacrifices	28.350087

Table II.4. Cross loadings (Construct 2)

	Collective Action	Harbor's Off.	Image	Information	Infrastructure	Interaction Sacrifice	Perceived Value	Price Sacrifice	Promotion & Mrkt	Relationship	& Environment
COL1	0.84	0.56	0.77	0.54	0.63	-0.44	0.80	-0.41	0.63	0.62	0.56
COL2	0.79	0.30	0.70	0.29	0.65	-0.31	0.71	-0.34	0.59	0.55	0.65
COL3	0.87	0.36	0.67	0.34	0.74	-0.21	0.70	-0.29	0.52	0.45	0.48
COL4	0.86	0.72	0.74	0.74	0.69	-0.50	0.67	-0.31	0.66	0.70	0.38
COL5	0.84	0.66	0.79	0.65	0.59	-0.34	0.51	-0.29	0.77	0.67	0.38
HO1	0.60	0.95	0.68	0.82	0.49	-0.77	0.61	-0.62	0.61	0.80	0.49
HO2	0.62	0.96	0.70	0.92	0.61	-0.67	0.60	-0.50	0.68	0.81	0.52
IMG1	0.73	0.70	0.91	0.63	0.59	-0.31	0.65	-0.33	0.67	0.77	0.36
IMG2	0.88	0.63	0.93	0.65	0.85	-0.37	0.76	-0.35	0.72	0.80	0.65
INFRA1	0.72	0.53	0.67	0.53	0.90	-0.25	0.68	-0.35	0.43	0.52	0.42
INFRA2	0.69	0.51	0.75	0.50	0.91	-0.24	0.73	-0.21	0.50	0.61	0.58
IT1	0.59	0.81	0.70	0.92	0.60	-0.58	0.63	-0.47	0.65	0.70	0.44
IT2	0.65	0.80	0.68	0.89	0.42	-0.73	0.57	-0.45	0.76	0.80	0.53
IT3	0.42	0.83	0.46	0.86	0.51	-0.53	0.40	-0.43	0.53	0.62	0.42
OVER1	0.72	0.59	0.74	0.59	0.77	-0.43	0.94	-0.56	0.46	0.67	0.45
OVER2	0.76	0.58	0.71	0.55	0.71	-0.60	0.95	-0.62	0.52	0.67	0.57
OVER3	0.78	0.63	0.74	0.60	0.74	-0.47	0.95	-0.53	0.43	0.69	0.46
OVER4	0.78	0.59	0.75	0.57	0.73	-0.55	0.95	-0.59	0.49	0.71	0.51
PM1	0.81	0.61	0.80	0.65	0.55	-0.42	0.58	-0.35	0.95	0.68	0.56
PM2	0.63	0.68	0.65	0.75	0.44	-0.45	0.36	-0.31	0.95	0.69	0.63
PS1	-0.20	-0.46	-0.22	-0.36	-0.18	0.50	-0.36	0.90	-0.25	-0.41	-0.43
PS2	-0.49	-0.60	-0.43	-0.55	-0.36	0.82	-0.71	0.94	-0.38	-0.65	-0.56
REL1	0.73	0.75	0.91	0.71	0.78	-0.43	0.71	-0.41	0.65	0.90	0.46
REL2	0.61	0.76	0.73	0.76	0.53	-0.59	0.58	-0.55	0.71	0.91	0.62
REL3	0.58	0.66	0.64	0.60	0.43	-0.60	0.58	-0.54	0.63	0.86	0.64
REL4	0.63	0.82	0.74	0.75	0.45	-0.65	0.69	-0.60	0.56	0.88	0.38
SE1	0.49	0.57	0.55	0.60	0.47	-0.53	0.44	-0.54	0.62	0.59	0.95
SE2	0.60	0.42	0.50	0.38	0.59	-0.40	0.55	-0.48	0.55	0.52	0.94
SS1	-0.44	-0.75	-0.37	-0.69	-0.27	1.00	-0.54	0.74	-0.46	-0.63	-0.50

Table II.5. T-values (Construct 3)

	T Statistics
Benefits -> Perceived value	6.425317
Image -> Benefits	8.449464
Information -> Benefits	8.577955
Network position -> Benefits	7.930562
Price -> Sacrifices	18.740915
Relationship -> Benefits	8.842871
Sacrifices -> Perceived value	1.208524
Safety -> Benefits	5.499522
Service Characteristics -> Benefits	10.277606
Service Sacrifice -> Sacrifices	14.254254
Time -> Sacrifices	10.385636

Table II.6. Cross loadings (Construct 3)

	Image	Information & Tech.	Network Position	Perceived Value	Price Sacrifice	Relationship	Safety	Service Charact.	Service Sacrifice	Time Sacrifice
IMG1	0.861	0.700	0.300	0.613	-0.528	0.726	0.626	0.587	-0.660	-0.657
IMG2	0.876	0.671	0.614	0.850	-0.526	0.592	0.574	0.714	-0.532	-0.598
IT1	0.806	0.946	0.464	0.718	-0.436	0.755	0.627	0.697	-0.706	-0.552
IT2	0.665	0.930	0.529	0.680	-0.381	0.547	0.511	0.615	-0.633	-0.452
NET1	0.513	0.429	0.886	0.726	-0.658	0.720	0.025	0.619	-0.468	-0.763
NET2	0.392	0.485	0.834	0.437	-0.094	0.283	0.218	0.573	-0.292	-0.343
OVER1	0.752	0.632	0.695	0.914	-0.648	0.797	0.419	0.685	-0.615	-0.809
OVER2	0.817	0.811	0.607	0.901	-0.628	0.817	0.617	0.800	-0.861	-0.820
OVER3	0.773	0.642	0.601	0.914	-0.459	0.673	0.323	0.633	-0.416	-0.582
OVER4	0.716	0.594	0.596	0.908	-0.471	0.586	0.294	0.590	-0.428	-0.548
PS1	-0.557	-0.414	-0.486	-0.625	0.972	-0.676	-0.325	-0.359	0.600	0.797
PS2	-0.621	-0.435	-0.415	-0.570	0.970	-0.754	-0.354	-0.325	0.601	0.729
REL1	0.511	0.350	0.489	0.590	-0.793	0.859	0.133	0.438	-0.592	-0.780
REL2	0.669	0.671	0.390	0.587	-0.492	0.798	0.716	0.687	-0.806	-0.625
REL3	0.780	0.737	0.553	0.809	-0.638	0.911	0.529	0.748	-0.820	-0.828
REL4	0.722	0.776	0.362	0.642	-0.466	0.833	0.555	0.571	-0.649	-0.494
REL5	0.538	0.436	0.634	0.683	-0.790	0.863	0.164	0.428	-0.497	-0.718
REL6	0.431	0.349	0.664	0.660	-0.561	0.694	-0.050	0.370	-0.308	-0.492
SER1	0.784	0.605	0.674	0.911	-0.546	0.748	0.449	0.768	-0.642	-0.777
SER2	0.646	0.499	0.699	0.703	-0.297	0.542	0.492	0.873	-0.501	-0.544
SER3	0.543	0.483	0.521	0.603	-0.159	0.345	0.252	0.742	-0.316	-0.400
SER4	0.555	0.624	0.340	0.384	-0.238	0.582	0.654	0.723	-0.696	-0.450
SER5	0.551	0.553	0.580	0.507	-0.256	0.476	0.494	0.878	-0.626	-0.622
SER6	0.470	0.590	0.467	0.436	-0.118	0.489	0.383	0.802	-0.650	-0.517
SS1	-0.683	-0.658	-0.491	-0.706	0.638	-0.775	-0.607	-0.744	0.925	0.857
SS2	-0.456	-0.570	-0.231	-0.363	0.379	-0.502	-0.681	-0.447	0.786	0.343
Safety1	0.750	0.648	0.196	0.500	-0.444	0.584	0.948	0.550	-0.738	-0.489
Safety2	0.441	0.415	-0.002	0.318	-0.121	0.170	0.862	0.489	-0.551	-0.282
TS1	-0.670	-0.576	-0.606	-0.757	0.487	-0.653	-0.401	-0.697	0.628	0.824
TS2	-0.579	-0.370	-0.539	-0.589	0.829	-0.707	-0.371	-0.529	0.670	0.888

Table II.7. T-values (Construct 4)

	T Statistics
Benefits -> Perceived value	2.467037
Geographical Location -> Benefits	8.555440
Image -> Benefits	9.582880
Information -> Benefits	9.805107
Network position -> Benefits	7.981399
Price -> Sacrifices	3.220590
Productivity -> Benefits	10.491135
Relationship -> Benefits	11.202038
Sacrifices -> Perceived value	2.121548
Service Sacrifices -> Sacrifices	5.329693

Table II.8. Cross Loadings (Construct 4)

	Geo. Location	Image	Perceived Value	Information & Tech.	Network Position	Productivity	Relationship	Service Sacrifices	Price Sacrifices
GEO1	1.000	0.748	0.636	0.586	0.728	0.550	0.724	-0.140	-0.476
IMG1	0.733	0.942	0.572	0.587	0.614	0.627	0.743	-0.325	-0.329
IMG2	0.688	0.954	0.558	0.801	0.639	0.798	0.840	-0.442	-0.089
IT1	0.478	0.574	0.783	0.922	0.741	0.716	0.725	-0.704	-0.242
IT2	0.485	0.694	0.614	0.942	0.764	0.778	0.848	-0.625	-0.210
IT3	0.630	0.738	0.693	0.872	0.778	0.872	0.843	-0.252	-0.195
NET1	0.623	0.655	0.598	0.737	0.880	0.697	0.864	-0.303	-0.555
NET2	0.643	0.487	0.852	0.715	0.856	0.724	0.687	-0.400	-0.390
OVER1	0.577	0.541	0.821	0.736	0.806	0.695	0.702	-0.713	-0.340
OVER2	0.726	0.690	0.932	0.793	0.929	0.822	0.829	-0.449	-0.535
OVER3	0.415	0.365	0.869	0.561	0.533	0.512	0.405	-0.541	-0.288
OVER4	0.381	0.365	0.809	0.443	0.455	0.380	0.370	-0.496	-0.412
P2	0.679	0.715	0.746	0.754	0.844	0.885	0.757	-0.464	-0.258
P3	0.449	0.741	0.730	0.868	0.748	0.944	0.792	-0.536	-0.187
P4	0.321	0.560	0.458	0.708	0.583	0.861	0.651	-0.292	0.127
PS2	-0.511	-0.276	-0.464	-0.331	-0.562	-0.199	-0.454	-0.032	0.935
PS3	-0.405	-0.144	-0.426	-0.139	-0.486	-0.074	-0.311	0.155	0.960
REL1	0.692	0.699	0.676	0.712	0.865	0.694	0.902	-0.239	-0.515
REL2	0.579	0.632	0.635	0.788	0.871	0.704	0.912	-0.353	-0.505
REL3	0.690	0.883	0.626	0.826	0.775	0.822	0.905	-0.464	-0.192
REL4	0.664	0.839	0.625	0.824	0.755	0.818	0.886	-0.372	-0.109
REL5	0.610	0.679	0.605	0.816	0.753	0.627	0.870	-0.380	-0.473
SS2	-0.140	-0.408	-0.642	-0.569	-0.403	-0.490	-0.406	1.000	0.076

Table II.9. T-values (Construct 5)

	T Statistics
Benefits -> Perceived value	4.420586
Dockworkers -> Benefits	7.700116
Image -> Benefits	5.187607
Information -> Benefits	2.943767
Network position -> Benefits	6.067871
Price -> Sacrifices	4.432793
Productivity -> Benefits	5.860410
Relationship -> Benefits	8.280952
Sacrifices -> Perceived value	1.739322
Service Sacrifice -> Sacrifices	5.534273
Time -> Sacrifices	5.507686

Table II.10. Cross-Loadings (Construct 5)

	Dockworkers	Image	Information Tech.	Network Position	Perceived Value	Price Sacrifice	Productivity	Relationship	Service Sacrifice	Time Sacrifice
DOCK1	0.745	0.641	0.316	0.103	0.401	-0.028	0.585	0.191	-0.310	-0.178
DOCK2	0.830	0.555	0.137	0.418	0.754	-0.478	0.385	0.612	-0.366	-0.577
IMG1	0.743	0.893	0.662	0.410	0.488	-0.009	0.686	0.452	-0.563	-0.480
IMG2	0.599	0.894	0.341	0.750	0.694	-0.097	0.540	0.623	-0.215	-0.543
IT1	0.276	0.561	1.000	0.362	0.249	-0.138	0.581	0.306	-0.681	-0.393
NET1	0.197	0.334	0.052	0.724	0.485	-0.214	0.262	0.682	-0.157	-0.554
NET2	0.318	0.628	0.473	0.773	0.454	0.000	0.263	0.307	-0.174	-0.279
OVER1	0.681	0.610	0.287	0.552	0.902	-0.398	0.764	0.832	-0.562	-0.730
OVER2	0.546	0.505	0.313	0.546	0.878	-0.648	0.586	0.815	-0.605	-0.589
OVER3	0.677	0.606	0.203	0.641	0.712	-0.195	0.167	0.549	-0.136	-0.412
OVER4	0.661	0.531	-0.017	0.385	0.872	-0.576	0.425	0.667	-0.211	-0.369
P1	0.518	0.531	0.268	0.347	0.575	-0.190	0.885	0.577	-0.536	-0.609
P2	0.700	0.681	0.570	0.172	0.567	-0.248	0.893	0.585	-0.763	-0.606
P3	0.608	0.652	0.525	0.278	0.602	-0.281	0.968	0.633	-0.680	-0.550
P4	0.230	0.530	0.697	0.478	0.382	-0.179	0.752	0.371	-0.533	-0.283
PS1	-0.277	0.025	-0.068	-0.103	-0.431	0.889	-0.101	-0.388	0.267	0.154
PS2	-0.432	-0.237	-0.017	-0.412	-0.645	0.769	-0.080	-0.482	0.113	0.133
PS3	-0.211	0.007	-0.217	0.063	-0.368	0.848	-0.399	-0.307	0.606	0.146
REL1	0.397	0.458	0.065	0.659	0.703	-0.244	0.317	0.799	-0.275	-0.679
REL2	0.403	0.641	0.207	0.525	0.674	-0.377	0.426	0.726	-0.299	-0.352
REL3	0.386	0.435	0.254	0.628	0.700	-0.389	0.539	0.906	-0.510	-0.691
REL4	0.349	0.344	0.267	0.622	0.729	-0.480	0.554	0.862	-0.545	-0.666
REL5	0.601	0.554	0.421	0.203	0.681	-0.321	0.662	0.740	-0.584	-0.443
SS1	-0.349	-0.449	-0.716	-0.188	-0.205	0.086	-0.284	-0.297	0.578	0.417
SS2	-0.327	-0.278	-0.429	-0.164	-0.473	0.481	-0.718	-0.507	0.892	0.457
TS3	-0.500	-0.573	-0.393	-0.548	-0.644	0.173	-0.592	-0.701	0.568	1.000

APPENDIX III

III. 1. Questionnaires (third phase of the research)

Container Port Users Perceived Value

1. General Questions

All your answers will be treated in the strictest confidence. The answers provided are not considered to officially express your company's but rather your personal views.

The objective of the survey is to evaluate your perceived value from a port of use. The scope of a port in the present survey is rather broad including various companies operating within or in combination with a port (ex. inland terminals). Therefore, throughout the survey please think about a specific use situation.

Thomas Vitsounis
Research Fellow
University of the Aegean
vitsounis@aegean.gr

* 1. Personal data

Name:

Company:

Email Address:

* 2. Position in the Company

* 3. Number of full-time permanent employees of your company (global scale).

- Less than 100
- Between 100-500
- Between 500-1000
- More than 1000

* 4. Number of TEUs handled in 2009

* 5. Your company is also offering (whether through subsidies or not):

- Stevedoring Services
- Shipping services
- Inland Terminal services
- Barges services
- Trucking services
- Rail services
- None

Container Port Users Perceived Value

2. Perceived Value from the Container Terminal Operator (T.O.)

*** 1. Please think about the best (in terms of perceived value) Container Terminal Operator (T.O.) that your company uses. Compared with another Terminal Operator located in the Port:**

	Strongly disagree		Neutral				Strongly agree		N/A
The T.O. adapts to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. offers to us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is highly productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the T.O. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. offers high quality services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical competence of the T.O. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. operates dockworkers that are skilled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. operates dockworkers that are flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The reputation of the T.O. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. keeps our own customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information systems used by the T.O. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. efficiently moves containers to the hinterland (if applicable)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rate of cargo damage is low when using that T.O.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The tariffs of this T.O. are low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using that T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no need to put extra coordination efforts to use that T.O.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost of using the T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

The waiting time to pick-up a container is low

The overall perceived value from the T.O. is high

Given the costs incurred the benefits offered by the T.O. are of high value

The use of the T.O. increases the value offered by our company to our customers

The value received from this port is worth the time, effort and money we have invested

If we had the chance we would use another Terminal Operator for the same cargo

Container Port Users Perceived Value

3. Perceived Value from the Inland Terminal (In.T.)

*** 1. Please think about the best (in terms of perceived value) Inland Terminal (In.T.) that your company currently uses. Compared with the second best:**

	Strongly disagree		Neutral				Strongly agree		N/A
The In.T. is productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the In.T. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. offers quality services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical competence of the In.T. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The geographical location of the In.T. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The reputation of the In.T. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. offers to us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. adapts efficiently to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is transparent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. keeps our own customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. provides accurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. provides information on time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information systems used by the In.T. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no need to put extra coordination efforts to use that In.T.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using the In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The transportation cost of using the In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rate of cargo damage when using that In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The overall perceived value from that In.T. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the costs incurred, the benefits offered by this In.T. are of high value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

The use of that In.T. increases the value offered by our company to our customers

The value received from this In.T. is worth the time, effort and money we spend

As long as nothing changes in the In.T., we do not think about using another one for that region

* 2. Characteristics of the Inland Terminal under study:

- The Inland Terminal under study is operated by a subsidiary of our company
- We have invested in that Inland Terminal
- We have a contract agreement with that Inland Terminal
- None

* 3. How many years are you currently using the Inland Terminal under study?

Container Port Users Perceived Value

4. Perceived Value from container shipping lines (S.L.)

*** 1. Please think about the best (in terms of perceived value) container shipping line (s.l.) that your company currently uses. Compared with the second best:**

	Strongly disagree		Neutral				Strongly agree		N/A
The s.l. adapts to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. is confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The communication with the s.l. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. offers to us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. is flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. has a good reputation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the s.l. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. has high safety standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. operates new ships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. uses an efficient Terminal Operator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. services multiple destinations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical competence of the s.l. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. sustains agreements for guarantee of entrance in the destination port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. calls directly at the port (no transshipment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. keeps our own customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The s.l. provides accurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information systems used by the s.l. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The tariffs of the s.l. are low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using that s.l. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no need to put extra coordination efforts to use that s.l.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The speed of the s.l. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

The s.l. does not arrive delayed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rate of cargo damage when using that s.l. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The overall perceived value from that s.l. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the costs incurred the benefits offered by the s.l. are of high value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The use of that s.l. enables us to offer superior value to our own clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The value received from that s.l. is worth the time, effort and money we spend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As long as nothing changes in the s.l. we do not think about redirecting cargo to another s.l.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 2. Characteristics of the container shipping line under study:

- Our company is a subsidiary of the container shipping line under study
- We have a long-term contract agreement with the container shipping line under study
- We have co-operation agreement with the container shipping line under study to service a specific shipper
- None

* 3. How many years are you using the shipping line under study?

Container Port Users Perceived Value

5. Perceived Value from the Port Authority (PA)

*** 1. Please think about the Port Authority (PA) that your company currently interacts with, more frequently. Compared with another Port Authority (whether you currently use or not):**

	Strongly disagree		Neutral				Strongly agree		N/A
The PA provides on-time and updated information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides adequate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The EDI systems of the PA are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA promotes the port effectively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA has a developed and efficient Marketing department	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is actively involved in solving problems of the members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA facilitates the coordination between the members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA ensures the efficient implementation of safety and security regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides efficient environmental management services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is transparent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA has a good reputation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The communication with the PA is easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is trustworthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ease of transactions with the PA is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA ensures the provision of adequate infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides adequate depth for the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The initiatives of the PA to increase port's hinterland connections are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The initiatives of the PA to increase the value added services provided within the port range	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

(industrial units, warehousing etc.) are efficient

The initiatives of the PA to attract more cargo in the port are efficient

The Harbors Office provides efficient services

The communication with the Harbors Office is easy

The port dues are low

The administration cost of our interactions with the PA are low

The coordination efforts of our interactions with the PA are low

The overall perceived value from the PA is high

Given the costs incurred the benefits offered by the PA are of high value

We receive high value from the PA

The value received from the PA is worth the time, effort and money we have invested

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

6. Perceived Value from general port characteristics

*** 1. Please think about the port under study. Compared with other ports that your company also uses:**

	Strongly disagree		Neutral				Strongly agree		N/A
The geographical location of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The port generates high volumes of cargo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The port is well connected with the hinterland	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The multimodal connections of the port are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rail connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The road connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The barges connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The social conditions of the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The economic conditions of the the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The political stability of the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of the Shipping lines calling at the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of FFs at the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of the Terminal Operators in the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of industrial units located close to the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of industrial units located in the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no sea congestion in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no land congestion in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The customs clearance in the port is rapid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The customs clearance in the port is without bureaucratic problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost of investing in the port is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Container Port Users Perceived Value

The administration cost of using the port is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no need to put extra coordination efforts when using the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the costs incurred, benefits offered by the port are of high value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We receive high value from this port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The value received from this port is worth the time, effort and money we have invested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This port contributes towards offering superior value to our own clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We would like to expand our business in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As long as nothing changes in the port we do not think about redirecting cargo to another port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

1. General Characteristics

All your answers will be treated in the strictest confidence. Also, the answers provided is not considered to officially express your company's but rather your personal views.

The objective of the survey is to evaluate your perceived value from a port of use. The cargo under study is containers. The scope of a port in the present survey is rather broad including various companies operating within or in combination with a port (such as an inland terminal). Therefore, throughout the survey please think about a specific use situation.

In case that you are an agent representing more than one container shipping line, please take the view of the one you are more familiar with.

Vitsounis Thomas
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University of the Aegean
vitsounis@aegean.gr

* 1. Personal Information

Name:
Company:
Email Address:

* 2. Position in the Company

* 3. Number of full-time permanent employees of your company (global scale).

- Less than 100
 Between 100 and 500
 Between 500 and 1.000
 More than 1.000

* 4. Number of TEUs handled in 2009

Shipping lines Perceived Value

* 5. Your company is also offering (whether through subsidies or not):

- Stevedoring Services
- Forwarding Services (door to door)
- Forwarding Services (port to door)
- Forwarding Services (port to inland terminal)
- Inland Terminal services
- Barges services
- Trucking services
- Rail services
- None

Shipping lines Perceived Value

2. Perceived Value from the Container Terminal Operator (TO)

*** 1. Please think about the best (in terms of perceived value) Terminal Operator (T.O.) that your company uses. Compared with another Terminal Operator located in the Port:**

	Strongly disagree		Neutral				Strongly agree		N/A
The T.O. successively adapts to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We consider the T.O. as confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. grants us a guarantee of entrance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. offers to us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the T.O. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. offers high quality services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical competence of the T.O. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. operates dockworkers that are skilled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. operates dockworkers that are flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The reputation of the T.O. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. keeps our customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information systems used by the T.O. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The T.O. efficiently moves containers to the hinterland (if applicable)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is always available berthing space when using that T.O.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rate of cargo damage is low when using that T.O.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The tariffs of this T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using that T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

We put limited coordination efforts to use that T.O.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost of using the T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The idle time when using that T.O. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The overall perceived value from the T.O. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the costs incurred, the benefits offered by the T.O. are of high value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The use of the T.O. increases the value offered by our company to our customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The value received from this T.O. is worth the time, effort and money we have invested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As long as nothing changes with the T.O., we do not think about using another one	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 2. The Terminal under study:

- Is a dedicated terminal
- We are shareholders of the terminal
- We are involved in the management of the terminal
- We have a long-term agreement with the Terminal Operator
- None

* 3. How many years are you using the Terminal Operator under study?

Shipping lines Perceived Value

3. Perceived Value from the Inland Terminal (In.T.)

*** 1. Please think about the best (in terms of perceived value) Inland Terminal (In.T.) that your company currently uses. Compared with the second best:**

	Strongly disagree		Neutral				Strongly agree		N/A
The In.T. is highly productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the In.T. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. offers high quality services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical competence of the In.T. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The geographical location of the In.T. is excellent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. Operator is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The reputation of the In.T. Operator is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. offers us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. adapts efficiently to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. Operator is transparent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. keeps our own customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. Operator provides us with accurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The In.T. Operator provides us information on time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Information Systems used by the In.T. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rent of the In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The use of the In.T. does not requires extra coordination efforts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using the In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rate of cargo damage when using that In.T. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The overall perceived value from that In.T. is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

Given the costs incurred,
the benefits offered by this
In.T. are of high value

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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The use of that In.T.
increases the value
offered by our company to
our customers

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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The value received from
this In.T. is worth the time,
effort and money we
spend

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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As long as nothing
changes with the In.T., we
do not think about using
another one for that
region

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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* 2. The Inland Terminal under study:

- Is operated by a subsidiary of our company
- We have invested in that Inland Terminal
- We have a contract agreement with that Inland Terminal
- None

* 3. How many years are you currently using the Inland Terminal under study?

Shipping lines Perceived Value

4. Perceived Value from feeder shipping lines (s.l.)

*** 1. Please think about the best (in terms of perceived value) feeder shipping line (feeder s.l.) that your company currently uses. Compared with the second best:**

	Strongly disagree		Neutral				Strongly agree		N/A
The feeder s.l. adapts well to our needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The communication with the feeder s.l. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. offers us customized services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is flexible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is experienced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The reputation of the feeder s.l. is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance of the feeder s.l. is consistent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. has high safety standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. operates new ships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. uses an efficient Terminal Operator in the destination port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. services multiple destinations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is technical competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. sustains agreements for guarantee of entrance in the destination port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. calls directly at the destination port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. keeps our own customers satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. is well connected with other members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The feeder s.l. provides us with accurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The IT systems of the feeder s.l. are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The tariffs of the feeder s.l. are low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using that feeder s.l. is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not put extra coordination efforts to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

that feeder s.l.

The time that the feeder s.l. needs to reach the destination port is low

The feeder s.l. is rarely delayed

The rate of cargo damage when using that feeder s.l. is low

The overall perceived value from that feeder s.l. is high

Given the costs incurred, the benefits offered by the feeder s.l. are of high value

The use of that feeder s.l. enables us to offer superior value to our clients

The value received from that feeder s.l. is worth the time, effort and money we spend

As long as nothing changes in the feeder s.l. we do not think about redirecting cargo to another feeder shipping line

* 2. Characteristics of the feeder shipping line under study:

- The feeder s.l. Is a subsidiary of our company
- We have a long-term agreement with that feeder s.l.
- None

* 3. How many years are you using the feeder shipping line under study?

Shipping lines Perceived Value

5. Perceived Value from the Port Authority (PA)

*** 1. Please think about the Port Authority (PA) that your company currently interacts with, more frequently. Compared with another Port Authority (whether you currently use or not):**

	Strongly disagree		Neutral				Strongly agree		N/A
The PA provides on-time and updated information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides adequate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The EDI systems of the PA are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA promotes the port effectively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA has a developed and efficient Marketing department	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is actively involved in solving problems of the members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA facilitates the coordination between the members of the port community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA ensures the implementation of safety and security regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides efficient environmental management services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is transparent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA has a good reputation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The communication with the PA is easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA is trustworthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ease of transactions with the PA is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides adequate infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The PA provides adequate depth for the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The initiatives of the PA to increase port's hinterland connections are efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The initiatives of the PA to increase the value added services provided within the port range (industrial units, warehousing etc.) are	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

efficient

The initiatives of the PA to attract cargo to the port are efficient

The Harbors Office provides efficient services

The communication with the Harbors Office is easy

The port dues are low

The administration cost of our interaction with the PA is low

The coordination efforts of our interactions with the PA are low

The maneuvering time is low

Our overall perceived value from the PA is high

Given the costs incurred, the benefits offered by the PA are of high value

We receive high value from the PA

The value received from the PA is worth the time, effort and money we have invested

Shipping lines Perceived Value

6. Perceived Value from the general port characteristics

*** 1. Please think about the port under study. Compared with other ports that your company also uses:**

	Strongly disagree		Neutral				Strongly agree		N/A
The geographical location of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The port generates high volumes of cargo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The port is well connected with the hinterland	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The multimodal connections of the port are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rail connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The road connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The barges connectivity of the port is good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The social conditions of the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The economic conditions of the the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The political stability of the region/country where the port is located are good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of the Freight Forwarders using the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of the Shipping Lines calling at the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of the Terminal Operators at the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of industrial units located close to the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of industrial units located in the port is adequate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no sea congestion in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no land congestion in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The customs clearance in the port is rapid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The customs clearance in the port is without bureaucratic problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shipping lines Perceived Value

The cost of investing in the port is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The administration cost of using the port is low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not put extra coordination efforts when using the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the costs incurred, the benefits offered by the port are of high value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We receive high value from this port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The value received from this port is worth the time, effort and money invested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This port contributes towards offering superior value to our clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We would like to expand our business in the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As long as nothing changes in the port we do not think about redirecting cargo to another port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>