

**UNIVERSITY OF THE AEGEAN**

**DEPARTMENT OF SHIPPING, TRADE  
AND TRANSPORT**



**THE NEXUS BETWEEN INNOVATION, DYNAMIC  
CAPABILITIES AND MARITIME SECURITY**

**Doctoral Dissertation  
by  
Ioannis Nellas**

**Chios, February 2021**

**UNIVERSITY OF THE AEGEAN**

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**by Ioannis Nellas**

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INNOVATION AND MARITIME SECURITY**

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## **Abbreviations**

DCs: Dynamic Capabilities

HoA: Horn of Africa

ISPS: International Ship and Port Facility Security

LNG: Liquefied Natural Gas

MDA: Maritime Domain Awareness

NPS: Naval Post Graduate School

PRC: People's Republic of China

R&D: Research and Development

UNCLOS: United Nations Convention on the Law of the Sea

USA: United States of America

VRIN: Valuable, Rare, Inimitable and Non-substitutable

## **Abstract**

Maritime security is an issue heavily discussed in forums and respective think tanks since there are many troubled areas in the world. On the other hand is a frequently spoken term with a background of uncertainty. Inevitably, organizations/institutions that tackle contemporary maritime security issues have adopted in a certain degree entrepreneurial strategies and tactics. According to business theory as defined by Teece et al. (1997) an important characteristic of a firm is to develop successfully is its: ***dynamic capability, meaning the ability of the firm to integrate, build, and reconfigure internal and external competences to address rapidly changing environments***".

A challenging academic question rises concerning whether the entrepreneurial concept of Dynamic Capabilities is applicable for institutions/organizations whose aim is the promotion of maritime security. The term "*institutions / organizations*" refers to navies, coastguards and private companies that are engaged to security threats such as piracy, illegal immigration etc. The purpose of this dissertation is to provide a nexus between the concept of dynamic capabilities, maritime security and innovation and suggest potential mechanisms that can be employed in this security domain. Specifically, we will attempt to present and analyze the above research aims in promoting DC's potential and applicability in the maritime security domain via innovation offices or centers where possible and feasible.

## Περίληψη στα Ελληνικά

Η θαλάσσια ασφάλεια είναι πλέον ένας όρος που χρησιμοποιείται ευρέως στη καθημερινότητα μας, καθώς πλέον μεγάλος αριθμός περιοχών αντιμετωπίζει οξεία προβλήματα άμεσα σχετιζόμενα με το θαλάσσιο περιβάλλον. Συνέπεια των ανωτέρω είναι ότι η αξιοποίηση του συνόλου των διαθέσιμων εργαλείων καθίσταται επιτακτική και μονόδρομος. Οι εμπλεκόμενοι με τη θαλάσσια ασφάλεια οργανισμοί (ναυτιλιακές εταιρείες, ναυτικά, ακτοφυλακή κ.ά.) ως οργανισμοί διαθέτουν οργανωτική δομή που έχει πολλά κοινά στοιχεία με αντίστοιχες εταιρείες που δραστηριοποιούνται στον ιδιωτικό τομέα και ως εκ τούτου γεννάται το εύλογο ερώτημα περί της δυνατότητας αξιοποίησης στρατηγικών, εννοιών (concepts) και επιμέρους επιχειρησιακών τακτικών που πηγάζουν από τη βιβλιογραφία της διοίκησης επιχειρήσεων. Ειδικότερα, μια επιχείρηση για να εξελιχθεί / αναπτυχθεί απαιτείται να διαθέτει «Δυναμικές Ικανότητες, ήτοι, όπως αναφέρεται από τους Teece et al. (1997), την ικανότητα μιας εταιρείας:

***“Να ενσωματώνει, να χτίζει και να αναμορφώνει εσωτερικές και εξωτερικές δομές (ικανότητες) για την αντιμετώπιση των διαφόρων προκλήσεων σε ένα ραγδαία μεταβαλλόμενο περιβάλλον”.***

Το ακαδημαϊκό ερώτημα που προκύπτει εστιάζει στην ενδεχόμενη δυνατότητα εφαρμογής της έννοιας (concept) των δυναμικών ικανοτήτων σε ιδρύματα / οργανισμούς που στοχεύουν στην προώθηση της ασφάλειας στη θάλασσα. Σημειώνεται ότι ο όρος «ιδρύματα/οργανισμοί» εν προκειμένω αναφέρεται στις ένοπλες δυνάμεις (πολεμικό ναυτικό), ακτοφυλακή και στις διάφορες ιδιωτικές εταιρείες που ασχολούνται με απειλές εναντίον της θαλάσσιας ασφάλειας, όπως η πειρατεία, η παράνομη μετανάστευση, στις ναυτιλιακές εταιρείες κ.ά. Ο σκοπός της διατριβής αυτής είναι η εισαγωγή της έννοιας των δυναμικών ικανοτήτων (Dynamic Capabilities) σε συνάρτηση με τη θαλάσσια ασφάλεια και την εκκίνηση της συζήτησης περί ενδεχόμενης μελλοντικής αξιοποίησης του εν λόγω concept από το επιχειρηματικό πλαίσιο στον τομέα της θαλάσσιας ασφάλειας, ενδεχομένως με την ίδρυση και κατ' επέκταση την αξιοποίηση συναφών γραφείων/κέντρων καινοτομίας. Ειδικότερα, η παρουσίαση και η ανάλυση των αποτελεσμάτων της διενεργηθείσας διδακτορικής έρευνας αποσκοπούν στην παρουσίαση της δυναμικής της έννοιας των Δυναμικών Ικανοτήτων, καθώς και στη χρησιμότητα/αξιοποίηση ενός προτεινόμενου

μηχανισμού Δυναμικών Ικανοτήτων, ο οποίος θα αποτελέσει τον θεωρητικό σύνδεσμο μεταξύ της Θαλάσσιας Ασφάλειας, των Δυναμικών Ικανοτήτων και της Καινοτομίας και παράλληλα θα αποτελέσει τη βάση για μελλοντικούς μελετητές στον αντίστοιχο τομέα ασφαλείας.



**PART I  
LITERATURE REVIEW ON  
DYNAMIC CAPABILITIES,  
CONTEMPORARY SECURITY  
AND INNOVATION  
(CHAPTERS I-III)**





## **CHAPTER I LITERATURE REVIEW**

# DYNAMIC CAPABILITIES THEORY LITERATURE REVIEW

## 1.1 Introduction

Dynamic Capabilities (DCs) is a term used in business literature that has been tackled from a considerable number of scholars during the last 3 decades. There are more than 2,500 articles in the business literature discussing the concept of DCs either directly or indirectly. There is a wide range of possible definitions that indirectly demonstrates the lack of a consolidated dynamic capabilities theory, since additional work is required in order to assure that the right assumptions, relationships and variables are taken into account. In order to understand this term in depth, comprehensive literature review and further research is required.

Maritime security is a general term encapsulating many distinct maritime-oriented issues. The DCs related theory does not delimits the potential fields for implementing the DCs concepts. Organizations and institutions focusing on issues related to maritime security follow entrepreneurial strategies and operational tactics to a significant extent. Their organizational structure shares many similarities to the respective corporate business firms. The major research question that this dissertation will attempt to address is the following:

***“Which dynamic capability feature (mechanism) encompassing innovative components would contribute significantly to improved performance of a maritime organization, practically and efficiently addressing modern maritime challenges and threats?”***

## Literature Review

At first, it is crucial to identify the impact of DCs in the business arena and then try to analyze it within the context of business literature. Teece et al. (1997, p. 516) have provided the following comprehensive definition of DCs:

***“Dynamic capability, meaning the ability of the firm to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.”***

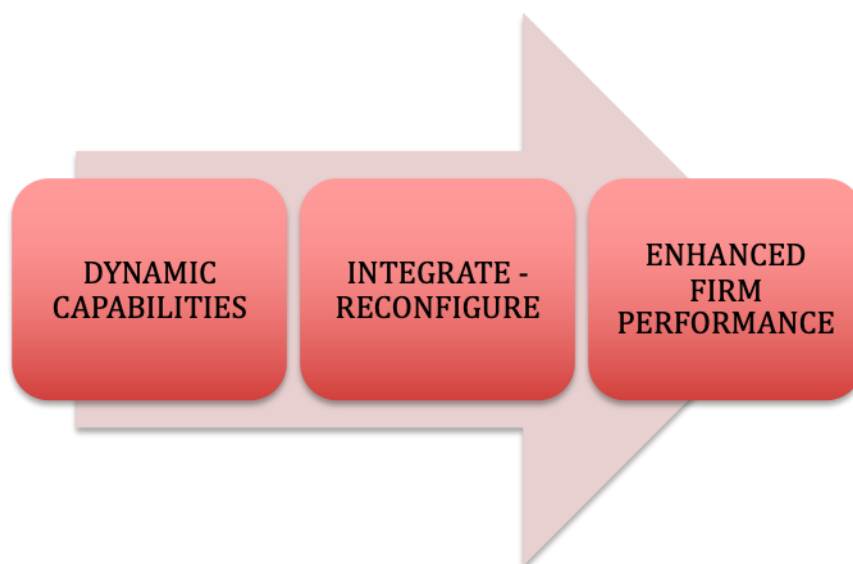
Another definition used by various scholars' approaches/describes dynamic capabilities as a “collective procedure”, where a firm adjusts its operating procedures accordingly in pursuit of high performance through a systematic and collective effort (Zollo and Winter, 2002; Barreto, 2010). A more detailed approach stresses the above argument, aiming for a “competitive advantage” (Eisenhardt and Martin, 2000). Other researchers support that if two firms are expected to have a similar set of DCs the expected outcome will be the same; however, this is not the case, since the respective outcome heavily depends on the costs involved and the respective timing of implementation of various entrepreneurial strategies and tactics (Zott, 2003).

Another relevant academic view underlines the complex relationships between **“resources, dynamic capabilities and firm performance”** and highlights the need for further research in this field (Barreto, 2010). The word “capabilities” in the term *dynamic capabilities* highlights the strategic management perspective and specifically the fact that we are not referring to specific, one-time accomplished achievements, but to the capacity to repeat them consistently in a sustainable manner (Zollo and Winter, 2002).

According to Eisenhardt and Martin (2000), DCs are proposed as a set of “specific and identifiable processes” whose main advantage originates from their capability to reconfigure existing resources into “value creating strategies”. Other academics argue that the contribution of DCs is indirect and is focused on the impact of operational capabilities (Cepeda and Dusya, 2007). A good practical example of DCs in the business field is strategic decision making that can be viewed as a new way of structuring and employing all available resources and sensing new

opportunities, challenges, and threats (Barreto, 2010).

The respective literature supports that the connections between dynamic capabilities and competencies mainly center on their ability to “**integrate and reconfigure**” (Teece et al, 1997; Eisenhardt and Martin, 2000;). The benefits acquired from the increase of competencies and the establishment of “operational routines” and resource positions add to an enhanced ability to address changing environments with a final outcome of improved firm performance (Barreto, 2010).



**Graph 1** The influence of Dynamic Capabilities on Firms

Our contemporary era is characterized by fundamental changes on a wide range of issues; ecosystems where “high dynamism prevails” are being developed (Eisenhardt and Martin, 2000; Barreto, 2002). In the entrepreneurial field, business firms on a daily basis experience significant changes; obviously there are respective challenges for a maritime organization focused on addressing evolving maritime security issues and threats just like business firms in turbulent business environments. Consequently, if we approach maritime organizations in a manner similar with business firms, they have to frequently reprioritize their goals and adjust their strategies and tactics in order to address new challenges (Teece et al, 1997;

Barreto, 2010; Teece, 2007).

A number of researchers claim that the concept of dynamic capabilities is important regardless of the level of dynamism (Eisenhardt and Martin, 2000), a view that will be argued later in this dissertation. The literature on dynamic capabilities proposes another interesting perspective that enlightens the field by introducing a “two level hierarchy” concept. In particular, the following categorization is proposed, “Zero-level Capabilities and Higher-level Capabilities”, as it is being presented below (Barreto, 2010).

The term “zero level capabilities” in this context reflects the basic capabilities that a firm should possess in order to be economically healthy, one could argue “the every day tasks and practices” of the organization (Winter, 2003). Various scholars connect the term “higher level capabilities” to DCs that are employed frequently in altering ordinary capabilities of the firms.<sup>1</sup> Maritime organizations on a daily basis normally deal with a wide range of operational and organizational issues. In order to be efficient, an organization should also support an internal mechanism to reconfigure ordinary routines. Specifically, a different approach that was adopted considered two types of routines, first, those that are employed in operational activities (routines), and second, the routines which are tasked to upgrade the respective operational routines (Zollo and Winter, 2002).

## **1.2 Creation and Development Mechanisms**

The business literature has identified and stated creation and development mechanisms. However, there has been special focus on the development of learning mechanisms. A number of scholars have suggested that there is a strong chance

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<sup>1</sup> Ibid., 994.

that a number of learning mechanisms will have the tendency to repeat the same mistakes, despite previous experiences and lessons learnt (Barreto, 2002).

Respective literature highlights the significance of “learning’ in the development of DCs. In addition, two specific components that play a key role:

- Variation is of high importance in markets where moderate dynamism prevails.
- Selection seems more relevant and applicable in markets where high dynamism prevails.

Some scholars have identified the importance of “learning mechanisms” in the development of DCs (Barreto, 2002). Another approach suggests different mechanisms based on deliberate cognition as below:<sup>2</sup>

- Knowledge articulation through discourse and evaluation process.
- Knowledge codification through utilization of existing tools of the already used routines.

In summary, Zollo and Winter (2002) proposed that mechanisms based on deliberation are more efficient in the development of DCs mechanisms based on “quasi automatic” procedures, since the less focus is involved and the task challenges exceed average expectations (Zahra et al, 2006). Zollo and Winter (2002) included additional components for the creation and establishment of DCs mechanisms such as:

- Trial
- Error
- Improvisation
- Imitation

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<sup>2</sup> Ibid.

According to Zahra et al (2006), their main argument was that newly established firms should move towards the factors stated previously, however well established firms should adopt learning processes that are highly interdependent to the accumulated firm's experience.

A successful business firm, obviously is capable of creating new capabilities and responses in order to address rising challenges in changing environments. The latter is equivalent to a maritime organization that is capable of tackling new maritime challenges. Maritime threats create an analogy between changing business environments and modern maritime environments.

DCs are basically a mechanism that consists of organizational and strategic routines that allows firms when markets are going through rough changes to develop their new resource configurations. A maritime translation of the latter consideration is a mechanism that allows dedicated organizations to promote new and innovative resources and reconfigure the existing ones in order to tackle respective maritime threats in a regional and international fashion.

### ***Heterogeneity assumptions***

Heterogeneity is a source of ambiguity for scholars regarding firms' inherent Dynamic Capabilities. Most scholars support that DCs have a specific identity for each firm (Teece et al, 1997). Another school, supported by Eisenhardt and Martin (2000), supports that DCs demonstrate commonalities, in the execution of the assigned tasks, the latter are widely known as "best practices".

The identification of firms where the concept of DCs is applicable establishes an academic challenge for future researchers (Barreto, 2002). The identification of the appropriate dimensions' set that is applicable for maritime organizations consists of an additional challenging academic task. A useful definition that will help us understand the role of DCs is to approach them as an "*aggregate of a multidimensional construct*" of a system that is dedicated to resolving issues (Law et

al, 1998).<sup>3</sup> The business literature has identified dynamic capabilities dimensions that are applicable to business firms and has proposed the categorization stated below:

*Development of new capabilities in different “Recognition of new need.*

*Assessment of existing capability configuration.*

*Acquisition of necessary new knowledge.*

*Creation of new capabilities to address the new challenge.*

*Alignment with other resources and capabilities in order to build a newly effective capability configuration.*

*Effectiveness of reconfiguration effort domain.*

*Development of new products” (Law et al, 1998; Diss, 2012).*

### **1.3 The Main Construct**

DCs constitute a construct that offers great opportunities for research. In order to further explore potential applications, it is crucial to set the relevant boundaries and adopt a credible and comprehensive definition. However, this is rather challenging, since relevant theory has not been delimited, and has been characterized by many as not concrete. An “out of the box” approach is required in order to move forward in terms of consolidating the DCs theory.

Different approaches offer varied conceptualizations of individual relevant elements stated below:

- Nature
- Specific role
- Scope of Dynamic Capabilities
- Heterogeneity Assumptions
- Context

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<sup>3</sup> Ibid.,”271.



Concerning nature, one of the main challenges is to consolidate the respective theoretical framework that many scholars consider as too wide. The role of DCs has evolved in the literature and a challenge for future researchers will involve to merge earlier and more recent literature. The level of dynamism is an important parameter that relates to “whether we should include stable, moderate and/or highly dynamic environments” (Barreto, 2010, p. 270).

Another factor that should be taken into account tackles the issue of heterogeneity. One of the issues to disentangle the factor of commonalities – ‘best practices’ across corporate firms and factor them into the relevant literature concerning the impact of DCs and what is the added value in advancing a firm’s competitive advantage. Many scholars have attempted to include in their theoretical background the scope or purpose of DCs. The latter is a rather controversial task, since from one hand we have to avoid the risk of being precise and on the other hand we need to address all criticisms that DCs theory is not consolidated.<sup>4</sup> It’s important to avoid the risk of being labeled as “tautological’, since the concept and main proposition of DCs might be confused.<sup>5</sup> In the beginning of this literature review we presented a definition of DCs Teece et al. (1997) proposed. However, the present literature review adopts the definition Barreto (2010, p. 270) proposes stated below:

*“A dynamic capability is the firm’s potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base”* (Barreto, 2010, p. 271).

The above definition argues that DCs are assumed as multidimensional construct, with four main dimensions:

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<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

- Propensity on sensing imminent challenges and threats
- On time decision making
- Decision making on contemporary market needs
- Ability to reconfigure the available resource base<sup>6</sup>

It is important to conceptualize that according to Barreto's definition, DCs are consisted from the previously stated dimensions, and only as a resultant from the latter. A promising field of research will involve a thorough study of their variations, specifics and co-shared ones. An additional academic question will potentially focus on the interrelations between the latter four dimensions. Business literature has provided considerable insight; however, a number of scholars have proposed the imperative to integrate the "decision making components" into the whole process (Moliterno and Wiersema, 2007). The relevant literature supports that decision-making is a critical component in the construct of DCs.<sup>7</sup>

In addition to the above argument, scholars have proposed that decision making is necessary to accomplish an efficient resource base configuration (Salvato, 2003; Pablo et al, 2007). Scholars like Adner and Helfat (2003) argue that decision making is also crucial in two regards:

- Timing of Decisions
- Decisional Content

The above academic argument has urged a number of scholars like Menguc and Auh (2006) to suggest that customary "market orientation" can evolve to DCS, as long as they are capabilities that allow transformations and modifications. The

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<sup>6</sup> Ibid.

<sup>7</sup> Ibid.,1070-1071

definition proposed by Barreto (2010) provides additional insights and in terms of functionality and content as listed below:

- Encompassment of the existing academic work
- Capability of 'ad hoc problem' solving
- Structural component

In particular, the definition previously analyzed has included the disputed component of "purpose", another aspect that the previous scholars have not tackled.<sup>8</sup> We have discussed previously the lack of consolidated theory concerning DCs, so it is rather inspiring that this definition accomplishes to constrain obscurity.

### ***Measurement Issues***

DCs, as stated previously, are viewed as an "aggregate of a multidimensional construct" that consists from the four dimensions previously analyzed, with a varying level of correlation and interdependence. A consequent generated need relates to the issue of operationalizing DCs and their respective related concepts. A challenging issue is the fact that DCs are themselves a set of "constructs" and not formative measures, which is an equivalent concept to "observed variables" (Edwards, 2001).

The respective literature over this issue will tackle the issue of operationalization of DCs, however there are many optional paths that scholars could follow. A measurement approach can involve surveys focused on DCs dimensions. Of course, these surveys may be based on questionnaires and interviews, oriented accordingly to the potential area of research (Danneels, 2008). Other scholars have adopted research methods based on experience, as a tool to evaluate DCs dimensions (King and Tucci, 2002). In summary, literature accepts that measuring

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<sup>8</sup>Ibid.

DCs dimensions is a rather challenging task and alternative measuring methods should be followed, i.e., through the analysis of specific case studies (Rosenbloom, 2000; Galunic and Eisenhardt, 2001; Pablo et al, 2007).

### ***Congruence***

One of the issues this literature review has stated is the lack of sufficient academic work on the specific issue of interrelations among key components that constitute DCs. One of the necessary steps to develop DCs theoretical framework, is for future scholars to study further the relations among the latter components. A guide in structuring this theory can be found on the academic work by Fry and Smith (1987) who support that principles of interrelations in respected areas/constructs of interest define the “congruence”.

This literature review will not focus on the analysis of the interrelations however it will tackle the link between DCs and firm performance. This field of research has been dominated by three schools of thought, as stated below:

- Direct link between DCs and firm performance (Teece et al, 1997).
- Indirect link between DCs and firm performance (Eisenhardt and Martin, 2000).
- DCs are not always linked to superior performance or competitive advantage (Zott, 2003).

In this literature review we discussed the aspect of heterogeneity and specifically about best practices” (Eisenhardt and Martin, 2000). Barreto (2010) argues that “best practices” among corporate firms deprives DCs from their impact to firm performance. From the author’s view and as a follow up to this literature review, DCs and “best practices” should be present in order for business firms to develop

and grow. Two important factors in a firm's congruence resonate in the ability to reconfigure efficiently already available and newly acquired resources. The VRIN (Valuable, Rare, Inimitable and Non-substitutable) framework provides a rather useful tool to evaluate whether each respective set of resources is "good enough" in conjunction with the available DCs to ultimately enhance firm performance (Barney, 1991). Last point concerning "congruence" will state that future researchers should focus on the interdependence of DCs and performance.

#### **1.4 Delimitation of DCs Theoretical Framework**

The literature review of DCs theory also highlights the need to delimit respective theory boundaries and assumptions, i.e., if all levels of dynamic environments should be taken into account (Barreto, 2010; Diss, 2012). Bacharach (1989) in his work suggested that the actual implementation of DCs involves the delimitation of the respective theoretical framework. An important critical aspect that literature over DCs has not identified relates to the type of business firms that can profit from the latter concept (Barreto, 2010). Scholars like Zollo and Winter (2002) have argued that multi-cross sector firms and organizations would benefit from the adoption of robust learning mechanisms that would ultimately enhance the firm's performance. In addition, literature suggests governmental and public sector companies as a new potential area for implementing the DCs concepts, since their operation takes place in turbulent environments. The election cycles in conjunction with the contemporary social conditions constitute as many scholars claim "rapid changing environments and consequently DCs are a potential tool for respective organizations (Zahra et al, 2006).

A supporting argument that stems from existing literature also suggests the employment of DCs in small, medium and large business firms (Doving and

Gooderham, 2008). Finally, the issue of decision-making is of high significance and should be taken into account, since the role of each individual is critical and holds a specific distinct role (Salvato, 2003; Pablo et al, 2007).

### **1.5 Research Gaps**

A follow-up challenging academic question emerges as to whether the entrepreneurial concept of DCs is applicable in institutions/organizations aiming to enhance and promote maritime security. The term "*institutions / organizations*" in this case refers to navies; coast guards; and shipping companies that face threats such as illegal immigration, drug and weapon smuggling, trafficking, energy security and border control. This field needs further research, in order to identify the applicability of the DCs concept and potentially define an applicable relevant mechanism for organizations that aim to enhance maritime security. It should not be neglected that various researchers have accepted an indirect link between firm performance and dynamic capabilities (Zott, 2003).

DCs are a controversial concept that requires further research in different fields of potential employment. Maritime security on the other hand is a complicated security chapter where the interplay of many factors takes place. Currently there is a strong debate concerning maritime security, since there are many troubled areas, i.e southern country members of the European Union dealing with illegal immigration due to the critical political situation in the wider Mediterranean area (Syrian war, Middle East issue, Libya crisis).

DCs are a feature of modern institutions/organizations in an era where rapidly changing environments have become a daily challenge. Literature on this issue identifies the need to define the organizations/institutions where this concept is applicable and in particular the benefits from adopting the concept (Barreto, 2010). A

follow up academic question will concentrate on the identification of the firms / institutions where the potential employment of DCS will not be beneficial.

### **Theoretical Goals**

- Familiarity with the maritime security domain.
- The relationship between innovation and maritime security.
- The nexus between Dynamic Capabilities, Innovation and Maritime Security.

### **1.6 Research Aims and Objectives**

The purpose of this dissertation is to identify the nexus between Dynamic Capabilities, Innovation and Maritime Security within the context of modern security challenges that are described in Chapter 3.

*In particular, the research goals and objectives are listed below:*

#### **Research Goals**

- The evolution of DCs theory as an aggregate of a multidimensional construct,
- **Modern Security Challenges** in terms of modern turbulent environments and the applicability of Dcs concept in the maritime security domain,
- **Innovation** as a key factor in optimizing the performance of respective institutions and the potential effect of DCs in institutions that tackle contemporary security challenges,
- Identification of institutions that address contemporary security challenges in the maritime domain and can facilitate/ implement the DCs framework.
- **Evaluation of the DCs framework** in tackling contemporary maritime threats.

#### **Research Objectives**

- Analysis of the “Dynamic Capabilities” theoretical framework and identification of potential utilization for the maritime domain.
- In depth study of the relationship between innovation and DCs and research on potential mechanisms that lead to improvement of firm performance and future adoption of innovative ideas and concepts.

- Evaluation of a proposed DCs mechanism that originates from the DCs business literature.

## **1.7 Dissertation Outline**

The structure of this dissertation consists of six chapters, i.e. an introductory Chapter, literature review, development, analysis, methodology, research framework, results' evaluations, conclusions, limitations and future suggestions. In Chapter I, this dissertation focuses on presenting the core concept of DCs. More precisely, it presents an overview of the present relevant business literature and at the same time highlights the nexus between the two generic concepts of DCs and maritime security.

Chapter II presents the theory connecting DCs and innovation with the ultimate goal to propose a conceptual DCs mechanism for organizations and institutions delegated to tackle issues related to modern maritime security threats.

Chapter III discusses the complexity of the maritime domain; in particular, it provides an overview of modern maritime challenges of our era. Then, a brief analysis of six contemporary maritime threats follows that demonstrates the need for a maritime security oriented dynamic capabilities mechanism that via a conceptual framework addresses contemporary maritime threats and offers at the same time an innovation component.

Chapter IV states the methodology and research framework for this dissertation. In particular the structure and the reasoning of the questionnaires that were utilized during this research. Then we proceed to the analysis of the results and after the employment of statistical models we worked constructively in order to identify fertile ground for dynamic capabilities in the maritime domain.

Chapter V restates conclusions and the added value of this dissertation; in particular the potential of DCs concept in the maritime domain as well as the need to incorporate innovation in respective strategies and tactics are highlighted and the usefulness of DCs in the maritime security domain is verified.

Chapter VI presents the limitations we faced during this research and also potential topics for future researchers that are not covered in this dissertation with academic potential that could further enhance in the future the academic outcome of this dissertation.





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## **CHAPTER II DYNAMIC CAPABILITIES AND INNOVATION IN MARITIME SECURITY**

# DYNAMIC CAPABILITIES AND INNOVATION IN MARITIME SECURITY

## 2.1 Innovation Theoretical Background

In this chapter, we discuss about the theoretical background of innovation and the nexus between DCs and innovation. It's important to have a better conceptualization of innovation and -for the purpose of this research- to adopt the following definitions of innovation and innovation performance from the literature:

*“Innovation as development of new products and/or services.”* (Brown and Eisenhardt, 1995, p. 351)

*“Innovation Performance, as the absolute or relative success of the product/service development program.”* (Song et al, 2006, p. 342)

Innovation is considered as a key element and factor in accomplishing a higher level of performance in the business world (Sharma and Lacey, 2004). The expected results from adopting innovative approaches usually lead to a better performance of the respective business firm (Simpson et al, 2006). Despite the obviously expected positive outcomes, there is strong debate over the fact that in many instances innovative approaches include a certain degree of failure since sometimes-high economic costs are incurred (Simpson et al, 2006). An additional insight supporting the above argument originates from the issue of sustainability. Specifically, some scholars support that long-term outcomes that stem from adopting innovative policies are negative sometimes, since they could potentially generate a large array of bi-products (higher economic costs, implementation failures).<sup>9</sup>

In principle, the respective business literature accepts the argument that

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<sup>9</sup> Ibid.

business environments identified as ones with high level of dynamism involve business firms with considerable innovation tactics and actions (Calantone et al, 2003). Firms operating in turbulent environments are forced to innovate in order to survive, a fact that some times constitutes their performance even more challenging (Kessler and Chakrabarti, 1996).

The above analysis might imply that innovative policies and methods always lead to success. Unfortunately, this is not always the case since the literature highlights the possibility of unsuccessful efforts (Mahajan et al, 1993). The academic question generated from the previous argument posed the issue of which mechanism can lead to successful innovation strategies and tactics to tackle maritime security challenges.<sup>10</sup> Therefore a significant number of studies attempted to tackle this issue by researching potential factors that have an impact on innovation strategies and tactics. The outcome of the latter research depends on the following (Damanpour, 1996):

*“Structural Complexity*

*Organizational Size*

*Environmental Uncertainty”*

In addition to the above and focusing on organizational aspects, the literature underscores also the following determinants, as positively linked to successful innovation:

*“Managerial Attitude towards change*

*Professionalism*

*Technical Knowledge Resources*

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<sup>10</sup> Ibid

*Functional Differentiation*

*Specialization*

*Administrative Intensity*

*Slack Resources*" (Damanpour, 1991).

Another issue the respective literature highlight focusses on inherent characteristics of large corporate companies that, like any respective organization, experience difficulties in moving ahead in terms of innovation and present "complacency" in terms of adopting forward looking innovative policies (Henderson, 1993).

DCs are considered in the business literature as "mechanisms" that promote innovation through the development of new products and services with innovative features (Teece et al, 1997, p. 515). In a more conceptual approach, DCs focus on sensing the need to change and ultimately lead to the adoption of a proper reaction that is supported with complementary tactic (Helfat et al, 2007). A critical component of organizations/firms stems from their inherent capabilities to perceive potential threats and opportunities, then gain knowledge and afterwards generate it in a fashion that is later disseminated through proper organizational structure and mechanisms (Eisenhardt, and Martin, 2000; Verona and Ravasi, 2003).

The fundamental concepts discussed above originate from the optics Schumpeter (1934) introduced to the field of innovation. He considered that in order to pursue productive innovation, the only option is to reach out for "out of the box" approaches and synergies in fields i.e (technical, structural) and ultimately deliver

new projects (services and products).<sup>11</sup>

The nexus between DCs and innovation, in my view, is founded upon the argument that organizations/firms involved in promoting or establishing high levels of maritime security will come across complex short-or long-term security challenges and consequently DCs take on a crucial role. Inevitably, innovation is critical component in the whole process since traditional approaches in many cases will not be efficient and “out of the box” approaches and policies have to be followed.

## **2.2 Maritime Security and Levels of Dynamism**

In the previous part of this chapter, we discussed about the theoretical background of innovation and attempted to connect it to the nature and operational mode of a business firm. However, a key component that remains to be analyzed focuses on “environmental dynamism” that according to the literature heavily relies on the following:

*“The rate of change in technologies*

*Customer Preferences*

*Intensity of Competition.”* (Jaworski and Kohli, 1993, pp. 54-55)

The respective literature has debated extensively over this issue and provides a wide range of perspectives. Some scholars argue that DCs in changing environments are not critical and assumed that constitute an inherent feature of organizations and firms even in low turbulence business environments (Zahra et al, 2002). On the contrast other scholars contended that DCs are at all times of significant importance regardless if we are focusing on “rapidly changing environments” or “moderate changing environments” with high “predictability”

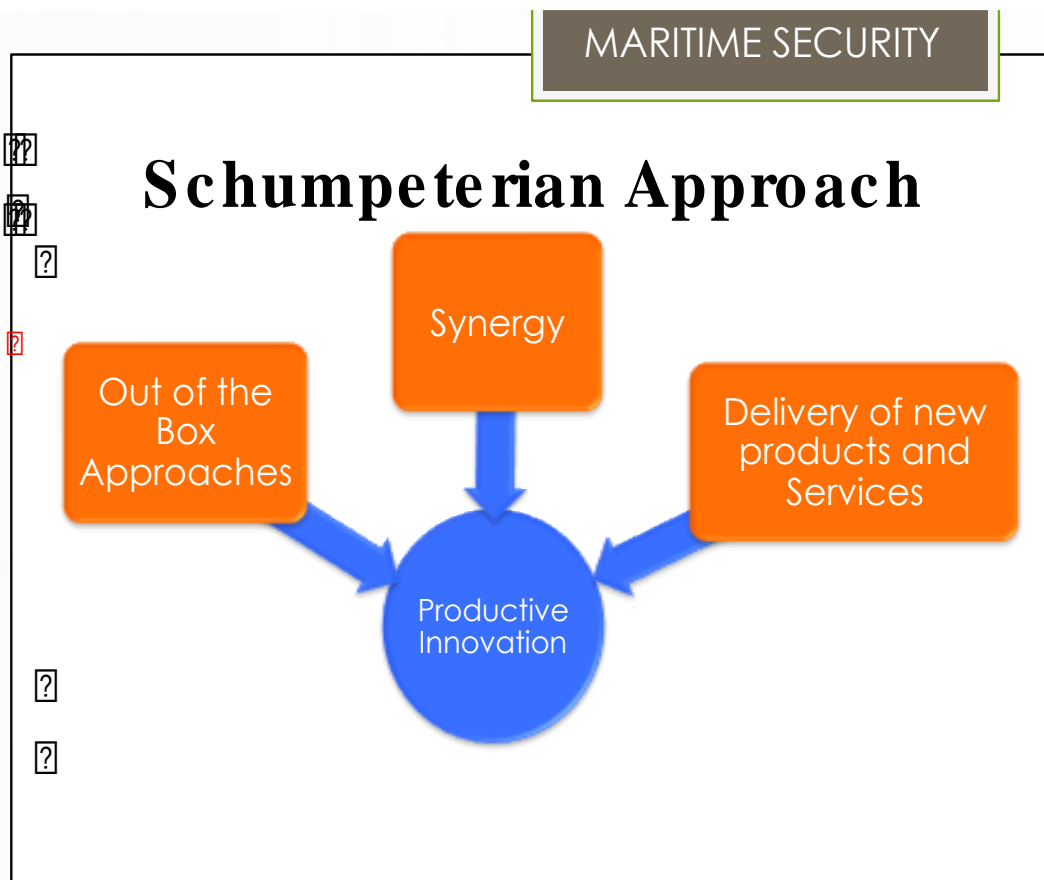
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<sup>11</sup>Ibid.

(Shaker et al, 2002).

Maritime security is a general term that encapsulates a great number of distinct security chapters that in many cases have a global impact as it was presented and analyzed in the previous two chapters. However, the six security issues in Chapter III are not analogous and similar and this leads to the obvious argument that a solution for them will consist of different deliverables.

In particular, the security issues related from the ice melting in the Arctic are different from the respective ones that originate from the issue of illegal migration. Indicatively, the issue of illegal immigration and the Arctic sea obviously includes the active participation of coastguards as maritime organizations tasked to ensure and promote maritime security. The issue of migration calls for a Schumpeterian approach that translates into urgent 'out of the box" synergy-based solutions that would counter migration flows and support domestic order on land and maritime borders. On the contrast Arctic sea issues demonstrate the need for future innovative adjustments and changes for the coastguard and global shipping; however the pace of how things are evolving cannot be compared in any way to the pace things were evolving during the migration crisis in Southern Europe during 2016. In connection to DCs theory, the character of changing environments is clearly demonstrated in a fashion that highlights the need for the delivery of new services and products that enhance maritime security.



**Graph 2 Productive Innovation and Maritime Security**

### **2.3 Capabilities Mechanism**

The next step of this dissertation, after proving the relevance and applicability of DCS in the maritime security arena to provide a generic Dynamic Capabilities mechanism as Diss proposes that is maritime oriented and would be a conceptual model for respective firms and organizations (Diss, 2012). The seven distinct dimensions that basically represent the basic components of DCs according to Diss are depicted in Figure 2 and listed below:

*“Opportunity Recognition*

*Capability Monitoring*

*Knowledge Creation*

*Knowledge Acquisition*

*Knowledge Sharing*

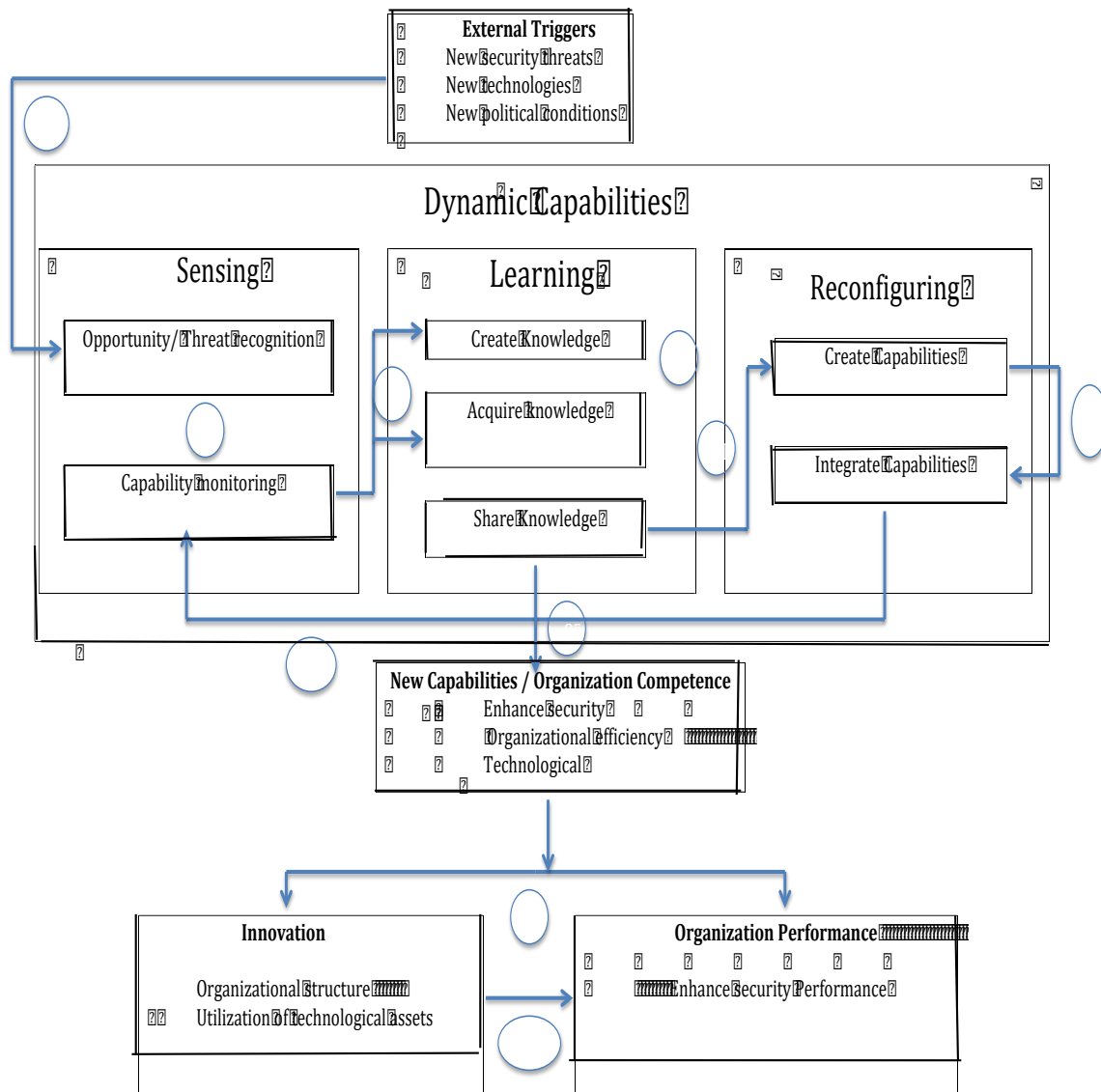
*Capability Creation*

*Capability Integration.”<sup>12</sup>*

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<sup>12</sup> Ibid.





**Graph 3 A Maritime Oriented Dynamic Capabilities Mechanism (Diss, 2012, Nikitakos and Nellas, 2015)**

Initially, we need to state that Capabilities are considered as the inherent abilities to perform an activity repeatedly in a sustainable manner that minimum standards are met (Grant, 1991; Amit and Schoemaker, 1993). An important issue that needs to be clarified lies on the issue of distinction between *operational* and dynamic capabilities.

The latter holds a dynamic main component that focuses on formulating “R&D and/or product development capabilities” (Diss, 2012, p. 16).

In summary, DCs represent the ability of maritime organizations or relative firms to perform the following sub-capabilities.<sup>13</sup>First of all, the need to identify what they are expecting (sensing) (Danneels, 2008). This term reflects the necessity to identify the changes in maritime environments through the establishment of proper processes.<sup>14</sup> The next capability involves for every organization or firm to self-evaluate if its present set of capabilities (status) has the ability-potential to address the upcoming challenges (Diss, 2012).

Another inherent ability that follows up tackles the issue of continuous “learning” which is equivalent to obtaining the necessary knowledge; integrate the latter to the existing and then disseminating through the proper channels (Verona and Ravasi, 2003; Helfat et al, 2007). The next step as depicted in Graph 3 deals with the issue of creating the new capabilities that are required in order to reach the respective goal each time (Diss, 2012). Consequently, the next step focuses on performing the necessary new adjustments and “re-alignments” of the new capabilities with the existing ones.<sup>15</sup> The last part of this mechanism tackles the critical components of new capabilities, innovation and organization and last but definitely not least the firm/organization performance. A phase that is necessary for every institution focuses on the point where a final comprehensive evaluation of the new capabilities takes place in order to determine if the desired standards and outcomes have been accomplished.<sup>16</sup> The DCs mechanism depicted in Graph 3 provides the two final outcomes, firstly innovation in terms of organizational structure

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<sup>13</sup> Ibid.,21.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

and utilization of technological assets and improved performance, which in this case translates to advanced enhancement of maritime security (new maritime oriented services and products) (Nikitakos and Nellas, 2015).

In summary, it is important to understand the significance of the seven DCs dimensions discussed above and especially the fact that primarily all of them are inherent features, present at all times providing each respective organization or firm the ability to address rising challenges in 'rapid' or 'moderate' changing environments (Teece et al, 1997; Barreto, 2010).

## **2.4 Conclusions**

Innovation is a critical component of maritime organizations that will eventually allow them to survive in turbulent security environments by offering innovative "out of the box" solutions through the delivery of new services and products. In the previous chapters we proved the significance of DCs in "rapidly changing environments". In Chapter III we will present the complexities of the modern maritime security arena and argue about the similarities and analogies of modern maritime environments to "business rapidly changing environments".

In Chapter II, we discussed about the significance of innovation through a respective overview of the literature and presented the need for maritime organizations and relevant firms delegated to tackle modern maritime challenges and threats to adopt policies and strategies that include innovative features.

In summary, Graph 3 depicted in this chapter provides a conceptual DCs mechanism, however more research is required in the fields of understanding the internal relations between the above seven distinct dimensions (Diss, 2012, p. 58). Also, a consequent academic challenge would involve the following in terms of

accurately adjusting and re-aligning potential shortcomings of the latter mechanism in the context of maritime security:

- *Establishment of Impact Metrics*
- *Evaluation of efficacy of the above discussed mechanism*

A future research study of the above two factors would contribute significantly to the implementation of DCs mechanisms that have actually been evaluated and re-aligned under the context of actually addressing modern maritime security threats.



## **CHAPTER III CONTEMPORARY MARITIME SECURITY THREATS AND CHALLENGES**

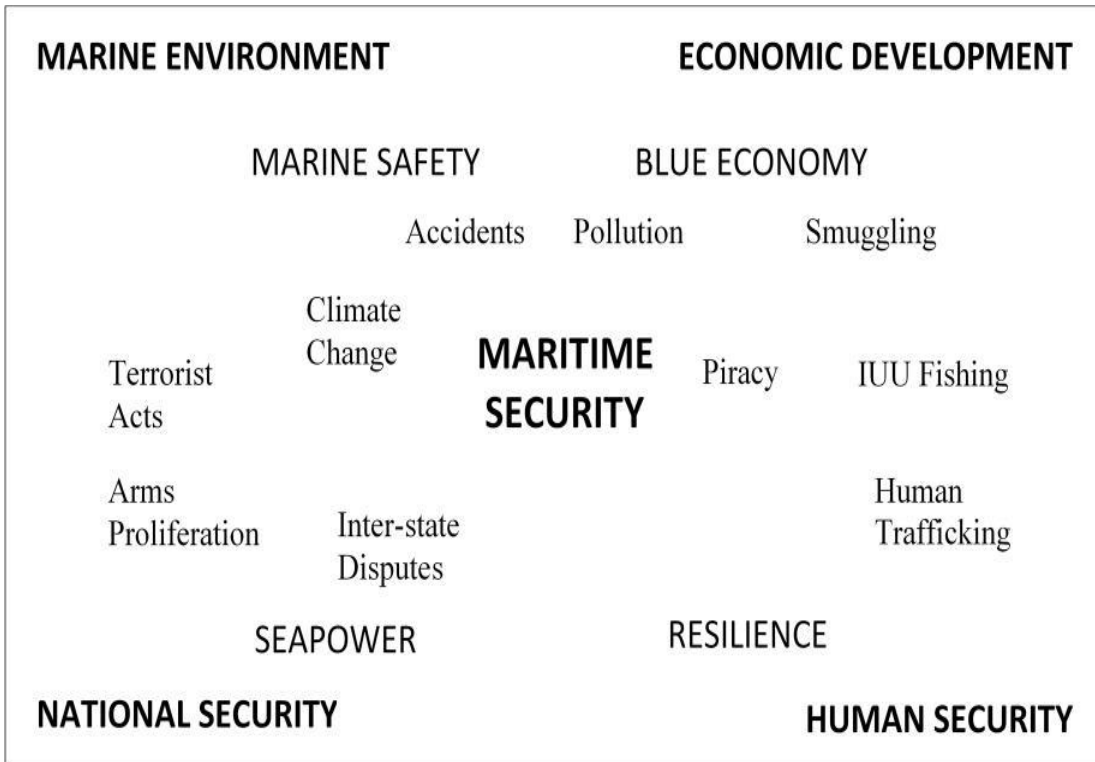
# CONTEMPORARY MARITIME SECURITY THREATS AND CHALLENGES

## 3.1 Introduction

Mankind in the 21<sup>st</sup> century encounters many security issues. The maritime domain obviously constitutes an arena for a high number of international actors and private entities that conduct international businesses. Rapid technological developments in conjunction with political instability in many coastal areas globally constitute the maritime domain as a catalytic factor to take into account. In addition, the augmented needs for energy in a planet where 70% is covered by water and production of recent geological data clearly demonstrate that sea basins possess significant deposits of natural gas and oil, ultimately highlight's even more the role of the maritime domain, i.e., as in the Eastern Mediterranean and the North Sea (Gürel et al, 2003).

Another phenomenon of our century that complicates the present situation deals with the issue of climate change. The byproducts of the latter phenomenon unfortunately have a negative impact on a wide array of environmental and security issues and many consider that the ice melting in the Arctic is the most important one, with severe consequences that would affect the whole planet permanently.

The main challenges that threaten maritime security are depicted below in a conceptual approach:



**Graph 4 Maritime Security (Shemella, 2010; Bueger, 2015)**

Despite the high number of security issues related to the maritime domain, in this chapter the focus will be on the following contemporary security challenges (Weitz, 2017):

- **Eastern Mediterranean Security Challenges**
- **South China Sea**
- **Modern Maritime Piracy**
- **Immigration and Human Trafficking**
- **Arctic Sea**
- **Port Security**

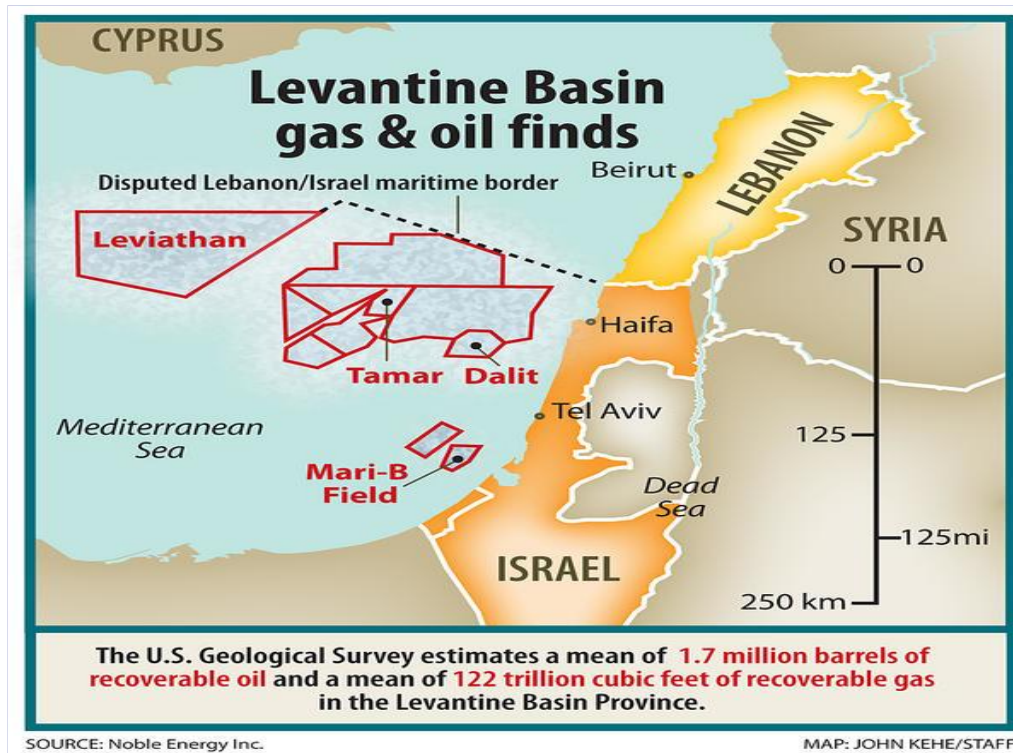
The overall scope of the analysis of this chapter will be the demonstration of the “rapidly changing environments” which strengthens the argument that DCs are a useful/potential tool to address modern maritime threats (Teece et al, 1997).

### **3.2 Eastern Mediterranean Security Challenges**

Energy is fundamental for regional development, quite frequently states and entities dispute over who will benefit the profits from the available energy resources. The Eastern Mediterranean is rich in energy resources i.e gas and oil. The total width of the maritime domain is less than 400 nm, consequently a need for the delimitation of the respective continental shelf and Economic Exclusive Zone (EEZ) for each Mediterranean state is generated. It has been known over the last decades that the wider maritime domain of Eastern Mediterranean is rich in terms of hydrocarbon resources. However, the depth of the sea in the area is more than 2,000m. Technological developments now permit the exploration of the seas in great depths in search of alternative resources. Over the last decades additional reserves have been discovered in the Eastern Mediterranean Sea.

Large reserves of natural gas have been discovered south of Cyprus, such as the Leviathan block and others that followed. Noble Energy, Derek Drilling, Aver Oil and Ratio Oil consisted the consortium that discovered the latter reserve. It was announced later on that in south of Cyprus, a large reserve was discovered, with an approximate magnitude of size from 5 to 8 tcf.

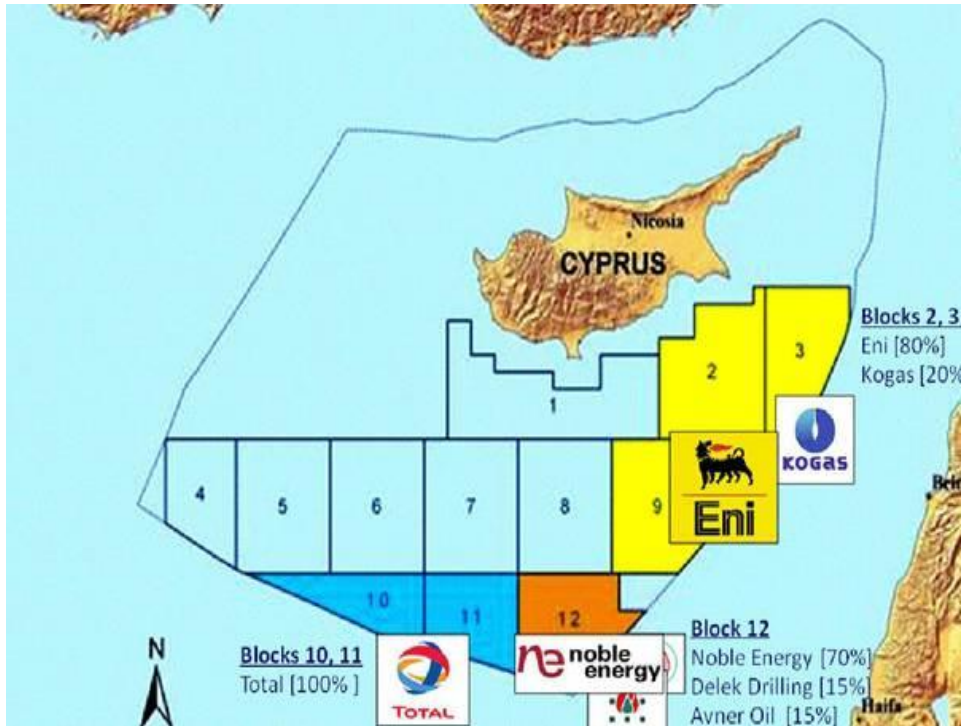




**Graph 5 Levantine Basin gas and oil fields<sup>17</sup>**

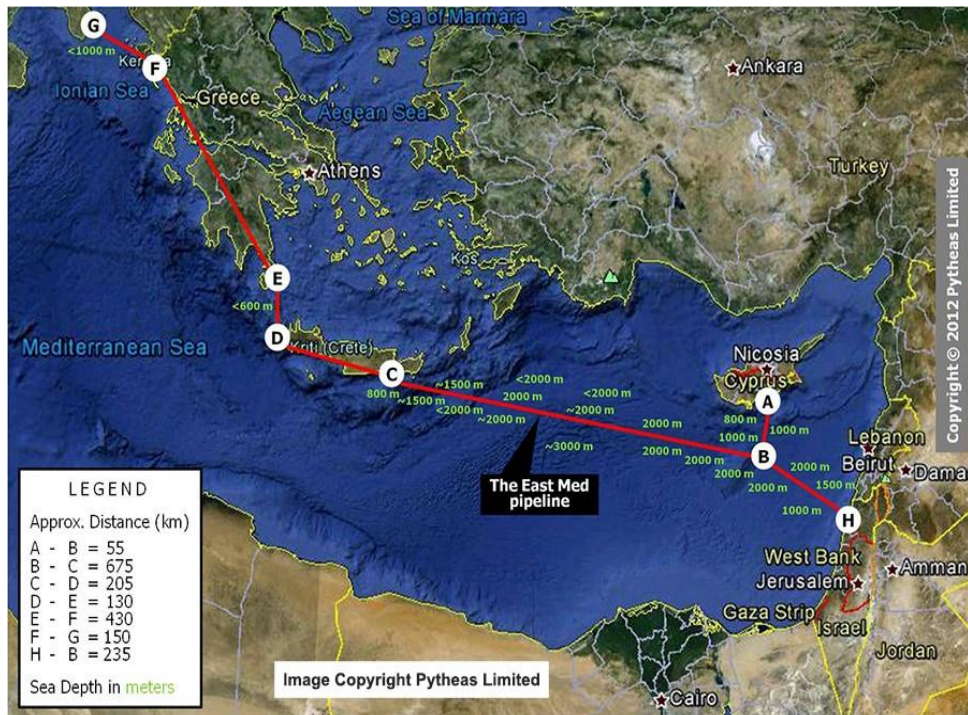
The declared total area covers approximately 70,000 square kilometers. Upon a successful completion of the relevant research and drilling process, a potential option for regional states can involve the shipment to Crete via tankers and then to the rest of Europe. An alternative plan recommends the building of a sub sea pipeline from Israel to Cyprus and then to Greece as depicted in Graph 7.

<sup>17</sup> Andrew Hess, Power Point presentation for “Energy Security on the Mediterranean Frontier of Eurasia”, *Central Asia and Caucasus*, The Fletcher School, Tufts University, April 2017.



**Graph 6 Blocks in the East Mediterranean (Hess, 2017)**

In addition, there is strong evidence of more energy reserves in the wider area east of Cyprus and consequently coastal states are incentivized even more to pursue a solution that allows the distribution of natural gas to European states.



**Graph 7 East – West Mediterranean sub sea pipeline (Hess, 2017)**

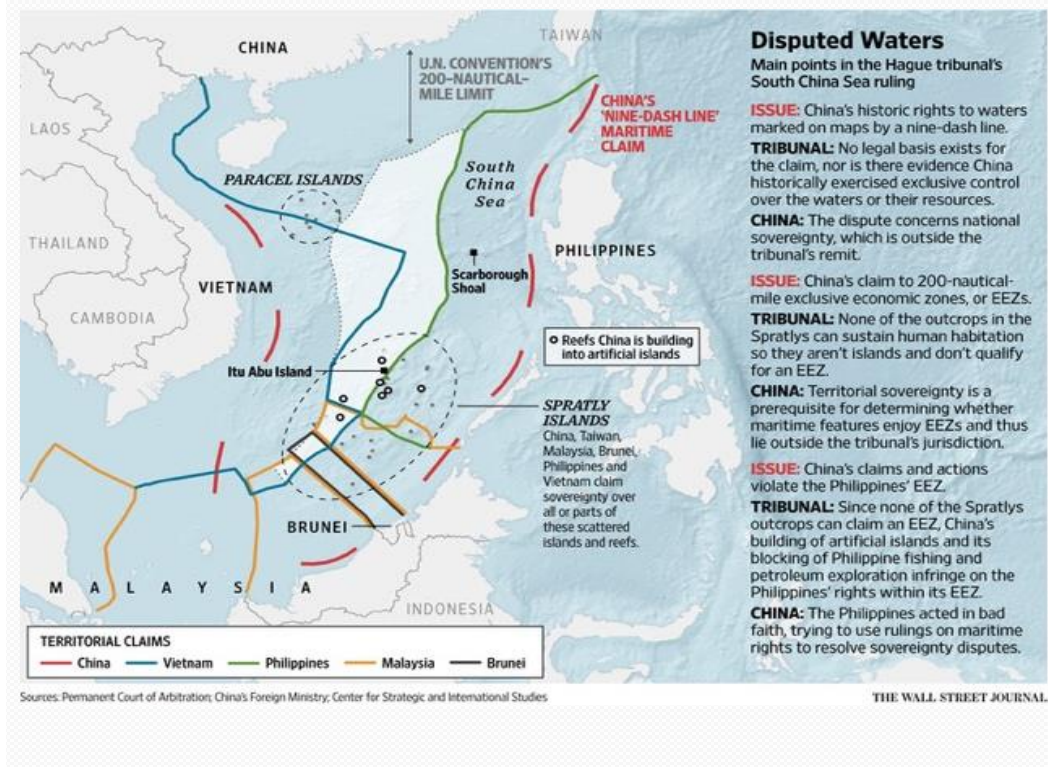
Europe is a great energy consumer; thus, the issue of energy resources ranks high in the security agenda. Currently, Europe highly depends on Russia for gas, however political relations in Eurasia in many instances are rather fragile. The Eastern Mediterranean could be an alternative energy provider for Europe, however considering the complexities in the area entails that certain steps are required from all stakeholders. Regional states should work towards a viable solution in the wider area, that would establish the necessary preconditions for energy companies to invest in the maritime domain of East Mediterranean and in the future adopt solutions that involve the shipment via LNG or through the building of subsea pipe line. As it has been previously stated, the Mediterranean Sea is a rather political fragile area that generates a significant number of maritime threats in terms of shipping and pipeline security. Organizations and agencies which will be delegated to secure international trade of oil and gas in the Mediterranean Sea, will also have to “*learn*” to operate in “*rapid changing environments*” in an innovative manner.

### **3.3 South China Sea**

The issue of the South China Sea has been a hot issue for decades. This geographic region is dominated by a great number of actors, protagonists or other smaller players as listed below:

- China (PRC)
- US
- Japan
- Philippines
- Vietnam
- Malaysia
- Indonesia
- Taiwan

All of the above share great interests in the wider area. In the recent past, the US as the predominant military power contained the aspirations of many countries. However, in the last decade, China has significantly increased its military capabilities. By contrast, the US has decreased its military budget expenditures over time (Mearsheimer, 2010).



Graph 8 Disputed Waters in South China Sea (Burgess, 201)

### The Stakes in the South China Sea

South China Sea is a maritime field of tension for many actors, so it is critical to understand the elements that make it so important. The large, recently discovered deposits of energy resources, “7 billion barrels of oil, 9 trillion cubic feet of natural gas”, incentivize all regional actors to claim rights and especially China, which has a great need for energy in order to support its developing economy (Dutton, 2011).

Another rising issue in the South China Sea originates from the wealth of fishing stock, that is why there are many fishing fleets operating in the wider area on a daily basis and the risks of unpleasant naval incidents and accidents have increased significantly (Dutton, 2011).<sup>18 19</sup> Also, it is important to keep in mind that in

<sup>18</sup> The fishing stock of South China Sea counts for the 10% of the global fishing stock.

<sup>19</sup> Ibid.,61

many cases fishing fleets are being utilized by states to promote respective national interests.<sup>20</sup>

Last but not least, South China Sea is an area of high maritime merchant vessel density where more than half of the world's shipping tonnage transits, exceeding in traffic the canals of Suez and Panama in traffic (Noer, 1996). In South China Sea, a high number of actors and interests interact and overlap respectively, especially in times where political context and condition in many countries are extremely fragile and support protectionist policies.



**Graph 9 One Belt One Road With the Silk road Initiative, China Aims to Build a Global Infrastructure Network (Hess, 2017)**

China inaugurated its first transnational pipeline in 2006 when it received oil drilled in Kazakhstan Kazak and Russia. This is a joint venture energy line financed by China that transports oil from western and central Kazakhstan to China. It is networked to pick up oil from the Caspian Sea via Xinjiang practically constituing Russia as the gas station for China. Another example of the energy networking is the

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<sup>20</sup> Ibid.,53-54.

import pipeline with a capacity of 444,000 bbl/d that carries oil Burma (Myanmar) to the back door of China without passing through the Strait of Malacca.

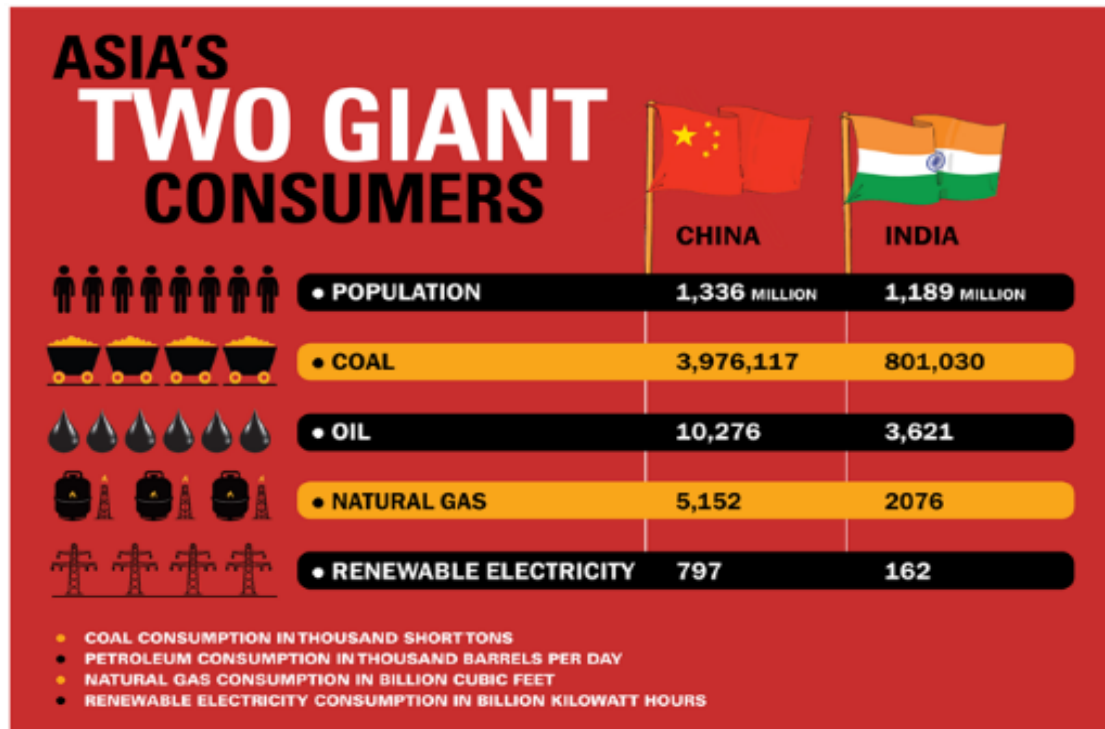


**Graph 10 Securing the Oil Supply Chain (Hess, 2017)**

Japan and South Korea, compete with China in the global markets for energy. China also uses Japanese refineries to process crude oil cargoes for Chinese consumption. All three of these states do not want political and economic instability. The most important external threat might emerge comes from shore disputes over naval passageways, and islands whose possession is claimed by China or other regional actors. India could cause some security problems in Himalayan regions, but again China and India are engaged in large scale research projects for energy in Eurasia and therefore India would probably not challenge China on land. It may be a different story in the maritime arena. India is currently building up a blue water naval establishment to serve its strategic interests in the Indian Ocean region. This maritime domain is currently dominated by the US and its ally Australia.

A potential threat to US interests in the region might appear if India and Russian attempt in the Indian Ocean to administer the huge maritime trade in

petroleum products that passes through the Strait of Malacca. Some scholars see an Indian Ocean maritime empire in the future based upon on a joint Russian Indian dominance running from east African coastal area s to the east coast of China.



(SOURCE: US ENERGY INFORMATION ADMINISTRATION, 2012)

Graph 11 Asia's Two Giant Consumers (Hess, 2017)

### 3.4 Modern Maritime Piracy

The issue of maritime piracy is a phenomenon that has ancient roots and has been a security issue ever since. A modern definition of maritime piracy according to UNCLOS is the following:<sup>21</sup>

*“(a) Any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship of a private aircraft, and directed:*

*(i) on the high seas, against another ship or aircraft, or against persons or property on board of such ship or aircraft;*

<sup>21</sup> Article 101, United Nations Convention on the Law of the Sea (UNCLOS), Dec 10, 1982.



*(ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;*

*(b) Any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;*

*(c) Any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b)."*

However, in this point it's important to state that in terms of modern maritime piracy the distinction between piracy and armed robbery is not taken into account. An interesting feature of maritime piracy is the fact that although it is a global phenomenon, it has been contained in less than 10 countries "Malaysia, Yemen, Indonesia, Nigeria, Oman, Somalia and Bangladesh" (Dugato and Berlusconi, 2015, pp. 4-5). Further more, it's important to underline the fact that large sea domains, such as those around Oceania and the North Atlantic Sea, have not experienced piracy attacks for a significant period of time. Obviously the higher probabilities of potential piracy attacks according to statistics appear in the following seas:

- Malacca Strait and the neighboring Seas
- Gulf of Aden and the Horn of Africa
- Gulf of Guineas (Dugato and Berlusconi, 2015).

The pirates' mode of operations varies in the above-discussed areas. Specifically, in Nigeria and the Horn of Africa there are well-structured international pirate networks, which in many cases focus on hijacking ships and to their consequent request for money in the form of ransom.<sup>22</sup> In all times their goal is to get the money and avoid killing innocent people (Regenlik, 2012).

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<sup>22</sup> Ibid., 8-9.

On the other coast of Africa, many consider Nigerian pirates to be the most aggressive and violent in terms of killing piracy victims (Twyman-Ghoshal and Pierce, 2014). In Southeast Asia piracy attacks mainly consists of attacks on anchored and berthed ships that obviously don't require high organizational levels and international networks (Bateman, 2010).



**Graph 13 Piracy in 2019** <sup>23</sup>

An important element of contemporary maritime piracy tackles the issue of identifying the ships that run the highest risk of being attacked. First of all, the characteristics of a ship hold an important role since high volume ships that can't increase speed are easy targets to potential pirates (Dugato and Berlusconi, 2015). According to existing literature, pirates' preferences over which merchant ships to attack are as follows in order of preference:

*Bulk Carriers*

*Cargo vessels*

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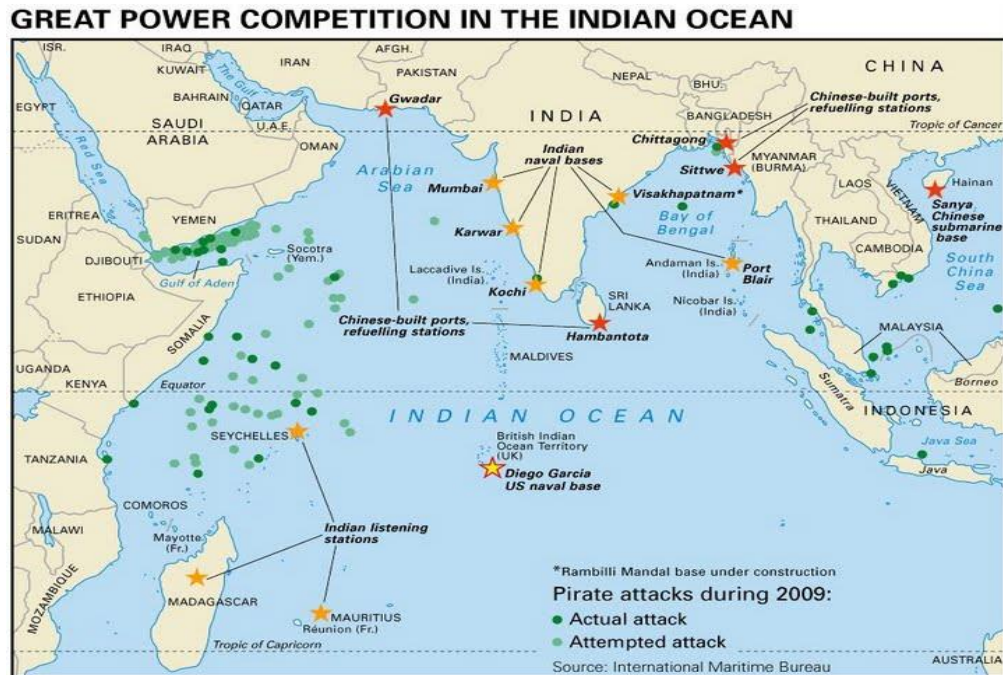
<sup>23</sup> International Chamber of Commerce ,Threat Map 2019, <https://iccwbo.org/media-wall/news-speeches/seas-off-west-africa-worlds-worst-pirate-attacks-imb-reports/>, accessed on May 28,2020

Containerships

Tankers

Chemicals-product tankers

Liquid gas carriers (Mejia et al, 2009).



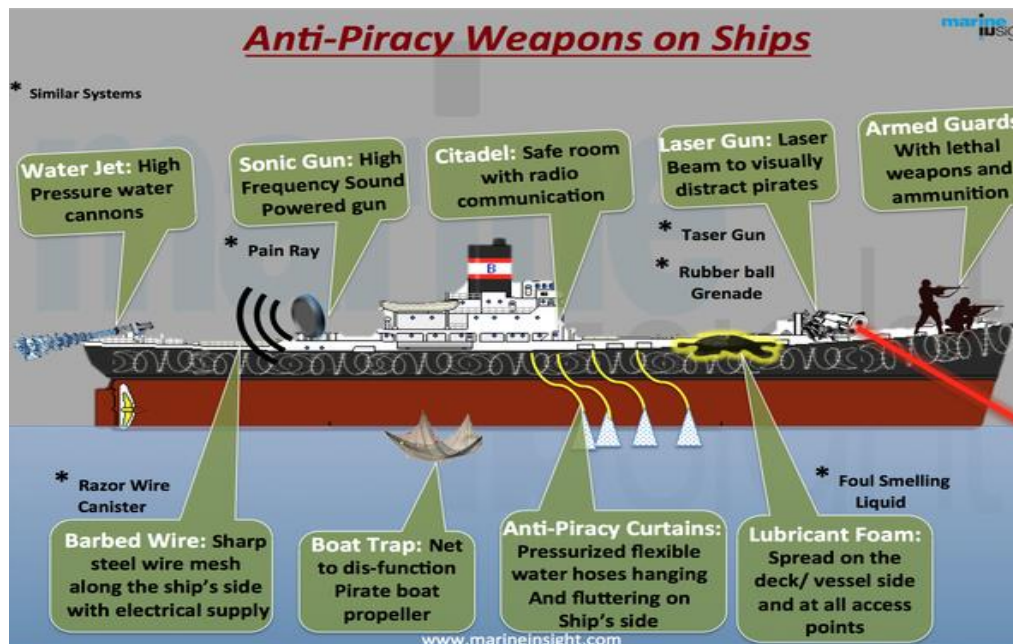
Graph 14 Piracy in Indian Ocean

As discussed previously pirates' operational tactics and strategies vary across the regions, however, there are key features of merchant ships transit activities that increase or decrease their probabilities of being attacked (Bateman, 2010). In brief, the latter features narrow down to the following: transit speed, whether the transit includes any stations, berthing or anchoring and the size and type of ship.<sup>24</sup>

In summary, the issue of piracy entails regional characteristics that respectively increase or decrease the likelihood of piracy incidents. In all instances, however, shipping companies or other respective maritime organizations come

<sup>24</sup> Ibid.

across 'rapidly changing environments' and the need for potential tools, i.e DCs, to address the latter changes becomes imperative.



**Graph 15 Anti-Piracy Weapons on Ships (Hess, 2017)**

### 3.5 Immigration and Human Trafficking

Modern Europe is facing a number of security challenges. Immigration, as a consequence of the Syrian War, has escalated over the last two years and European states are forced to tackle an issue that causes significant domestic and international tensions.

The large volume of illegal immigration to Europe utilizes sea routes and particularly the Mediterranean Sea. The paths modern migrants and smugglers are following present certain features that constitute the latter difficult to monitor by states and enforce order in terms of drastically reducing migrant flows.

Primarily, maritime borders are not like land borders. There is no specific inviolable line, on the contrary, monitoring maritime borders becomes more complicated since maritime traffic becomes more congested with ships transiting

under the status of “innocent passage”.<sup>25</sup> A byproduct of this situation is the complex and collaborative approach required in order to accomplish efficient Maritime Domain Awareness (MDA).



**Graph 16 Migration Flows in the Aegean and Hellenic Coast Guard** <sup>26</sup>

The following definition of MDA will help us conceptualize the difficulties in monitoring a maritime border is stated below (Shemella, 2010):

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<sup>25</sup> Passage according to UNCLOS definition in article 18 means the following: “Passage means navigation through the territorial sea for the purpose of:  
of:

- (a) Traversing that sea without entering internal waters or calling at a roadstead or port facility outside internal waters; or
- (b) Proceeding to or from internal waters or a call at such roadstead or port facility.

2. Passage shall be continuous and expeditious. However, passage includes stopping and anchoring, but only in so far as the same are incidental to ordinary navigation or are rendered necessary by force majeure or distress or for the purpose of rendering assistance to persons, ships or aircraft in danger or distress.”

<sup>26</sup> Photograph from Kathimerini daily news paper,  
[http://s.kathimerini.gr/resources/2015-09/gr1522873\\_22810926-thumb-large.jpg](http://s.kathimerini.gr/resources/2015-09/gr1522873_22810926-thumb-large.jpg),  
accessed on line March 01 2017.

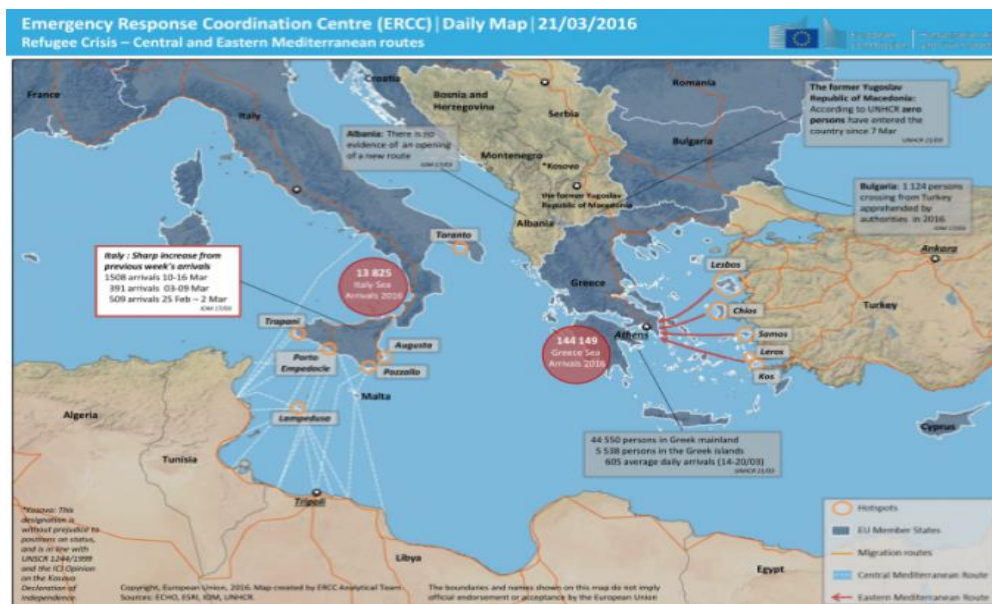
**“Maritime Domain Awareness” (MDA)** *is the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment*”. In addition to the above arguments, we should keep in mind that the Mediterranean Sea is a crossroad of trade and culture. The high-density merchant ship traffic is justified by the proximity of:

- Suez Canal
- Bosporus Sea
- Adriatic Sea
- West Mediterranean Sea (Gibraltar Straits)

Another factor that affects the efficient patrolling of the above waters lies on the fact that seas like the Aegean are full of islands, islets, rocks. Smugglers take advantage of the regional geographical characteristics, and consequently the task of coast guards and respective police forces becomes increasingly difficult (Castles, 2004). The latter argument focuses on addressing counterarguments by people not familiar with the maritime domain, that experience difficulties in understanding how smugglers manage to carry refugees to continental Europe via the South Mediterranean.<sup>27</sup>

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<sup>27</sup> Ibid., 863.



**Graph 17 Migration Flows in the Eastern Mediterranean (Weitz, 2017)**

Maritime organizations i.e coast guards and navies that are delegated to counter this phenomenon experience on a tactical and operational level “rapidly changing environments” (Teece et al, 1997, p. 516). DCs might be a potential tool through the development of a properly oriented mechanism towards maritime threats.

### 3.6 Arctic Sea

The drastic reduction of ice in the Arctic has increased significantly the magnitude of human activities in the latter continent. During the past decades the focus of human activities was mainly scientific, related to climate change and meteorological issues. However, the security agenda has altered over the recent years since new security factors have to be taken into account i.e delimitation of the continental shelves for the five coastal states (O’ Rourke, 2011):

- The United States
- Canada
- Denmark (Greenland)

- The Russian Federation
- Norway

The above states have submitted or preparing their submissions concerning their “outer continental shelves” boundaries (O’ Rourke, 2011). Another consequence of the ice melting deals with commercial shipping issues, since new navigational routes are being developed and shaped. The new Arctic routes stated below in addition generate the need for regulatory maritime frameworks to be developed: <sup>28</sup>

- Northern Sea route
- Northwestern Passage



**Graph 18 New Arctic Routes <sup>29</sup>**

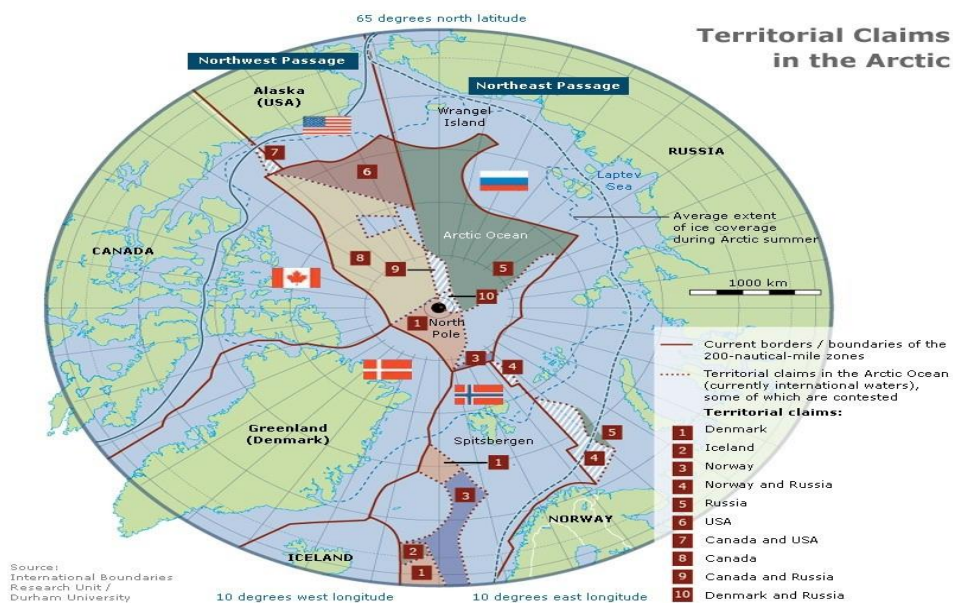
One of the reasons that incentivize Arctic states to pursue their rights deals with the fact that the latter region is rich in natural resources such as natural gas and oil. Exploration surveys will most likely take place in the near future, and this is one of the reasons that the issue of delimitation of the continental shelves becomes

<sup>28</sup> Ibid.,55.

<sup>29</sup> Graphic by Stephen Rountree at *U.S. News and World Report*, <http://www.usnews.com/articles/news/world/2008/10/09/global-warming-triggers-an-international-race-for-the-artic/photos/#1>, accessed on March 11, 2017.



crucial (O' Rourke, 2011). Many would expect that the Arctic would evolve rapidly to an area of high contention between the Arctic states; however, this is not the case since the present level of cooperation is more than hopeful and necessary for a definite solution on the unresolved Arctic issues (Dalaklis et al, 2018). The situation in Arctic as described above complicates the maritime environment for shipping companies that support global shipping. Furthermore, the tension between the US and Russia establishes a “rapid changing environment” for all involved actors.

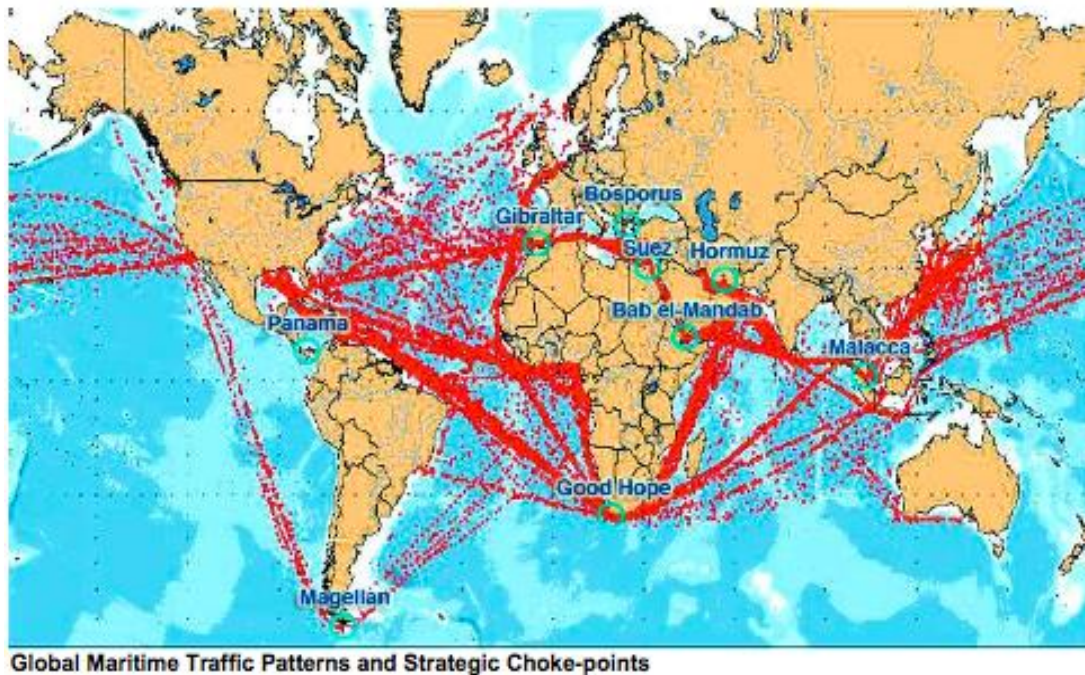


**Graph 19 Arctic Territorial Claims (Burgess, 2017)**

### 3.7 Port Security

The vast majority of international cargo, more than 90%, is carried globally via ships. From an economic point of view, international trade is a critical factor in the financial development and growth of each country. Mankind witnessed in the near past, terrorist attacks in the maritime domain i.e USS COLE triggered a series of security concerns. Unfortunately the 21th century after the 09/11 attack has irreversibly negatively impacted the security domain. The maritime domain by

definition constitutes an environment where potential terrorists and criminals can conduct terrorist attacks and activities respectively.



**Graph 20 Global Maritime Choke Points (Weitz, 2017)**

Graph 20 offers a representative visual depiction of the contemporary maritime complexities in terms of density and proximity to geographical areas that face significant security challenges i.e:

- Piracy in east and West Africa
- Migration flows in Eastern Mediterranean and North Europe.

Although there is extensive literature over the above two issues, many researchers seem to neglect the fact that these ships berth or anchor in ports before their trip begins and one of the critical factors to promote security in the maritime domain relates to the fundamental issue of port security.

One of the concerns that was raised inevitably tackled the issue of port security. A critical component in the international trade business will focus in port operations. The complexity and the volume of contemporary port operations

mandated the need for new frameworks and concepts to be implemented. IMO as response to these challenges, established in 2004 ISPS (International Ship and Port Facility Security) code. The ultimate goal of this initiative was to enhance maritime security in an era where there are high risks of port security violations, in the long run the latter initiative forced flag states to pursue more in terms of respective standardization processes. Port security inevitably acquired a new dimension and evolved to a project that requires the interplay of many actors. A business oriented perspective would link the modern maritime security environment to a business “rapid changing environment” as previously analyzed (Barreto, 2010, p. 271).



**Graph 21 Port Security Facilities (Weitz, 2017)**

### **3.8 Conclusions**

Our globalized world is experiencing political and security challenges that mankind has never come across before. The contemporary technological developments, such as cybercrime and social media in many instances further complicate already difficult issues. The maritime domain is indisputably a field where

international actors or private entities are obliged to adopt different operational routines and DCs in order to address constant evolving challenges.

In this chapter we discussed about maritime challenges that have a significant impact on global maritime security and significantly affect international governmental actors or respective private entities i.e shipping companies. The business literature clearly emphasizes on the benefits of DCs as an entrepreneurial concept with many applications. Epigrammatically, the purpose of this chapter was to demonstrate the “dynamic nature” of modern maritime challenges and provide a nexus between maritime security and DCs. A complementary approach will adopt the argument that the “dynamic nature” is a ‘rapid changing environment’ where the involved actors should consider the notion of DCs as tool to enhance their performance (Teece et al, 1997, p. 516).

Last, in this point it is rather insightful to conceptualize the usefulness of DCs in tackling modern maritime threats by providing a connection between DCs and maritime security by stating an alternative definition that exists in the literature:

*“A dynamic capability is the firm’s (a **maritime organization’s**) potential to systematically solve problems, formed by its propensity to sense opportunities and (**contemporary maritime**) threats, to make timely and market-oriented decisions, and to change its resource base”* (Barreto, 2010, p. 271).



**PART II  
(CHAPTERS IV-V VI)**



**CHAPTER IV  
DYNAMIC CAPABILITIES, INNOVATION  
AND MARITIME SECURITY  
METHODOLOGY AND  
RESEARCH FRAMEWORK**

## **4.1 Introduction**

This chapter aims to present the research methodology. Following the formulation of the research cases and the proposal of the new theoretical model, the process of designing the research and carrying out the steps of the research process follows.

Given the research needs and constraints, it was decided to conduct the survey among experts and non experts in Greece and abroad. A fully structured questionnaire was used as a basic research tool and distributed in Greece and abroad. Finally, 130 fully completed and exploitable questionnaires were collected.

Research goals and research cases have been formulated and identified, empirical research was designed on the basis of the following key steps<sup>30</sup> and specifically selecting the appropriate method of collecting data, identifying the appropriate designing of a questionnaire, collecting data, data processing, drawing conclusions and summarizing results.

## **4.2 Determination of method of data collection, sampling method and sample size determination**

The choice of the most appropriate method for collecting data was based on specific criteria, which would both enable the fulfillment of the research objectives and facilitate the practice of the research process. Also, the choice of the data collection method was made in relation to sample selection, with the ultimate goal of approaching the responders appropriately and in the appropriate space and time and thus ensuring satisfactory response rates. Among the options for a personal interview, telephone interview, postal mailing, and self-administered completion, the latter was selected.

In particular, given the need to collect a quantitatively sufficient sample, the method of personal interview was rejected because of its high time and cost. Subsequently, the feasibility of adopting the postal questionnaire method was rejected, which rejected due to the difficulty of accessing databases as well as the low response rates presented by the method. Finally, the telephone interview was judged inappropriate due to the extent of the questionnaire and its consequent length of time, as well as the difficulty in accessing databases.

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<sup>30</sup> McCormack and Hill (1997)

In conclusion, it was considered that the self-guided completion method had the most advantages and disadvantages compared to the others. Its main advantage was that it did not require the continued presence of a researcher, which is particularly important in terms of cost, especially if the research was designed to draw its sample from different parts of the world. In this case it would be difficult to complete the research in a relatively short period of time. Two additional key advantages of the self-guided method of completion are that the respondent is not influenced by the direct or indirect guidance of the researcher and that he / she permits the person to respond to his or her own pace (Stathakopoulos, 2001). Of course, this method is disadvantageous since there is no possibility of explanations and clarifications, which makes it necessary both the pilot test of the questionnaire and the existence of clear and objective instructions that will direct the respondents to the purpose and the way of completing.

As regards the timing of the distribution and completion of the questionnaire, it was considered appropriate for the respondents to respond at their own convenience. This option served both for easy and discreet localization of responders and for ensuring their availability they are more likely to be willing to spend time filling in a questionnaire than at any other time of their available time.

In the four thematic units, the exact content and type of each question was decided, and then the exact order of the questions was determined. In particular, the first strand ("Your relationship to the issues of maritime security") concerned the existing relationship of participant with the issues of maritime security. Thus, the participants were asked to answer a series of questions about maritime security, such as the level of familiarity with maritime security, what does the term maritime security entails, the number of experts in maritime security they know.

The second part of the survey ("The relationship between innovation and maritime security") concerned its evaluation by the respondents. The evaluation was carried out using various parameters of the innovation and the nexus to maritime security (level of innovation in modern maritime organizations, foundation of new institutions related to innovation, overall impression of the responders).

The third part of the survey ("Maritime security and Dynamic Capabilities") focused on evaluating a proposed Dynamic capabilities mechanism that originates from the existing business literature. The latter proposed Dynamic Capabilities mechanism has been modified accordingly in order to describe the contemporary



maritime environment.

Finally, the fourth strand ("Basic Demographic Characteristics") attempted to obtain information on the socio-demographic characteristics of visitors such as gender, nationality (for English questionnaires), age category, level of education, income category, type of employment.

After finalizing the structure, content and order of questions, which was decided on the basis of the principle of rational continuity, it was necessary to determine the type of each question. Decisions on type of questions were among the most important questions in the questionnaire as they had to be chosen in a way to meet information needs and to facilitate the use of specific statistical methods for processing responses.

As a general principle, it was considered appropriate to use almost exclusively closed-ended questions as they facilitate both the process of completing the questionnaire and the process of coding and analyzing data. Also, in order to ensure the validity of the questionnaire content, pre-existing scales were used for the majority of variables. Altogether, 18 reconsideration questions and suggestions were used and multi-item measurement was performed in most cases to determine the key variables of the theoretical model.

In the first, second and the third part of the questionnaire, differential questions and seven-point Likert scales and significant differential were used. Respondents were asked to identify and prioritize basic concepts. All third-party questions were of the Likert seven-step scale type.

It is noted that important differential scale questions and Likert, which require the respondent to choose the point representing his opinion between two bipolar words / expressions, are widely used in surveys using SEM analysis. Finally, the categorical and dichotomous variables were used in the questions of the fourth part, which studied the socio-demographic characteristics of the respondents. In the questionnaires addressed to foreigners, there was an additional open-ended question of completing if they are Greeks or not.

A promise of confidentiality was given to the responses and the results of the survey. The latter was considered a particularly important incentive for all the participants to fill out the questionnaire. Based on their initial estimates, the questionnaires were sent in hard copy. Altogether, 145 questionnaires were available in Greek and English. Together with the questionnaires accompanying information

was provided, informing the responsible persons in detail about the research framework and expressing thanks for their crucial contribution. The time horizon of completion of the survey was extended to August 2019.

To improve the response rate, phone reminders were made to a number of participants: one in the average of the duration of the survey and a few days before the expiry of the deadline for the questionnaire collection. The collection of completed questionnaires was completed at the end of August 2019, with the final harvesting of 130 questionnaires.

## 4.3 Results Analysis

### Research variables

The contemporary research consists of the following research variables ( $M_i$ ), as depicted in the table below:

**Table 1** Research Variables

$M_i$	Description	Questions
M <sub>1</sub>	Understanding of the term maritime security	A1
M <sub>2</sub>	Perception of the term maritime security	A2
M <sub>3</sub>	Knowledge of maritime security experts	A3
M <sub>4</sub>	Complex Variable Innovation and Maritime Security	B(1-10)
M <sub>5</sub>	Complex Variable Dynamic Capabilities and Maritime Security	Γ (1-3)

### Reliability

Reliability was evaluated via the implementation of various methods and mainly with *Cronbach Alpha* that is widely used (Nova, Kaltsouni 2006). An arithmetic value that approaches 0.7 was calculated (although the literature argues that 0.6 is acceptable) (Loukaidis, 2011, Cohen et al. 2008). The discussed analysis was executed via the command *Reliability Analysis* of SPSS software<sup>31,32</sup>. The overall questionnaire reliability was (~0.7).

**Table 2** Questionnaire Analysis Reliability

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.639	.656	15

<sup>31</sup> SPSS: Analyze→Scale→Reliability analysis→Statistics→Scale if item deleted.

<sup>32</sup> Multiple choice questions were excluded ( demographic data).

## Demographic Profile of respondents

In this research the number of participants was 130 (n=130) in the time frame from 01/03/2018 to 30/08/2019, in total of 145 questionnaires that were distributed. In particular, there is a marginal majority of men (50.8%, 66 men), while women account for 49.2%, (64 women). Concerning the education level, the majority are high school graduates or/and university students (60%, 78 people), college and university graduates are the 30.8% (40 people). On the other hand, college/university students consist the majority of our sample (60%, 78 people) while employees constituted 40% (52 people). Regarding the age distribution of the sample, the majority is between 40 and 65 years old (84,7%, 110 people), with the majority of the latter to concentrate on the upper domain of the age contribution (46-56, 60 people). As for the level of connection between their profession and maritime security, a marginal majority (50.77%, 66 participants) views their profession as relevant to the concept of maritime security.

### 4.3.1 Descriptive Analysis

#### Connection/ Level of Familiarization

The current research concerning the level of connection and familiarization of the participants has concluded to the following <sup>33</sup>:

- *Knowledge of Maritime Security Issues* (Table 3). The majority of the participants state from minimum (36.9%, 48 participants) to average knowledge (35.4%, 46 participants). A relatively low number of participants states good to very good knowledge (18.5%, 24 participants).

**Table 3** Question A1 Results Analysis.

		Frequency (f)	Percentage (%)
		12	9,2
	BARELY	48	36,9
	NOT WELL	46	35,4
	WELL	20	15,4
	VERY WELL	4	3,1
Total		130	100,0

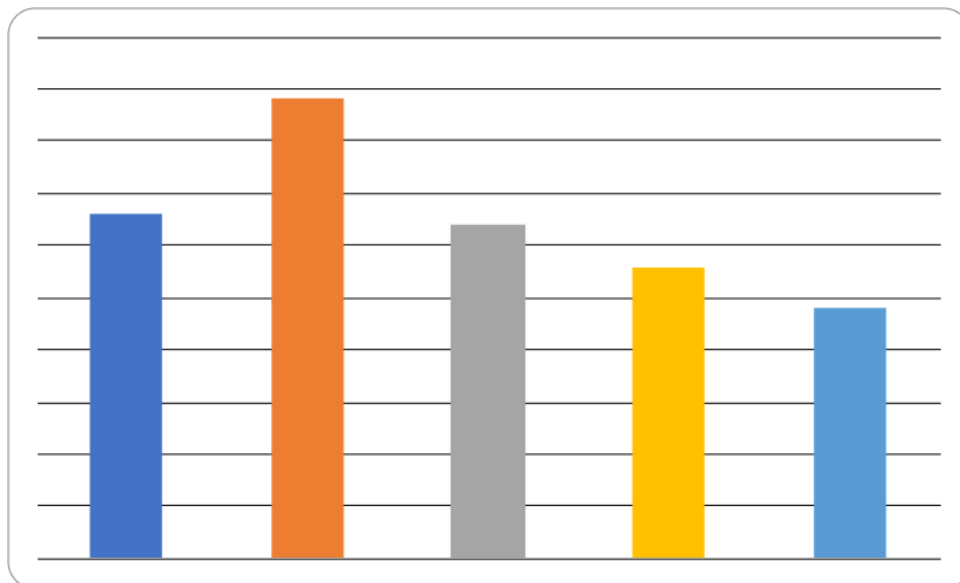
- *Perception of the term maritime security* (Table.4, Graph 22). The majority of the participants selected one option (33.8%, 44 participants) και secondly options 2 & 3 (21.5%, 28 participants). In particular, the tackling of illegal

<sup>33</sup> Analyze → Descriptive Statistics → Frequencies [SPSS]

activities and border protection were the most popular for the participants in terms of maritime security perception.

**Table 4 A2 Question Results Analysis**

		Frequency (f)	Percentage (%)
	ONE CHOICE	44	33,8
	TWO CHOICES	28	21,5
	THREE CHOICES	28	21,5
	FOUR CHOICES	12	9,2
	ALL CHOICES	18	13,8
	Total	130	100,0



**Graph 22** Graphic Representation of Question A2 results

- *Knowledge of maritime security experts* (Table 5). The majority of the participants knows 1-4 experts (44.6%, 58 participants), and as a follow up those that know from 5 - 9 experts and those that don't know anyone account equally for 23.1% (30 participants).

**Table 5** Question A3 Analysis Results.

		Frequency (f)	Percentage (%)
	AT LEAST 10	12	9,2
	5 TO 9	30	23,1
	1 TO 4	58	44,6
	NONE	30	23,1
	TOTAL	130	100,0

### Views regarding the relevancy between innovation and maritime security

In this entity of the questionnaire that tackles general views regarding the relevancy between innovation and maritime security we have the following results (Table 6)<sup>34</sup>:

**Table 6** Analysis of the Relevancy between Maritime Security and Innovation

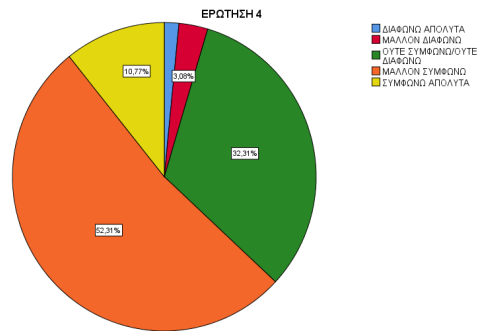
Question	Extremely well	Very well	Somewhat well	Not so well	Not at all well	I don't know/ answer
1st <sup>35</sup> (4) <sup>36</sup>	2 (1,5%)	4 (3,1%)	42 (32,3%)	68 (52,3%)	14 (10,8%)	0
2 <sup>nd</sup> (5)	0	10 (7,7%)	32 (24,6%)	52 (40%)	36 (27,7%)	0
3 <sup>rd</sup> (6)	8 (6,2%)	32 (24,6%)	32 (24,6%)	44 (33,8%)	14 (10,8%)	0
4 <sup>th</sup> (7)	4 (3,1%)	36 (27,7%)	62 (47,7%)	16 (12,3%)	12 (9,2%)	0
5 <sup>th</sup> (8)	4 (3,1%)	6 (4,6%)	10 (7,7%)	54(41,5%)	56 (43,1%)	0
6 <sup>th</sup> (9)	2 (1,5%)	8 (6,2%)	34 (26,2%)	60 (46,2%)	26 (20%)	0
7 <sup>th</sup> (10)	2 (1,5%)	4 (3,1%)	18 (13,8%)	54 (41,5%)	52 (40%)	0
8 <sup>th</sup> (11)	2 (1,5%)	6 (4,6%)	32 (24,6%)	60 (40,6%)	30 (23,1%)	0
9 <sup>th</sup> (12)	4 (3,1%)	8 (6,2%)	50 (38,5%)	42 (32,3%)	24 (18,6%)	2 (1,5%)
10 <sup>th</sup> (13)	34 (26,2%)	58 (44,6%)	16 (12,3%)	18 (13,8%)	4 (3,1%)	0

<sup>34</sup> SPSS: Analyze → Descriptive Statistics → Frequencies

<sup>35</sup> Number of sub-question in complex variable B

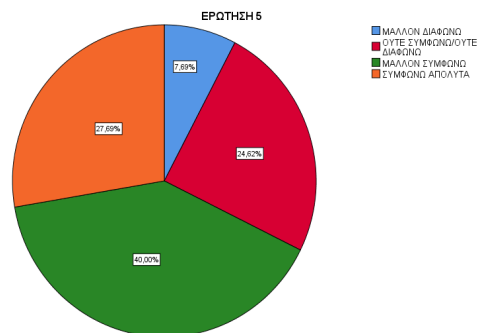
<sup>36</sup> Question number in the questionnaire

- *The concept of innovation is relevant to the concept of maritime security* (Question 1) (Graph 23): The vast majority of the participants supports that there is a conceptual link with Maritime Security (~63%, 82 participants), on the contrary only 4.6% (6 participants) does not agree. In addition, there is a significant percentage that stands equally from the above discussed views (32.3%, 42 participants).



**Graph 23** Graphic Depictions of Question 4

- *Innovation is a significant parameter in the decision-making process in organizations that promote maritime security* (Question 5) (Graph 24): The vast majority supports that innovation is a key factor in the decisionmaking process in organizations that promote maritime security (~68%, 88 participants), only 7.7% (10 participants) think differently. Furthermore, a significant part of the sample support none of the above views (remain neutral) (24.6%, 32 participants).

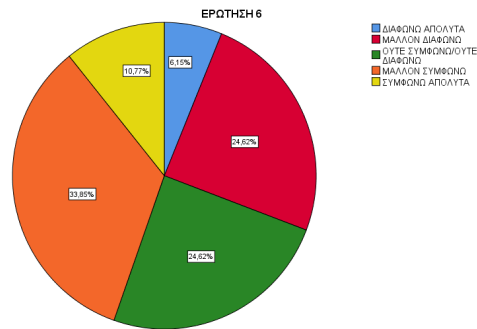


**Graph 24** Graphic Depiction of Question 5

- *The employment of innovation as parameter/feature of a respective leader relates solely to the characteristics of his/her personality.*

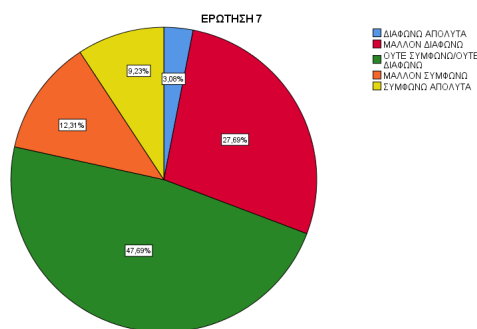
The relative majority of the participants supports that the employment of innovation is directly related to the personality of each leader. (~45%, 58 participants), in addition a significant percentage 30.8% (40 participants) does

not agree with the latter view (Question 6, Graph 25). Finally, a considerable number of participants does not agree or disagree (24.6%, 32 participants).



**Graph 25** Graphic depiction of Question 6

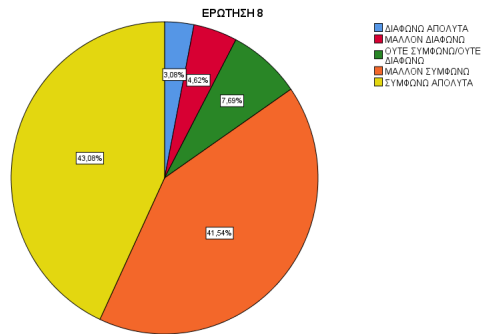
- The contemporary views of our leaders today concerning maritime security issues is directly and strongly linked with the concept of innovation (Question 7) (Graph 26): The vast majority of the participants does not agree or disagree 47.7% (62 participants). A significant percentage does not agree that our leaders today link maritime security with innovation (~31%, 40 participants), while the rest agree 21.5% (28 participants).



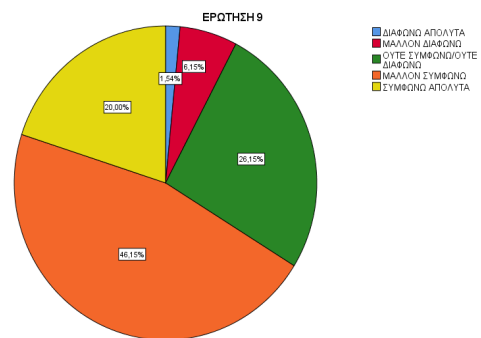
**Graph 26** Graphic Depiction of Question 7

- The foundation of an innovation center or office in institutions that primarily tackle topics directly involved with maritime security. In these insitutions, the answers from the questionnaires predict a positive impact since the vast majority 85.6%, (111 participants) supports the above statement, (Question 8) (Graph 27) and only 7.7 % (10 participants) disagree.



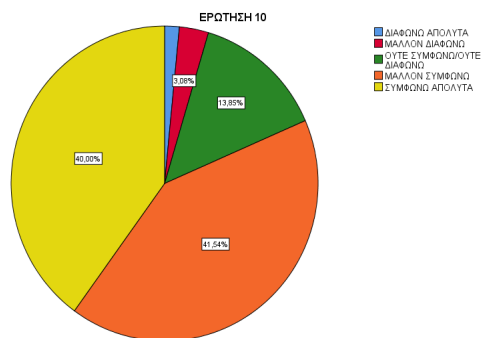


**Graph 27** Graphic Depiction of Question 8



**Graph 28** Graphic Depiction of Question 9

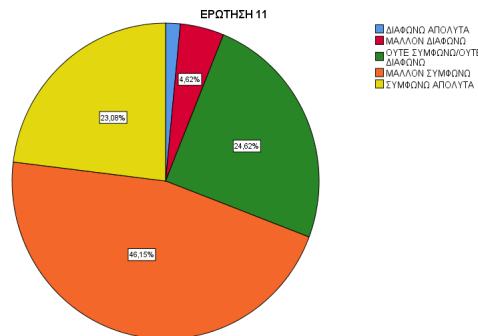
- *The foundation of an office/center that tackles maritime security issues in respective organizations will contribute significantly in positive tackling of contemporary maritime security issues* (Question 10) (Graph 29): The vast majority of the participants supports that the latter foundation in organizations that tackle modern maritime security issues (81.5%, 106 participants), on the other hand only 4.6% (6 participants) disagrees. In addition, a relative small part of the sample remains neutral (13.8%, 18 participants).



**Graph 29** Graphic Depictions of Question 10

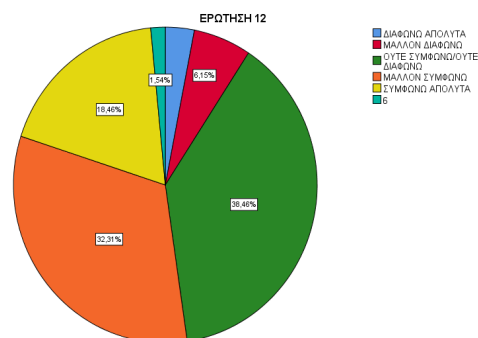
- *The foundation of an office/center will be received positively from the respective maritime community* (Question 11) (Graph 30): The majority of the participants supports that the latter foundation would be received positively from the respective

maritime community (69.3%, 90 participants), only 6.1% (8 participants) disagree. And last almost 25% (32 participants) remain neutral.



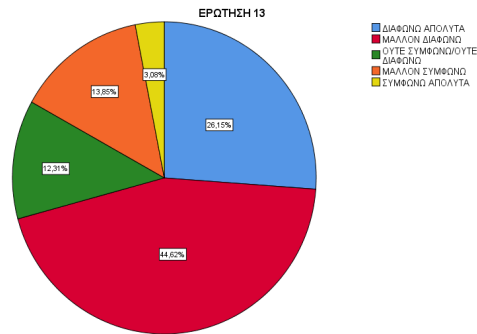
**Graph 30** Graphic Depiction of Question 11

- *The contemporary complicated maritime security status will lead de facto to the adoption of policies /strategies and solutions that entail elements of innovation* (Question 12) (Graph 31): A marginal majority supports that the contemporary maritime security status will de facto lead to the adoption of *adoption of policies /strategies and solutions that entail elements of innovation* (50.5%, 66 participants), on the other hand only 9.3% (12 participants) disagrees. And last, a significant portion of the participants remains neutral (38.5%, 50 participants).



**Graph 31** Graphic Depiction of Question 12

- *Is there sufficient media coverage / promotion of maritime security issues from mass media.* (Question 13) (Graph 32): The vast majority of the sample disagrees with this statement (70.8%, 92 participants), on the other hand a relative small portion of the sample agrees (16.9%, 22 participants). Last, the remaining percentage stated their neutrality (12.3%, 16 participants).



**Graph 32** Graphic Depiction of Question 13

In the next table, we can see cummulative the results concerning the relationship between Inovation and Maritime Security, and the key points are highlighted/ stated below:

- The strongest-most popular views are the following:
  - *The foundation-establishement of an office/center in organizations/institutions that tackle maritime security issues with a positive outome holds a point average (p.a. 4.17)*
- The less strong – popular views are the following:
  - *There is sufficient coverage of maritime security issues from mass media holds a point average (p.a. 2.23)*
  - *Does our modern leaders thoughts regarding maritme security issues entail innovation features with a point average of 2.97 (p.o.2,97).*

**Table 7** Statistical Profile of participants (Questions B1 – 10)

Views concernivy maritime security issues	1st View (Q.4)	2nd View (Q.5)	3rd View (Q.6)	4th View (Q.7)	5th View (Q.8)	6th View (Q.9)	7th View (Q.10 )	8th View (Q.11 )	9th View (Q.12 )	10th View (Q.13)
Point Average (p.a.)	3.68	3.88	3.18	2.97	4.17	3.77	4.15	3.85	3.62	2.23

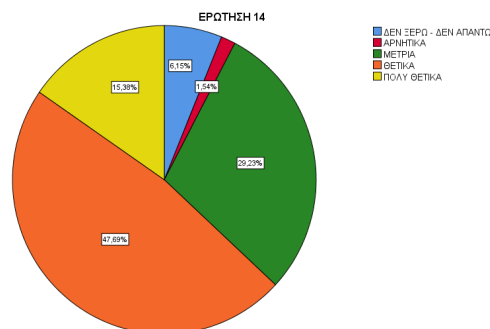
### 4.3.2 Maritime Security and Dynamic Capabilities

In this entity of the questionnaire regarding the opinion/stand of the participants on maritime security in conjunction with Dynamic Capabilities we have concluded to the following results (Table 8)<sup>37</sup>:

**Table 8** Maritime Security in terms of Dynamic Capabilities

Question	Extremely well	Very well	Somewhat well	Not so well	Not at all well	I don't know/ answer
1st <sup>38</sup> (14) <sup>39</sup>	20 (15.4%)	62 (47.7%)	38 (29.2%)	2 (1.5%)	0	8 (6.2%)
2 <sup>nd</sup> (15)	12 (9.2%)	48 (36.9%)	46 (35.4%)	12 (9.2%)	2 (1,5%)	10 (7.7%)
3 <sup>rd</sup> (16)	18 (13.8%)	76 (58.5%)	30 (23.1%)	4 (3.1%)	0	2 (1.5%)

- *Efficiency of adoption /integration of innovative approaches and components in institutions/organizations that tackle modern maritime security issues.* (Question (14)) (Graph 33): The vast majority of the sample evaluates positively the above view (~63%, 82 participants), only 1.5% (2 participants) stand against the above statement. In addition, a respectable part of the participants does not adopt a negative or positive point view (29.2%, 38 participants).



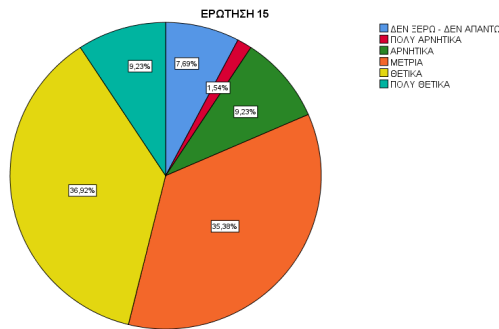
<sup>37</sup> SPSS: Analyze → Descriptive Statistics → Frequencies

<sup>38</sup> Sub-question in complex variable Γ

<sup>39</sup> Number of questions in the questionnaire

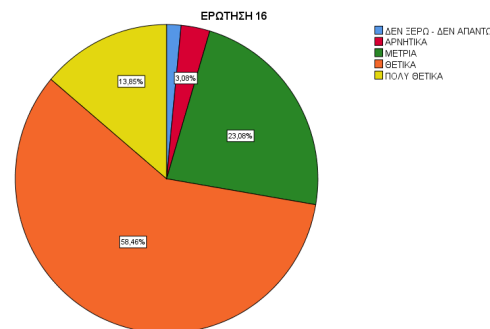
**Graph 33 Graphic Depiction of Question 14**

- *The prospect of adoption from innovation centers/offices of the discussed / depicted Dynamic Capabilities Mechanism (Question 15) (Graph 34):* The relative majority of the participants evaluates positively the above statement (~46%, 60 participants), on the other hand 10.7% (14 participants) evaluates it negatively. Last, a considerable percentage remains neutral (35.4%, 46 participants).



**Graph 34 Graphic Depiction of Question 15**

- *The total evaluation of the discussed Dynamic Capabilities Mechanism (Question 16) (Graph 35):* The vast majority holds a positive evaluation of the overall Dynamic Capabilities Mechanism (~72%, 94 participants), only 3.1% (4 participants) evaluates negatively the overall discussed Dynamic Capabilities mechanism. Last, a considerable percentage holds a neutral view regarding the overall Dynamic Capabilities Mechanism (23.1%, 30 participants).



**Graph 35 Graphic Depiction of Question 16**

In the next table, we can have an overview/evaluation of the relation ship between Dynamic Capabilites and Maritime Security, where starting from the maximum to the minimum we have the following results (Table 9):

- *Total Evaluation of the Dynamic Capabilities Mechanism (p.a.4.78)*
- *Efficiency of integration/adoption of innovative approaches and elements in organizations/institutions that tackle contemporary maritime security issues (p.a.4.58)*
- *The prospect of adoption from innovation centers/offices of the discussed / Dynamic Capabilities Mechanism (p.a.4.20).*

**Table 9** Statistical profile from the evaluation of the relation ship between Dynamic Capabilities and Maritime Security ( Questions B1 – 10)

<b>Views on the relationship between DCs and Maritime Security</b>	<b>Question14 1st statement</b>	<b>Question15 2nd statement</b>	<b>Question16 3rd statement</b>
Point Average (p.a.)	4,58	4,20	4,78

### 4.3.3 Analysis and Factor Correlation

The calculation of the research factors is the following<sup>40</sup> :

- ✓ Factor relationship with maritime security ( $\Pi_{\Sigma\Theta A}$ ):

$$\Pi_{\Sigma\Theta A} = [\sum_{i=1} Q_{value}] / m \quad [1]$$

για  $\Pi_{\Sigma\Theta A}$ : Entity A, m: max number of questions (3) & i: number of question 1|2|3

- ✓ Factor Relation ship between innovation and maritime security ( $\Pi_{\Lambda\Kappa\Theta A}$ ):

$$\Pi_{\Lambda\Kappa\Theta A} = [\sum_{i=1} Q_{value}] / m \quad [2]$$

για  $\Pi_{\Lambda\Kappa\Theta A}$ : Entity B, m: max number of question (10) & i: number of question 1..10

- ✓ Factor Evaluation of Relation ship between Dynamic Capabilites and Maritime Security ( $\Pi_{\Delta\Delta\Theta A}$ ):

$$\Pi_{\Delta\Delta\Theta A} = [\sum_{i=1} Q_{value}] / m \quad [3]$$

για  $\Pi_{\Delta\Delta\Theta A}$ : Entity Γ, m: max number of questions (3) & i: question number 1|2|3

The descriptive analysis of the above factors (Table 10, Graph 36) led to the following conclusions:

- The factor of total evaluation holds the highest point average (p.a. 4.5),

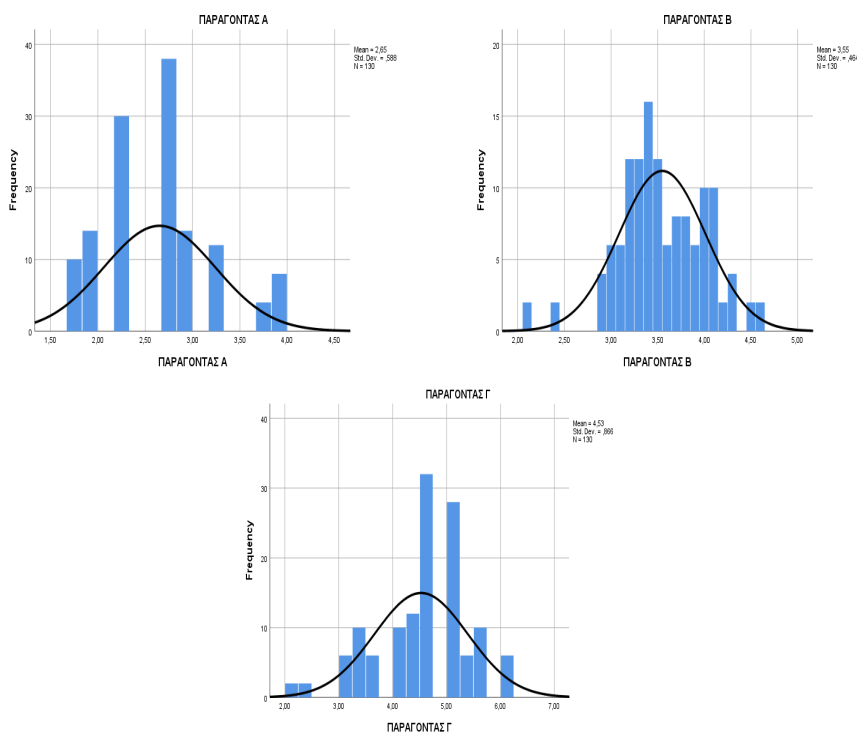
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<sup>40</sup> Cummulative calculation of summs

- The factor that describes the relation ship between the participants and maritime security holds the lowest point average (p.a. 2.6).

**Table 10** Statistical Profile of the above factors (ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

		ΠΣΘΑ	ΠΑΚΘΑ	ΠΑΔΙΘΑ
N	Valid	130	130	130
	Missing	0	0	0
Mean		2,6515	3,5492	4,5277
Median		2,6700	3,5000	4,7000
Mode		2,67	3,40	4,70
Std. Deviation		,58807	,46393	,86634
Variance		,346	,215	,751
Range		2,33	2,50	4,00
Minimum		1,67	2,10	2,00
Maximum		4,00	4,60	6,00



**Graph 36** Graphic Depiction of Factor Variation (ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

The distibution test (normality) of the 3 factors, was conducted witht the **K-S & S-W tests** (Nova-Kaltsouni, 2006, Loukaidis, 2011), where the following results were produced:

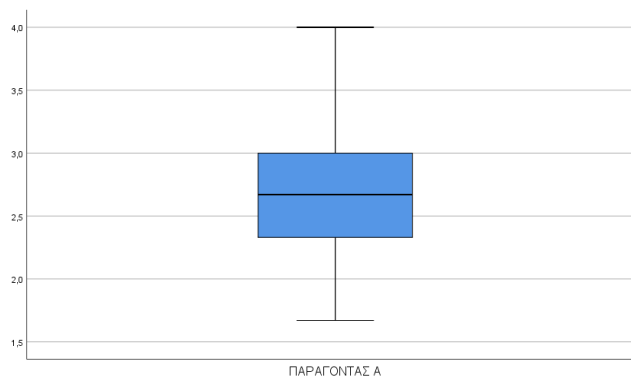
**Table 11** Factor Normality Tests (ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
FACTOR A (ΠΣΘΑ)	.195	130	.000	.933	130	.000
FACTOR B (ΠΑΚΘΑ)	.096	130	.005	.972	130	.008
FACTOR Γ (ΠΑΔΙΘΑ)	.210	130	.000	.936	130	.000

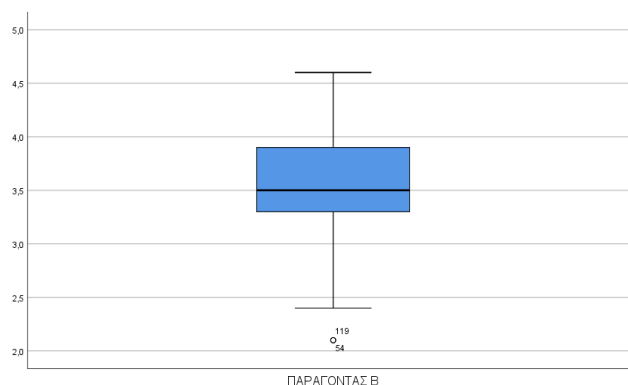
a. Lilliefors Significance Correction

- For all the factors, it was proven during the tests that there is no normality (Sig.<0.05),
- Consequently, the correlation test will be conducted with Spearman rho, (non parametric Statistics).

As a follow up, the employment of Box & Whiskey diagrams demonstrated non normal distribution:

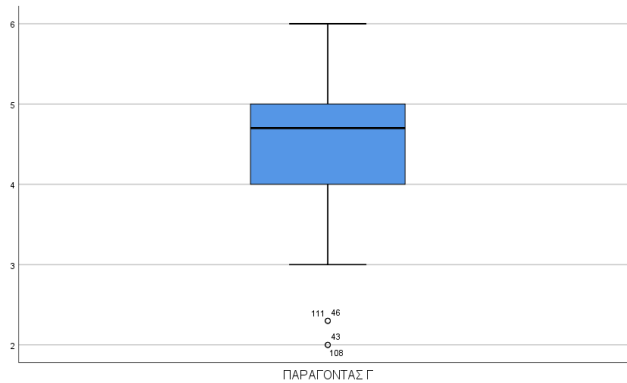


**Graph 37** Graphic Depiction of ΠΣΘΑ



**Graph 38** Graphic Depiction of ΠΑΚΘΑ





**Graph 39** Graphic Depiction of ΠΑΔΙΘΑ

Last the correlation between factors provided the following results (Table 12):

**Table 12** Factor Correlation Test (ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

			FACTOR A (ΠΣΘΑ)	FACTOR B (ΠΑΚΘΑ)	FACTOR Γ (ΠΑΔΙΘΑ)
Spearman's rho	FACTOR A (ΠΣΘΑ)	Correlation Coefficient	1,000	,045	-,007
		Sig. (2-tailed)	.	,614	,937
		N	130	130	130
	FACTOR B (ΠΑΚΘΑ)	Correlation Coefficient	,045	1,000	,377**
		Sig. (2-tailed)	,614	.	,000
		N	130	130	130
	FACTOR Γ (ΠΑΔΙΘΑ)	Correlation Coefficient	-,007	,377**	1,000
		Sig. (2-tailed)	,937	,000	.
		N	130	130	130
**. Correlation is significant at the 0.01 level (2-tailed).					

- Specifically, there is statistic relationship/analogy among factors ΠΑΔΙΘΑ & ΠΑΚΘΑ (<0,05), with moderate positive correlation (in particular when one factor increases, the other factor increases accordingly).

#### 4.3.4 Correlation of Factors that describe the relationship / familiarization with maritime security

The correlation test will be conducted with Spearman rho method, (NP Statistics), since both factors  $\Pi_{\text{ΑΔΙΘΑ}}$  &  $\Pi_{\text{ΑΚΘΑ}}$  demonstrate non normal distribution. More specifically:

**Table 13** Factor Corellation Test ( $\Pi_{\text{ΑΚΘΑ}}$ ,  $\Pi_{\text{ΑΔΙΘΑ}}$ ) & Knowledge of Maritime Security Issues (Question 1 - Entity A).

			QUESTION 1	FACTOR B ( $\Pi_{\text{ΑΚΘΑ}}$ )	FACTOR Γ ( $\Pi_{\text{ΑΔΙΘΑ}}$ )
Spearman's rho	QUESTION 1	Correlation Coefficient	1,000	,033	,216*
		Sig. (2-tailed)	.	,707	,014
		N	130	130	130

- There is significant statistical interelation between factor  $\Pi_{\text{ΑΔΙΘΑ}}$  and the specific knowledge of maritime security (Question 1)( $<0,05$ ), with moderate positive correlation (when one factor increases, the other factor increases respectively).

#### 4.3.5 Influence of Demographics

The evaluation of demographic data (non parametric evaluation due to factor non normality) in conjunction ( $\Pi_{\text{ΣΘΑ}}$ ,  $\Pi_{\text{ΑΚΘΑ}}$ ,  $\Pi_{\text{ΑΔΙΘΑ}}$ ) concluded to following results:

- *Age Influence* (Table 14)

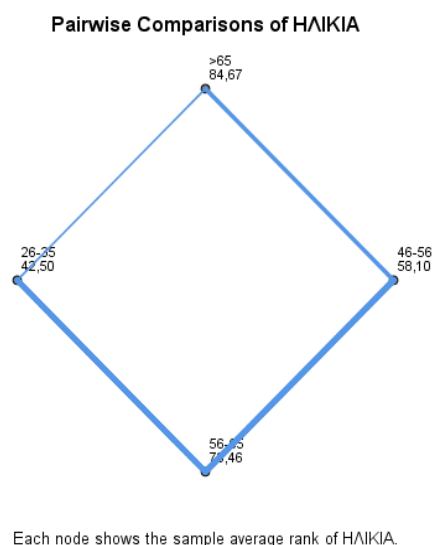
**Table 14** Evaluation of age influence to the rerseach factors

( $\Pi_{\text{ΣΘΑ}}$ ,  $\Pi_{\text{ΑΚΘΑ}}$ ,  $\Pi_{\text{ΑΔΙΘΑ}}$ ).

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of FACTOR A is the same across categories of AGE.	Independent-Samples Kruskal-Wallis Test	,011	Reject the null hypothesis.
2	The distribution of FACTOR B is the same across categories of AGE.	Independent-Samples Kruskal-Wallis Test	,062	Retain the null hypothesis.
3	The distribution of FACTOR Γ is the same across categories of ΗΛΙΚΙΑ.	Independent-Samples Kruskal-Wallis Test	,004	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,050.

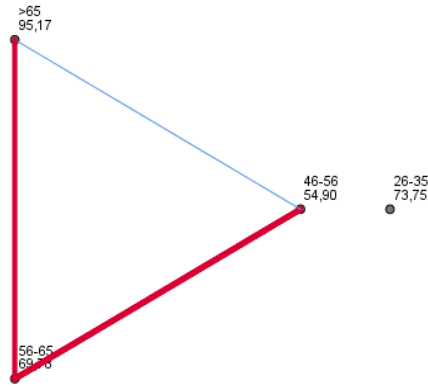
- Factor  $\Pi\Sigma\Theta A$  is influenced from the Age factor (Sig.: 0,011). In particular, the level of familiarization of the participants with maritime security issues increases respectively as the age of the participant increases. The oldest the participant the more familiar is with modern maritime security issues (Graph. 40).



**Graph 40** Graphic Depiction of the  $\Pi\Sigma\Theta A$  relation ship with the participant's age.

- The factor  $\Pi\Delta\Delta\iota\Theta A$  is influenced from the age of participants (Sig.: 0,004). In particular, the average value of the factor increases respectively with the age, (the youngest participants are excluded) the oldest the participant the more positively he/she evaluates the relationship between Dynamic Capabilities and Maritime Security (Graph 41).

Pairwise Comparisons of ΗΛΙΚΙΑ



Each node shows the sample average rank of ΗΛΙΚΙΑ.

**Graph 41** Graphic Depiction of ΠΑΔΙΘΑ factor in conjunction with Age.

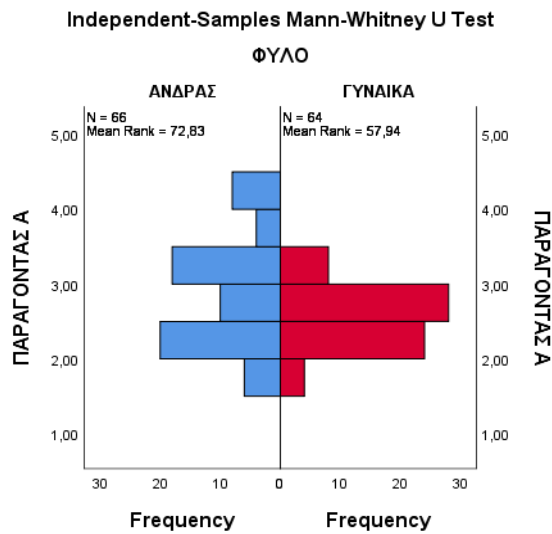
- Gender influence ( Table 15)

**Table 15** Test of gender influence and Research factors

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of FACTOR A is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	,021	Reject the null hypothesis
2	The distribution of FACTOR B is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	,142	Retain the null hypothesis
3	The distribution of FACTOR Γ is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	,008	Reject the null hypothesis
Asymptotic significances are displayed. The significance level is ,050.				

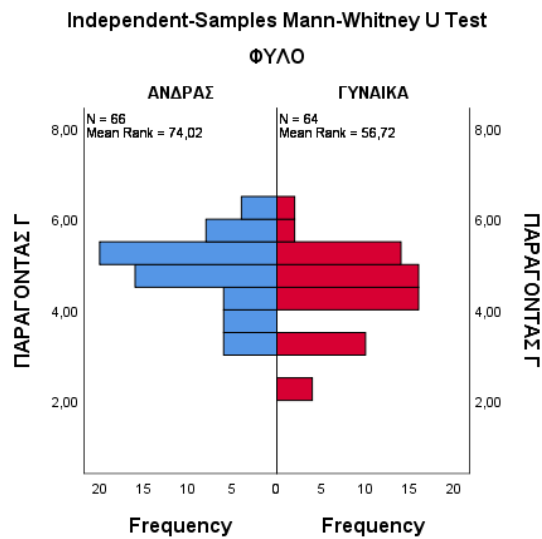
(ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

- Factor ΠΣΘΑ is influenced from Gender (Sig.: 0,021). In particular, men are more familiar/related than women with contemporary maritime security issues (Graph 42).



**Graph 42** Graphic Depiction of Factor Παράγοντας Α relationship with GENDER

- Factor Παράγοντας Β is influenced from GENDER (Sig.: 0,008). In particular, men evaluate more the relationship between Dynamic Capabilities and Maritime Security than women (Graph 43).



**Graph 43** Graphic Depiction of factor Παράγοντας Β in conjunction with GENDER

- **Influence of Educational Background (Table 16)**

**Table 16** Test of Educational background and Research Factors

(ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ).

	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
1	The distribution of FACTOR A is the same across categories of EDUCATIONAL BACKGROUND.	Independent-Samples Kruskal-Wallis Test	,006	Reject the null hypothesis
2	The distribution of FACTOR B is the same across categories of EDUCATIONAL BACKGROUND.	Independent-Samples Kruskal-Wallis Test	,100	Retain the null hypothesis
3	The distribution of FACTOR Γ is the same across categories of EDUCATIONAL BACKGROUND.	Independent-Samples Kruskal-Wallis Test	,598	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is 050.

- The factor ΠΣΘΑ is influenced from the educational background (Sig.: 0,006). Specifically there is variation in conjunction with the educational background of the participants regarding the level of familiarization with contemporary maritime security issues, i.e participants with PHD are more familiar (Graph 44).

**Graph 44** Graphic Depiction of factor ΠΣΘΑ in conjunction with the participant's educational background.

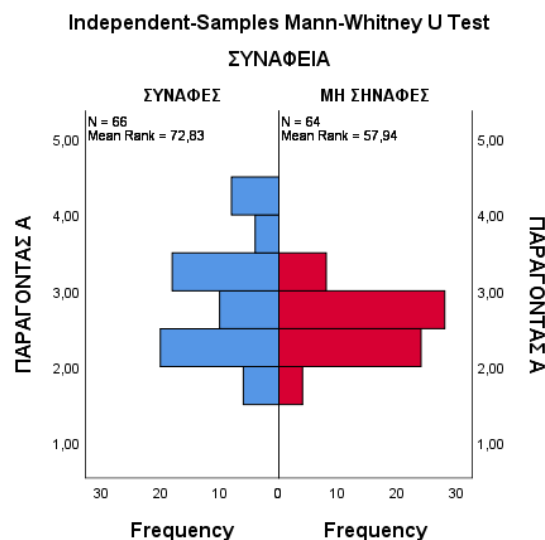
- **Influence of Professional Relevancy (Table 17)**

**Table 17** Evaluation of Professional relevancy with maritime security and Research Factors (ΠΣΘΑ, ΠΑΚΘΑ, ΠΑΔΙΘΑ)

	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
1	The distribution of FACTOR A is the same across categories of RELEVANCY.	Independent-Samples Mann-Whitney U Test	,021	Reject the null hypothesis.

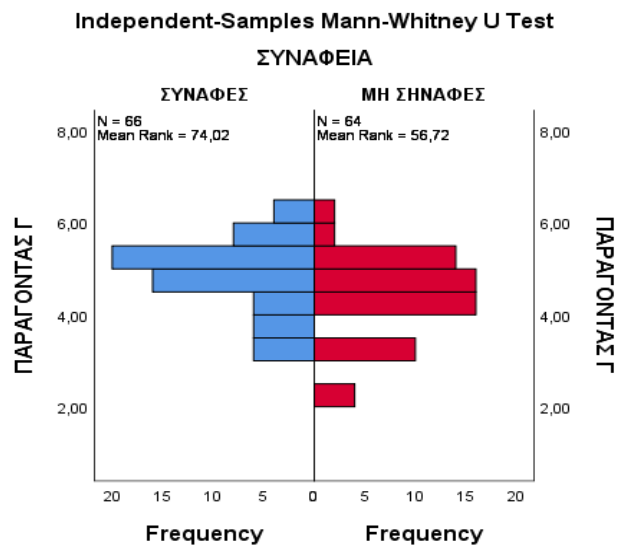
2	The distribution of FACTOR B is the same across categories of RELEVANCY.	Independent-Samples Mann-Whitney U Test	,142	Retain the null hypothesis.
3	The distribution of FACTOR Γ is the same across categories of RELEVANCY.	Independent-Samples Mann-Whitney U Test	,008	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is ,050.				

- The factor ΠΣΘΑ is directly influenced from professional relevancy with maritime security (Sig.: 0,021). In particular, the participants that have professional relevancy with the wider concept of maritime security are more familiar/related to contemporary maritime security issues (Graph 45).



**Graph 45** Graphic Depiction of factor ΠΣΘΑ (values) in conjunction with Professional Relevancy

- Factor ΠΑΔΙΘΑ is directly influenced from professional relevancy (Sig.: 0,008). In particular, participants whose profession is relevant with maritime security evaluate higher the relation ship between Dynamic Capabilities and Maritime Security (Graphs 45, 46).



**Graph 46** Graphic Depiction of ΠΑΔΙΘΑ in conjunction with Professional relevancy





**CHAPTER V  
SUMMARY, CONCLUSIONS  
AND ADDED VALUE OF  
THIS RESEARCH**

## 5.1 Introduction

In this dissertation, the main objective was to examine innovative ways to address modern maritime challenges. Specifically, we studied the business literature and in particular the entrepreneurial term “Dynamic Capabilities”. One of the most significant challenges was to understand the similarities/differences between institutions/organizations that tackle modern maritime security issues and business firms since the present literature did not provide any connection between DCs, innovation and maritime security. The most appropriate method for my research was through questionnaires that were handed out to various participants. An analysis of the above questionnaires was conducted via scientifically approved methods in order to extract trustworthy conclusions.

## 5.2 Contributions, Findings and Final Conclusions

The research steps included defining research variables and factors that would allow us to answer the main question of this dissertation and more practically the applicability of DCs in maritime security. The adopted research factors are:

**Factor  $\Pi_{\Sigma\Theta\Lambda}$ :** Familiarization with maritime security

**Factor  $\Pi_{\text{AK}\Theta\Lambda}$ :** Relationship between innovation and maritime security

**Factor  $\Pi_{\text{A}\Delta\text{I}\Theta\Lambda}$ :** Evaluation of Relationship between Dynamic Capabilities and Maritime Security

The above factors originate from the 3 entities of the questionnaire. This research provided the following results concerning **Factor  $\Pi_{\Sigma\Theta\Lambda}$** . Primarily, only a small number of the participants claim good to very good knowledge of maritime security issues (18,5 %). In addition, the knowledge of maritime experts is limited since the largest part of the participants know 0-4 experts in maritime security (68%). The last question related with **Factor  $\Pi_{\Sigma\Theta\Lambda}$**  deals with the perception of the term

maritime security where the majority answered/selected specific answers. Consequently, we conclude that the majority of the people holds a limited perception of the term maritime security.

**Factor Π<sub>ΑΚΘΑ</sub>** deals as stated previously with the relationship between innovation and maritime security. The research from the questionnaires provides the following key points concerning innovation and maritime security. Innovation in principle is relevant to the concept of maritime security since the majority holds a positive view regarding the adoption of innovative solutions and in general as an important parameter in the decision-making process. Another parameter that should be taken into account is the personality of each respective leader and his stand towards the concept of innovation. A key point in this process lies also in the foundation of functional innovation offices/centers in institutions/organizations oriented in tackling modern security challenges that through the utilization of suitable mechanisms will produce solutions that entail innovative components. On the otherhand there is a general consensus regarding the lack of sufficient media coverage in contemporary maritime security challenges.

**Factor Π<sub>ΑΔΙΘΑ</sub>** tackles Dynamic Capabilities in conjunction with Maritime Security. The 3 main points from this questionnaire entity are stated below. There is a positive prospect in adopting the proposed DCs mechanism from respective offices/centers. After reviewing the respective business literature, we adopted the proposed Dynamic Capabilities mechanism as depicted in the questionnaires of the present survey. The objective of the proposed Dynamic Capability mechanism is to come up with a method of producing solutions that will address contemporary maritime security challenges in the short and near future. The literature considers as a key component for a business firm to be able to reconfigure internally in order to

tackle its respective challenges. A thorough study of the questionnaires indicates a positive stand towards the latter mechanism since nearly 80% supports it directly or indirectly (remain neutral). The last point is confirmed by the point supported in the questionnaires that innovation offices/centers in maritime oriented organizations/institutions view positively the adoption of the discussed DCs mechanism.

A rather interesting point regarding the quantitative result comes from the demographics of the participants. Age, gender and educational background are related to the level of familiarization of the participants with the wider concept of maritime security. Epigrammatically, older people, both men and women with high educational background are more familiar with the contemporary security agenda in the maritime domain.

### **5.3 Added Value**

The added value of this dissertation comes from the fact that we utilize the term “Dynamic Capabilities” that originates from the business literature in a new domain. Specifically, this term has been studied and reviewed from a significant number of business scholars, as it is stated in Chapter I. On the other hand, maritime organizations and respective companies hold an organizational structure that is analogous to the respective organizational structure of business firms. A fact that provided the necessary theoretical background in order to examine the potential use of DCs in the maritime domain. The literature clearly supports the employment of DCs in the context of promoting their interests and in this case maritime security through the development of new services and products that encompass innovative features. Mankind, in the following years will come across new security challenges; the new Arctic routes constitute new fields of contention but will also reshape global

shipping in all levels. South China Sea disputes also constitute a multidimensional issue since there are high stakes in conjunction with a high number of involved actors. In particular, the high-density traffic of global shipping in addition to the high number presence of fishing fleets complicate the situation even more and issues like establishing accurate MDA become more complicated.

Innovation is a critical component of organizations that will eventually allow them to survive in turbulent security environments by offering innovative “out of the box” solutions through the delivery of new services and products. The significance of innovation through a respective overview of the literature presented the need for maritime organizations and relevant firms delegated to tackle modern maritime challenges and threats to adopt policies and strategies that include innovative features.

The academic goal of this dissertation was to prove the applicability of DCs in an innovative fashion in the maritime security arena. In this academic journey a conceptual generic maritime oriented dynamic capability mechanism that offers to respective organizations and companies the delivery of new products and services with innovative features was provided and received positively as well. The discussed mechanism (Graph 3), regardless the level of dynamism, constitutes a nexus between DCs, innovation and maritime security and provides fertile ground for further research regarding potential modifications that will provide better results. Maritime organizations and/or institutions that tackle modern maritime security issues should not hesitate to ‘borrow’ and/or utilize the business literature in order to self improve the performance of each respective organization. In this case, maritime security in a turbulent security domain requires different approaches in order to accomplish innovative solutions. Business literature provides a number of useful tools and in

particular DCs where our research verified their potential.



## **CHAPTER VI LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH**

## 6.1 Limitations

During this survey we come across various difficulties and limitations as this Phd dissertation was evolving. One of the challenges was to design a questionnaire that will promote our research objectives taking into account in general the limited levels of perception regarding maritime security. We knew from the beginning that a significant number in our sample was not familiar with maritime security concepts, therefore the process of designing and structuring the questionnaires in greek and english required consistent and rigorous efforts in order to accomplish clarity and comprehensiveness.

## 6.2 Suggestions for Future Research

More research is required in the fields of understanding the internal relations between the DCs distinct dimensions. Also, a consequent academic challenge for future researchers would involve the following in terms of accurately adjusting and re-aligning potential shortcomings of the latter mechanism in the context of maritime security:

- *Establishment of Impact Metrics*
- *Evaluation of efficacy of the above discussed mechanism*

A future research study of the above two factors would contribute significantly to the implementation of DCs mechanisms that have actually been evaluated and re-aligned under the context of actually addressing modern maritime security threats. The proposed conceptual DCs mechanism in this dissertation is a paradigmatic conceptual model proposal for maritime oriented organizations since it encompasses the basic features the literature proposes. However, since this is generic, more research is required in terms of implementation in each field and area in order to be



properly modified and reach the desired standards in terms of efficiency. Future researchers should move towards the academic direction of conducting surveys where the participants would belong strictly to the maritime community in order to further evaluate the proposed DCs mechanism on a step-by-step process. Future academic researchers should also review the business literature in order to find additional entrepreneurial concepts that might be applicable in the wider security domain.

## APPENDICES (A-J)

### APPENDIX A Ερωτηματολόγιο

1. Πόσο καλά θεωρείτε ότι γνωρίζετε τα θέματα Θαλάσσιας Ασφάλειας;

α. Πολύ καλά  
λίγο

β. Καλά  
στ. Καθόλου

γ. Μέτρια

δ. Λίγο

ε. Πολύ

<b>Παρακαλούμε σημειώστε τον βαθμό συμφωνίας ή διαφωνίας σας με τις ακόλουθες προτάσεις.</b>					
	<b>Διαφωνώ απόλυτα</b>	<b>Μάλλον διαφωνώ</b>	<b>Ούτε συμφωνώ ούτε διαφωνώ</b>	<b>Μάλλον συμφωνώ</b>	<b>Συμφωνώ απόλυτα</b>
2. Η έννοια της καινοτομίας (innovation) σχετίζεται με την έννοια της θαλάσσιας ασφάλειας.					
3. Η καινοτομία αποτελεί βασική παράμετρο στην διαδικασία λήψης αποφάσεων στους οργανισμούς που προάγουν την θαλάσσια ασφάλεια.					
4. Η αξιοποίηση της καινοτομίας ως παραμέτρου λήψης αποφάσεων εξαρτάται αποκλειστικά από τα					

<p>χαρακτηριστικά/ιδιοσυγκρασία του εκάστοτε ηγέτη.</p>					
<p>5. Η σκέψη των σημερινών ηγετών/ υπευθύνων για θέματα θαλάσσιας ασφάλειας είναι άρρηκτα συνδεδεμένη με την έννοια της καινοτομίας.</p>					
<p>6. Η ίδρυση/ανάπτυξη ενός κέντρου καινοτομίας (innovation center) σε οργανισμούς που ασχολούνται με την θαλάσσια ασφάλεια αποτελεί ένα ρεαλιστικό ενδεχόμενο.</p>					
<p>7. Η ίδρυση ενός γραφείου /κέντρου καινοτομίας στους οργανισμούς που εμπλέκονται με θέματα θαλάσσιας ασφάλειας οργανισμών/ εταιρειών θα έχει θετικό</p>					

αντίκτυπο.					
8. Η ίδρυση ενός γραφείου /κέντρου καινοτομίας στους οργανισμούς που εμπλέκονται με θέματα θαλάσσιας ασφάλειας θα συνέβαλλε στην θετική αντιμετώπιση θεμάτων θαλάσσιας ασφάλειας.					
9. Η ίδρυση γραφείου /κέντρου καινοτομίας θα είχε θετική ανταπόκριση από την αντίστοιχη κοινότητα.					
10. Η σημερινή πολύπλοκη κατάσταση στον χώρο της θαλάσσιας ασφάλειας θα οδηγήσει νομοτελειακά στην υιοθέτηση πολιτικών και λύσεων οι οποίες εμπεριέχουν στοιχεία καινοτομίας.					
11. Υπάρχει επαρκής προβολή / κάλυψη των					

Θεμάτων ασφαλείας από τα ΜΜΕ.					
-------------------------------	--	--	--	--	--

12. Παρακαλούμε επιλέξτε από τις παρακάτω προτάσεις όποια/ όποιες θεωρείτε ότι εκφράζουν επαρκώς τον τρόπο με τον οποίο αντιλαμβάνεστε τον όρο **Θαλάσσια Ασφάλεια**; (περισσότερες από μία απαντήσεις μπορούν να γίνουν δεκτές)

α. Προστασία των θαλασσιών συνόρων

β. Αντιμετώπιση παράνομων δραστηριοτήτων (διακίνηση ναρκωτικών – παράνομη μετανάστευση-πειρατεία κ.ά.)

γ. Θαλάσσια Επαγρύπνηση

δ. Το σύνολο θεμάτων αρμοδιότητας της Ελληνικής Ακτοφυλακής

ε. Το σύνολο θεμάτων αρμοδιότητας του Πολεμικού Ναυτικού

στ. Δεν γνωρίζω/ δεν απαντώ

13. Πόσα ονόματα ειδικών επί θεμάτων Θαλάσσιας Ασφάλειας γνωρίζετε?

α. Τουλάχιστον 10

β. 5-9

γ. 1-4

δ. Κανένα

### **Ενότητα Β: Απόψεις για τη σχέση Καινοτομίας και Θαλάσσιας Ασφάλειας**

14. Καταγράψτε (προαιρετικά) την άποψή σας για τους τρόπους συσχέτισης των έννοιών της Καινοτομίας και της Θαλάσσιας Ασφάλειας:

### **Ενότητα Γ: Θαλάσσια Ασφάλεια και Δυναμικές Ικανότητες**

Το γράφημα που ακολουθεί περιγράφει την βηματίστικη διαδικασία αντιμετώπισης προκλήσεων σε μεταβαλλόμενα περιβάλλοντα αναφορικά με την

ανάγκη δημιουργίας ή/και περαιτέρω αξιοποίησης υφιστάμενων ικανοτήτων από τον εκάστοτε εμπλεκόμενο οργανισμό με θέματα θαλάσσιας ασφάλειας.

Ο σκοπός του ανωτέρω μηχανισμού είναι η περαιτέρω βελτίωση της απόδοσης του εκάστοτε οργανισμού, η οποία περιλαμβάνει την υιοθέτηση καινοτόμων χαρακτηριστικών στον μελλοντικό τρόπο λειτουργίας/δράσης του οργανισμού. Οι τρεις πυλώνες του μηχανισμού είναι οι ακόλουθοι:

α) η **διαίσθηση των επικείμενων προκλήσεων και ευκαιριών,**

β) η **πρόσκτηση ή/και δημιουργία της απαραίτητης γνώσης στο πλαίσιο δημιουργίας νέων ικανοτήτων ή αναδιανομής των υφιστάμενων.**

γ) οι **διαδικασίες αξιολόγησης των νέων ικανοτήτων του οργανισμού, αφού προβεί στις απαραίτητες διαδικασίες εναρμόνισης (alignment) στα νέα οργανωτικά δεδομένα.**

Αφού μελετήσετε το Γράφημα που ακολουθεί, παρακαλούμε να αξιολογήσετε τον παρακάτω μηχανισμό ανάπτυξης **«Δυναμικών Ικανοτήτων»** ως προς τα ακόλουθα σημεία: <sup>41</sup>

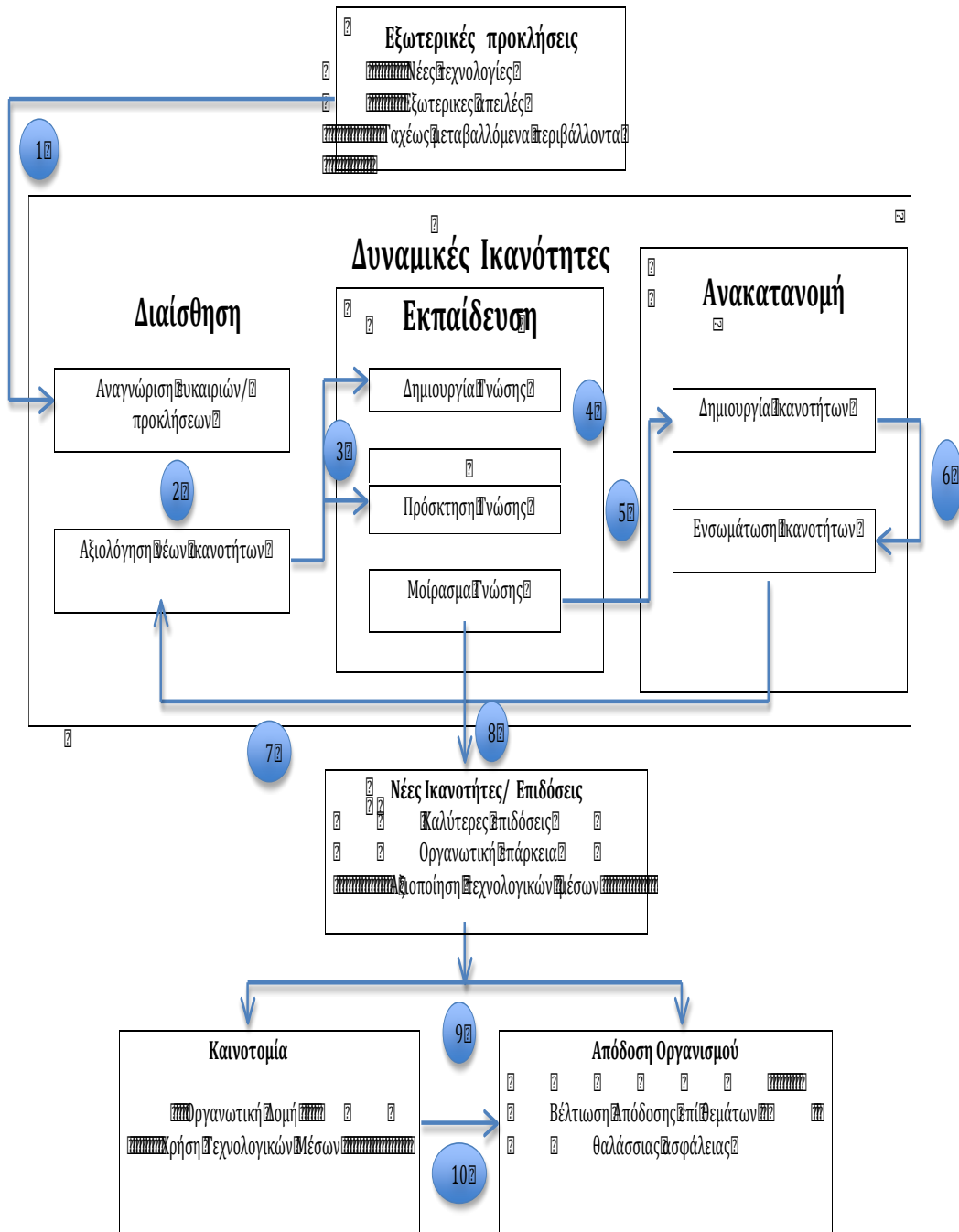
α. Την αποτελεσματικότητα ενσωμάτωσης καινοτόμων προσεγγίσεων και στοιχείων στους οργανισμούς οι οποίοι εμπλέκονται με την θαλάσσια ασφάλεια?  
α. Πολύ θετικά β. Θετικά γ. Μέτρια δ. Αρνητικά ε. Πολύ αρνητικά στ. Δεν ξέρω/ δεν απαντώ

β. Την προοπτική υιοθέτησης από γραφεία /κέντρα καινοτομίας του παρακάτω μηχανισμού ανάπτυξης Δυναμικών Ικανοτήτων?  
α. Πολύ θετικά β. Θετικά γ. Μέτρια δ. Αρνητικά ε. Πολύ αρνητικά στ. Δεν ξέρω/δεν απαντώ

γ. Συνολικά/ εν γένει πώς αξιολογείτε τον παρακάτω μηχανισμό?  
α. Πολύ θετικά β. Θετικά γ. Μέτρια δ. Αρνητικά ε. Πολύ αρνητικά στ. Δεν ξέρω/δεν απαντώ

---

<sup>41</sup> Σημείωση: **Δυναμικές Ικανότητες** είναι οι ικανότητες που διαθέτει κάθε οργανισμός/επιχείρηση να αντιμετωπίζει τις εκάστοτε προκλήσεις και απειλές σε ταχέως μεταβαλλόμενα περιβάλλοντα, με την εξεύρεση αντίστοιχων λύσεων.]



**Γράφημα .... Μηχανισμός Ανάπτυξης Δυναμικών Ικανοτήτων**

### Ενότητα Δ: Δημογραφικά χαρακτηριστικά:

- ✚ **Φύλο:** Άρρεν Θήλυ
- ✚ **Ηλικία:** 18 – 30 31-45 46 – 60 60+
- ✚ **Επίπεδο Εκπαίδευσης:** Υποχρεωτική Λύκειο  
Πανεπιστήμιο ή ΤΕΙ Μεταπτυχιακό Διδακτορικό
- ✚ **Επαγγελματική κατάσταση:** Φοιτητής/ φοιτήτρια Μισθωτός/ή,  
Ελεύθερος Επαγγελματίας Άνεργος/η Συνταξιούχος Άλλο
- ✚ **Συνάφεια Επαγγέλματος με τη θαλάσσια ασφάλεια:** Συναφές– Μη  
συναφές



## APPENDIX B Questionnaire

How familiar are you with maritime security issues?

- a. Extremely familiar   b. Very familiar   c. somewhat familiar   d. Not so familiar   e. I don't know anything about maritime security

What is your perception of the term "maritime security"?  
(you can circle more than one answer)

- a. Maritime border monitoring
- b. Tackling of illegal activities (drug smuggling, illegal migration, piracy etc.)
- c. Maritime Domain Awareness
- d. Range of issues for which the Coastguard is responsible?
- e. Range of issues for which the Navy is responsible?
- f. Answers d and e
- h. I don't answer/I don't know

How well do you think that innovation that can go along with maritime security?

- a. Extremely well   b. Very well   c. Somewhat well   d. Not so well   e. They do not go together at all

How many experts on maritime security do you know?

- a. A lot (>10)   b. Many (6-10)   c. A few (3-5)   d. Very few (1-2)   e. No one

How do you view the establishment of an innovation center in organizations that work on issues related to maritime security;

- a. Extremely favorably b. Very favorably c. Somewhat favorably d. Not so favorably e. Not at all favorably

Do you think that organizations that work on issues related to maritime security consider innovation in the final decision making process and, if yes, to what degree?

- a. All the time b. Most of the time c. Some of the time d. Rarely e. Never

In organizations that work on maritime related security issues to what degree you consider that the decision making process includes innovation as a critical component?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

To what degree do you think that the above inclusion relates to the specific characteristics of the leader of a particular organization?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

Do you think that modern leaders/managers have a positive view on the issue of innovation and how this relates to the organization's/firm's practices?

- a. Extremely positive b. Very positive c. Somewhat positive d. Not so positive e. Not at all positive

Do you think that the foundation of an innovation center will be a positive development for organizations / firms that deal with maritime security related issues?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

Do you think that the above foundation will contribute positively to addressing maritime security related issues?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

How do you think the respective community will view the foundation of an innovation center?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

What do you think is the outlook in maritime security? Will the present complicated situation lead inevitably to innovative “out of the box” approaches?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

Do you think that mass media present enough contemporary maritime security issues?

- a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

Please write (optionally) a paragraph that summarizes your views over the issue of “Innovation and Maritime Security”?

How do you evaluate the Dynamic Capabilities Mechanism in terms of the following?<sup>42</sup>

**a.** Integration of innovative approaches and features in institutions in organizations and firms that work on issues related to maritime security?

a. Extremely well b. Very well c. somewhat well d. Not so well e. Not at all well

**b.** Possibility of the innovation centers adopting the Dynamic Capabilities Mechanism stated below?

a. Extremely well b. Very well c. somewhat well d. Not so well e. Not at all well

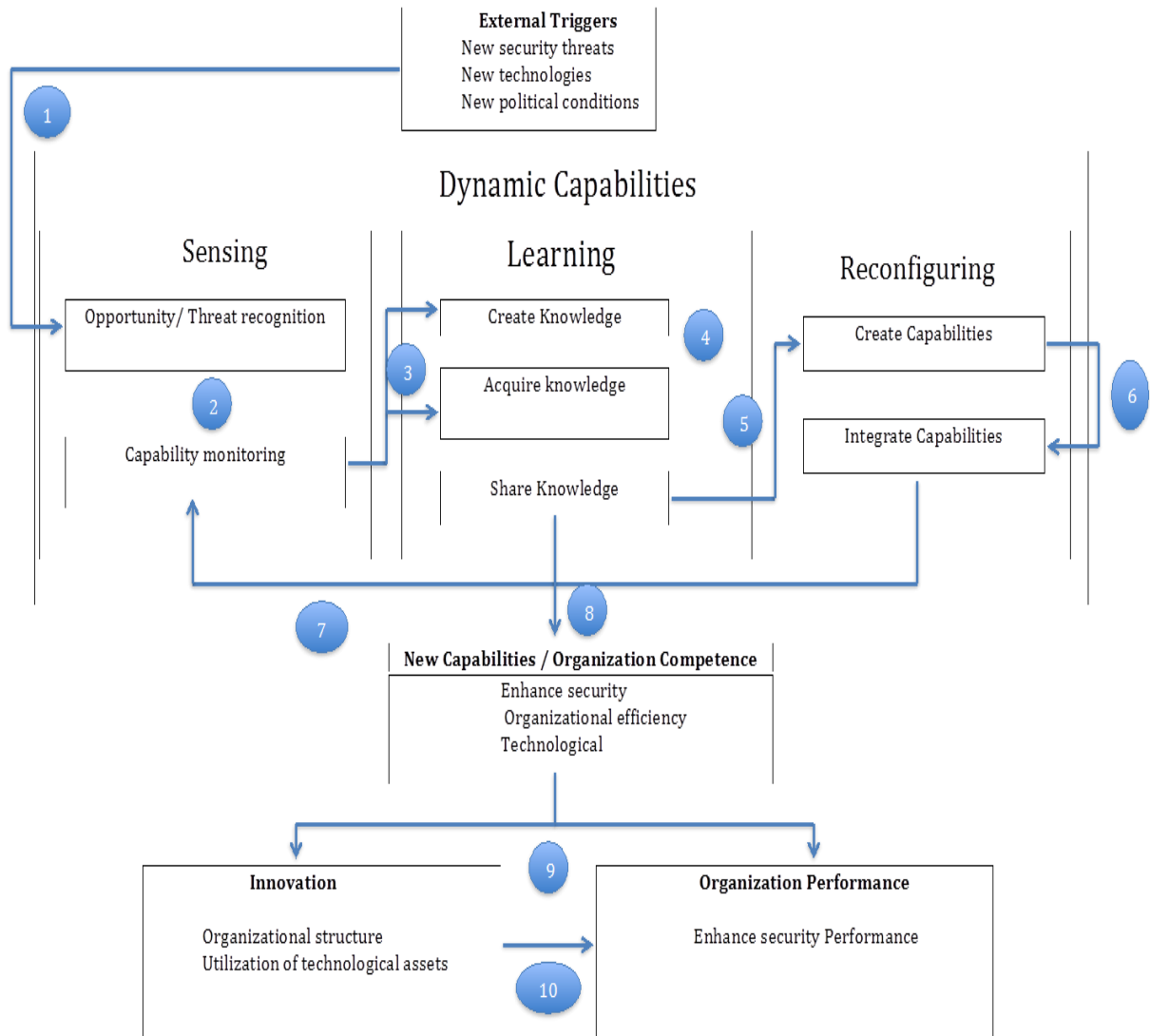
**c.** What is your overall evaluation of the Dynamic Capabilities Mechanism stated below?

a. Extremely well b. Very well c. Somewhat well d. Not so well e. Not at all well

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<sup>42</sup> A dynamic capability is the firm's potential to systematically solve problems, formed by the propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base

## DYNAMIC CAPABILITIES MECHANISM



**Figure .....**  
**Demographics**

**Please circle your answer**

**Age:** 15 – 30 , 31 – 50    50+

**Educational Background:**

**Occupation:**

**Nationality:**

**Profession relevance to maritime security:** Relevant - Not relevant

## **APPENDIX C INTERVIEW FORMAT (GREEK)**

1. Η έννοια της καινοτομίας (innovation) σχετίζεται με την έννοια της θαλάσσιας ασφάλεια;
2. Η καινοτομία αποτελεί βασική παράμετρο στη διαδικασία λήψης αποφάσεων στους οργανισμούς που προάγουν την θαλάσσια ασφάλεια;
3. Η καινοτομία αποτελεί βασική παράμετρο στη διαδικασία λήψης αποφάσεων στους οργανισμούς που προάγουν την θαλάσσια ασφάλεια;
4. Η αξιοποίηση της καινοτομίας ως παραμέτρου λήψης αποφάσεων εξαρτάται αποκλειστικά από τα χαρακτηριστικά/ιδιοσυγκρασία του εκάστοτε ηγέτη;
5. Η σκέψη των σημερινών ηγετών/ υπευθύνων για θέματα θαλάσσιας ασφάλειας είναι άρρηκτα συνδεδεμένη με την έννοια της καινοτομίας;
6. Η ίδρυση ενός γραφείου /κέντρου καινοτομίας στους οργανισμούς που εμπλέκονται με θέματα θαλάσσιας ασφάλειας οργανισμών/ εταιρειών θα έχει θετικό αντίκτυπο;
7. Η ίδρυση/ανάπτυξη ενός κέντρου καινοτομίας (innovation center) σε οργανισμούς που ασχολούνται με την θαλάσσια ασφάλεια αποτελεί ένα ρεαλιστικό ενδεχόμενο;
8. Η ίδρυση ενός γραφείου /κέντρου καινοτομίας στους οργανισμούς που εμπλέκονται με θέματα θαλάσσιας ασφάλειας θα συνέβαλλε στην θετική αντιμετώπιση θεμάτων θαλάσσιας ασφάλειας;
9. Η ίδρυση γραφείου /κέντρου καινοτομίας θα είχε θετική ανταπόκριση από την αντίστοιχη κοινότητα;
10. Η σημερινή πολύπλοκη κατάσταση στον χώρο της θαλάσσιας ασφάλειας θα οδηγήσει νομοτελειακά στην υιοθέτηση πολιτικών και λύσεων οι οποίες εμπεριέχουν στοιχεία καινοτομίας.
11. Υπάρχει επαρκής προβολή /κάλυψη των θεμάτων θαλάσσιας ασφαλείας από τα ΜΜΕ;

## ΑΞΙΟΛΟΓΗΣΗ ΜΗΧΑΝΙΣΜΟΥ ΔΥΝΑΜΙΚΩΝ ΙΚΑΝΟΤΗΤΩΝ

Το γράφημα που ακολουθεί περιγράφει έναν μηχανισμό/ μια διαδικασία βημάτων αντιμετώπισης προκλήσεων από Οργανισμούς που ασχολούνται με θέματα θαλάσσιας ασφάλειας σε μεταβαλλόμενα περιβάλλοντα αναφορικά με την ανάγκη δημιουργίας ή/και πρόσθετης αξιοποίησης υφιστάμενων ικανοτήτων. Ο σκοπός του μηχανισμού είναι η περαιτέρω βελτίωση της απόδοσης του Οργανισμού, η οποία περιλαμβάνει την υιοθέτηση καινοτόμων χαρακτηριστικών στον μελλοντικό τρόπο λειτουργίας/δράσης του. Οι τρεις πυλώνες του μηχανισμού είναι:

α) η **διαίσθηση/διαισθητική αντίληψη των επικείμενων προκλήσεων και ευκαιριών,**

β) η **πρόσκτηση ή/και δημιουργία της απαραίτητης γνώσης στο πλαίσιο δημιουργίας νέων ικανοτήτων ή αναδιανομής των υφιστάμενων.**

γ) οι **διαδικασίες αξιολόγησης των νέων ικανοτήτων του οργανισμού, αφού προβεί στις απαραίτητες διαδικασίες εναρμόνισης (alignment) στα νέα οργανωτικά δεδομένα.**

Αφού παρατηρήσετε/ μελετήσετε το Γράφημα που ακολουθεί, παρακαλούμε να αξιολογήσετε τον παρακάτω μηχανισμό ανάπτυξης **«Δυναμικών Ικανοτήτων»** ως προς τα ακόλουθα σημεία: <sup>43</sup>

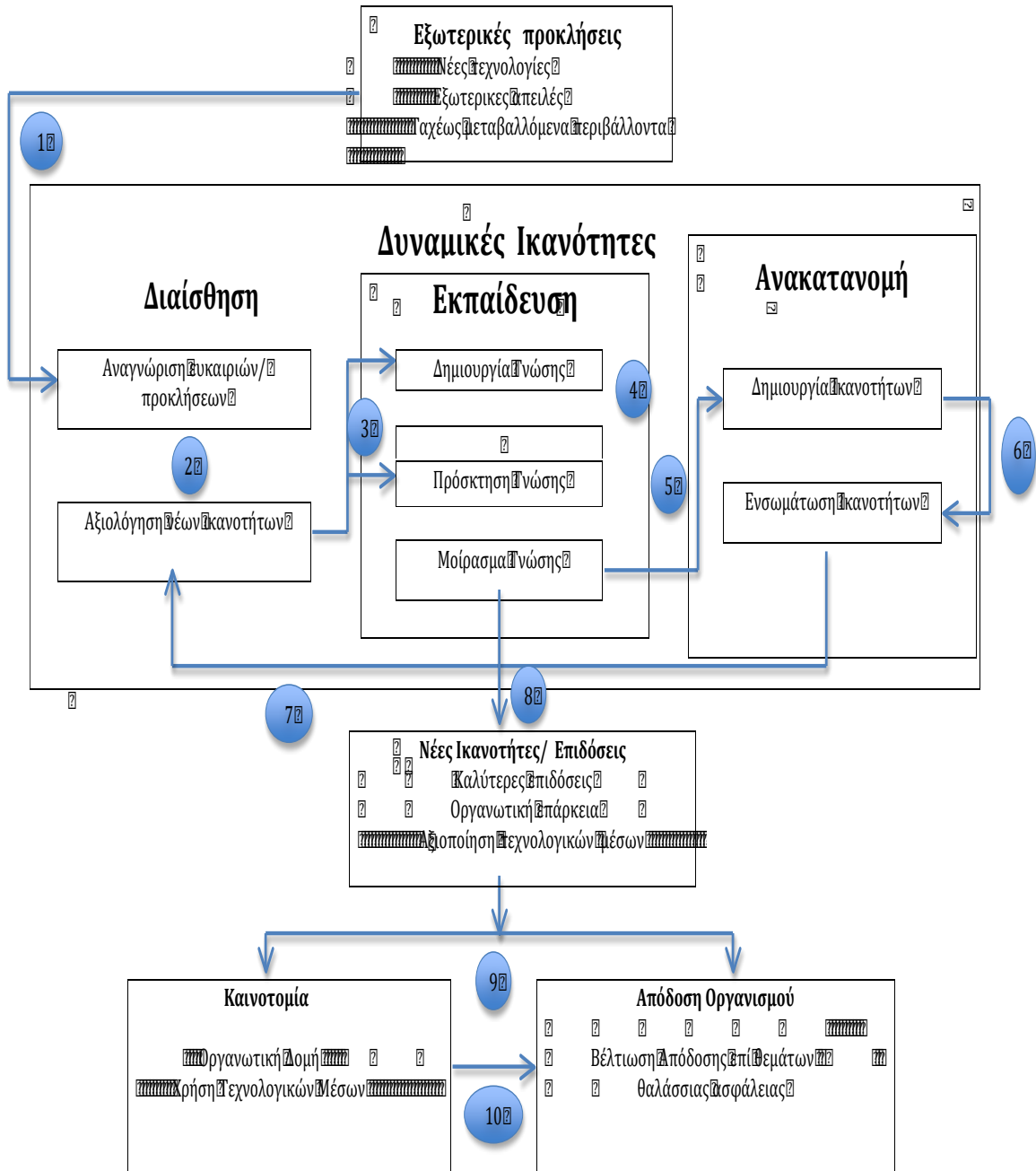
13. Πως εκτιμάτε την αποτελεσματικότητα ενσωμάτωσης καινοτόμων προσεγγίσεων και στοιχείων στους οργανισμούς οι οποίοι εμπλέκονται με την θαλάσσια ασφάλεια;
14. Ποια η άποψη σας για την προοπτική υιοθέτησής του από γραφεία /κέντρα καινοτομίας του παρακάτω μηχανισμού ανάπτυξης Δυναμικών Ικανοτήτων εφόσον τους παρασχεθεί κατάλληλη υποστήριξη?
15. Πως αξιολογείτε συνολικά τον μηχανισμό;

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<sup>43</sup> Σημείωση: **Δυναμικές Ικανότητες** είναι οι ικανότητες που διαθέτει κάθε οργανισμός/επιχείρηση να αντιμετωπίζει τις εκάστοτε προκλήσεις και απειλές σε ταχέως μεταβαλλόμενα περιβάλλοντα, με την εξεύρεση αντίστοιχων λύσεων.]



## DYNAMIC CAPABILITIES MECHANISM



**Γράφημα 1 Μηχανισμός Δυναμικών Ικανοτήτων**

**Καταγράψτε (προαιρετικά) την άποψή σας για τους τρόπους συσχέτισης των έννοιών της Καινοτομίας και της Θαλάσσιας Ασφάλειας**

## **APPENDIX D INTERVIEW FORMAT (ENGLISH)**

1. What is your perception of the term “maritime security”?
  
2. How well do you think that innovation that can go along with maritime security?
  
3. How do you view the establishment of an innovation center in organizations that work on issues related to maritime security;
  
4. Do you think that organizations that work on issues related to maritime security consider innovation in the final decision making process and, if yes, to what degree?
  
5. In organizations that work on maritime related security issues to what degree you consider that the decision making process includes innovation as a critical component?
  
6. To what degree do you think that the above inclusion relates to the specific characteristics of the leader of a particular organization?
  
7. Do you think that modern leaders/managers have a positive view on the issue of innovation and how this relates to the organization’s/firm’s practices?
  
8. Do you think that the foundation of an innovation center will be a positive development for organizations / firms that deal with maritime security related issues?
  
9. Do you think that the above foundation will contribute positively to addressing maritime security related issues?
  
10. How do you think the respective community will view the foundation of an innovation center?

11. What do you think is the outlook in maritime security? Will the present complicated situation lead inevitably to innovative “out of the box” approaches?
12. Do you think that mass media present enough contemporary maritime security issues?
13. Please write (optionally) a paragraph that summarizes your views over the issue of “Innovation and Maritime Security”?
14. How do you evaluate the Dynamic Capabilities Mechanism in terms of the following?<sup>44</sup>
  - c. Integration of innovative approaches and features in institutions in organizations and firms that work on issues related to maritime security?
  - d. Possibility of the innovation centers adopting the Dynamic Capabilities Mechanism stated below?
  - c. What is your overall evaluation of the Dynamic Capabilities Mechanism stated below?

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<sup>44</sup> A dynamic capability is the firm's potential to systematically solve problems, formed by the propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base

## APPENDIX E DEMOGRAPHICS ANALYSIS

### Frequencies

<b>Notes</b>		
Output Created		
Comments		
Input	Data	\\ANALYSIS_NELLAS\TELIKO ARXEIO ANALYSIS\DB_NELLAS FINAL.sav
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax	FREQUENCIES VARIABLES=FYLO HLIKIA EDU PROF SYNAF /PIECHART PERCENT /ORDER=ANALYSIS.	
Resources	Processor Time	00:00:01,06
	Elapsed Time	00:00:00,94

<b>Statistics</b>						
		ΦΥΛΟ	ΗΛΙΚΙΑ	ΕΚΠΑΙΔΕΥΣΗ	ΙΔΙΟΤΗΤΑ	ΣΥΝΑΦΕΙΑ
N	Valid	130	130	130	130	130
	Missing	0	0	0	0	0

## Frequency Table

### ΦΥΛΟ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΑΝΔΡΑΣ	66	50,8	50,8	50,8
	ΓΥΝΑΙΚΑ	64	49,2	49,2	100,0
	Total	130	100,0	100,0	

### ΗΛΙΚΙΑ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26-35	8	6,2	6,2	6,2
	46-56	60	46,2	46,2	52,3
	56-65	50	38,5	38,5	90,8
	>65	12	9,2	9,2	100,0
	Total	130	100,0	100,0	

### ΕΚΠΑΙΔΕΥΣΗ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΛΥΚΕΙΟ	78	60,0	60,0	60,0
	ΙΕΚ-ΜΕΤΑΛΥΚΕΙΑΚΗ	12	9,2	9,2	69,2
	ΣΧΟΛΗ				
	ΑΕΙ/ΤΕΙ	30	23,1	23,1	92,3
	ΜΕΤΑΠΤΥΧΙΑΚΟ	2	1,5	1,5	93,8
	ΔΙΔΑΚΤΟΡΙΚΟ	8	6,2	6,2	100,0
	Total	130	100,0	100,0	

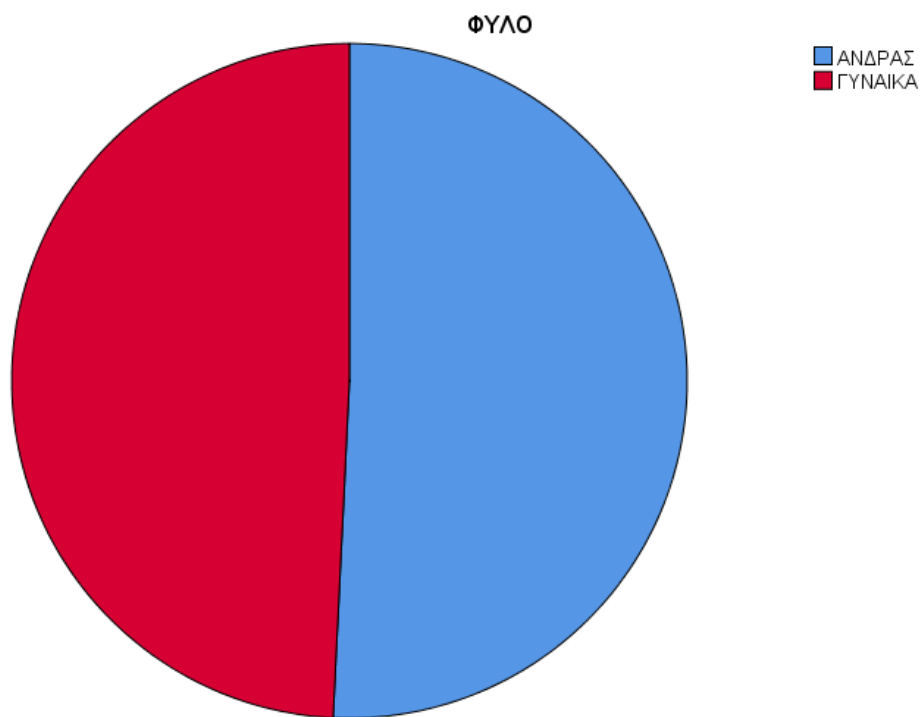
### ΙΔΙΟΤΗΤΑ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΦΟΙΤΗΤΗΣ	78	60,0	60,0	60,0
	ΜΙΣΘΩΤΟΣ	52	40,0	40,0	100,0
	Total	130	100,0	100,0	

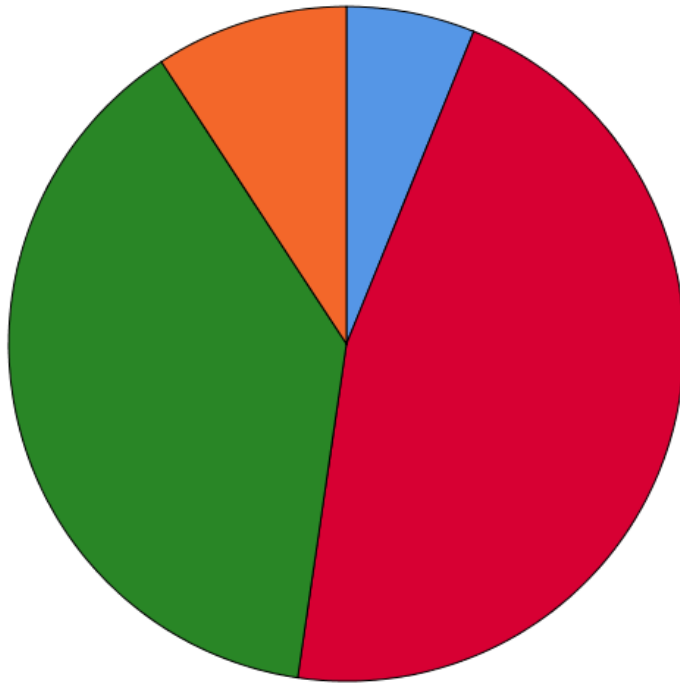
### ΣΥΝΑΦΕΙΑ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΣΥΝΑΦΕΣ	66	50,8	50,8	50,8
	ΜΗ ΣΗΝΑΦΕΣ	64	49,2	49,2	100,0
	Total	130	100,0	100,0	

## Pie Chart

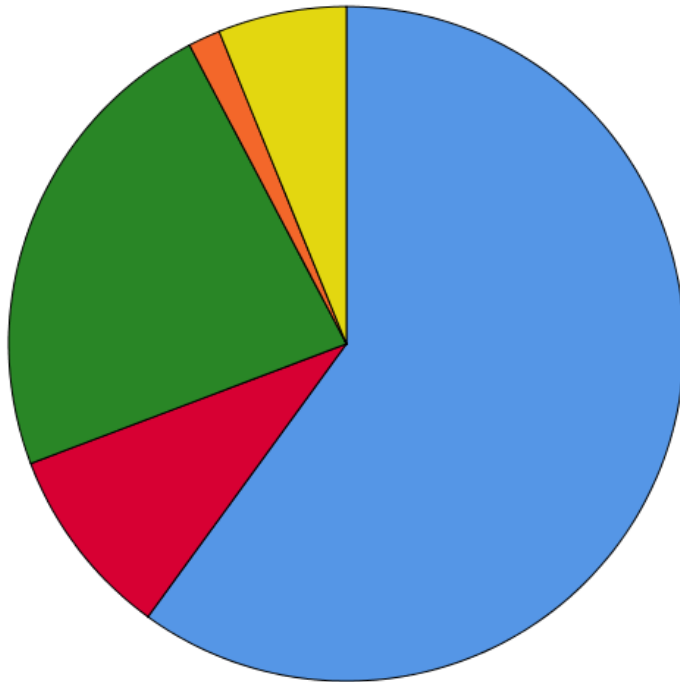


ΗΛΙΚΙΑ



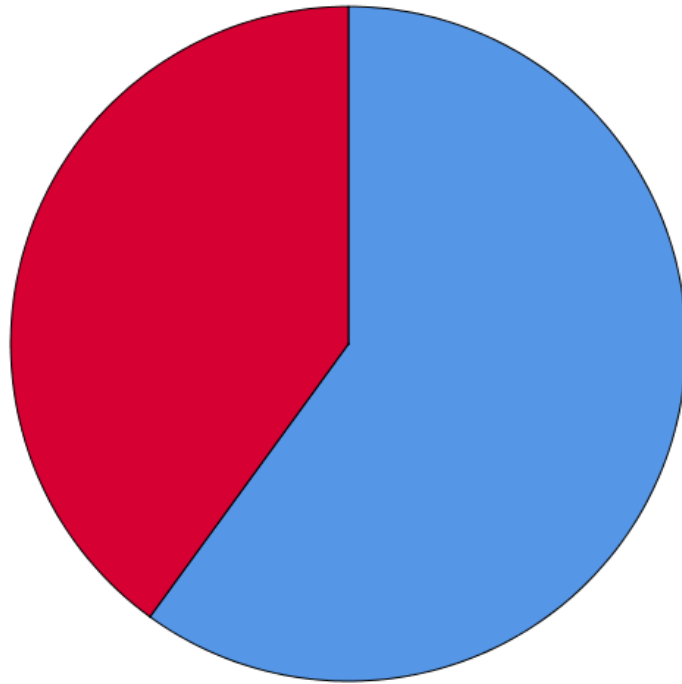
- 26-35
- 46-56
- 56-65
- >65

ΕΚΠΑΙΔΕΥΣΗ



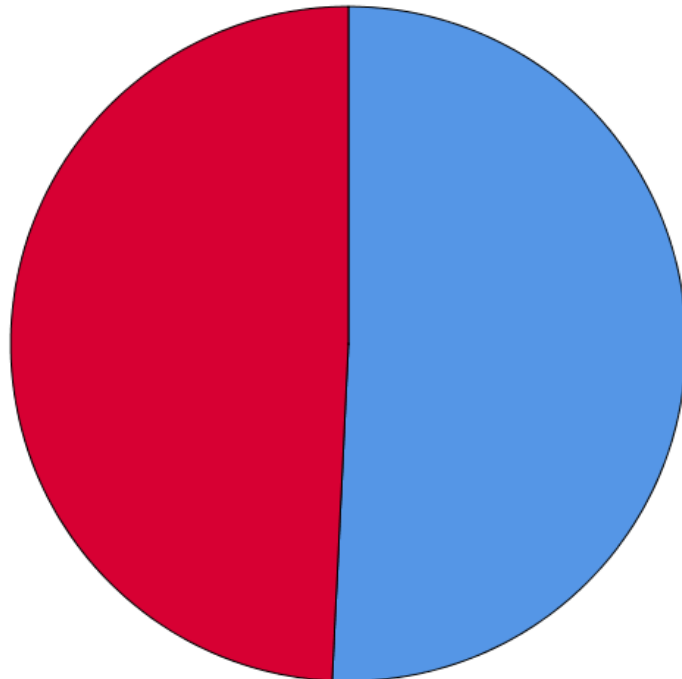
- ΛΥΚΕΙΟ
- ΙΕΚ-ΜΕΤΑΛΥΚΕΙΑΚΗ ΣΧΟΛΗ
- ΑΕΙ/ΤΕΙ
- ΜΕΤΑΠΤΥΧΙΑΚΟ
- ΔΙΔΑΚΤΟΡΙΚΟ

ΙΔΙΟΤΗΤΑ



■ ΦΟΙΤΗΤΗΣ  
■ ΜΙΣΘΩΤΟΣ

ΣΥΝΑΦΕΙΑ



■ ΣΥΝΑΦΕΣ  
■ ΜΗ ΣΗΝΑΦΕΣ



## APPENDIX F RELIABILITY ANALYSIS

### Notes

Output Created		11-MAY-2020 22:33:52
Comments		
Input	Data	C:\Users\ANALYSIS NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
	Matrix Input	C:\Users\Desktop\ANALYSIS NELLAS\DB_NELLAS1.sav
	Missing Value Handling	Definition of Missing
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax		RELIABILITY /VARIABLES=e1 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA  /STATISTICS=DESCRIPTIV E SCALE CORR /SUMMARY=TOTAL.
Resources	Processor Time	00:00:00,02
	Elapsed Time	00:00:00,03

[DataSet1] C:\Users\ANALYSIS NELLAS\DB\_NELLAS1.sav

**Scale: ALL VARIABLES**

### Case Processing Summary

		N	%
Cases	Valid	130	100,0
	Excluded <sup>a</sup>	0	,0
	Total	130	100,0

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,639	,656	15

### Item Statistics

	Mean	Std. Deviation	N
ΕΡΩΤΗΣΗ 1	2,66	,953	130
ΕΡΩΤΗΣΗ 3	2,82	,896	130
ΕΡΩΤΗΣΗ 4	3,68	,770	130
ΕΡΩΤΗΣΗ 5	3,88	,907	130
ΕΡΩΤΗΣΗ 6	3,18	1,112	130
ΕΡΩΤΗΣΗ 7	2,97	,948	130
ΕΡΩΤΗΣΗ 8	4,17	,974	130
ΕΡΩΤΗΣΗ 9	3,77	,894	130
ΕΡΩΤΗΣΗ 10	4,15	,885	130
ΕΡΩΤΗΣΗ 11	3,85	,885	130
ΕΡΩΤΗΣΗ 12	3,62	1,007	130
ΕΡΩΤΗΣΗ 13	2,23	1,082	130
ΕΡΩΤΗΣΗ 14	4,58	1,153	130
ΕΡΩΤΗΣΗ 15	4,20	1,248	130
ΕΡΩΤΗΣΗ 16	4,78	,835	130

### Inter-Item Correlation Matrix

	ΕΡΩΤΗΣΗ 1	ΕΡΩΤΗΣΗ 3	ΕΡΩΤΗΣΗ 4	ΕΡΩΤΗΣΗ 5	ΕΡΩΤΗΣΗ 6	ΕΡΩΤΗΣΗ 7
ΕΡΩΤΗΣΗ 1	1,000	-,455	,188	,041	-,058	-,080
ΕΡΩΤΗΣΗ 3	-,455	1,000	-,110	,201	-,121	,030
ΕΡΩΤΗΣΗ 4	,188	-,110	1,000	,342	-,057	,220
ΕΡΩΤΗΣΗ 5	,041	,201	,342	1,000	,115	,176
ΕΡΩΤΗΣΗ 6	-,058	-,121	-,057	,115	1,000	,241
ΕΡΩΤΗΣΗ 7	-,080	,030	,220	,176	,241	1,000
ΕΡΩΤΗΣΗ 8	-,021	-,159	,094	,252	,057	-,078
ΕΡΩΤΗΣΗ 9	,035	-,112	,184	,137	,184	,321
ΕΡΩΤΗΣΗ 10	,025	-,023	,415	,410	,129	,135
ΕΡΩΤΗΣΗ 11	,067	-,212	,222	,054	,281	,253
ΕΡΩΤΗΣΗ 12	,122	-,354	,219	,135	,299	,134
ΕΡΩΤΗΣΗ 13	,016	-,100	,034	-,066	-,216	,022
ΕΡΩΤΗΣΗ 14	,181	-,165	,092	-,005	,012	,017
ΕΡΩΤΗΣΗ 15	,097	,047	,342	-,074	-,094	,215
ΕΡΩΤΗΣΗ 16	,161	-,033	,349	,190	,394	,344

### Inter-Item Correlation Matrix

	ΕΡΩΤΗΣΗ 8	ΕΡΩΤΗΣΗ 9	ΕΡΩΤΗΣΗ 10	ΕΡΩΤΗΣΗ 11	ΕΡΩΤΗΣΗ 12
ΕΡΩΤΗΣΗ 1	-,021	,035	,025	,067	,122
ΕΡΩΤΗΣΗ 3	-,159	-,112	-,023	-,212	-,354
ΕΡΩΤΗΣΗ 4	,094	,184	,415	,222	,219
ΕΡΩΤΗΣΗ 5	,252	,137	,410	,054	,135
ΕΡΩΤΗΣΗ 6	,057	,184	,129	,281	,299
ΕΡΩΤΗΣΗ 7	-,078	,321	,135	,253	,134
ΕΡΩΤΗΣΗ 8	1,000	,206	,564	,337	,209
ΕΡΩΤΗΣΗ 9	,206	1,000	,300	,367	,193
ΕΡΩΤΗΣΗ 10	,564	,300	1,000	,526	,258
ΕΡΩΤΗΣΗ 11	,337	,367	,526	1,000	,264
ΕΡΩΤΗΣΗ 12	,209	,193	,258	,264	1,000
ΕΡΩΤΗΣΗ 13	-,155	,168	-,167	-,173	-,032
ΕΡΩΤΗΣΗ 14	,077	,057	,109	-,109	,062
ΕΡΩΤΗΣΗ 15	-,015	,264	,155	,014	-,099
ΕΡΩΤΗΣΗ 16	,007	,224	,297	,186	,140

### Inter-Item Correlation Matrix

	ΕΡΩΤΗΣΗ 13	ΕΡΩΤΗΣΗ 14	ΕΡΩΤΗΣΗ 15	ΕΡΩΤΗΣΗ 16
ΕΡΩΤΗΣΗ 1	,016	,181	,097	,161
ΕΡΩΤΗΣΗ 3	-,100	-,165	,047	-,033
ΕΡΩΤΗΣΗ 4	,034	,092	,342	,349
ΕΡΩΤΗΣΗ 5	-,066	-,005	-,074	,190

ΕΡΩΤΗΣΗ 6	-,216	,012	-,094	,394
ΕΡΩΤΗΣΗ 7	,022	,017	,215	,344
ΕΡΩΤΗΣΗ 8	-,155	,077	-,015	,007
ΕΡΩΤΗΣΗ 9	,168	,057	,264	,224
ΕΡΩΤΗΣΗ 10	-,167	,109	,155	,297
ΕΡΩΤΗΣΗ 11	-,173	-,109	,014	,186
ΕΡΩΤΗΣΗ 12	-,032	,062	-,099	,140
ΕΡΩΤΗΣΗ 13	1,000	,301	,264	,107
ΕΡΩΤΗΣΗ 14	,301	1,000	,511	,422
ΕΡΩΤΗΣΗ 15	,264	,511	1,000	,369
ΕΡΩΤΗΣΗ 16	,107	,422	,369	1,000

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ΕΡΩΤΗΣΗ 1	51,88	34,031	,057	,341	,652
ΕΡΩΤΗΣΗ 3	51,72	37,504	-,250	,483	,688
ΕΡΩΤΗΣΗ 4	50,86	31,221	,437	,467	,603
ΕΡΩΤΗΣΗ 5	50,66	31,699	,299	,433	,618
ΕΡΩΤΗΣΗ 6	51,35	32,106	,177	,433	,637
ΕΡΩΤΗΣΗ 7	51,57	31,193	,328	,303	,613
ΕΡΩΤΗΣΗ 8	50,37	32,235	,216	,441	,629
ΕΡΩΤΗΣΗ 9	50,77	30,380	,445	,323	,597
ΕΡΩΤΗΣΗ 10	50,38	29,665	,532	,618	,585
ΕΡΩΤΗΣΗ 11	50,69	31,439	,337	,477	,612
ΕΡΩΤΗΣΗ 12	50,92	31,699	,252	,295	,624
ΕΡΩΤΗΣΗ 13	52,31	34,168	,018	,286	,662
ΕΡΩΤΗΣΗ 14	49,95	30,494	,294	,485	,617
ΕΡΩΤΗΣΗ 15	50,34	29,311	,348	,527	,607
ΕΡΩΤΗΣΗ 16	49,75	29,582	,582	,526	,580

### Scale Statistics

Mean	Variance	Std. Deviation	N of Items
54,54	35,568	5,964	15

## APPENDIX H VARIABLES CORRELATION

<b>Notes</b>		
Output Created		16-MAY-2020 14:57:52
Comments		
Input	Data	C:\Users\NELLAS\DATA NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
	Missing Value Handling	Definition of Missing
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax	EXAMINE VARIABLES=e1 INDEX_B INDEX_C /PLOT BOXPLOT STEMLEAF HISTOGRAM NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.	
Resources	Processor Time	00:00:10,00
	Elapsed Time	00:00:04,24

### Case Processing Summary

	Cases	
Valid	Missing	Total

	N	Percent	N	Percent	N	Percent
ΕΡΩΤΗΣΗ 1	130	100,0%	0	0,0%	130	100,0%
ΠΑΡΑΓΟΝΤΑΣ Β	130	100,0%	0	0,0%	130	100,0%
ΠΑΡΑΓΟΝΤΑΣ C	130	100,0%	0	0,0%	130	100,0%

### Descriptives

		Statistic	Std. Error	
ΕΡΩΤΗΣΗ 1	Mean	2,66	,084	
	95% Confidence Interval for Mean	Lower Bound	2,50	
		Upper Bound	2,83	
	5% Trimmed Mean	2,65		
	Median	3,00		
	Variance	,908		
	Std. Deviation	,953		
	Minimum	1		
	Maximum	5		
	Range	4		
	Interquartile Range	1		
	Skewness	,291	,212	
	Kurtosis	-,262	,422	
ΠΑΡΑΓΟΝΤΑΣ Β	Mean	3,5492	,04069	
	95% Confidence Interval for Mean	Lower Bound	3,4687	
		Upper Bound	3,6297	
	5% Trimmed Mean	3,5573		
	Median	3,5000		
	Variance	,215		
	Std. Deviation	,46393		
	Minimum	2,10		
	Maximum	4,60		
	Range	2,50		
	Interquartile Range	,63		
	Skewness	-,254	,212	
	Kurtosis	,647	,422	
ΠΑΡΑΓΟΝΤΑΣ C	Mean	4,5235	,07537	
	95% Confidence Interval for Mean	Lower Bound	4,3744	
		Upper Bound	4,6727	
	5% Trimmed Mean	4,5561		
	Median	4,6700		
	Variance	,738		

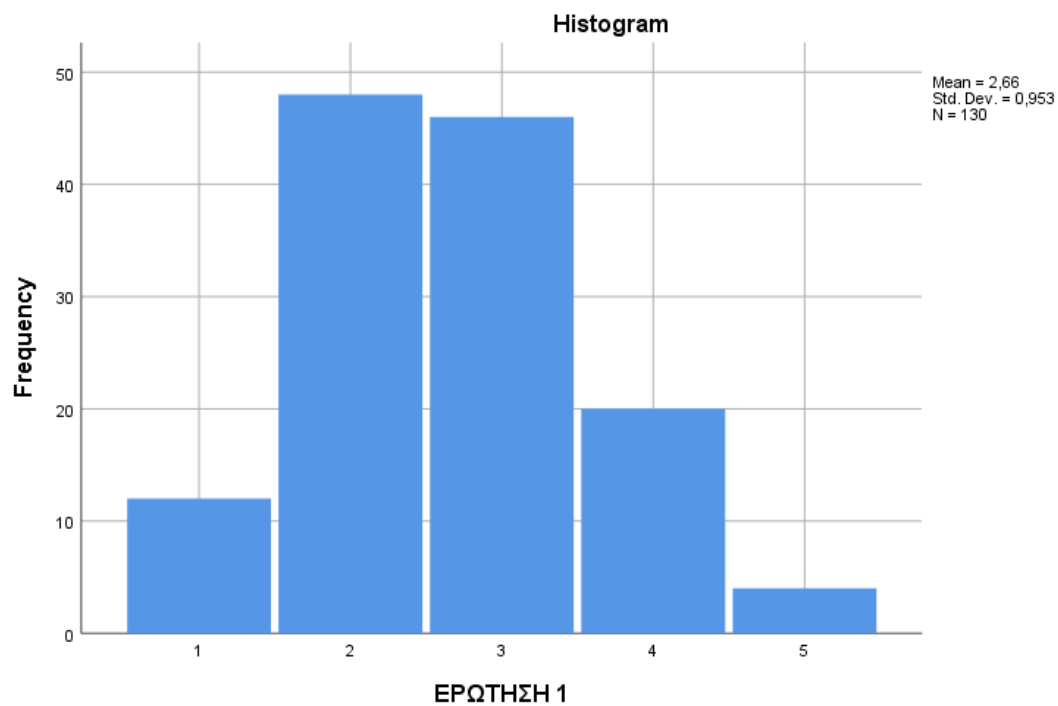
Std. Deviation	,85934	
Minimum	2,00	
Maximum	6,00	
Range	4,00	
Interquartile Range	1,00	
Skewness	-,696	,212
Kurtosis	,410	,422

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
QUESTION 1	,218	130	,000	,897	130	,000
FACTOR Β	,096	130	,005	,972	130	,008
FACTOR Γ	,198	130	,000	,939	130	,000

a. Lilliefors Significance Correction

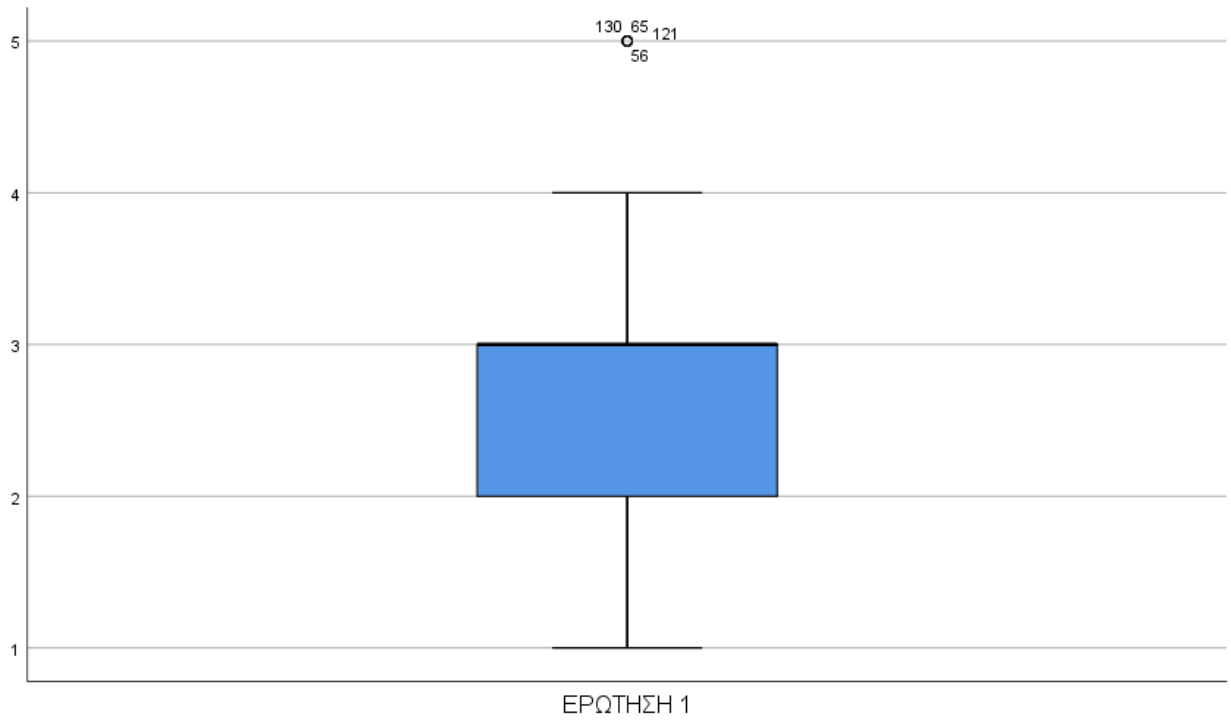
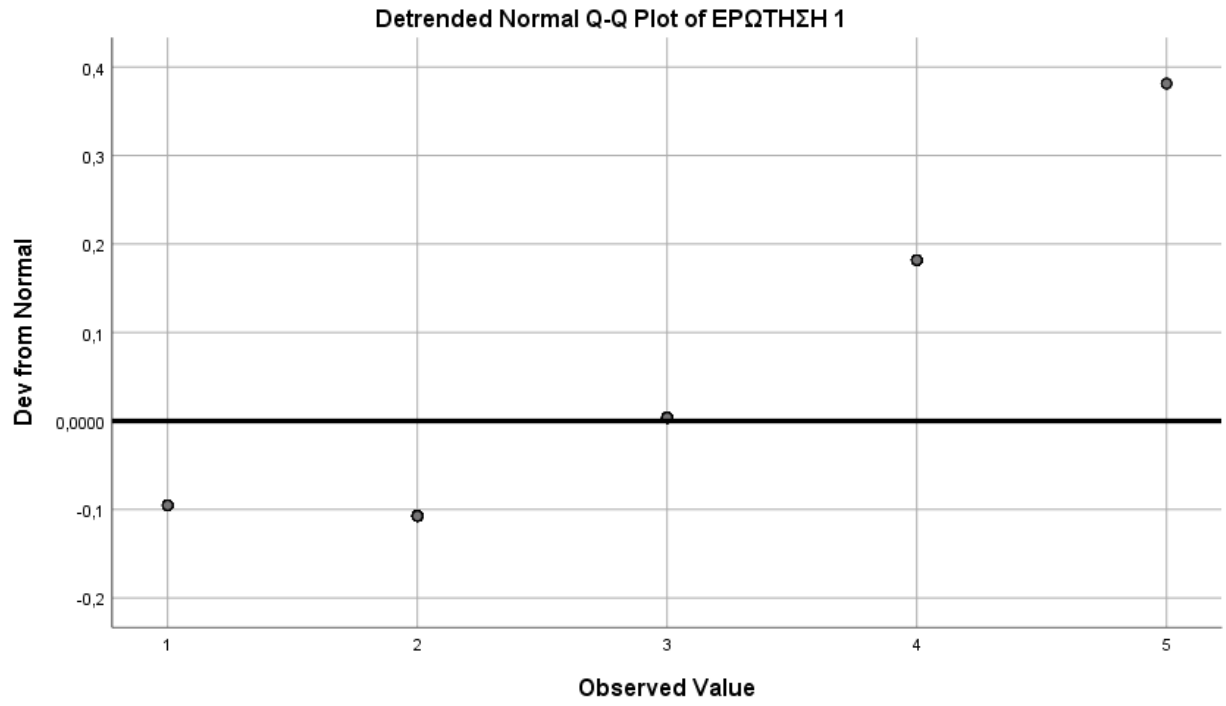
### QUESTION 1



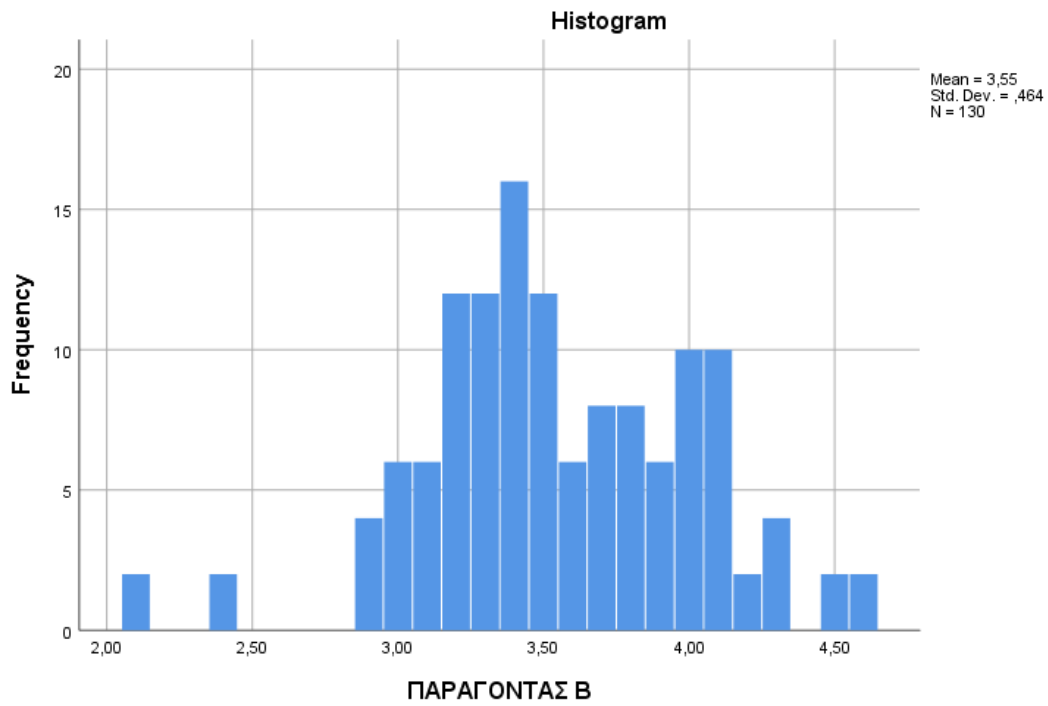
### ΕΡΩΤΗΣΗ 1 Stem-and-Leaf Plot







**FACTOR B**



**FACTOR B Stem-and-Leaf Plot**

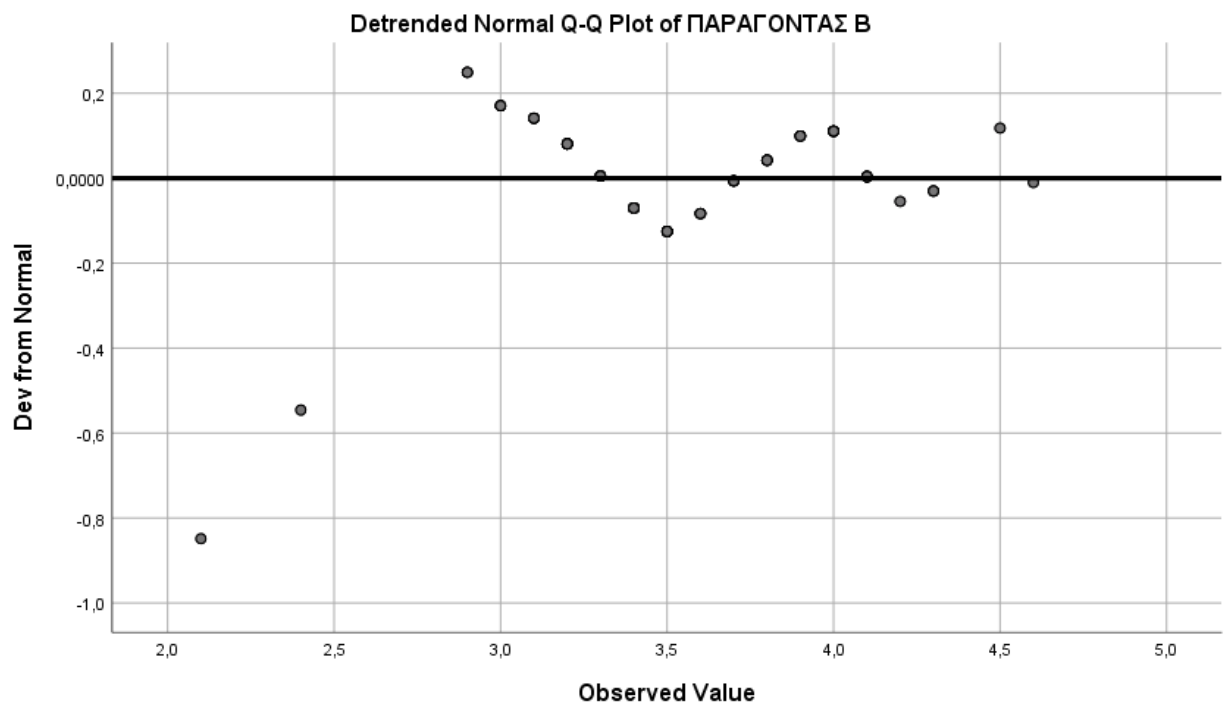
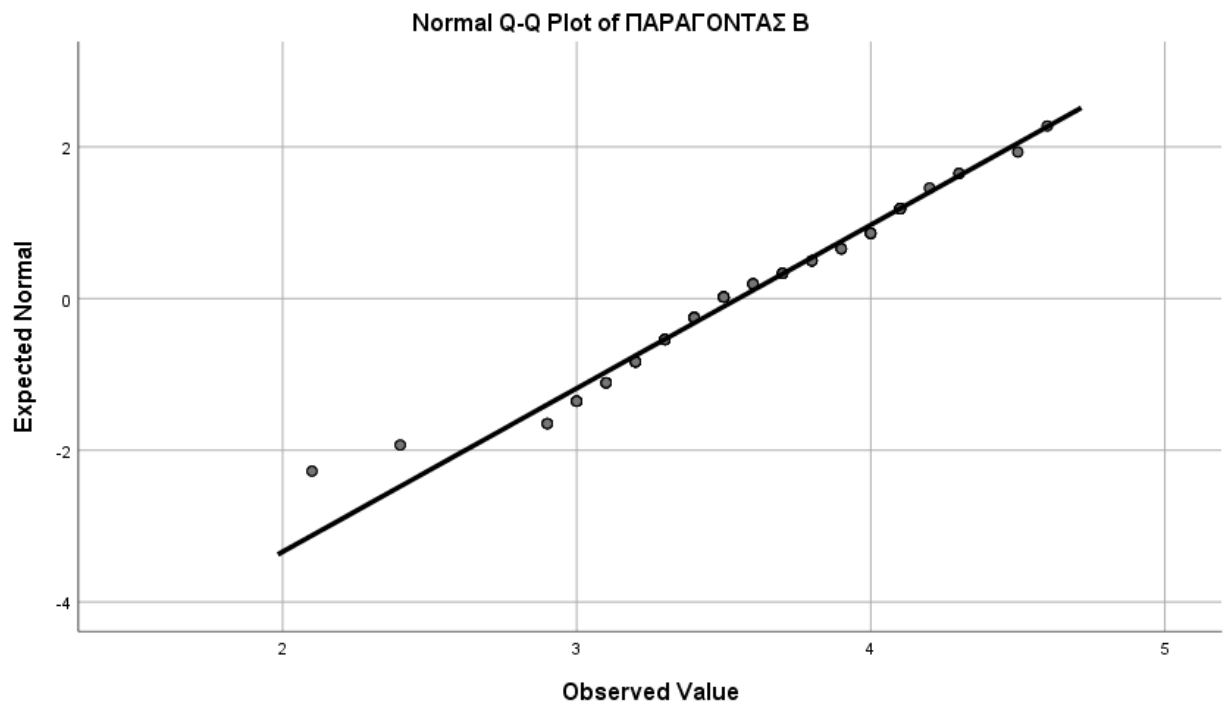
Frequency Stem & Leaf

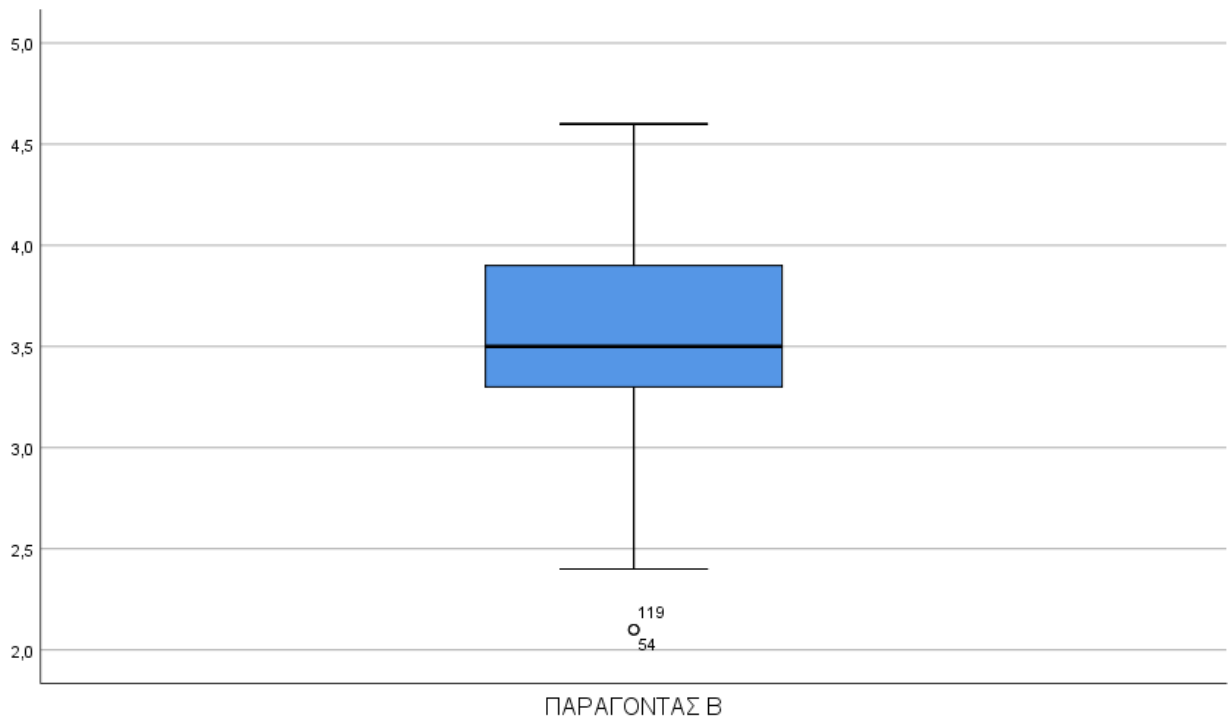
```

2,00 Extremes  (= <= 2,1)
,00  2 .
2,00  2 . 44
,00  2 .
4,00  2 . 9999
12,00  3 . 000000111111
24,00  3 . 22222222222233333333333333
28,00  3 . 444444444444444444445555555555
14,00  3 . 66666677777777
14,00  3 . 88888888999999
20,00  4 . 00000000001111111111
6,00  4 . 223333
2,00  4 . 55
2,00  4 . 66

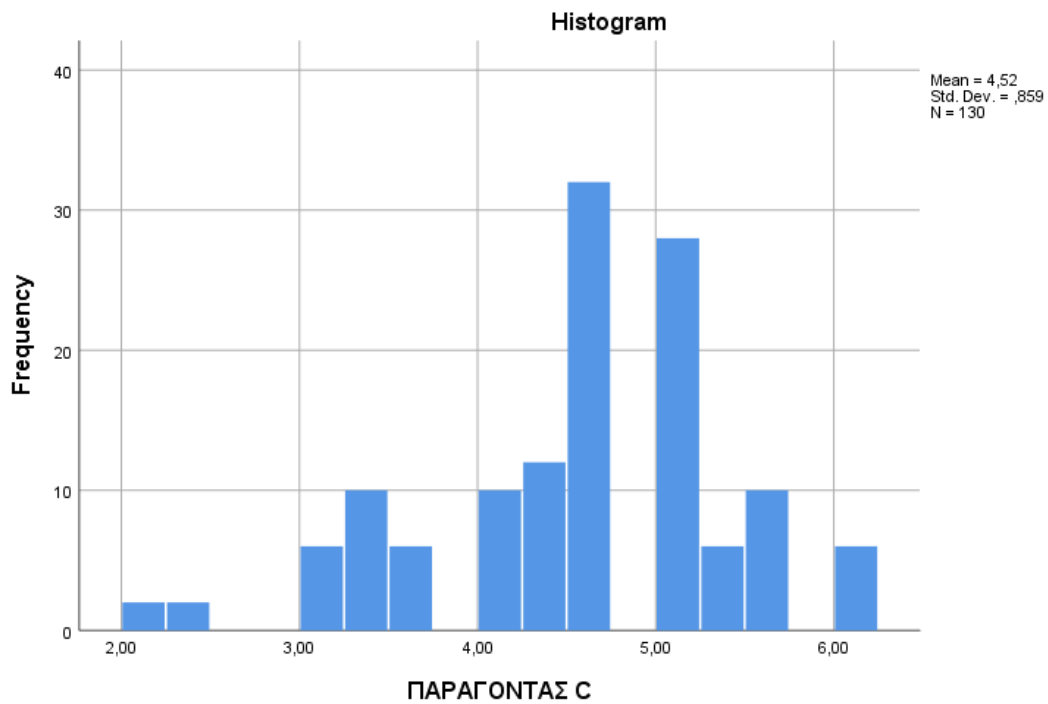
```

Stem width: 1,00  
Each leaf: 1 case(s)



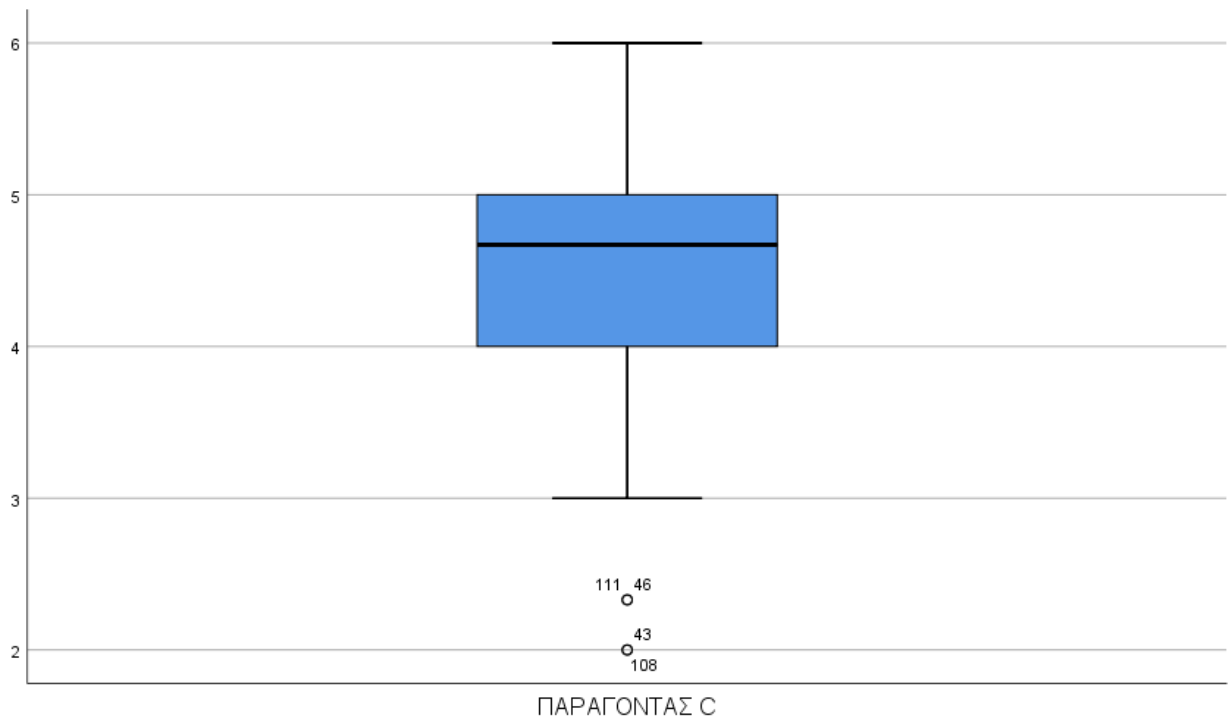
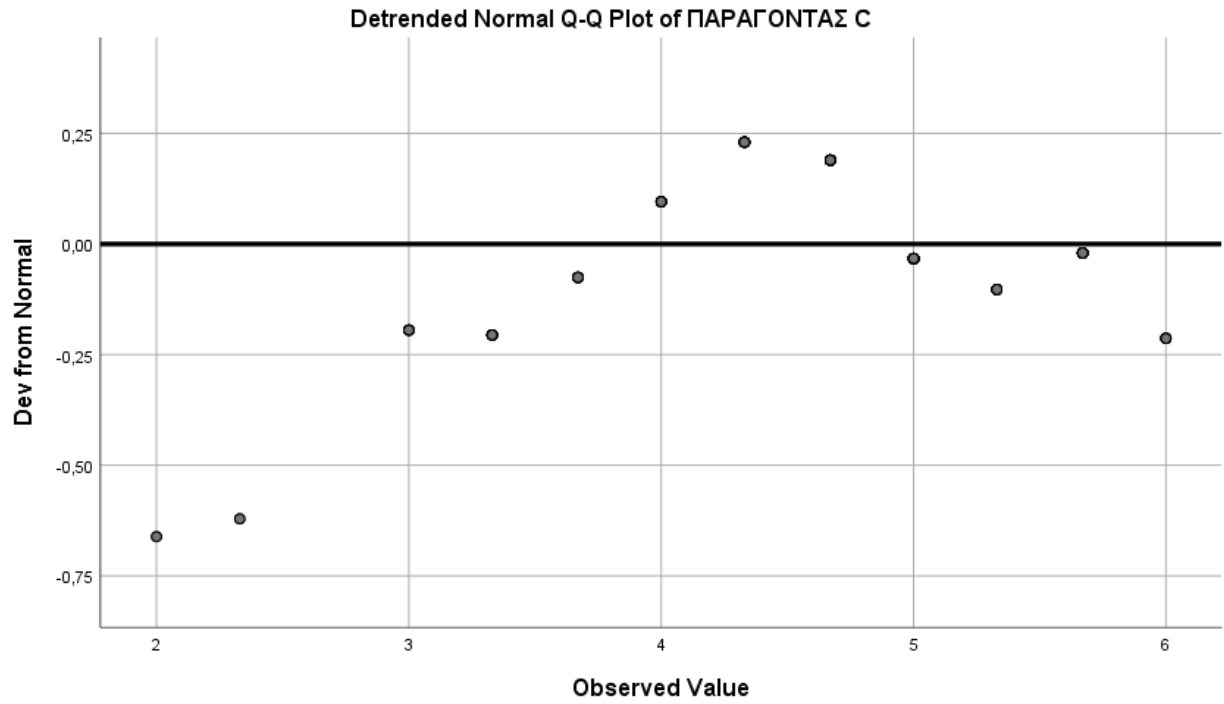


## FACTOR Γ



## FACTOR Γ Stem-and-Leaf Plot





```

NONPAR CORR
/VARIABLES=e1 INDEX_B INDEX_C
/PRINT=SPEARMAN TWOTAIL NOSIG
/MISSING=PAIRWISE.

```

## Nonparametric Correlations

### Notes

Output Created		16-MAY-2020 15:02:00
Comments		
Input	Data	C:\Users\ NELLAS\DATA NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax	NONPAR CORR /VARIABLES=e1 INDEX_B INDEX_C /PRINT=SPEARMAN TWO-TAIL NOSIG /MISSING=PAIRWISE.	
Resources	Processor Time	00:00:00,00
	Elapsed Time	00:00:00,01
	Number of Cases Allowed	524288 cases <sup>a</sup>

a. Based on availability of workspace memory

### Correlations

		ΕΡΩΤΗΣΗ 1	ΠΑΡΑΓΟΝΤΑΣ B
Spearman's rho	ΕΡΩΤΗΣΗ 1	Correlation Coefficient	1,000
			,033

	Sig. (2-tailed)	.	,707
	N	130	130
FACTOR B	Correlation Coefficient	,033	1,000
	Sig. (2-tailed)	,707	.
	N	130	130
FACTOR Γ	Correlation Coefficient	,216*	,377**
	Sig. (2-tailed)	,014	,000
	N	130	130

### Correlations

		ΠΑΡΑΓΟΝΤΑΣ C	
Spearman's rho	QUESTION 1	Correlation Coefficient	,216*
		Sig. (2-tailed)	,014
		N	130
	FACTOR B	Correlation Coefficient	,377**
		Sig. (2-tailed)	,000
		N	130
	ΠΑΡΑΓΟΝΤΑΣ C	Correlation Coefficient	1,000
		Sig. (2-tailed)	.
		N	130

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

```
FREQUENCIES VARIABLES=INDEX_B INDEX_C
/FORMAT=NOTABLE
/STATISTICS=STDDEV VARIANCE RANGE MINIMUM MAXIMUM MEAN
MEDIAN MODE
/ORDER=ANALYSIS.
```

### Frequencies

#### Notes

Output Created	16-MAY-2020 15:05:43	
Comments		
Input	Data	C:\Users\NELLAS\DATA NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>



	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=INDEX_B INDEX_C /FORMAT=NOTABLE /STATISTICS=STDDEV VARIANCE RANGE MINIMUM MAXIMUM MEAN MEDIAN MODE /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00,00
	Elapsed Time	00:00:00,00

### Statistics

		FACTOR B	FACTOR C
N	Valid	130	130
	Missing	0	0
Mean		3,5492	4,5235
Median		3,5000	4,6700
Mode		3,40	4,67
Std. Deviation		,46393	,85934
Variance		,215	,738
Range		2,50	4,00
Minimum		2,10	2,00
Maximum		4,60	6,00

## APPENDIX I DESCRIPTIVE ANALYSIS

### Frequencies

Notes		
Output Created		11-MAY-2020 02:15:34
Comments		
Input	Data	C:\Users \ANALYSIS NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
	Missing Value Handling	Definition of Missing
Cases Used		Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=e1 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 /STATISTICS=STDDEV MEAN /PIECHART PERCENT /ORDER=ANALYSIS.
Resources	Processor Time	00:00:08,53
	Elapsed Time	00:00:03,82

Statistics						
		QUESTION 1	QUESTION 3	QUESTION 4	QUESTION 5	QUESTION 6
N	Valid	130	130	130	130	130
	Missing	0	0	0	0	0
Mean		2,66	2,82	3,68	3,88	3,18
Std. Deviation		,953	,896	,770	,907	1,112

Statistics						
		QUESTION 7	QUESTION 8	QUESTION 9	QUESTION 10	QUESTION 11

N	Valid	130	130	130	130	130
	Missing	0	0	0	0	0
Mean		2,97	4,17	3,77	4,15	3,85
Std. Deviation		,948	,974	,894	,885	,885

### Statistics

		QUESTION 12	QUESTION 13	QUESTION 14	QUESTION 15	QUESTION 16
N	Valid	130	130	130	130	130
	Missing	0	0	0	0	0
Mean		3,62	2,23	4,58	4,20	4,78
Std. Deviation		1,007	1,082	1,153	1,248	,835

### Frequency Table

#### QUESTION 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΚΑΘΟΛΟΥ	12	9,2	9,2	9,2
	ΕΛΑΧΙΣΤΑ	48	36,9	36,9	46,2
	ΜΕΤΡΙΑ	46	35,4	35,4	81,5
	ΚΑΛΑ	20	15,4	15,4	96,9
	ΠΟΛΥ ΚΑΛΑ	4	3,1	3,1	100,0
	Total	130	100,0	100,0	

#### QUESTION 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΤΟΥΛΑΧΙΣΤΟΝ 10	12	9,2	9,2	9,2
	5 ΕΩΣ 9	30	23,1	23,1	32,3
	1 ΕΩΣ 4	58	44,6	44,6	76,9
	ΚΑΝΕΝΑΝ	30	23,1	23,1	100,0
	Total	130	100,0	100,0	

#### QUESTION 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	2	1,5	1,5	1,5

ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	4	3,1	3,1	4,6
ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	42	32,3	32,3	36,9
ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	68	52,3	52,3	89,2
ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	14	10,8	10,8	100,0
Total	130	100,0	100,0	

### QUESTION 5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	10	7,7	7,7	7,7
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	32	24,6	24,6	32,3
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	52	40,0	40,0	72,3
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	36	27,7	27,7	100,0
	Total	130	100,0	100,0	

### QUESTION 6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	8	6,2	6,2	6,2
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	32	24,6	24,6	30,8
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	32	24,6	24,6	55,4
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	44	33,8	33,8	89,2
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	14	10,8	10,8	100,0
	Total	130	100,0	100,0	

### QUESTION 7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	4	3,1	3,1	3,1
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	36	27,7	27,7	30,8
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	62	47,7	47,7	78,5
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	16	12,3	12,3	90,8

	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	12	9,2	9,2	100,0
	Total	130	100,0	100,0	

### QUESTION 8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	4	3,1	3,1	3,1
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	6	4,6	4,6	7,7
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	10	7,7	7,7	15,4
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	54	41,5	41,5	56,9
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	56	43,1	43,1	100,0
	Total	130	100,0	100,0	

### QUESTION 9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	2	1,5	1,5	1,5
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	8	6,2	6,2	7,7
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	34	26,2	26,2	33,8
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	60	46,2	46,2	80,0
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	26	20,0	20,0	100,0
	Total	130	100,0	100,0	

### QUESTION 10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	2	1,5	1,5	1,5
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	4	3,1	3,1	4,6
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	18	13,8	13,8	18,5
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	54	41,5	41,5	60,0
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	52	40,0	40,0	100,0
	Total	130	100,0	100,0	

### ΕΡΩΤΗΣΗ 11

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	2	1,5	1,5	1,5
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	6	4,6	4,6	6,2
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	32	24,6	24,6	30,8
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	60	46,2	46,2	76,9
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	30	23,1	23,1	100,0
	Total	130	100,0	100,0	

### QUESTION 12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	4	3,1	3,1	3,1
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	8	6,2	6,2	9,2
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	50	38,5	38,5	47,7
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	42	32,3	32,3	80,0
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	24	18,5	18,5	98,5
	6	2	1,5	1,5	100,0
	Total	130	100,0	100,0	

### QUESTION 13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ	34	26,2	26,2	26,2
	ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ	58	44,6	44,6	70,8
	ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ	16	12,3	12,3	83,1
	ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ	18	13,8	13,8	96,9
	ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ	4	3,1	3,1	100,0
	Total	130	100,0	100,0	

### QUESTION 14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΕΝ ΞΕΡΩ - ΔΕΝ ΑΠΑΝΤΩ	8	6,2	6,2	6,2
	ΑΡΝΗΤΙΚΑ	2	1,5	1,5	7,7
	ΜΕΤΡΙΑ	38	29,2	29,2	36,9
	ΘΕΤΙΚΑ	62	47,7	47,7	84,6
	ΠΟΛΥ ΘΕΤΙΚΑ	20	15,4	15,4	100,0
	Total	130	100,0	100,0	

### QUESTION 15

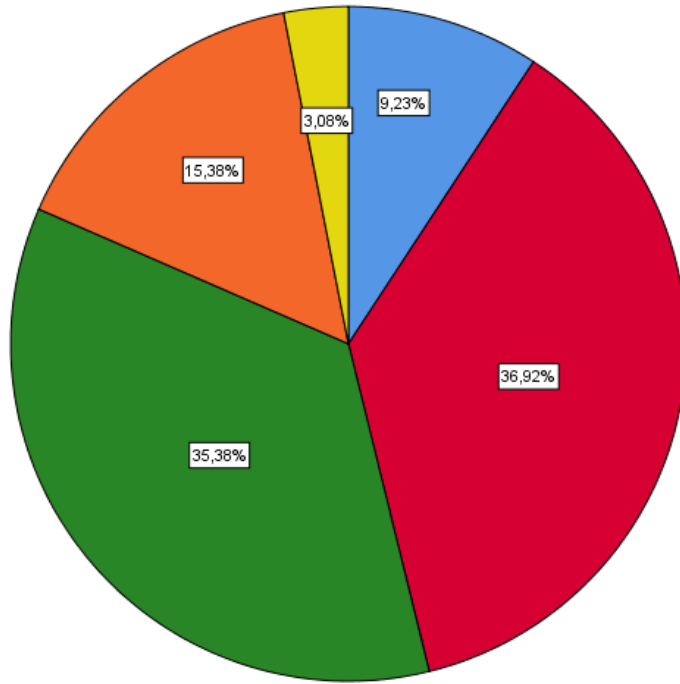
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΕΝ ΞΕΡΩ - ΔΕΝ ΑΠΑΝΤΩ	10	7,7	7,7	7,7
	ΠΟΛΥ ΑΡΝΗΤΙΚΑ	2	1,5	1,5	9,2
	ΑΡΝΗΤΙΚΑ	12	9,2	9,2	18,5
	ΜΕΤΡΙΑ	46	35,4	35,4	53,8
	ΘΕΤΙΚΑ	48	36,9	36,9	90,8
	ΠΟΛΥ ΘΕΤΙΚΑ	12	9,2	9,2	100,0
	Total	130	100,0	100,0	

### QUESTION 16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΔΕΝ ΞΕΡΩ - ΔΕΝ ΑΠΑΝΤΩ	2	1,5	1,5	1,5
	ΑΡΝΗΤΙΚΑ	4	3,1	3,1	4,6
	ΜΕΤΡΙΑ	30	23,1	23,1	27,7
	ΘΕΤΙΚΑ	76	58,5	58,5	86,2
	ΠΟΛΥ ΘΕΤΙΚΑ	18	13,8	13,8	100,0
	Total	130	100,0	100,0	

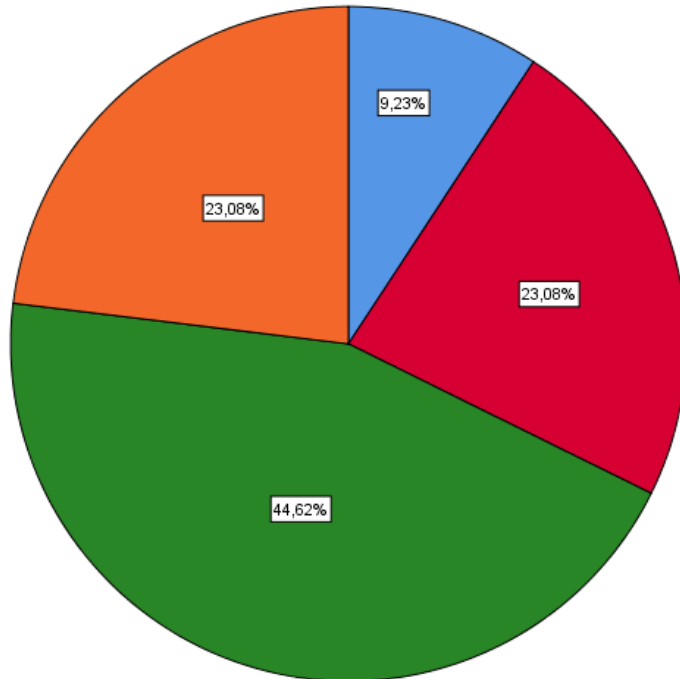
## Pie Chart

ΕΡΩΤΗΣΗ 1



- ΚΑΘΟΛΟΥ
- ΕΛΑΧΙΣΤΑ
- ΜΕΤΡΙΑ
- ΚΑΛΑ
- ΠΟΛΥ ΚΑΛΑ

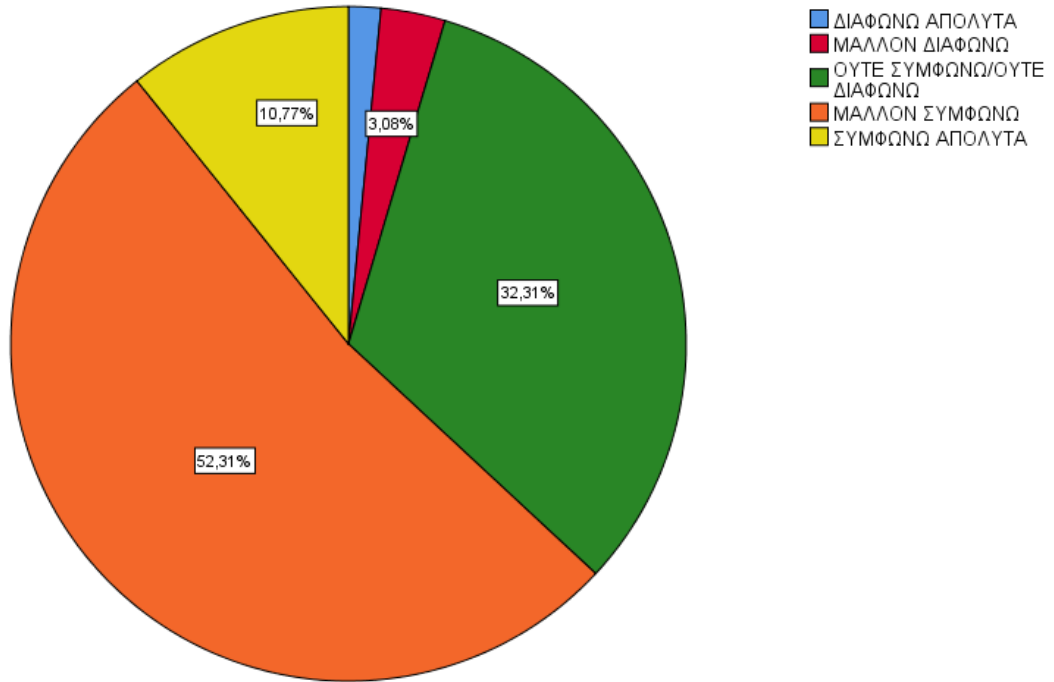
ΕΡΩΤΗΣΗ 3



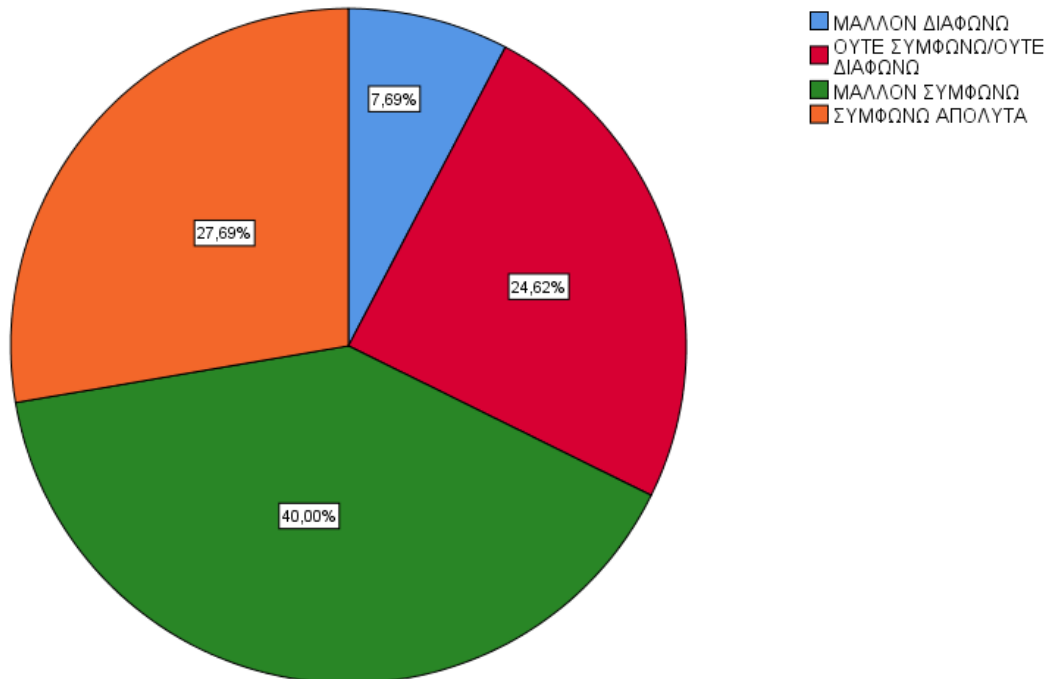
- ΤΟΥΛΑΧΙΣΤΟΝ 10
- 5 ΕΩΣ 9
- 1 ΕΩΣ 4
- ΚΑΝΕΝΑΝ



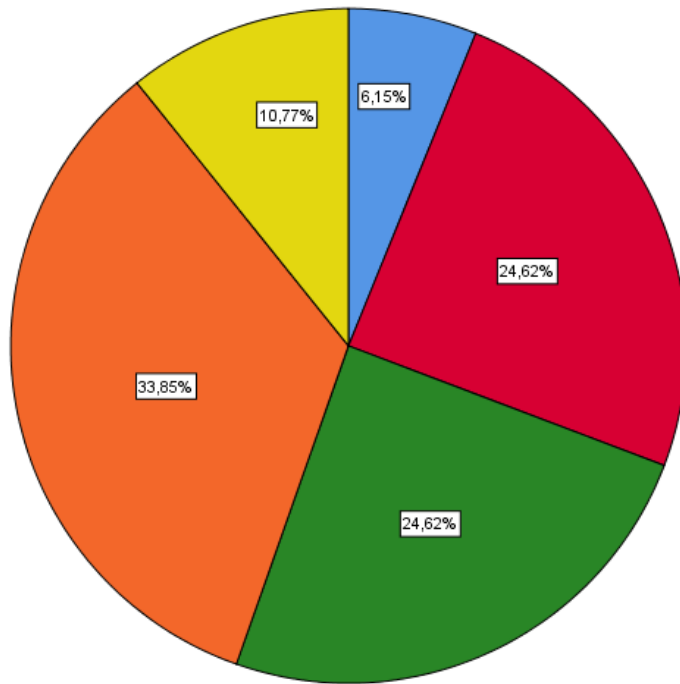
ΕΡΩΤΗΣΗ 4



ΕΡΩΤΗΣΗ 5

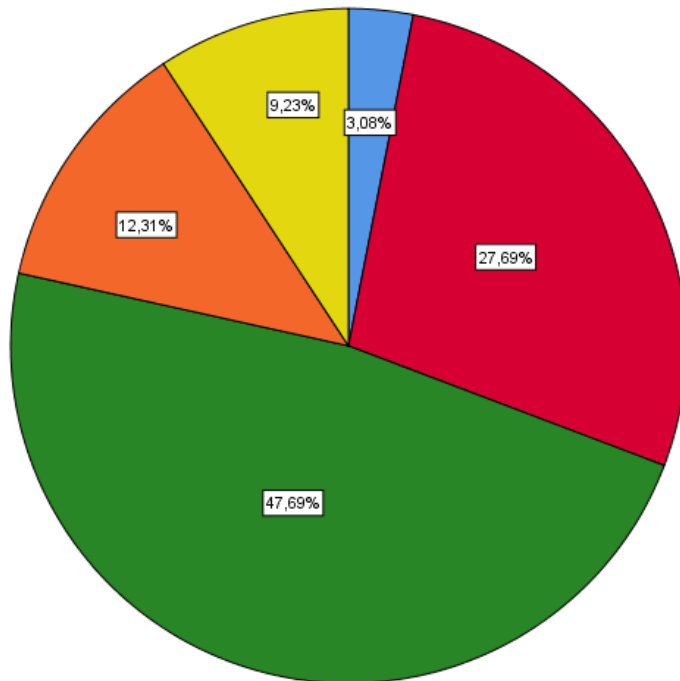


### ΕΡΩΤΗΣΗ 6



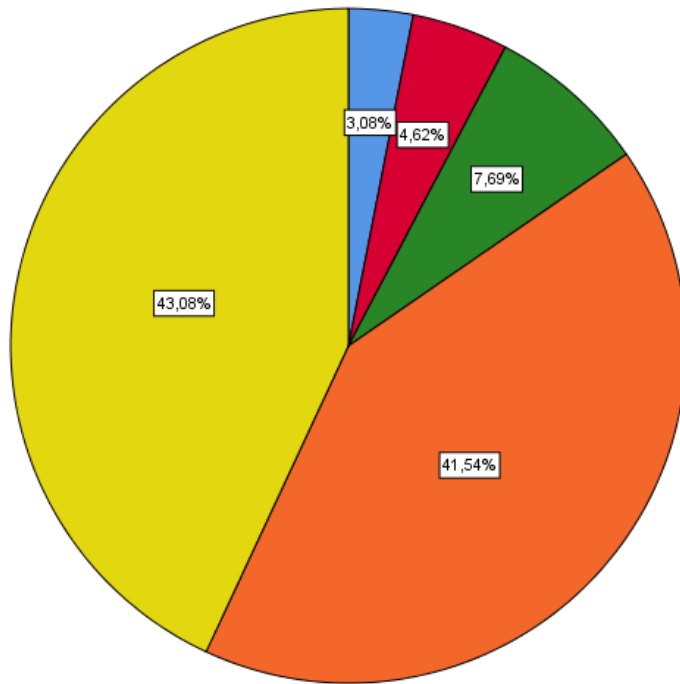
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

### ΕΡΩΤΗΣΗ 7



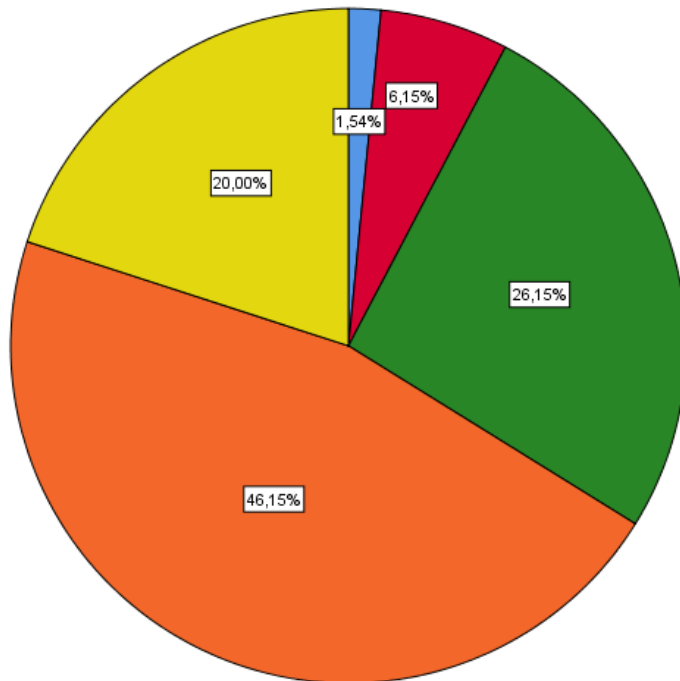
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

### ΕΡΩΤΗΣΗ 8



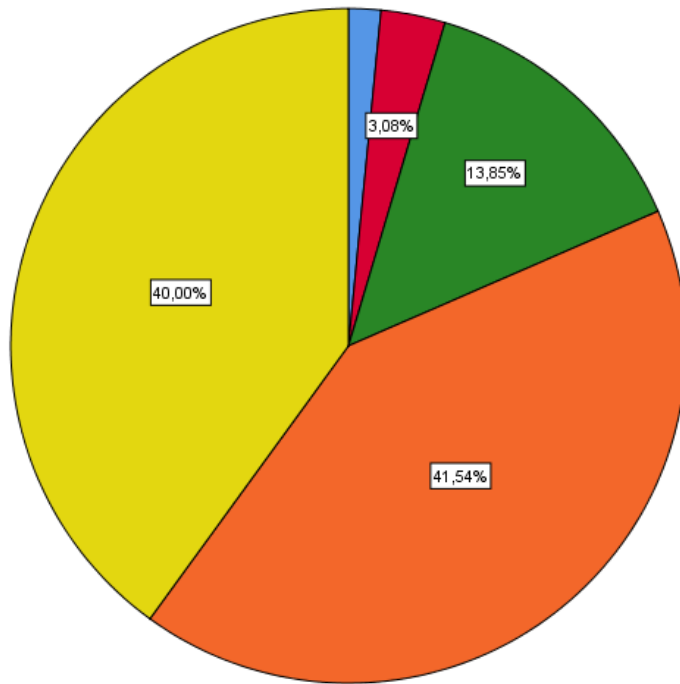
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

### ΕΡΩΤΗΣΗ 9



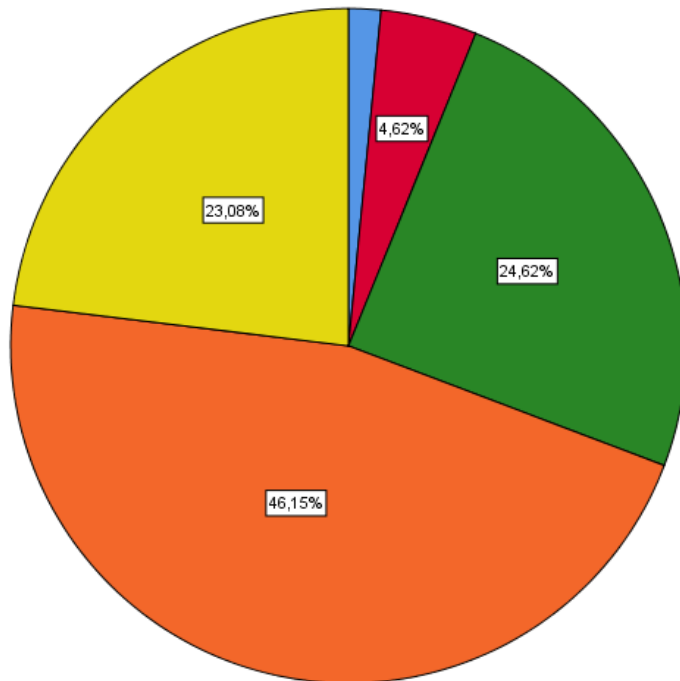
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

ΕΡΩΤΗΣΗ 10



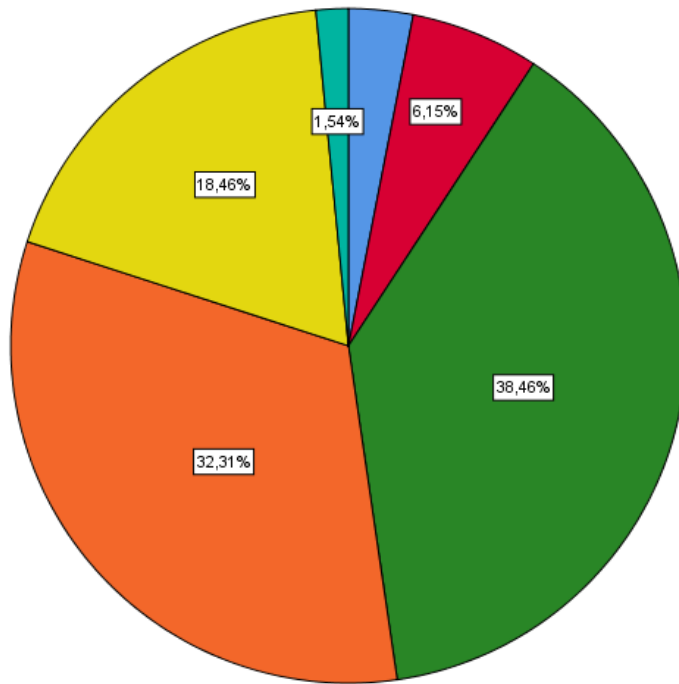
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

ΕΡΩΤΗΣΗ 11



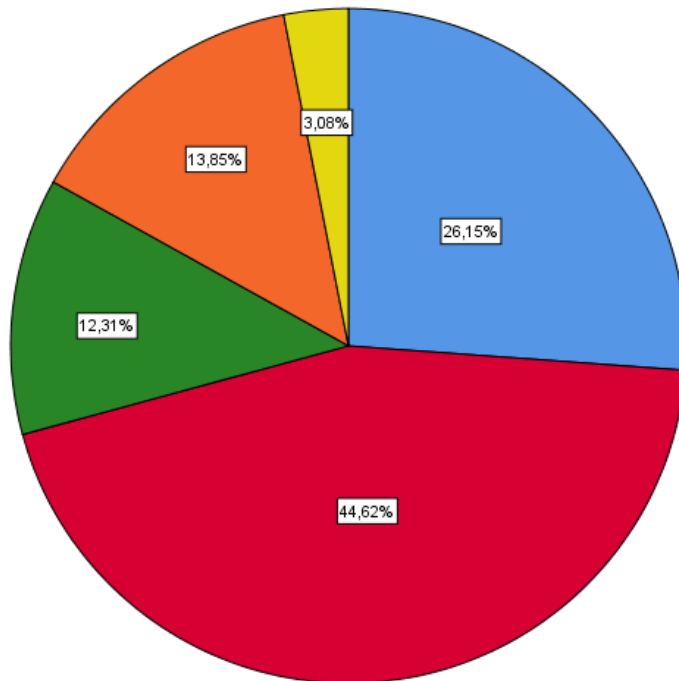
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

ΕΡΩΤΗΣΗ 12



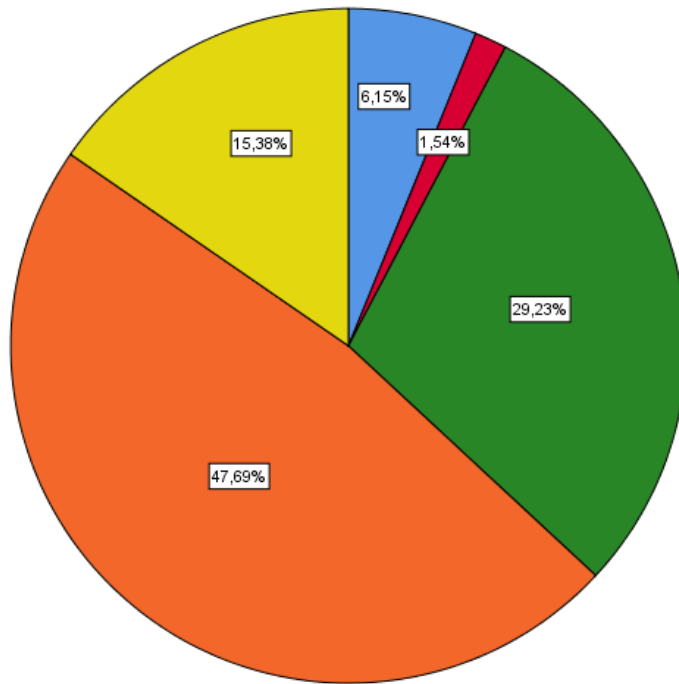
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ
- 6

ΕΡΩΤΗΣΗ 13



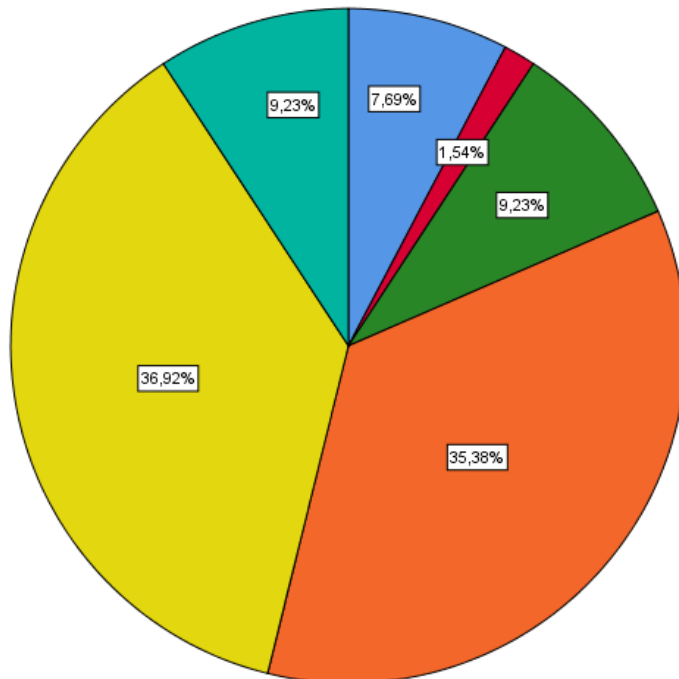
- ΔΙΑΦΩΝΩ ΑΠΟΛΥΤΑ
- ΜΑΛΛΟΝ ΔΙΑΦΩΝΩ
- ΟΥΤΕ ΣΥΜΦΩΝΩ/ΟΥΤΕ ΔΙΑΦΩΝΩ
- ΜΑΛΛΟΝ ΣΥΜΦΩΝΩ
- ΣΥΜΦΩΝΩ ΑΠΟΛΥΤΑ

ΕΡΩΤΗΣΗ 14



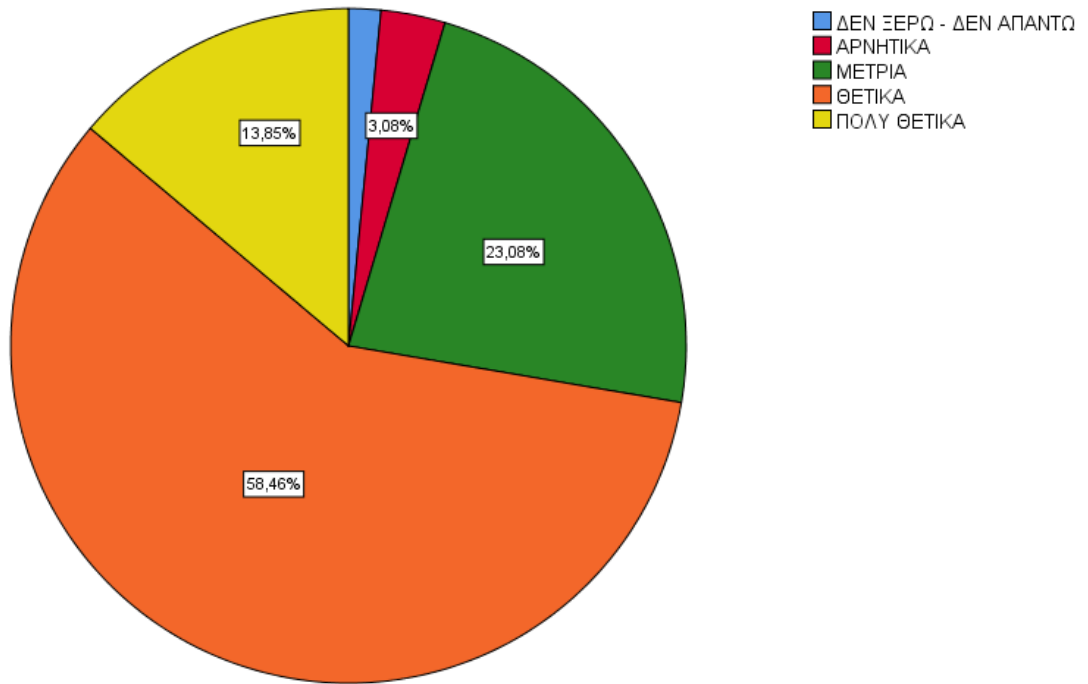
- ΔΕΝ ΞΕΡΩ - ΔΕΝ ΑΠΑΝΤΩ
- ΑΡΝΗΤΙΚΑ
- ΜΕΤΡΙΑ
- ΘΕΤΙΚΑ
- ΠΟΛΥ ΘΕΤΙΚΑ

ΕΡΩΤΗΣΗ 15



- ΔΕΝ ΞΕΡΩ - ΔΕΝ ΑΠΑΝΤΩ
- ΠΟΛΥ ΑΡΝΗΤΙΚΑ
- ΑΡΝΗΤΙΚΑ
- ΜΕΤΡΙΑ
- ΘΕΤΙΚΑ
- ΠΟΛΥ ΘΕΤΙΚΑ

ΕΡΩΤΗΣΗ 16



## APPENDIX J AGE FACTOR

### Frequencies

#### Notes

Output Created		04-JUN-2020 01:47:22
Comments		
Input	Data	C:\Users\ANALYSIS NELLAS\DB_NELLAS1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=HLIKIA STASH /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00,02
	Elapsed Time	00:00:00,01

#### Statistics

		HLIKIA	ΑΝΤΙΛΗΨΗ ΓΙΑ ΘΑΛΑΣΣΙΑ ΑΣΦΑΛΕΙΑ
N	Valid	130	130
	Missing	0	0



## Frequency Table

		AGE			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26-35	8	6,2	6,2	6,2
	46-56	60	46,2	46,2	52,3
	56-65	50	38,5	38,5	90,8
	>65	12	9,2	9,2	100,0
	Total	130	100,0	100,0	

## PERCEPTION OF MARITIME SECURITY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ΜΙΑ ΕΠΙΛΟΓΗ	44	33,8	33,8	33,8
	2 ΕΠΙΛΟΓΕΣ	28	21,5	21,5	55,4
	3 ΕΠΙΛΟΓΕΣ	28	21,5	21,5	76,9
	4 ΕΠΙΛΟΓΕΣ	12	9,2	9,2	86,2
	ΟΛΕΣ ΤΙΣ ΕΠΙΛΟΓΕΣ	18	13,8	13,8	100,0
	Total	130	100,0	100,0	

## APPENDIX K FACTOR ANALYSIS

### Notes

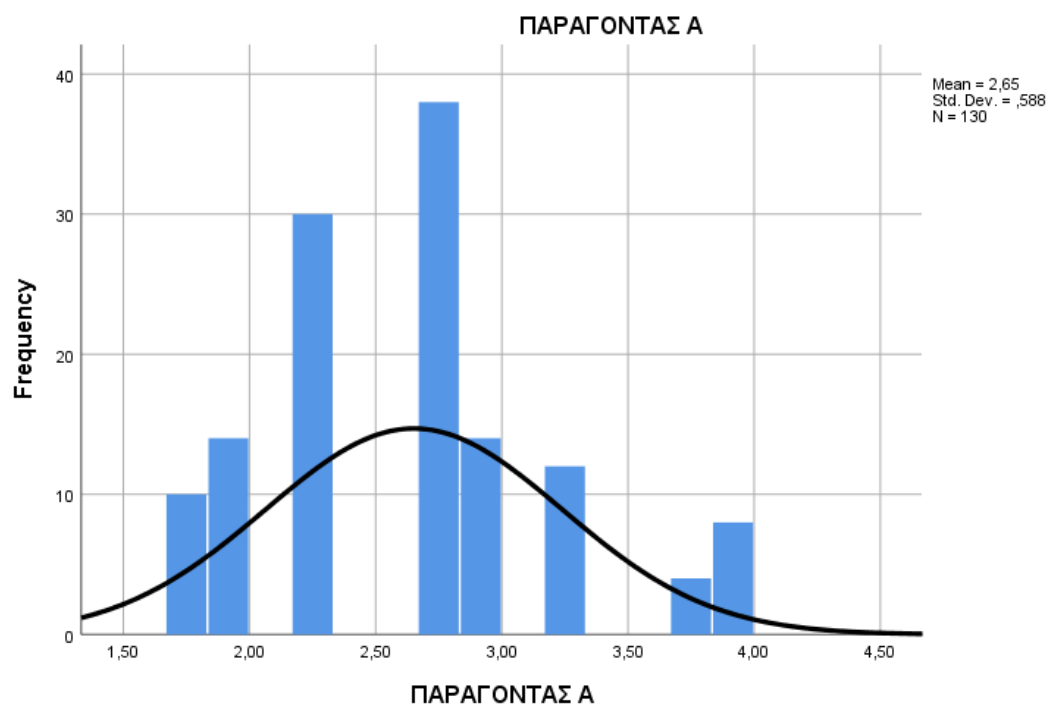
Output Created		05-JUN-2020 03:01:27
Comments		
Input	Data	C:\Users\ ANALYSIS NELLAS\TELIKO ARXEIO ANALYSIS\DB_NELLAS FINAL.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=PARA PARB PARC /FORMAT=NOTABLE /STATISTICS=STDDEV VARIANCE RANGE MINIMUM MAXIMUM MEAN MEDIAN MODE /HISTOGRAM NORMAL /ORDER=ANALYSIS.
Resources	Processor Time	00:00:02,64
	Elapsed Time	00:00:01,37

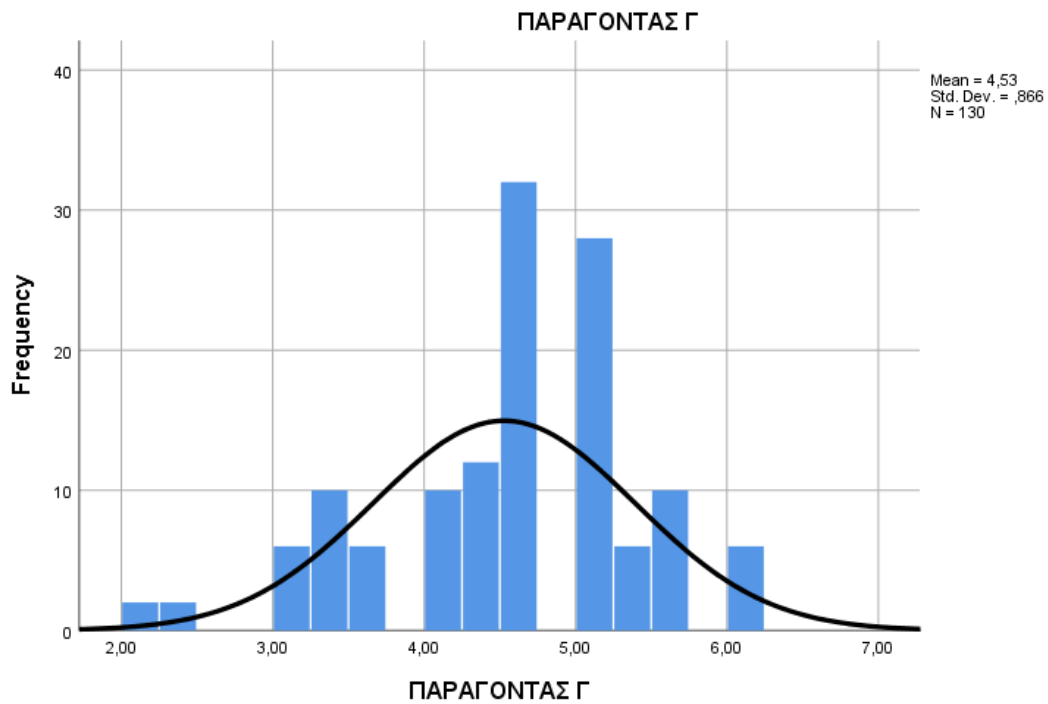
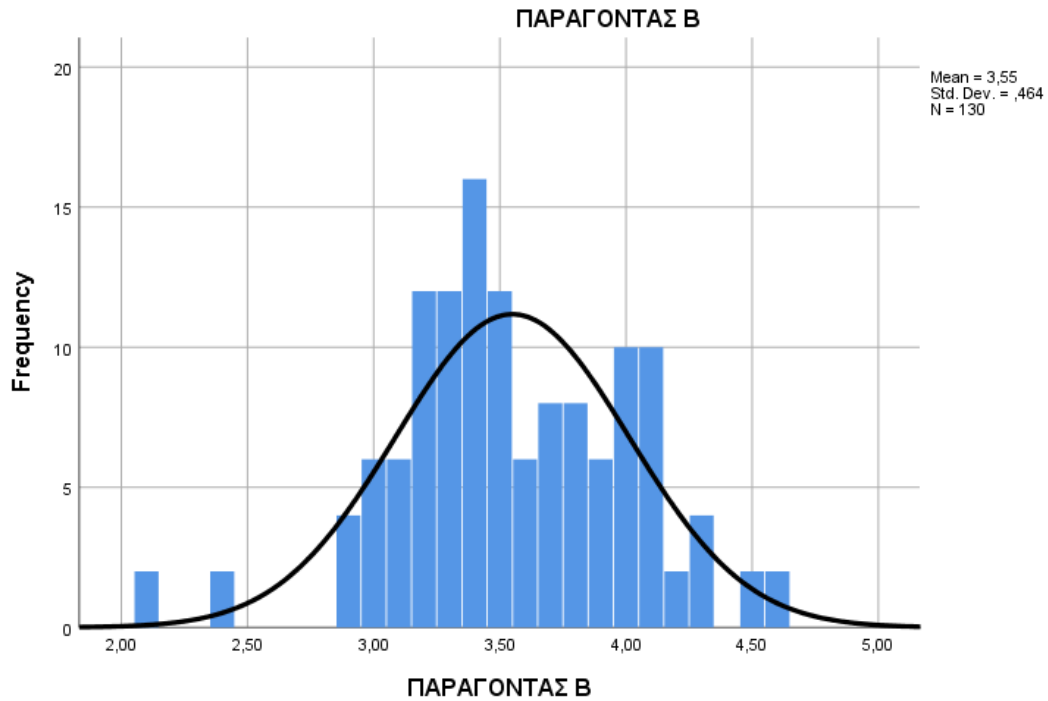
[DataSet1] C:\Users\Desktop\ANALYSIS NELLAS\TELIKO ARXEIO  
ANALYSIS\DB\_NELLAS FINAL.sav

### Statistics

		ΠΑΡΑΓΟΝΤΑΣ Α	ΠΑΡΑΓΟΝΤΑΣ Β	ΠΑΡΑΓΟΝΤΑΣ Γ
N	Valid	130	130	130
	Missing	0	0	0
Mean		2,6515	3,5492	4,5277
Median		2,6700	3,5000	4,7000
Mode		2,67	3,40	4,70
Std. Deviation		,58807	,46393	,86634
Variance		,346	,215	,751
Range		2,33	2,50	4,00
Minimum		1,67	2,10	2,00
Maximum		4,00	4,60	6,00

### Histogram





```

EXAMINE VARIABLES=PARA PARB PARC
/PLOT BOXPLOT STEMLEAF HISTOGRAM NPLOT
/COMPARE GROUPS
/STATISTICS DESCRIPTIVES
/CINTERVAL 95

```

/MISSING LISTWISE  
/NOTOTAL.

### Notes

Output Created		05-JUN-2020 03:03:45
Comments		
Input	Data	C:\Users\ ANALYSIS NELLAS\TELIKO ARXEIO ANALYSIS\DB_NELLAS FINAL.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=PARA PARB PARC /PLOT BOXPLOT STEMLEAF HISTOGRAM NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /INTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:07,36
	Elapsed Time	00:00:03,19

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
FACTOR A	130	100,0%	0	0,0%	130	100,0%
FACTOR B	130	100,0%	0	0,0%	130	100,0%
FACTOR Γ	130	100,0%	0	0,0%	130	100,0%

### Descriptives

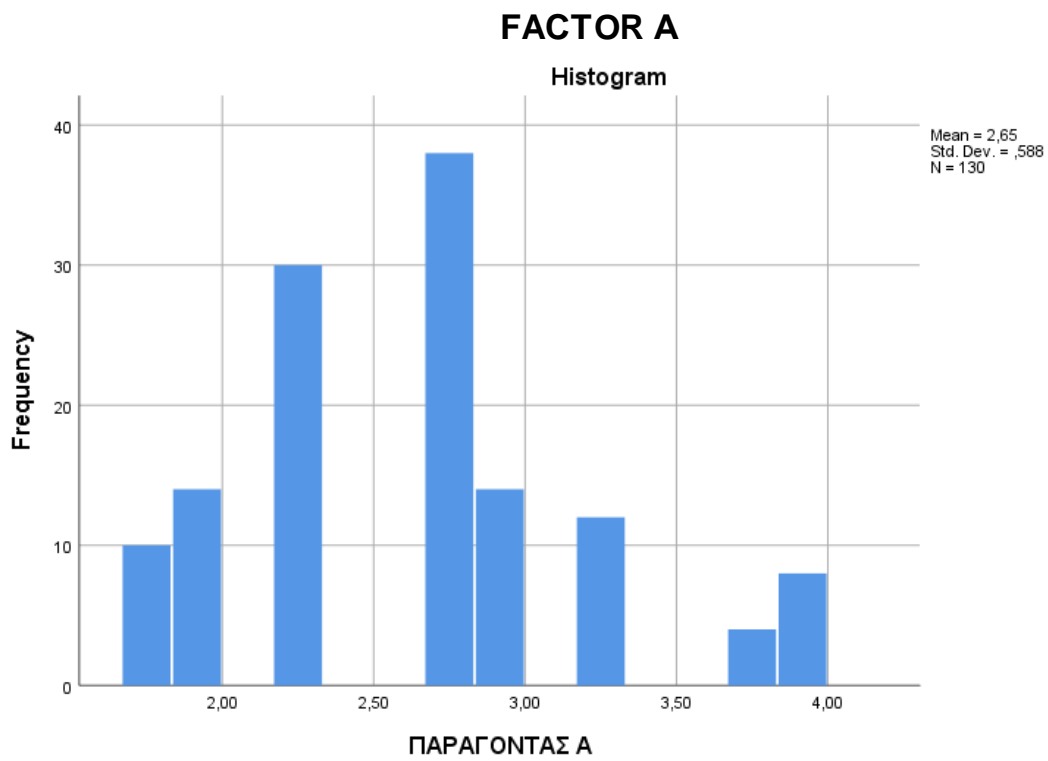
		Statistic	Std. Error	
FACTOR A	Mean	2,6515	,05158	
	95% Confidence Interval for Mean	Lower Bound	2,5495	
		Upper Bound	2,7536	
	5% Trimmed Mean	2,6312		
	Median	2,6700		
	Variance	,346		
	Std. Deviation	,58807		
	Minimum	1,67		
	Maximum	4,00		
	Range	2,33		
	Interquartile Range	,67		
	Skewness	,536	,212	
	Kurtosis	,027	,422	
FACTOR B	Mean	3,5492	,04069	
	95% Confidence Interval for Mean	Lower Bound	3,4687	
		Upper Bound	3,6297	
	5% Trimmed Mean	3,5573		
	Median	3,5000		
	Variance	,215		
	Std. Deviation	,46393		
	Minimum	2,10		
	Maximum	4,60		
	Range	2,50		
	Interquartile Range	,63		
	Skewness	-,254	,212	
	Kurtosis	,647	,422	
FACTOR Γ	Mean	4,5277	,07598	
	95% Confidence Interval for Mean	Lower Bound	4,3774	
		Upper Bound	4,6780	

5% Trimmed Mean	4,5611	
Median	4,7000	
Variance	,751	
Std. Deviation	,86634	
Minimum	2,00	
Maximum	6,00	
Range	4,00	
Interquartile Range	1,00	
Skewness	-,704	,212
Kurtosis	,397	,422

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ΠΑΡΑΓΟΝΤΑΣ Α	,195	130	,000	,933	130	,000
ΠΑΡΑΓΟΝΤΑΣ Β	,096	130	,005	,972	130	,008
ΠΑΡΑΓΟΝΤΑΣ Γ	,210	130	,000	,936	130	,000

a. Lilliefors Significance Correction



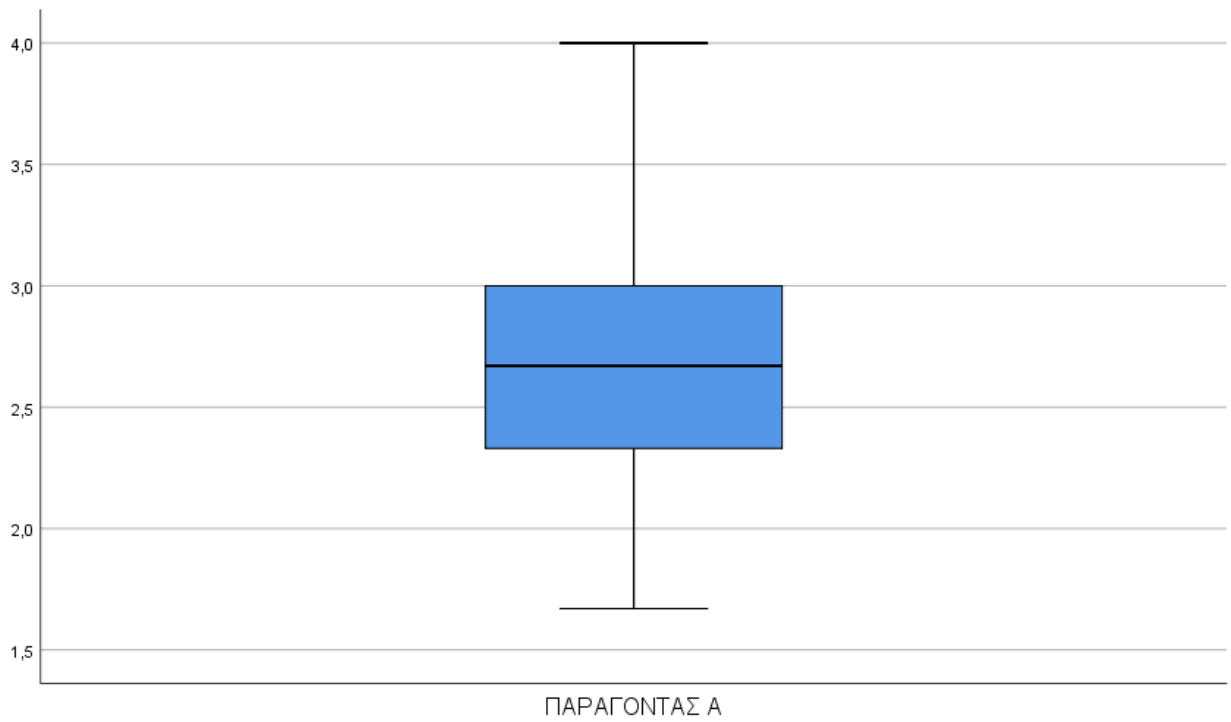
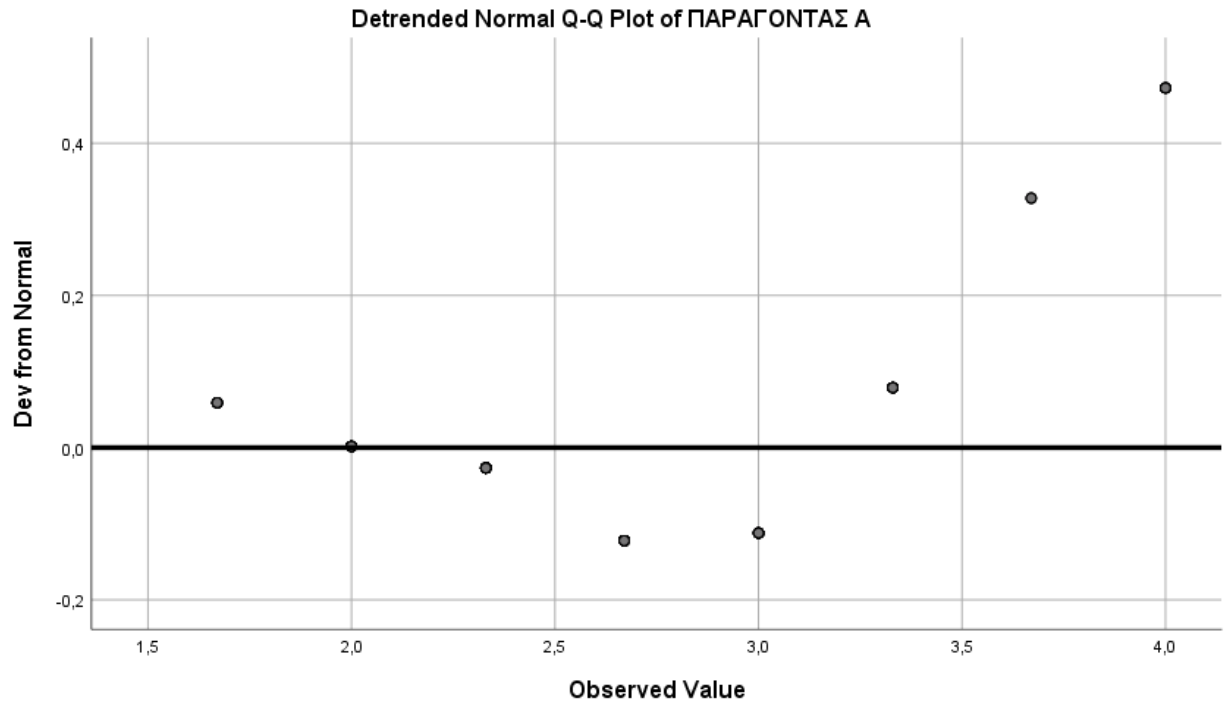
#### ΠΑΡΑΓΟΝΤΑΣ Α Stem-and-Leaf Plot

Frequency    Stem & Leaf

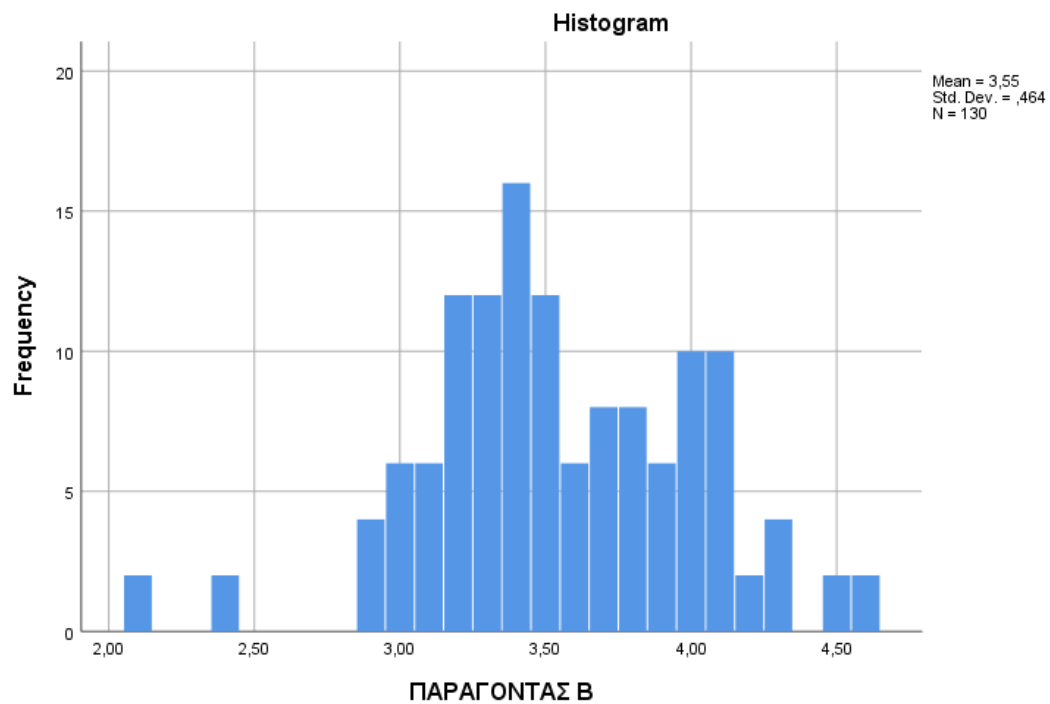
10,00    1 . 6666666666  
,00    1 .







**FACTOR B**



**ΠΑΡΑΓΟΝΤΑΣ Β Stem-and-Leaf Plot**

Frequency Stem & Leaf

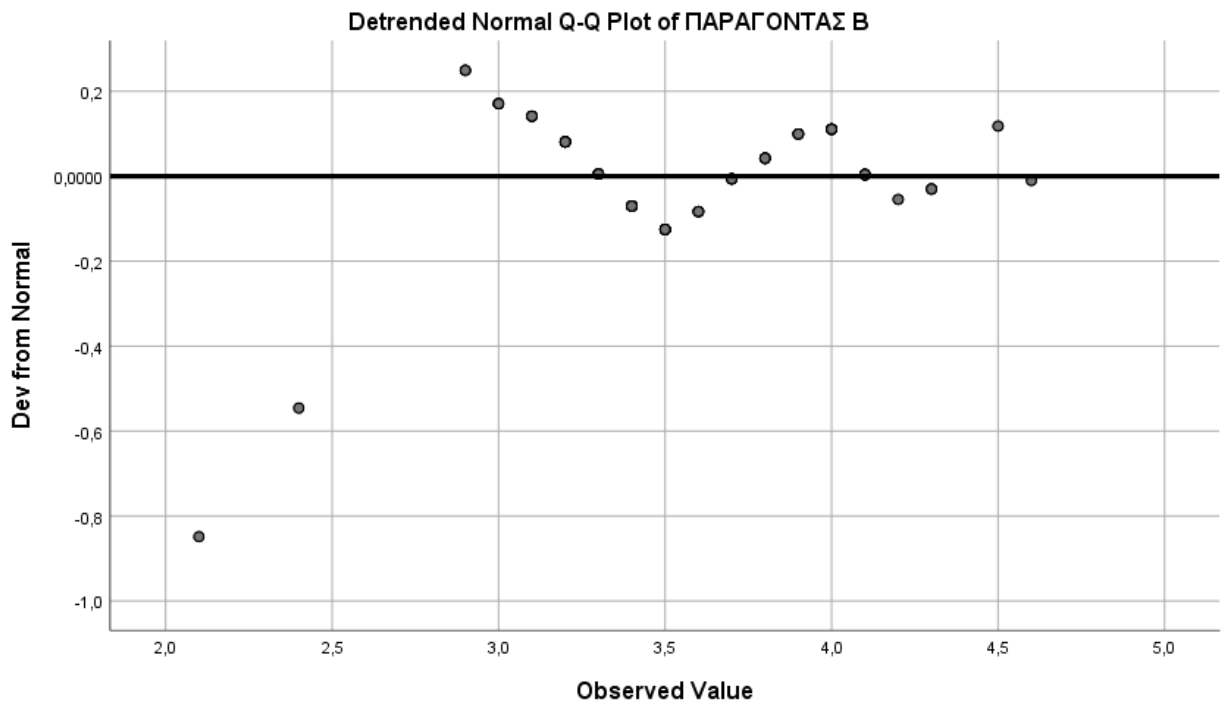
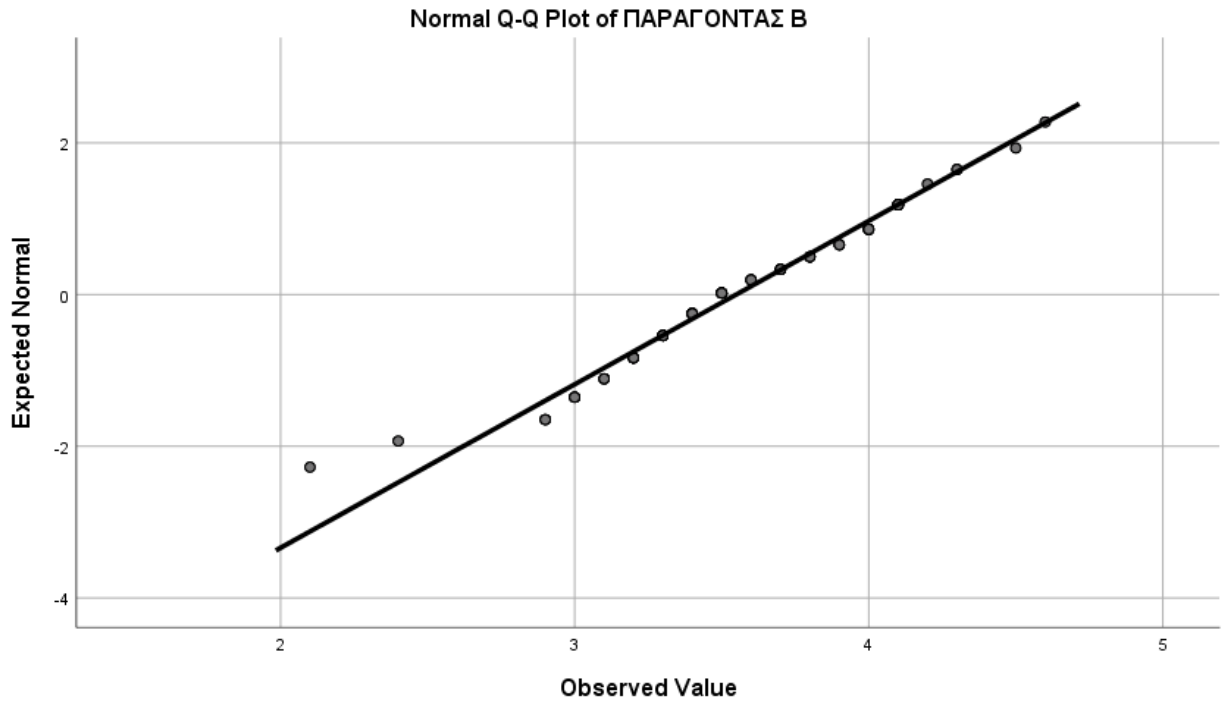
2,00 Extremes (= < 2,1)

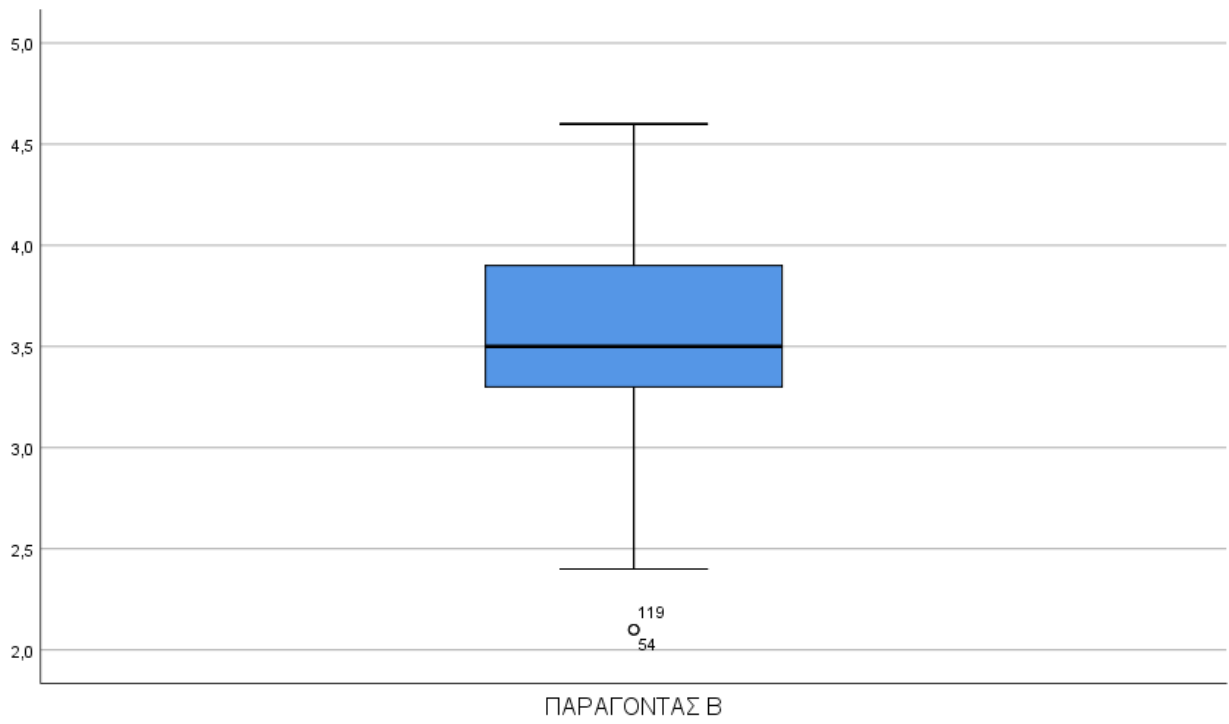
```

,00  2 .
2,00  2 . 44
,00  2 .
4,00  2 . 9999
12,00  3 . 000000111111
24,00  3 . 222222222222333333333333
28,00  3 . 4444444444444444555555555555
14,00  3 . 66666677777777
14,00  3 . 88888889999999
20,00  4 . 00000000001111111111
6,00  4 . 223333
2,00  4 . 55
2,00  4 . 66

```

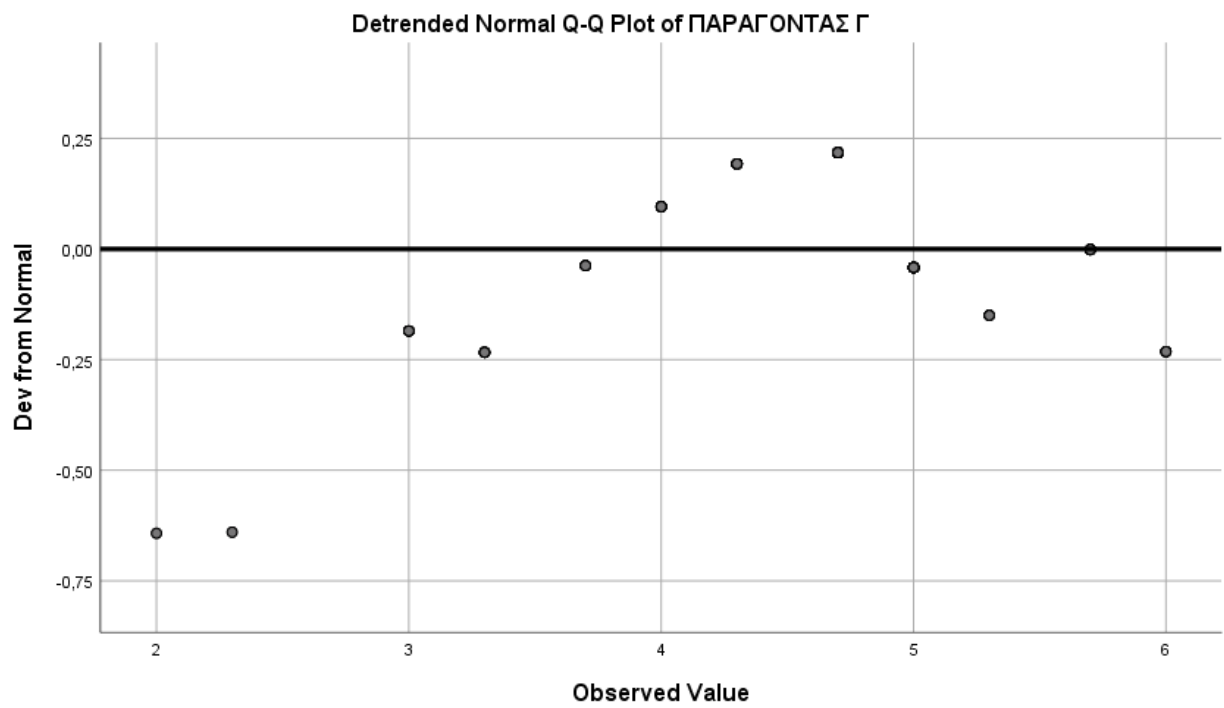
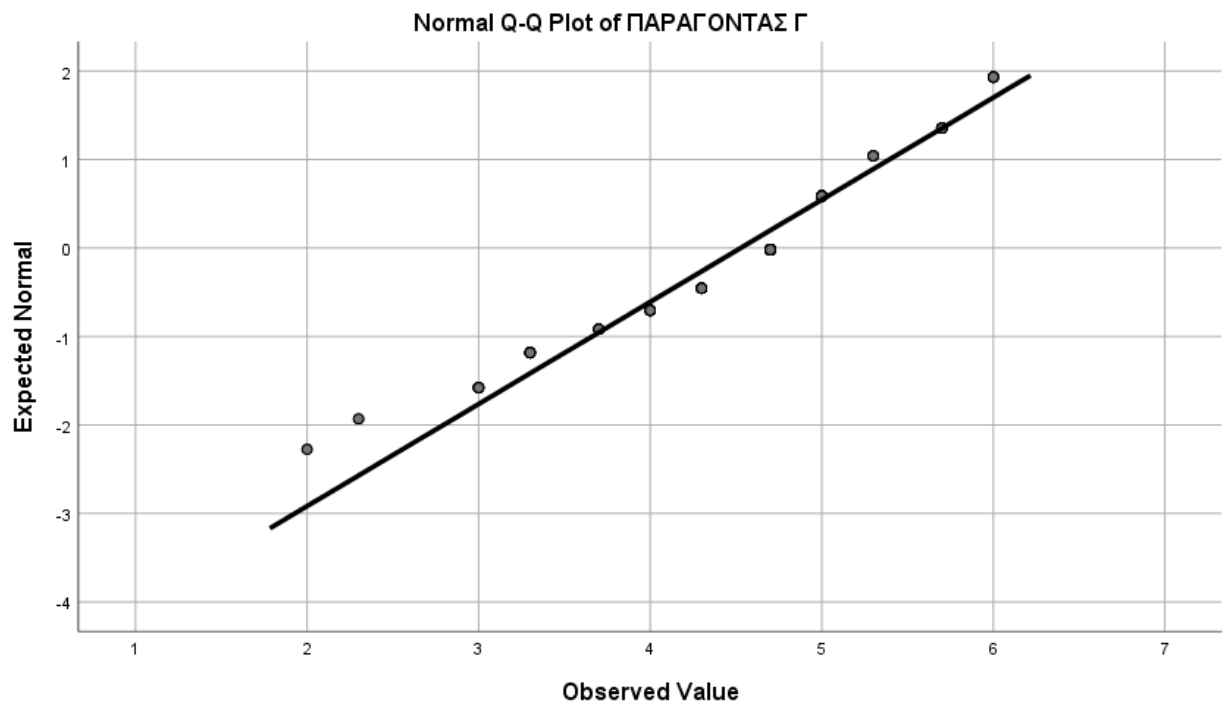
Stem width: 1,00  
Each leaf: 1 case(s)

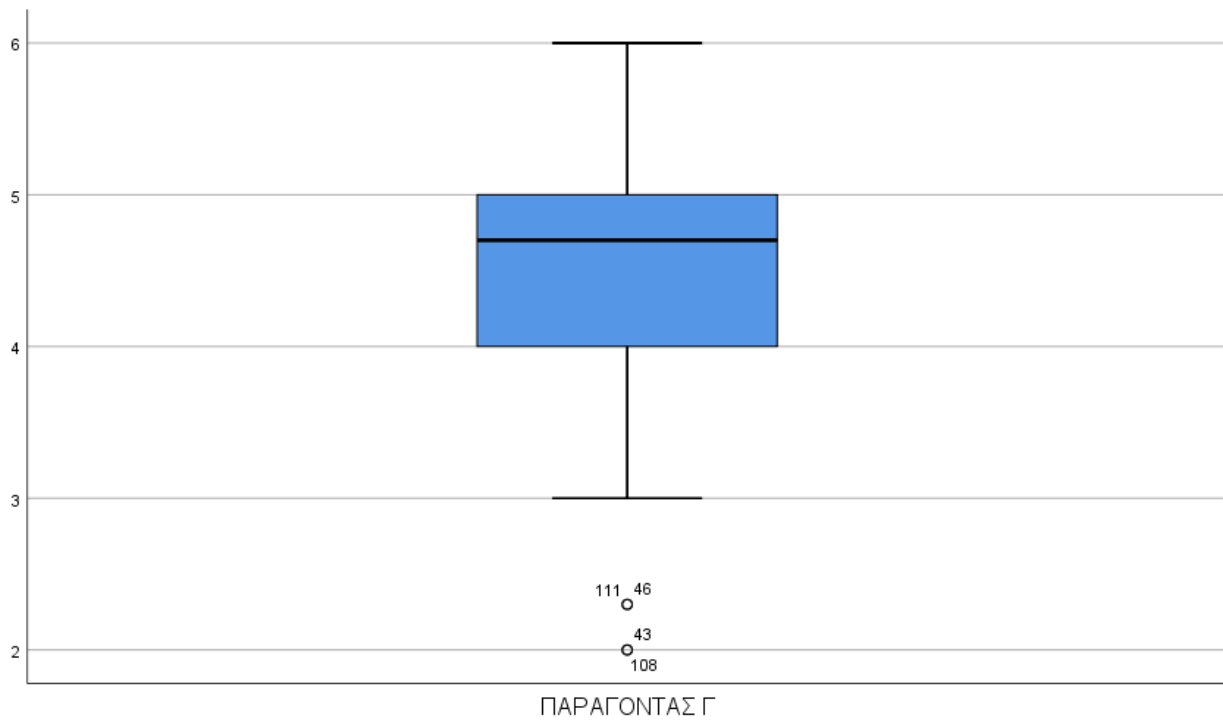




**FACTOR C - Γ**







```
NONPAR CORR
/VARIABLES=PARA PARB PARC
/PRINT=SPEARMAN TWOTAIL NOSIG
/MISSING=PAIRWISE.
```

### Non parametric Correlations

#### Notes

Output Created		05-JUN-2020 03:04:52
Comments		
Input	Data	C:\Users\ \Desktop\ANALYSIS NELLAS\TELIKO ARXEIO ANALYSIS\DB_NELLAS FINAL.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	130
	Missing Value Handling	Definition of Missing



	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		NONPAR CORR /VARIABLES=PARA PARB PARC /PRINT=SPEARMAN TWO TAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00,02
	Elapsed Time	00:00:00,01
	Number of Cases Allowed	524288 cases <sup>a</sup>

a. Based on availability of workspace memory

### Correlations

			ΠΑΡΑΓΟΝΤΑΣ A	ΠΑΡΑΓΟΝΤΑΣ B
Spearman's rho	FACTOR A	Correlation Coefficient	1,000	,045
		Sig. (2-tailed)	.	,614
		N	130	130
	FACTOR B	Correlation Coefficient	,045	1,000
		Sig. (2-tailed)	,614	.
		N	130	130
	FACTOR C	Correlation Coefficient	-,007	,377**
		Sig. (2-tailed)	,937	,000
		N	130	130

### Correlations

			ΠΑΡΑΓΟΝΤΑΣ Γ
Spearman's rho	FACTOR A	Correlation Coefficient	-,007
		Sig. (2-tailed)	,937
		N	130
	FACTOR B	Correlation Coefficient	,377**
		Sig. (2-tailed)	,000
		N	130
	FACTOR C	Correlation Coefficient	1,000
		Sig. (2-tailed)	.
		N	130

\*\* . Correlation is significant at the 0.01 level (2-tailed).

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