ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΙΓΑΙΟΥ

ΤΜΗΜΑ ΔΙΟΙΚΗΣΗΣ ΕΠΙΧΕΙΡΗΣΕΩΝ

ΔΙΑΤΡΙΒΗ

για την απόκτηση διδακτορικού διπλώματος
του Τμήματος Διοίκησης Επιχειρήσεων

Αντωνία Μαρκογιαννοπούλου

The role, impact, and interrelation of technical external drivers, namely ESA2010, IPSAS/EPSAS accounting standardization and ERP systems, towards Public Sector Accounting reforms

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Ethical Statement

I am the exclusive author of this Doctoral thesis entitled "The role, impact, and interrelation of technical external drivers, namely ESA2010, IPSAS/EPSAS accounting standardization and ERP systems, towards Public Sector Accounting reforms". This thesis is original and has been prepared exclusively for the award of Doctor of Philosophy of the Department of Business Administration. Any help provided in order to prepare my thesis is being acknowledged and is referred within the thesis. In addition, within my thesis I refer all sources and data that I have used, even though their inclusion is indirect. In general, I confirm that through the preparation of this thesis, I have followed the law provisions for intellectual property and personal information privacy, and principles of academic ethics.

Δήλωση Ηθικής

Είμαι η αποκλειστική συγγραφέας της υποβληθείσας διδακτορικής διατριβής με τίτλο «Ο ρόλος, ο αντίκτυπος και η αλληλεπίδραση των τεχνικών εξωτερικών παραγόντων, συγκεκριμένα του ευρωπαϊκού λογιστικού πλαισίου ESA2010, της λογιστικής τυποποίησης IPSAS/EPSAS και των πληροφοριακών-λογισμικών συστημάτων, προς τις μεταρρυθμίσεις της λογιστικής του Δημόσιου Τομέα». Η συγκεκριμένη διδακτορική διατριβή είναι πρωτότυπη και εκπονήθηκε αποκλειστικά με σκοπό την απόκτηση του Διδακτορικού διπλώματος του Τμήματος Διοίκησης Επιχειρήσεων. Κάθε βοήθεια που είχα για την προετοιμασία της αναγνωρίζεται πλήρως και αναφέρεται εντός της εργασίας. Επιπλέον, εντός της εργασίας αναφέρονται οι πηγές και τα δεδομένα που χρησιμοποιήθηκαν, ακόμη κι αν η συμπερίληψή τους υπήρξε έμμεση ή παραφρασμένη. Γενικότερα, δηλώνω ότι, κατά την εκπόνηση της διδακτορικής μου διατριβής έχω τηρήσει απαρέγκλιτα όσα ο νόμος ορίζει περί διανοητικής ιδιοκτησίας και έχω συμμορφωθεί πλήρως με τα προβλεπόμενα στο νόμο περί προστασίας προσωπικών δεδομένων και τις αρχές Ακαδημαϊκής Δεοντολογίας.

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Abstract

Developments in accounting practices and standards have created the need for harmonised and transparent financial and budget statements among governments at a global level. The suitability of accrual accounting basis for the public sector has long been a controversial issue. Nevertheless, its adoption has gained global acceptance as it facilitates the balance sheets and net income preparation and reporting, not only at the government-entity level but also in the public sector as a whole (Pallot 1992). Bergmann (2012) stated that this method facilitates reliable and available financial information to support decision-making, while Grossi and Soverchia (2011) claimed that such immediate access to financial information fosters fiscal sustainability, transparency, and accountability. Beyond these benefits, Manes-Rossi et al. (2017) highlighted accounting information as a precondition for evaluating governments' fiscal sustainability and effective resource allocation and planning.

International Public Sector Accounting Standards (IPSAS), with accrual basis accounting as their foundation, are the outcome of successive New Public Management (NPM) reforms, which have caused great diversity on their suitability globally (Christiaens *et al.*, 2015). Research on harmonization in European accounting and implementation of the IPSAS-based European Public Sector Accounting Standards (EPSAS) in the European Union (EU) indicated that the European Commission (EC) aims to enhance transparency, comparability, and cost efficiency, provided its member states willingly apply the newly developed standards (Frintrup *et al.*, 2020).

Driven by this controversy between accrual and cash basis accounting and the fact that accrual accounting has been promoted by the Public Sector Committee of the International Federation of Accountants (IFAC) as the centrepiece of IPSAS and EPSAS and the financial measurement tool for fostering accountability and decision-making, this thesis investigates the quality of ESA2010 accrual accounting framework from the statistical reporting perspective. Similarly with financial reporting that needs to be conducted on an accurate and reliable accounting basis to fairly reflect the fiscal position of the government sector (Manes-Rossi *et al.*, 2017) statistics need to provide stakeholders with qualitative information.

As pointed out, a common framework is needed to cope with the materiality and diversity of accounting bases. Whether the information is intrinsically driven by decision-making or by an external non-technical need for transparency and credibility, has also been a debatable issue

regarding the accruals shift (Berger, 2018). Jesus and Jorge (2015) highlighted the importance of reducing discrepancies between government accounts (GA) and national accounts (NA), and the ability of government shifts from cash basis to accrual accounting to support reliable budget reporting.

In this context, this thesis highlights the contribution of technical external drivers, namely European System of Accounts (ESA2010) accrual accounting framework, the Information technology (IT) with modernization of Enterprise Recourse Planning (ERP) systems and the IPSAS/EPSAS accounting standardization towards Public Sector Accounting (PSA) reforms and accrual accounting adoption.

From a theoretical perspective, this study has strengths. With its results on the high accrual accounting reporting quality, it endorses the role of ESA2010 as a driver to accrual accounting reforms, fosters the interconnectedness efforts of GA with NA through IPSAS and EPSAS accounting standardization, sheds light on the isomorphism in government's ERP and IT modernization practises towards PSA reforms. Not only it highlights the facilitator role of these external drivers individually but highlights their joint efforts and interplay to accrual accounting adoption.

This thesis has also practical implications. It showcases successful ERP reforms, experiences, and challenges faced by EU member states as paradigm cases for governments that wish to embark on accrual accounting reforms at a wider level. It evidences that the accrual accounting adoption entails the interaction of more than one driver. With this study, there are opportunities for accounting academics and practitioners to research the quality of public sector governmental accounting comparative analysis with corresponding statistics, using promoted value relevance tools. Bergmann (2021) underlined that "if financial statements do matter economically, their quality should also matter" and approached this issue from an audit surveillance perspective ensuring their quality. Indeed, improvements in government and national accounts reporting alignment efforts should always strive to improve their reporting quality proactively to facilitate both reporting and audit purposes. For this purpose, this thesis highlights the role, impact, and interaction of drivers towards the public sector modernization practices.

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Περίληψη

Οι εξελίξεις στις λογιστικές πρακτικές και στα λογιστικά πρότυπα έχουν δημιουργήσει την ανάγκη για εναρμονισμένες και διαφανείς οικονομικές και δημοσιονομικές καταστάσεις μεταξύ των κυβερνήσεων σε παγκόσμιο επίπεδο. Παρά το γεγονός ότι η καταλληλότητα της λογιστικής σε δεδουλευμένη βάση για το δημόσιο τομέα είναι ένα αμφιλεγόμενο ζήτημα, η υιοθέτησή της τυγχάνει παγκόσμιας αποδοχής επειδή επιτρέπει την κατάρτιση ισολογισμών και την πληροφόρηση για τα έσοδα και τα έξοδα, όχι μόνο σε επίπεδο κυβέρνησης αλλά και στο δημόσιο τομέα ως σύνολο. Η δεδουλευμένη μέθοδος διευκολύνει στην παρουσίαση αξιόπιστης οικονομικής πληροφόρησης για την υποστήριξη της λήψης αποφάσεων, ενώ θεωρείται ότι η άμεση πρόσβαση σε χρηματοοικονομικές πληροφορίες ενισχύει τη δημοσιονομική βιωσιμότητα, τη διαφάνεια και τη λογοδοσία. Πέρα από αυτά τα οφέλη, οι λογιστικές πληροφορίες αποτελούν προϋπόθεση για την αξιολόγηση της δημοσιονομικής βιωσιμότητας και της αποτελεσματικής κατανομής και προγραμματισμού των πόρων των κυβερνήσεων.

Τα Διεθνή Λογιστικά Πρότυπα του Δημόσιου Τομέα (IPSAS), με βάση τη λογιστική σε δεδουλευμένη βάση, είναι το αποτέλεσμα διαδοχικών μεταρρυθμίσεων της Νέας Δημόσιας Διοίκησης, οι οποίες έχουν διερευνηθεί ως προς την καταλληλότητά τους παγκοσμίως. Έρευνα σχετικά με την εναρμόνιση στην ευρωπαϊκή λογιστική και την εφαρμογή των Ευρωπαϊκών Λογιστικών Προτύπων του Δημόσιου Τομέα (EPSAS) στην Ευρωπαϊκή Ένωση που βασίζονται στα IPSAS έδειξε ότι η Ευρωπαϊκή Επιτροπή στοχεύει στην ενίσχυση της διαφάνειας, της συγκρισιμότητας και της αποδοτικότητας κόστους, υπό την προϋπόθεση ότι τα κράτη μέλη της εφαρμόζουν πρόθυμα σύγχρονα ανεπτυγμένα πρότυπα.

Με γνώμονα αυτή τη διαμάχη μεταξύ της λογιστικής σε δεδουλευμένη βάση και της ταμειακής βάσης και του γεγονότος ότι η λογιστική σε δεδουλευμένη βάση έχει προωθηθεί από την Επιτροπή Δημόσιου Τομέα της Διεθνούς Ομοσπονδίας Λογιστών (IFAC) ως το επίκεντρο των IPSAS και EPSAS και ως εργαλείο χρηματοοικονομικής μέτρησης για την ενίσχυση της λογοδοσίας και της λήψης αποφάσεων, η διατριβή αυτή διερευνά την ποιότητα του λογιστικού πλαισίου ESA2010 σε δεδουλευμένη βάση από την σκοπιά της στατιστικής αναφοράς. Ομοίως

με την χρηματοοικονομική αναφορά που πρέπει να διεξάγεται σε ακριβή και αξιόπιστη λογιστική βάση για να αντικατοπτρίζει σωστά τη δημοσιονομική θέση του δημόσιου τομέα,οι στατιστικές αναφορές πρέπει να παρέχουν στους ενδιαφερόμενους ποιοτικές πληροφορίες.

Όπως επισημάνθηκε, απαιτείται ένα κοινό πλαίσιο για την αντιμετώπιση της ουσιαστικότητας και της διαφορετικότητας των λογιστικών βάσεων. Το αν οι πληροφορίες καθοδηγούνται εγγενώς από τη λήψη αποφάσεων ή από μια εξωτερική ανάγκη για διαφάνεια και αξιοπιστία, ήταν επίσης ένα ζήτημα σχετικά με τη μετατόπιση της λογιστικής βάσης από ταμειακή σε δεδουλευμένη. Θεωρείται σημαντική η δυνατότητα της μείωσης των αποκλίσεων μεταξύ των κρατικών λογαριασμών και των εθνικών λογαριασμών και της ικανότητας της κυβέρνησης να μετατοπιστεί από τη λογιστική ταμειακής βάσης στη λογιστική σε δεδουλευμένη βάση για την υποστήριξη αξιόπιστων δημοσιονομικών εκθέσεων. Σε αυτό το πλαίσιο, η παρούσα διατριβή υπογραμμίζει την ποιότητα των πλαισίων λογιστικής σε δεδουλευμένη βάση και παρουσιάζει τους καταλυτικούς παράγοντες προς τις μεταρρυθμίσεις της Λογιστικής του Δημόσιου Τομέα και την υιοθέτηση της λογιστικής σε δεδουλευμένη βάση. Πιο συγκεκριμένα υπογραμμίζει τη συμβολή τεχνικών εξωτερικών παραγόντων όπως του λογιστικού πλαισίου ESA2010 σε δεδουλευμένη βάση, της τεχνολογίας πληροφορικής με τον εκσυγχρονισμό των λογισμικών συστημάτων (ERPs) και της λογιστικής τυποποίησης IPSAS/EPSAS προς τις μεταρρυθμίσεις της Λογιστικής του Δημόσιου Τομέα (PSA).

Από θεωρητικής σκοπιάς, αυτή η μελέτη έχει δυνατά σημεία. Με τα αποτελέσματά της υποστηρίζει την ποιότητα της λογιστικής σε δεδουλευμένη βάση, ενισχύει τις προσπάθειες διασύνδεσης του λογιστικού πλαισίου στατιστικής αναφοράς σε δεδουλευμένη βάση με τη λογιστική τυποποίηση IPSAS &EPSAS και ρίχνει φως στον ισομορφισμό στις λογιστικές πρακτικές πληροφοριακών συστημάτων των κυβερνήσεων προς τις μεταρρυθμίσεις του δημοσίου τομέα. Καταδεικνύει ότι οι λογιστικές μεταρρυθμίσεις συνεπάγονται την συνδυαστική και συντονισμένη συνεισφορά των εξωτερικών παραγόντων προς την κατεύθυνση αυτή.

Η διατριβή αυτή έχει επίσης πρακτικές επιπτώσεις. Καταδεικνύει επιτυχείς μεταρρυθμίσεις, εμπειρίες και προκλήσεις που αντιμετωπίζουν τα κράτη μέλη της ΕΕ ως υποδείγματα για τις κυβερνήσεις που επιθυμούν να ξεκινήσουν μεταρρυθμίσεις της λογιστικής σε δεδουλευμένη βάση. Με αυτήν τη μελέτη, υπάρχουν ευκαιρίες για ακαδημαϊκούς και επαγγελματίες λογιστές, οικονομολόγους να ερευνήσουν την ποιότητα της λογιστικής του δημόσιου τομέα και συγκεκριμένα των κυβερνήσεων σε σύγκριση με αντίστοιχες στατιστικές αναφορές και πρακτικές, χρησιμοποιώντας προωθούμενα εργαλεία μέτρησης της συνάφειας (αξίας). Ο Bergmann (2021), υπογραμμίζει ότι «εάν οι οικονομικές καταστάσεις έχουν οικονομική σημασία, η ποιότητά τους θα πρέπει επίσης να έχει σημασία» και προσεγγίζει αυτό το ζήτημα από την οπτική της επιτήρησης ελέγχου διασφαλίζοντας την ποιότητά τους. Πράγματι, οι βελτιώσεις στις προσπάθειες ευθυγράμμισης της υποβολής εκθέσεων των κυβερνητικών και των εθνικών λογαριασμών θα πρέπει πάντα να προσπαθούν να βελτιώσουν την ποιότητα των αναφορών τους προληπτικά ώστε να διευκολύνουν τόσο τους σκοπούς υποβολής εκθέσεων όσο και ελέγχου και όλοι οι παράγοντες, τα πληροφοριακά συστήματα, οι στατιστικές αναφορές και η λογιστική τυποποίηση να συμβάλλουν προς αυτή την κατεύθυνση.

Contents

List of abbreviations

CF	Conceptual Framework
CFS	Consolidated Financial Statements
CIPFA	Chartered Institute of Public Finance and Accountancy
EC	European Commission
EPSAS	European Public Sector Accounting Standards
ERP	Enterprise Resource Planning
ESA	European System of Accounts
EU	European Union
EURIBOR	Euro Interbank Offered Rate
EDP	Excessive Deficit Procedure
FRB	Financial Reporting Basis
FRF	Financial Reporting Framework
GA	Government Accounts
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
GFS	Government Finance Statistics
GFSM	Government Finance Statistics Manuals and Guides
GGS	General Government Sector
GPFR	General Purpose Financial Reports
GPFS	General Purpose Financial Statements
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IPSAS	International Public Sector Accounting Standards
IPSASB	International Public Sector Accounting Standards Board

IT	Information Technology
MIS	Management information systems
MoF	Ministry of Finance
MS	Member States
NA	National Accounts
NPFM	New Public Financial Management
NPM	New Public Management
OECD	Organization for Economic Cooperation and Development
PSA	Public Sector Accounting
PULSAR	Public Sector Accounting and Reporting Program
RPG	Recommended Practice Guidelines
SNA	System of National Accounts
UK	United Kingdom
WGA	Whole of Government Accounts

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1. Introduction

Government initiatives to introduce the management philosophy of public sector modernization originates in early 1980s in an effort to become more private-sector oriented and due to the failure of traditional public administration. Incentive of the New Public Management (NPM) reforms has been the hypothesis that the business-like orientation will lead to greater cost efficiency for governments. In this worldwide process of governments to transit from cash to accrual basis accounting as a result of the simulation to private sector techniques, scholars who initially considered the suitability of this accounting reform to be self-evident, later expressed concerns (Bonollo, 2022). One of the most prominent attributes of NPM is the public sector accounting (PSA) reform. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position.

The fact that the Government Finance Statistics Manuals and Guides 2014 (GFSM), the International Public Sector Accounting Standards (IPSAS) and the European System of Accounts 2010 (ESA2010) are all based on accrual accounting facilitates their reconciliation. From an accounting perspective, IPSAS have been established as the unanimously accepted international accounting standards aligned with PSA guidelines and tailored to public sector principles. IPSAS are considered appropriate for the compilation with Government Finance Statistics (GFS) under statistical standards. GFS uses government accounting in input terms and compilation of statistical information in output terms is facilitated with IPSAS application (Schwaller, 2019). In the European Union (EU), the need for harmonization accruals-based systems, has introduced the European Public Sector Accounting Standards (EPSAS) which is not meant to replace statistical reporting (i.e., ESA2010, GFS) but to limit differences.

In terms of institutional isomorphism, PSA reforms with the designation of international (IPSAS) and regional accounting standards (EPSAS) with accrual accounting basis as best accounting practice, seem to have been led by the normative and coercive pressures of international organizations, consulting and auditing firms, associations and auditing standard setters with the aim to lead to enhanced governance and accountability (Adhikari *et al*., 2019; Jayasinghe *et al*., 2020).

Efficient and fruitful PSA reform implementation differentiates at country level based on individual characteristics, political support, traditional procedures and complexity. Therefore, although great advantages are attributed to accrual basis accounting such as cost-effective management and improved monetary administration (de Aquino et al.,2020), transition to a new accounting model entails high level of complexity (Polzer et al.,2019). Such reforms also entail considerable cost in information technology (IT) modernization and Enterprise Resource Planning (ERP) systems, respective staff training and organizational changes to support accounting reforms.

This high complexity and cost are the reason that countries seek information about how to drive the PSA reform efforts efficiently. The focus of this thesis is on the factors that drive implementations during this process. The accrual accounting basis, as benchmarking of both government accounting and statistical reporting and the ERP systems' affordability to support such accrual accounting changes has featured IPSAS/EPSAS, ESA2010 and ERP systems as reform driven facilitators towards PSA reforms (World Bank/ Public Sector Accounting and Reporting Program (PULSAR), 2021).

This thesis is divided into three sections. In the first section it aims to highlight the contribution of the ESA2010 accrual accounting framework to the value relevance (thus the quality) of statistical reporting of governmental NA. It aims to foster the analysis of accrual accounting harmonization processes in European division using the accounting framework of NA as key element. In order to improve social, political, and economic decision making and accountability, it advocates value relevance tools that facilitate the examination and comparability of financial, budgetary, and aggregated statistical reports. With its findings, this study has practical implications as it i) concludes that ESA2010 generates value relevant (thus qualitative) NA financial reporting in EU and the United Kingdom (UK) on an accrual basis; ii) highlights the financial variables that better interpret bond returns thus governments' necessity to borrow money.

In the second section, this thesis investigates the facilitator and driven role of ERP systems modernization towards PSA reforms, the institutional isomorphism in the choice of ERP vendors of European Union (EU) member states (MS) and the association of the upgrade and establishment of ERP systems with accrual accounting reforms. It combines the results of this analysis with the mandatory use of the ESA2010 accrual conceptual framework (CF) in the context of IPSAS adoption (as benchmark of the EPSAS project) in the EU division.

In the third section, this thesis analyzes the role and impact of IPSAS and EPSAS accounting standardization as technical external drivers towards PSA reforms. Then it analyzes the interrelation with the other two technical external drivers as it combines the results of the two previous sections in terms of institutional isomorphism. Firstly, it employs the high-quality results from the emulation of the private sector techniques to the public sector in the context of NPM to show how these endorse the interconnectedness efforts with accounting standardization and showcases their interrelation. Secondly, it refers to the Directive 2011/85/EU which obliged governments to have accounting systems in place that enable them to generate accrual data with a view to preparing the ESA reporting. In terms of institutional isomorphism, which stated that the influence of the International Federation of Accountants (IFAC) and International Public Sector Accounting Standards Board (IPSASB) entail examples of normative forces exerted for the adoption of the IPSAS, it demonstrates that these pressures have led to IT modernization to enable government to support accrual accounting and regional and international accounting standardization adoption.

This thesis aims to introduce to public sector accounting literature the value relevance method to enable assess the public sector statistical reporting quality. It promotes value relevance models that can be adjusted and used in public sector - government accounting statistics. As the superiority of accrual basis accounting over cash basis accounting in governmental accounting, has been debated world widely, this thesis provides evidence for the high quality of accrual accounting frameworks. It is paramount that European and Organization for Economic Co-operation and Development (OECD) official statistics must be of high-quality and meet users' needs. Statistics are a public good and must be generated first and foremost with users in mind and that has been a clear motive throughout this thesis. In the context for transparent financial reporting of high quality, this thesis also advocates the modernization of ERP systems to support PSA reforms and to facilitate stakeholders' needs. Through collection of the upgrading and establishment of ERP systems in the EU division and the UK, it endorses previous literature, that ERP systems are drivers and facilitators of PSA reforms and proves in the context of mimetic isomorphism, that governments imitate ERP practices to support accrual accounting reforms. It contributes also empirically as it showcases success stories of ERP systems on their establishment or upgrade, for governments that are in same process of information technology modernization.

Last, it proves that technical external such as the ESA2010, EPSAS and IPSAS and ERP systems associate and interact under regulative, cognitive and normative pressures towards a joint effort for PSA reforms.

For future reference, the trend to accrual accounting basis transition is expected to continue world widely, considering that it is supported and promoted by international institutions, such as the International Monetary Fund (IMF), OECD, and the World Bank (European Commission, 2019b). In this context, this study aims to showcase the combined efforts of technical external drivers to promote accrual accounting basis as the cornerstone of PSA reforms.

1.1 Research questions - Objectives

Within this context, in the first section, the objective of the current thesis is to add to the existing government statistics literature in relation with PSA standardization and administration. This section also contributes empirically by investigating the reporting quality of national accounts. With the use of the ESA2010 statistical indicator, this thesis employs empirical data in addressing the following research questions to investigate the quality of statistical financial reporting using bond return regression models in relevance with balance sheet, income, debt and Euribor figures. Therefore, the thesis addresses the following research questions:

Question 1: What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with the ESA2010 accrual accounting framework in EU member states and the UK?

Question 2: Which variables provide stakeholders with high quality governmental statistics reporting that strongly associates with bond returns in the EU member states and the UK?

In the second section, considering that ESA2010 and the international and regional accounting standards, namely IPSAS and EPSAS, are both external drivers of PSA reforms, this thesis employs qualitative methods to interrelate those with a third external driver, the Enterprise Software (ERP) Solutions (Pulsar, 2021) as joined effort towards governmental accrual accounting adoption. To do so, the thesis states the following research questions:

Question 1: What is the association between increased accrual accounting, IT maturity scores, and the establishment or upgrading of ERP software systems?

Question 2: Do ERP systems facilitate changes in public sector accounting?

Question 3: Are there similarities between EU member states in terms of their ERP vendors' choices of PSA reforms?

In the third section, this thesis analyses the role of IPSAS and EPSAS accounting standardization as technical external driver towards PSA reforms and combines the results of the two previous sections to associate them with:

a) the statistical reporting quality of General Governments National Accounts of the EU MSs and the UK with the use of ESA2010 accrual accounting framework

b) the facilitator role of ERP software systems of EU MSs and the UK and the modernization efforts in terms of mimetic isomorphism.

1.2. Methodology

To achieve the objective of the thesis, and to answer to the research questions, different methodologies are utilized. The thesis deploys both quantitative and qualitative methods.

Based on Pulsar (2021), the ESA2010 accrual accounting framework, the IPSAS and EPSAS accounting standards, and the Enterprise Recourse Planning (ERP) reforms are among the technical external drivers towards NPM reforms, with accrual accounting basis consisting of its focal point. Below the methodological approach of the role and impact of each one of these drivers individually and of their interrelation is outlined.

Methodological approach of ESA2010 accounting framework's reporting quality

With the introduction and adoption of the accrual accounting system in the public sector as a result of NPM reforms, which attempted to emulate the accounting practices and procedures used in the private sector, value relevance analysis is employed in the public domain using the accrual accounting framework of ESA2010, to assess the quality of accrual accounting basis in the context of statistical reporting via bond returns' regression analysis.

Three econometric models are used, each one serving different financial purposes analysis. Relative value relevance method assesses the reporting quality of General Governments National Accounts of

EU member states for the period 1999-2019 with the use of ESA2010 statistical indicator. The coefficient of determination of the regression analysis enables stakeholders to compare the quality of statistical reporting of various member countries. The econometric models have all as dependent variable the long-term government bond yields and as independent variables, equity, income, debt and Euribor figures.

Methodological approach of ERP systems' facilitator role to PSA reforms, the association of the accrual accounting reforms with ERP systems' upgrade/establishment and the mimetic isomorphism of ERP vendors' choice towards accounting modernization in the EU and UK.

This part of the thesis investigates the ERP reforms of 27 EU Member States and the UK, their respective IT modernizations and their association with accounting changes. EU member states representatives were questioned on their ERP reforms, their facilitator role and associated specific ERP vendors with accounting reforms. The thesis used qualitative method and combined the results with previous surveys on behalf of Eurostat (PwC, 2014,2020; Ernst and Young, 2012) to demonstrate that indeed ERP systems are technical external drivers towards accrual accounting reforms as benchmark of IPSAS adoption. As EPSAS accounting standards are IPSAS based, results influence governments that wish to embark on accrual accounting reforms and moreover to IPSAS/EPSAS adoption. The results also showcase mimetic isomorphism of the EU MSs towards ERP systems upgrade.

Methodological approach of IPSAS and EPSAS accounting standardization as technical external drivers towards PSA and NPM reforms and their interrelation with ESA2010 accrual accounting framework and ERP systems.

Accrual accounting, as the focal point of NPM reforms, provides significant information content to communicate financing decisions and allows the government to take a long-term view. Christiaens et al. (2015) underlined the connection of the IPSAS standards with the general NPM approach. Subject reforms brought accrual accounting to PSA systems, in an approximation to business accounting, and the adaptation of the IPSAS framework to national standards. In EU member states, the PSA reforms seem to have been driven principally by external factors, such as EU guidelines (Directive 2011/85/UE) that mandate accrual accounting for fiscal reporting under the ESA

2010 and the Eurostat initiative to implement and develop the IPSAS-based EPSAS (World Bank/ PULSAR, 2021). In this context, in this section, this thesis employs the results of ESA2010 accrual accounting reporting quality to further highlight interconnectedness efforts of Government and National accounts alignment through accounting standardization and to foster their interrelation as technical external drivers. In addition, this thesis uses the ERP systems, to associate their facilitative and driver role with decision and policy making towards adopting IPSAS and EPSAS accounting standardization in terms of institutional isomorphism and to showcase further their interdependence as technical external drivers.

1.3. Contribution of the study

As far as the first section is concerned, the thesis contributes to theory as it fosters the quality of accrual accounting basis for the public sector. It moreover provides empirical and practical contribution by introducing relative value relevance econometric models that provide stakeholders with reliable information on the financial position of the government. It showcases significant financial variables and coefficients of statistical reporting for each government. With its value relevant results, the first research section supports evidence-based decision making, allows comparisons between EU governments and the UK, and contributes to increased transparency and accountability.

In EU MSs, the EU guidelines (Directive 2011/85/UE) require accrual accounting for fiscal reporting under the ESA 2010 and promote the EPSAS project to achieve homogeneity in PSA practices (World Bank/ PULSAR, 2021). As perceived low IT maturity is related to higher anticipated IT costs (PricewaterhouseCoopers, 2014, 2020) and considering a previous study (Frintrup *et al.*, 2020) that identified IT costs as a potential barrier to implementing the EPSAS, the second section contributes by highlighting the facilitator role of ERP systems in accounting-related changes and the mimetic isomorphism in ERP vendors' choices towards PSA reforms.

The third section highlights the contribution of accounting standardization to PSA reforms. It also uses both quantitative and qualitative methods to investigate not only the individual contribution of IPSAS and EPSAS as technical external drivers, but the combined contribution and interrelation of all the aforementioned drivers related with accrual accounting reforms. This section showcases and confirms the reporting quality of ESA2010, provides evidence to support the interconnectedness efforts of IPSAS and EPSAS with ESA2010 accounting framework, highlights the interdependence of accounting standardization with ERP systems and confirms that ERP systems are facilitators towards accrual accounting, thus the focal point of IPSAS and EPSAS adoption.

1.4. Outline of the thesis

The rest of the thesis is developed in two parts: the first part includes chapters two to four and provides a theoretical analysis. In particular, chapter two presents the conceptual framework, structure and the characteristics of both IPSAS and EPSAS accounting standardization that influence PSA, displays a brief summary of IPSAS, their treatment and approach and ultimately analyses the similarities and differences between IPSAS and EPSAS.

Chapter three presents the compatibility of Government Accounts with National Accounts in the context of accounting standardization. It presents the convergence efforts of IPSAS with the SNA accrual accounting framework, the similarities of ESA2010 with SNA accrual accounting framework, similarities of SNA and ESA, the compatibility of NA and GA from IPSAS' and EPSAS' perspective and concludes with the summary and overview of the compatibility between NA, GA, SNA, ESA, GFS and General Government Sector (GGS). This chapter highlights the significance of both statistical and financial reporting, their convergent and divergent points, and highlights rationale for interconnectedness efforts.

Chapter four sets the theoretical basis for the analysis of public sector accrual accounting reforms and the driven role of technical external factors. It addresses the controversial issue of public sector modernization efforts resulting to accrual accounting adoption and its suitability to government sector. It approaches the study from the impact and role of accounting framework, ERPs and accounting standardization to accrual accounting transition. It adds to the theoretical debate of accrual accounting superiority over cash basis by endorsing the accrual accounting framework in statistical reporting. It presents how the transition to accrual accounting in the public sector qualifies the synchronized efforts of technical external drivers and their importance for the prevalence of public sector accrual accounting. Moreover, it explains how institutional isomorphism and subsequent pressures impact on the role of technical external drivers towards the homogeneity and spread of accrual accounting practices in the governmental sector in EU members states and the UK.

The second part of the thesis covers chapters five to seven. It includes individual analysis of the drivers to PSA reforms; it conducts quantitative and qualitative research and combines the results to present interrelated efforts of the technical external drivers to accrual accounting transition of EU member states. Chapter five provides an empirical assessment of the quality of the statistical reporting in EU division, the association of ESA2010 with decision and policy making and it showcases significant variables that a stakeholder should consider when assessing the quality of NA and statistical reporting. Moreover, it confirms that although government accounting practices might vary in input terms, the quality of statistical reporting with ESA2010 accrual accounting framework in output terms is high.

Chapter six analyzes the ERP systems modernization towards PSA reforms. It uses qualitative method to showcase the facilitator role of ERP systems in the context of IT modernization to accrual accounting reforms -using IPSAS and EPSAS as benchmark- in EU member states and the UK. It highlights that there is strong association of the accounting and IT maturity scores that increased compared to the previous surveys on behalf of Eurostat of PricewaterhouseCoopers, 2014, 2020; Ernst and Young, 2012) and the establishment or upgrading of ERP software systems. It confirms that the ERP systems function as technical external drivers that facilitate PSA reforms. Ultimately, it adds to the institutional isomorphism of EU accounting practises as it points out that there are similarities between EU member states in terms of their ERP vendors' choices related with accounting reforms.

Following the findings of chapter five and chapter six, chapter seven focuses on the IPSAS and EPSAS accounting standardization and their driven role on accounting reforms and associates their impact with the quantitative results of ESA2010 accrual accounting framework and with the qualitative results of ERP systems on the facilitator role and the mimetic isomorphism on the ERP vendor choices. Specifically, considering that the value relevance results of ESA2010 accrual accounting framework provide stakeholders with high statistical reporting quality of EU and UK governments, this thesis endorses the interconnectedness efforts of ESA2010 with EPSAS accounting standardization and proves that IT modernization is a prerequisite to support accrual accounting and IPSAS/EPSAS adoption.

Finally, chapter eight summarizes the main findings of the thesis, underlines its contributions on decision and policy making for governments that wish to embark on PSA reforms, discusses the limitations and provides suggestions for future research on reform driven facilitators towards accrual accounting practices and IPSAS and EPSAS accounting standardization.

1.5. Participation in conferences and publications

Parts of this thesis have been presented at Greek and international conferences:

1. 16th Annual Hellenic Finance and Accounting Association Conference (H.F.A.A.), Athens, Greece 2017
2. 17th Annual Hellenic Finance and Accounting Association Conference (H.F.A.A.), Athens, Greece, 2018
3. 10th International EIASM Public Sector Conference - European Institute for Advanced Studies in Management
   Event dates: September 2018, Conference venue: Lund University, Sweden
4. CQU Research Seminar Series 2019 (Discipline of Accounting, Finance, Economics and Property)
   Event date: 12/05/2019, Organizing University: CQ University Australia
5. CIGAR Virtual Biennial Conference 2021 (24-25 June) and Doctoral Colloquium (23 June 2021)
6. 20th Annual Hellenic Finance and Accounting Association Conference (H.F.A.A.), Athens, Greece, 2021
7. Participation in the 2days seminar "Days of Innovation and Research of the University of the Aegean - Dimitris Edouardos Gardikis", June 2022
8. EGPA PSG XII Public Sector Financial Management 2023 Spring Workshop, Host Institution: Faculty of Economics and Business (FEB), 27-28 April 2023, Zagreb, Croatia "Challenges and opportunities in public sector financial management and reporting"

Furthermore, parts of this thesis (in sections 5, 6 and 7) have been published in two international journals

1. Bekiaris, M. and Markogiannopoulou, A. (2023), "Enterprise resource planning system reforms of European Union member states in association with central government accrual accounting and IPSAS adoption", *Journal of Public Budgeting, Accounting and Financial Management*, Vol. 35 No. 1, pp. 115-140. https://doi.org/10.1108/JPBAFM-06-2021-0104

2. Bekiaris, M. and Markogiannopoulou, A. (2022), "Value relevance of general government national accounts with ESA2010 accrual accounting framework. Association of ESA2010 reporting quality with decision making and accounting standardisation". *Journal of Accounting and Management Information Systems*, 21(4), pp.546-574. http://dx.doi.org/10.24818/jamis.2022.04005

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2. Conceptual framework and characteristics of IPSAS and EPSAS accounting standardization

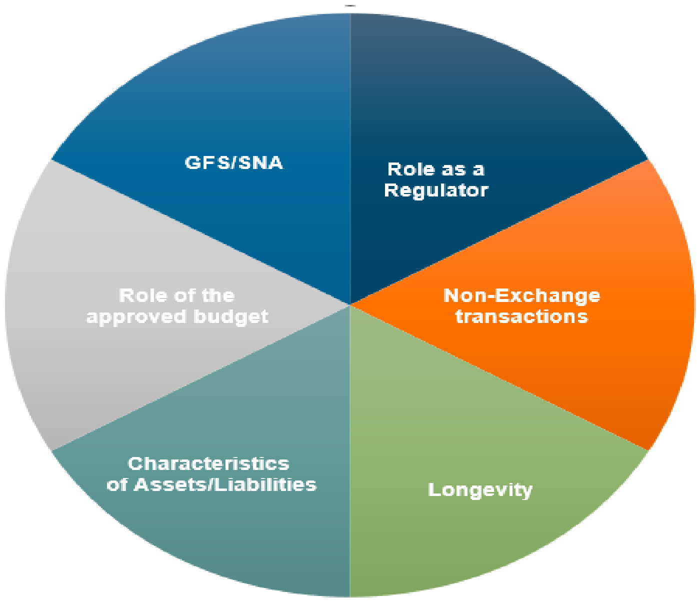
2.1 IPSAS framework and characteristics

The IPSAS have been promoted by the corresponding IPSASB, under the auspices of IFAC as a global public sector accounting effort to achieve governmental financial accountability and transparency (Heald, 2003). In the first phase, the IPSASB, used the International Financial Reporting Standards (IFRS) as the basis of score of standards. This first phase started in 1996 and lasted until 2002. From then on, within the framework of the second phase, the board focused on special issues of the public sector. So initially they proposed general cash basis standard for those countries that for various reasons were unable to adopt the accrual method while all other standards are based on the accrual method accounting (Handbook of IPSAS Pronouncements, IPSASB, 2008). International organizations finance countries that are willing to adopt IPSAS while these accounting standards serve as a prerequisite for capital financing by the World Bank. All countries, not necessarily member states of EU but at international level, are encouraged to harmonize their accounting standards with the IPSAS regardless of their economic and regulatory system. In this context, IPSAS are the global reference point for accounting harmonization and assessment of accounting practices, a fact that justifies its multifaceted importance for all stakeholders such as policy and decision makers, regulators, standard setters, borrowers, scholars, and practitioners. In 2013, the EU, inspired by IPSAS, proceeded with the effort to harmonize accrual-based PSA standards by promoting EPSAS. This plan was based on the belief that the "superiority" of the accrual's principle, whether for macroeconomic or microeconomic monitoring, is undisputed (European Commission, 2013b, p. 6). In the context of the EU, accounting consolidation is considered as a prerequisite for fiscal balance in order to achieve comparability, control and improvement of fiscal balance (Mussari, 2019).

As far as the familiarization with the IPSAS is concerned, this section displays the structure, and characteristics of these international standards. A first distinction is between lower and upper IPSAS (Chan, 2008). Lower ones concern the definitions of "deficit" and "debt" used in calculating the financial ratios under the Maastricht Treaty, and in meeting the conditionality requirements of the IMF. SNA manual, following the IMF guidelines, displays the guiding principles for the composition of the General Government statements. The second classification of upper IPSAS, displays the financial reporting requirements both in SNA and ESA, the IMF's GFS, and Fiscal Transparency (FT) and the OECD Budget Transparency projects. Due to the close association between these two categories, these international organizations worked on their harmonization.

As far as the typical characteristics of IPSAS are concerned, IPSAS can be described as an international governmental version of business accounting standards with business-like regulations and laws. It is actually the advance of the regional Anglo-American government accounting model to international one, with accrual accounting basis consisting of its focal point. Alternatively, IPSAS can be considered as the replication of the IFRS, which are set by the International Accounting Standards Board (IASB) for multinational corporations. The scope of IPSAS is the compilation of financial statements and related financial disclosures about the annual performance of governments that are of public interest. Considering the numerous transactions between private and public sector, premise of IPSAS is to base on a uniform set of accounting principles, namely the preparation of consolidation of financial statements under the accrual accounting basis.

Figure 2.1. IPSAS CF: characteristics of public sector that influence PSA



Source: https://cfrr.worldbank.org/sites/default/files/2020-10/02.pdf.

2.2 IPSAS summary, treatment, and approach

In below table 2.1 the thesis displays a summary of the provisions of all IPSAS standards, recommended practice guidelines (RPGs) and the CF, as outlined in Deloitte (2021). Five projects have also been processed: 1) Conceptual framework for general purpose financial reports of public sector entities 2) Review of cash-basis IPSAS 3) Financial instruments 4) Fiscal sustainability of government programs and their financing 5) Heritage assets (Toudas *et al*.,2013).

Table 2.1 IPSAS summary

IPSAS 1	Presentation of Financial Statements General Standards on Reporting category (together with nos.1, 2, 3, 6, 8,10,14,18, 20, 22, 24).
IPSAS 2	Cash Flow Statements General Standards on Reporting category
IPSAS 3	Accounting Policies, Changes in Accounting Estimates and Errors Notes: This standard is included General Standards on Reporting category and also in the category of standards on Specific Elements of Financial Statements (together with nos 3, 5, 7, 11, 12, 13, 15, 16, 17, 19, 21, 25, 26).
IPSAS 4	The Effects of Changes in Foreign Exchange Rates Notes: Regarding General Standards on Accounting Recognition and Measurement, only Nos 4,9 and 23 are related.
IPSAS 5	Borrowing Costs Note: Standard on Specific Elements of Financial Statements
IPSAS 6	Consolidated and Separate Financial Statements — superseded by IPSAS 34-38 General Standards on Reporting category
IPSAS 7	Investments in Associates — superseded by IPSAS 34-38 Note: Standard on Specific Elements of Financial Statements
IPSAS 8	Interests in Joint Ventures — superseded by IPSAS 34-38 General Standards on Reporting category
IPSAS 9	Revenue from Exchange Transactions Notes: Regarding General Standards on Accounting Recognition and Measurement, only Nos 4,9 and 23 are related.

IPSAS 10	Financial Reporting in Hyperinflationary Economies General Standards on Reporting category
IPSAS 11	Construction Contracts Note: Standard on Specific Elements of Financial Statements
IPSAS 12	Inventories Note: Standard on Specific Elements of Financial Statements
IPSAS 13	Leases Note: Standard on Specific Elements of Financial Statements
IPSAS 14	Events After the Reporting Date General Standards on Reporting category
IPSAS 15	Financial Instruments: Disclosure and Presentation — superseded by IPSAS 28 and IPSAS 30 Note: Standard on Specific Elements of Financial Statements
IPSAS 16	Investment Property Note: Standard on Specific Elements of Financial Statements
IPSAS 17	Property, Plant and Equipment Note: Standard on Specific Elements of Financial Statements
IPSAS 18	Segment Reporting General Standards on Reporting category
IPSAS 19	Provisions, Contingent Liabilities and Contingent Assets Note: Standard on Specific Elements of Financial Statements
IPSAS 20	Related Party Disclosures General Standards on Reporting category
IPSAS 21	Impairment of Non-Cash-Generating Assets Notes on treatment and approach: One basic difference between IFRS and IPSAS is that in the latter ones, these assets that do not produce commercial benefits. Recognition of impairment loss is presented as fair value depreciation. Note: Standard on Specific Elements of Financial Statements
IPSAS 22	Disclosure of Financial Information About the General Government Sector Notes on treatment and approach: This standard is very much related with this study as it clarifies the differences between government accounting (financial reporting)

	and statistical reporting. In the latter one the General Government Sector (GGS) financial and non-financial corporations are both included, necessitating additional disclosures. General Standards on Reporting category.
IPSAS 23	Revenue from Non-Exchange Transactions (Taxes and Transfers) Notes on treatment and approach: This standard covers taxes and transfers, which refer to fines, donations and debt forgiveness. Revenues are increases in assets or decreases in liabilities. Revenue recognition depends on the taxable events that trigger potential resource inflows. Regarding General Standards on Accounting Recognition and Measurement, only Nos 4,9 and 23 are related. This standard is also included in General Standards on Reporting category.
IPSAS 24	Presentation of Budget Information in Financial Statements Notes on treatment and approach: Disclosures are made outside of financial statements. This standard calls for the following disclosures: original and final budget with projected revenues and appropriations; actual amounts on the budgetary basis; an explanation of variances; as well as a reconciliation of accrual and budgetary bases. This standard is also included in General Standards on Reporting category.
IPSAS 25	Employee Benefits — superseded by IPSAS 39 Note: Standard on Specific Elements of Financial Statements
IPSAS 26	Impairment of Cash-Generating Assets Note: Standard on Specific Elements of Financial Statements
IPSAS 27	Agriculture
IPSAS 28	Financial Instruments: Presentation
IPSAS 29	Financial Instruments: Recognition and Measurement – replaced by IPSAS 41
IPSAS 30	Financial Instruments: Disclosures
IPSAS 31	Intangible Assets
IPSAS 32	Service Concession Arrangements: Grantor
IPSAS 33	First-time Adoption of Accrual Basis IPSASs
IPSAS 34	Separate Financial Statements
IPSAS 35	Consolidated Financial Statements
IPSAS 36	Investments in Associates and Joint Ventures

IPSAS 37	Joint Arrangements
IPSAS 38	Disclosure of Interests in Other Entities
IPSAS 39	Employee Benefits
IPSAS 40	Public Sector Combinations
IPSAS 41	Financial Instruments
IPSAS 42	Social Benefits
RPG 1	Reporting on the Long-Term Sustainability of an Entity's Finances
RPG 2	Financial Statement Discussion and Analysis
RPG 3	Reporting Service Performance Information
	The Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities
	Financial Reporting under the Cash Basis of Accounting

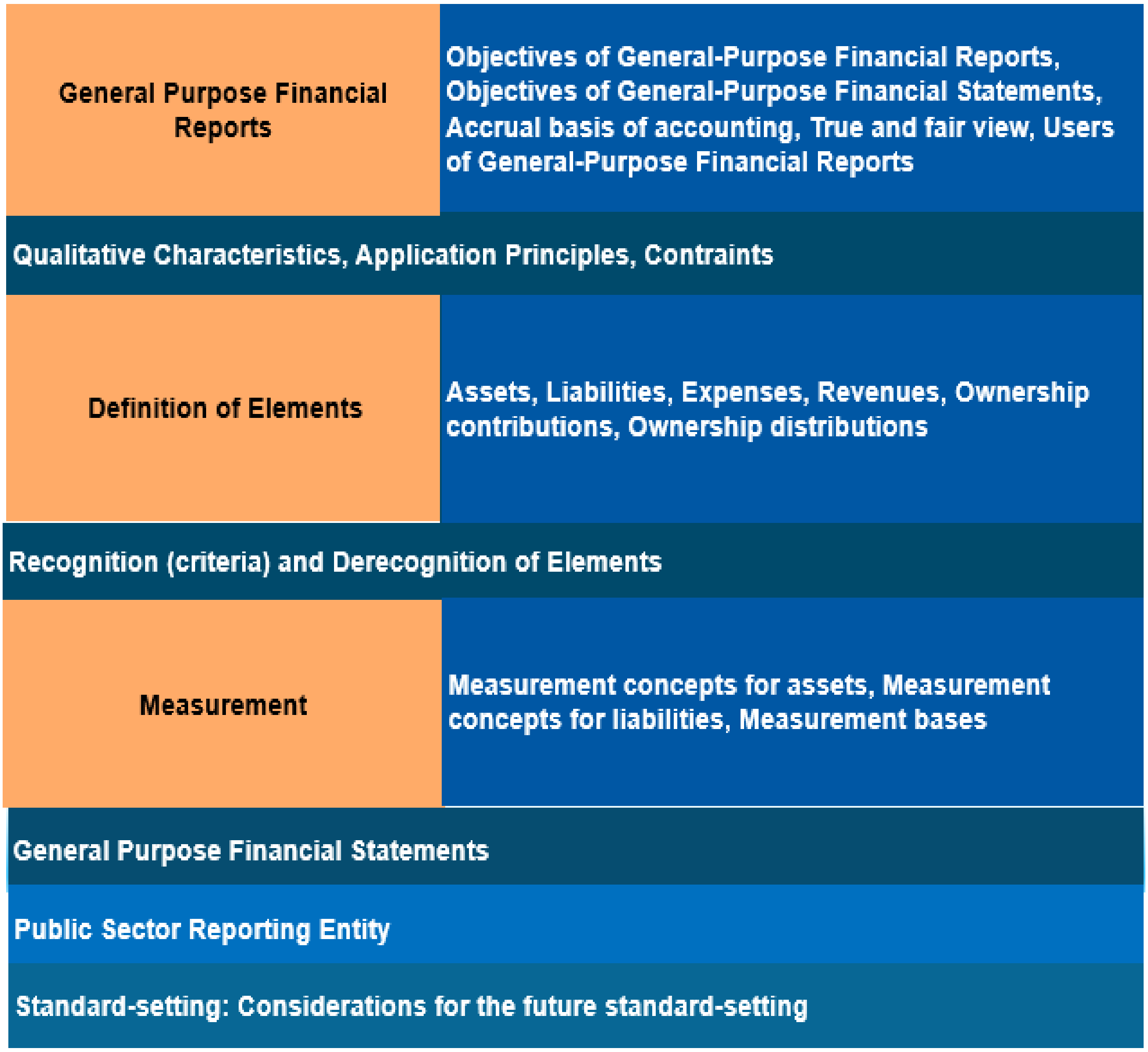
2.3 EPSAS framework and characteristics

The importance of PSA derives mainly from the fact that public finance concerns collection of taxes destined to provide public goods to beneficiaries. Therefore, the fiscal policy must be fair and based on financial reports that provide a complete and reliable financial position. Based on the European Commission (2020), this expectation is considered to be verified with the use of the accrual accounting basis method which is also the main goal of the EPSAS CF. The effort to adopt them stems from the need for transparency and comparability between EU Member States. The EPSAS CF and related standards should present a set of concepts and definitions for the development, adoption, and publication of EPSAS that best serve the general principle of public interest and favour the European public benefit. EPSAS General Purpose Financial Statements (GPFSs), such as the financial position and results statement, cash flows, changes in assets, should enhance accountability and decision-policy making and financial management of stakeholders. The quality characteristics of EPSAS are considered to be the relevance that ensures the validity of financial information, reliability that provides accurate information, completeness on the recognition criteria, prudence so that assets or income are not overstated while liabilities or expenses are not underestimated, neutrality, verifiability -which is the quality of information that helps guarantee users that GPFRs is based on supporting evidence in a way that it faithfully represents the substance of financial statements-, substance over form, understandability, timeliness and comparability. The EC should adopt EPSAS on the premise that they serve the European public benefit, serve the aforementioned GPFRs objectives and integrate the qualitative characteristics. What is important to mention for the key concepts of this thesis is that EPSAS should align with international accounting standards and principles as per below (European Commission, 2018).

The European Parliament, in line with the Article 143 of EU Regulation No 966/2012 and with the Council dated 25/10/2012, on the financial rules applicable to the general budget of the EU

- the accounting standards for the private sector (IAS Regulation and the Directive 2013/34/EU) of the European Parliament and the Council on the annual consolidated financial statements, and respective reports of certain types of undertakings, referred in brief as the Accounting Directive
- Generally Accepted Accounting Principles (GAAP) for the public sector that have attained a high level of accounting maturity
- ESA rules

Figure 2.3. The structure of EPSAS Conceptual Framework

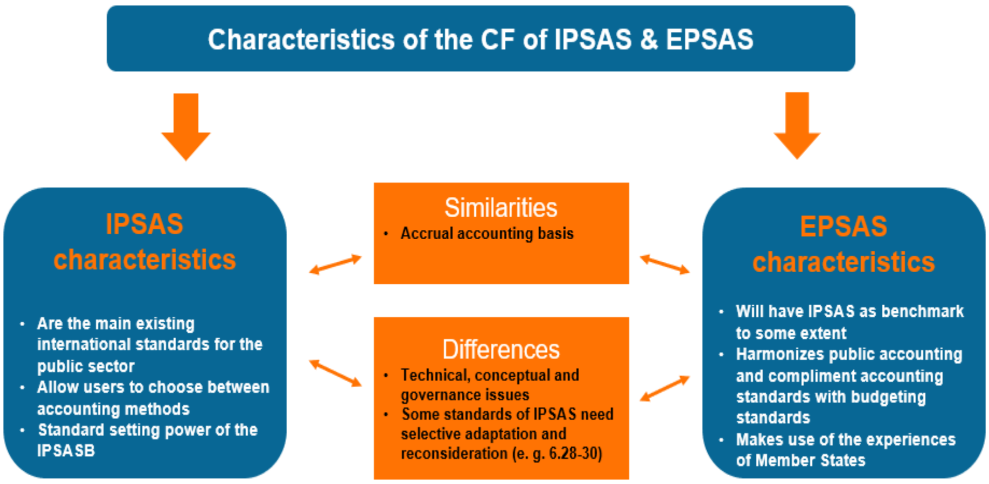


2.4 Similarities and differences in the CF of IPSAS and EPSAS accounting standardization

The need to harmonize accounting practices in EU countries has led the EC, following a public consultation, to conduct auditing surveys to investigate the suitability of IPSAS (PricewaterhouseCoopers, 2014; Ernst and Young, 2012). The result of the investigations was to decide to develop a new set of European standards due to the high heterogeneity of public sector national accounting standards in member countries and the significant variation in their accounting maturity compared to IPSAS. Although the suitability of IPSASs has been questioned, doubts have been raised about the content of the European standards as well (Cohen *et al.*, 2022). For this reason, it was considered proper to set the IPSAS as cornerstone for the development of EPSAS and the drawing up of a per se conceptual framework (CF) (Mann *et al.*, 2019) that would describe the purpose of the latter. The objective of the EC was the development of a CF that would bring together all the forces affecting the public sector (standards applied in the EC, the private sector, the nationally developed GAAP for the public sector, and the rules of the statistical accounting framework adopted under the ESA). It was however reasonable and expected that the aforementioned heterogeneity would not allow the member states to have the same preferences and views regarding the CF thus creating additional resistance to the development and implementation of the EPSAS. However, the undisputed commonality of both standards is accrual accounting which has been facilitated by the involvement of both IPSAB and private sector professionals who embrace accrual accounting standards as these are more familiar to large audit firms (Mann *et al.*, 2019).

A first issue raised was whether EPSAS should lean towards IPSAS or National Standards. It was considered that since Member States have already made efforts to move to IPSAS, the preferred accounting principles of future EPSAS should not be far away. So, the similarity of the two standards could be due to exactly this, in the attempt to avoid a heavy burden on the EU countries again to adopt something completely different (Brusca *et al.*, 2021). Therefore, subject similarity would be an incentive for countries that have already made efforts to converge with IPSAS to adopt EPSAS.

Figure 2.4 Similarities and differences in the CF of IPSAS and EPSAS



But what is a handicap on the convergence of EPSAS with IPSAS is that the latter are insufficient to achieve de facto comparability of information, basically due to the choices allowed and the judgment required (Mattei *et al.*, 2020). Despite this, the fact that EPSAS must be aligned with accounting standards of international acceptance enables convergence with IPSAS.

Additional outcome associated to the link between the CF of EPSAS and IPSAS, presented provisions of the IPSAS, the EU accounting standards, national PSA standards, the ESA (including the Manual on Government Deficit and Debt when applicable), the IFRS, as well as other standards available in frameworks such as UNESCO, NATO etc. Therefore, the development of EPSAS summarizes the stream of choices and solutions that refer to the existing, national, and international, accounting standards.

Up to the tenth Working Group (PricewaterhouseCoopers, 2020), for the evolution of the joint EPSAS framework, IPSAS were considered conducive to the European public good. However, in many cases, the analysis concluded that in order to achieve a consistent application of IPSAS across the EU and to better address the objective of comparability of EPSAS financial statements, additional guidance and improvements might be needed in some areas. The main issue is that their development is a slow process where the degree of their convergence with IPSAS still remains an unsolved problem and the stakeholders need to solve the same discrepancies (Fioretti and Lomi, 2008).

3. Compatibility of Government Accounts with National Accounts in the context of accounting standardization

3.1 Compatibility of IPSAS and ESA

Systematic efforts are made for establishing a close link between the government and statistical reporting, namely between the IPSAS and ESA. These interconnectedness efforts have proven to be major problem (Bellanca, 2014) as special concerns of legitimacy and responsibility raise due to the fact that IFAC, a private sector organization, defines the governance of the IPSASB members and determines strategies and policies without the involvement of the member states that are actually impacted. Nevertheless, it is oxymoron that a private sector organization such as IFAC designs PSA standards.

IPSAS have included a cash basis standard, so as to enable countries to transition smoothly to accrual basis one. Nowadays, as far as concerns the budgetary discipline, the EU treaty obliges its EU member states to prepare their NA in accordance with the ESA2010 accrual accounting framework in order to meet the convergence criteria of the same (De Jesus, 2011). Upon convergence of GA to NA, many adjustments are needed as the input of information is mainly cash based as it concerns budgetary statements. However, the fact that this procedure is not strictly monitored, final deficit/surplus (NA) reliability and comparability are in doubt (the same percentage of deficit might be calculated in very different ways), also considering that the basis from which each country starts (in GA budgetary reporting) is still not harmonized. Due to the sovereign debt crisis and the austerity measures, the IFAC and the EU parliament, have mandated the IPSAS compliance, in a consistent, uniform and comprehensive way, covering all the GGS subsectors (De Jesus, 2014). Regarding the association of these two accounting systems and reporting, the problem mainly derives from GGS data to NA, since they are attained from GA, where the divergences and the diversity that stem from the macro accounting system may question the reliability, relevance and comparability of the aggregates that support the financial decisions of EU member states (Jones and Luder, 1996).

3.2 Compatibility of ESA 2010 and SNA 2008

As far as the ESA2010 is concerned, the Council Regulation no.2223/96 and its subsequent initial amendments and later Council Directive 2011/85/EU, define the guidelines with which EU MSs need to prepare their NA, to align with a variety of political and social systems. The ESA2010 indicator - with its accrual accounting framework- must facilitate the purposes of whole of governments' evaluation and enable the monitoring and control of its relevant fiscal policies in order to be eligible for the European Monetary Funds (Benito and Bastida, 2009). General government accounts are the most precise of the national accounts which are drawn up to accrual accounting and the compilation method is more accounting and less statistical. The ESA 2010 varies both in scope and in concepts from its predecessor ESA 95 as it demonstrates advances in measuring modern economies, developments in methodological research and the user needs.

SNA 2008 complies with ESA 2010 as the structure of the latter is consistent with the worldwide guidelines of the former. In order to support its application, Eurostat published necessary handbooks and manuals. The EU parliament, with the Council Regulation (EC) no.2516/2000, introduced a flexible ESA general recognition criterion regarding taxes and social contributions, enabling EU MSs to recognize these according to three different methods. Based on accrual accounting basis of NA guideline, taxes are recognized with three different methods. The accrual basis method recognizes taxes at the time taxes actually occur. The adjusted cash basis method allows -when this is feasible- a time adjustment for the recognition of the taxes. When none of these two methods is applicable, either accrual basis or adjusted cash basis then cash basis can be implemented of the recognition of taxes.

3.3 Compatibility of National Accounts and General Accounts from IPSAS' and EPSAS' perspective

Several authors (e.g., Montesinos and Vela, 2000) have highlighted the relevance of studying the link between (GA – microeconomic perspective) and (NA – macroeconomic perspective) in order to assess whether GA systems are able to meet ESA95 and later ESA2010 requirements, namely relating to the information provided by the GGS. EU MSs have long made efforts, since early 1990s, towards PSA reforms and accrual basis accounting method. There are still governments that clearly use accrual basis and others that use modified cash basis accounting in budgetary statements. As long as the accrual accounting method is not introduced to budgetary accounting systems, this modified cash basis method can be used mainly to inform stakeholders over governments' performance and control of its agencies. This method however would less be appropriate for budgetary decision and policymaking as for the purposes of financial reporting accrual basis can foster the purposes of greater transparency and accountability (Groot and Budding, 2008).

Regarding differences between GA and NA, the IPSASB developed a working program concerning the convergence of IPSAS to NA systems, issuing a research report (IPSASB, 2005) with the aim to identify the differences between financial reporting provided by the statistically based accounting systems (NA prepared according to IMF's GFSM2001, SNA93 as updated in 2008, and ESA95) and the financial information reported under IPSAS government accounts issued up to June 2004 (IPSASB, 2005). This document identified the key issues that involve different accounting treatments in GA and NA and made recommendations in order to reduce or eliminate the divergences between the two accounting systems wherever possible (Jesus and Jorge, 2010). Moreover, the IPSASB consultation paper, entitled 'IPSASs and government finance statistics reporting guidelines', (IPSASB, 2012), documents the key points representing variance between the two accounting systems, namely those resulting from their different objectives and different reporting entity definitions, as well as specific differences regarding recognition, measurement and presentation.

As forementioned, the main differences of GA with NA were related to recognition criteria, particularly on taxes recognition, accounts receivable (customers) and accounts payable (vendors) and interest paid or accrued. This focus is justified because material GA–NA variance stems from the fact that NA derives from micro data that gets collected from various institutional sectors and adjustments are necessary in order to harmonize the time variance of their occurrence. These accounting basis differences imply adjusting and corrections based on estimations of GA data to determine the macroeconomic ratios, such as debt and deficit, which have repercussions for their comparability and reliability. Keuning and Tongeren (2004) highlighted that this approach requires the adoption of accrual basis under GA and also a standardization of procedures and practices between the two accounting systems.

From a theoretical standpoint, this thesis highlights the differences between GA and NA, focusing on the accounting basis issues but from practical standpoint, it evidences that regardless of the government accounting basis in input terms, the output with NA accrual accounting framework is of high quality. IPSAS and EPSAS (IPSAS based) with accrual accounting basis being its focal point, are used as the benchmark for the convergence efforts so as to show the impact in statistical reporting quality of implementation, of those countries that have considered the alignment of statistical guidelines in their government accounting. Therefore, this thesis contributes to a better understanding of the accounting basis differences for the convergence process between GA and NA, permitting more reliable and informative budgetary reporting to be reached from both micro and macro perspectives. As far as concerns the budgetary accounting and reporting systems, this study highlights how important it is that GA retains its reporting quality when converting from cash to accruals.

3.4 Compatibility between NA, GA, SNA, ESA, GFS, GGS

National Accounts' main purpose is to provide information about the key aggregate indicators (e.g., volume growth, gross domestic product, national income, disposable income, savings and consumption) of the economic activity of all organizations and households in a certain country, so that a national economy could be evaluated and compared with other countries' aggregates (Benito *et al*., 2007). Marti (2006) underlines that (SNA), the (GFS) Manual and the (ESA) compile aggregated data in order to assess national income, deficit/surplus and financial net worth for the whole economy, separated into institutional sectors, the (GGS) being one of these and that ultimately introducing accrual in budget, is itself a controversial issue.

National accounts record the transactions between national institutional entities (non-financial corporations, general government, financial corporations, households and non-profit institutions serving households) for the purposes of fiscal policy at a macro level. These systems focus on economic activities related with the statistical conceptual framework for activities that apply within an economy and in relation with stakeholders in the rest of the world. They forecast and describe macro aggregates for a nation as a whole and the interaction between the different economic agents (IPSASB, 2012). Input of Government sector NA aggregates are based on GA, so the convergence of these two systems is mandatory to confirm reliability and accuracy of the output data that sustain EU fiscal and monetary policies; Regardless of the EU MSs domestic government practices, the adoption of a full accrual basis is compulsory for the majority of transactions when preparing their NA. There are still many countries though that have not embraced the accrual basis accounting in their budgetary systems in government accounting which consists in fact the main data source for the conversion of GA to NA.

4. Theoretical framework and literature

4.1 Public Administration Theory and NPM Model

The public sector is an essential part of an economy. In times of crisis, such as the recent global COVID-19 pandemic, the war in Ukraine and the energy crisis, governments are increasingly using fiscal policy measures so that the citizens of the impacted countries can withstand the economic and social consequences. The public sector contributes significantly to the economic development of a country and therefore those in charge of managing public funds are accountable for the outcome of their fiscal policy, being responsible for the decision making. In this context, Financial Accountability Management in the Public Sector becomes synonymous with the concept of reflective responsibility. High levels of transparency are needed to strengthen governments' accountability for their decision-making. The challenges of globalization have greatly strengthened the drive for better public sector services, to improve the quality and accountability of government agencies and their members, to deliver better services while ensuring greater transparency in Public Financial Management (PFM).

In addition to PFM, strong governance should be in place to enable governments and public sector entities -around the world- to make correct decisions for people, the planet, and the economy. This strengthening of financial accountability in the public sector prerequisites that the disclosure of an accurate financial position is at the core of the entire PFM system and necessitates strong interconnection of its functions (e.g., accounting, and budgetary) to improve control. To support financial accountability's strengthening, the existence of appropriate data analysis software and management of internal controls (MIS) able to reduce corruption, to foster citizens' awareness through regular publication of governmental financial statements, to support proper planning of economic reform in order to respond to challenges such as changes in laws and regulations as well as developing IT systems to sustain subject reforms, are also needed.

High-quality, global PSA standards play a key role in strengthening PFM to support public sector transparency, comparability, accountability, and decision-making. IFAC strongly supports the adoption and implementation of accrual accounting, in particular the IPSAS. Although there has been positive impetus behind the global transition to accrual accounting, full implementation of IPSAS is still a long-term endeavour for many governments.

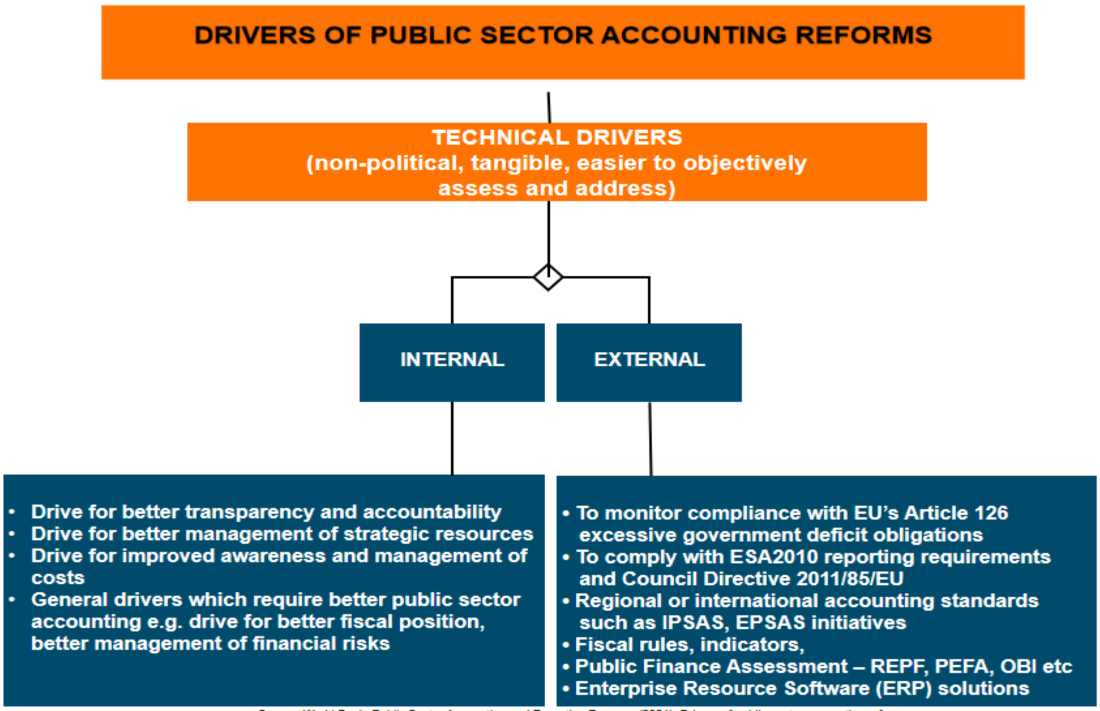
The NPM model represents new advances that were made to public administration theory as a novel approach of public sector governance, with the aim to improve efficiency and accountability (Gomes et al., 2015). The term itself was first introduced by academics to describe the techniques developed during the 1980s as part of an effort to make public services more 'business-like' and to improve its efficiency by using private sector management models and free market principles into the public sector (Lampropoulou and Oikonomou, 2018). Accrual accounting as the focal point of NPM, provides significant information content to communicate financing decisions and allows the government to take a long-term view (Salato *et al.,* 2022). Adoption-related decisions seem to be more motivated by the objectives of accountability and transparency (Nitzl *et al*., 2020) with the aim to maintain the international harmonization process (Brito and Jorge, 2021). Developed countries, such as the United Kingdom are leading this reform process and already have a prominent level of implementation of accrual accounting in the public sector (Ghani *et al.*, 2019), in the belief that it will lead to better decision making (Hyndman and Connolly, 2011). Christiaens *et al*. (2015) underlined the connection of IPSAS standards with the general (NPM) approach. Subject reforms brought accrual accounting to PSA systems, in an approximation to business accounting, and the adaptation of the IPSAS framework to national standards. In EU member states, the PSA reforms seem to have been driven primarily by external factors, such as EU guidelines that require accrual accounting for fiscal reporting under the ESA 2010 and the Eurostat initiative to promote and develop the IPSAS-based EPSAS (World Bank/ PULSAR, 2021).

4.2 Drivers of PSA reforms

There are many studies on the drivers of accrual accounting adoption decisions in the public sector in the context of Europe and other developed countries. Major PSA reforms are typically shaped by a range of complex institutional, political, and cultural factors (Hyndman and Lapsley, 2016). Indeed, political support, commitment, and funding from international organizations in terms of the pervasive need to harmonize PSA are vital for a successful accrual accounting implementation process in developed economies (Salato *et al.,* 2022). Beyond external factors and political pressure, adoption-related decisions seem to be more motivated by the objectives of accountability and transparency and driven by the NPM (NPM) paradigm (e.g., Ada and Christiaens, 2017; Agasisti *et al.,* 2018; Gigli and Mariani, 2018; Christensen *et al.,* 2019; Nitzl *et al.,* 2020). Most EU countries seem to have accomplished these objectives by implementing accrual accounting throughout their accounting and budgetary reporting processes (Stefanescu, 2020). Regardless of the approach, technology is an integral part of any accrual accounting implementation project, where the accounting workstream is managed along with the IT workstream (IFAC, 2019).

Accrual accounting reform targets the supply of reliable and inclusive information on public finance and provision of a basis for the enhanced financial control of government practices (Lüder, 1992). According to the World Bank/PULSAR (2021), diversity in target setting, objectives, political support, capacities, and administrative procedures led governments to seek suitable drivers of reform during the demanding process of transitioning to accrual accounting. Based on the World Bank (2021, p.9), drivers stimulus something or cause it to happen, make progress, develop, change, or grow stronger". These can be technical and non-technical. The former distinguishes between internal and external drivers. The latter includes international standards, such as IPSAS and EPSAS, as an external requirement for compliance with fiscal rules or indicators. ERP solutions also consist of an external technical driver (World Bank, 2021). This study aims to analyse individually three of the below external drivers, namely the ESA2010 accounting framework, the international and regional accounting standards (IPSAS and EPSAS), the Enterprise Recourse Software (ERP) solutions and their in- between relationship and interaction towards PSA reforms.

Figure 4.2 Drivers of PSA reforms



Source: World Bank, Public Sector Accounting and Reporting Program (2021). Drivers of public sector accounting reforms

This thesis seeks to contribute to an understanding of the nature of the NPM in practice, the drivers of change towards new models of public management and the outcomes of the change process. More specifically, this thesis focuses on the European Union member states and the UK and the interrelationship of the IT and accounting maturity, based on earlier surveys on behalf of Eurostat (PricewaterhouseCoopers, 2014, 2020) in relation to the application of accrual accounting basis at the central government level as a prerequisite for the application of IPSAS. The main objective of IPSAS convergence is the global adoption of accrual-based accounting to foster accountability and transparency with the aim to pave the way to PSA harmonization. Enterprise Resource Planning (ERP) system modernization is considered a move in this direction. This thesis reinforces the view that the robust accrual accounting reform, which is the focal point of IPSAS, entails a build-up of a reliable management information system (MIS) for accounting and auditing surveillance. It showcases that indeed the planning and the transition to an accrual basis included in the majority of the member states necessitates the implementation of new information systems or the upgrading of existing ones and that the information systems were drivers and facilitators of accrual accounting reforms.

The intention of the ERP system is the collection of data from the interdepartmental parts of an organization, their integration in financial reporting, in order to foster the correct decision-making, efficiency, control and flexibility and possibly to facilitate the attribution of responsibilities. Hence one can see the ERP system as an attempt to create accountability. As EU member states are obliged by Article 3 of Directive 2011/85/EU to have in place accounting systems that enable the preparation of ESA2010 reports, a suitable IT infrastructure that can support accrual accounting, strong internal controls, processes, and record keeping seems inevitable.

4.3 The role of drivers in terms of the theoretical institutional framework

PSA reform has become a global feature of governments around the world driven by the pursuit of efficiency, transparency, and accountability to achieve homogeneity and comparability in their accounting practises in the context of institutional isomorphism and respective coercive, normative, and mimetic pressures. Albeit the reform goal of governments in their efforts towards public sector modernization is the implementation of accrual accounting, there are national variations attributed to historical, cultural, political, and institutional factors. During this modernization process, governments employ various drivers, establishing their rivalry and alliance, to ensure successful accrual accounting implementation process, confirming the political nature of the government accounting formation process (Marwata and Alam, 2006).

Effective, reliable, and sustainable reforms depend on the capacity to build wide coalitions, identify external drivers and pressures, and align them into the policy-making process (Meloni, 2010). The most fruitful results for PSA reforms seem to be achieved if there is a good mix of internal, external, technical as well as non-technical drivers that can support not only the start but also the full implementation of the PSA reform (World Bank/PULSAR 2021).

Previous studies underline the interaction of various drivers in terms of organizational change within government organizations to show that change is possible through a complex interplay of problem pressure, policy solutions, and political entrepreneurship (Lichtmannegger and Tobias, 2020). In the context of EPSAS project, Natalitzi (2022) studied Italy and Sweden in their diverse cultural and accounting transitions, to identify potential positive factors of a national PSA standard-setting context that facilitate international harmonization. This study focused on the European context, aimed to underline that although countries might differ in their national characteristics, the superlative prerequisites can set up a positive environment in which to foster international harmonization. This study does not attribute the international harmonization in the public sector to institutional and governmental factors such as legislation, auditing practises, an inclusive and participative standard-setting process, and the accrual accounting maturity as supportive key actors. Hopper et al., (2017) studied the emerging economies to underline that donor pressures might be the pervasive driver of persuasion, limiting the influence of actors within a country. This is in line with Hepworth, (2017) who claimed that the adoption of IPSAS is mainly driven by external parties such as consultants, donors, and the accountancy profession that have own benefit not necessarily aligned with the country concerned. Adhikari et al. (2019) attributes PSA reforms to supplier-led initiative as a result from the loan conditionality and development discourses of international organisations such as the World Bank and the IMF. This seems to be a long lasting and pervasive perspective as the study of Kapur (1997) favoured international organizations as external driver to accounting globalization setting aside technological innovations. Hepworth (2017, p. 141) noted "that the implementation of the accrual-based IPSASs in European-influenced developing and transition economy countries is not an appropriate reform unless preceded or accompanied by other, essentially managerial, reforms".

In this context of institutional theoretical framework, this thesis analyses the role, impact, and interplay of technical external drivers towards PSA. It underlines the quality of ESA2010 framework under the ESA coercive pressure of Directive 2011/85/UE for accrual accounting. It showcases the mimetic pressures of ERP vendor choices in their IT modernization process to support accrual accounting reforms. Ultimately it underlines the interplay of ESA2010 and ERP systems with the adoption of IPSAS and EPSAS accounting standardization under the international organisations, which can acquire the power of coercion through their control over governments that need resources from them in order to survive and under the exertion of normative pressures of respective international boards.

5. ESA2010 reporting requirement and quality in the context of Council Directive 2011/85/EU towards PSA reforms[1]

5.1 Introduction

Public sector accrual-based accounting sets the breeding ground for the provision of high-quality statistics (European Commission (EC), 2012) at the European level for the harmonization of government accounting with financial statistical reporting. At the macroeconomic level, the SNA 2008 draws the statistical perspective of financial reporting, while GA comprises the applicable micro-level point of view. National accounts have been produced and circulated with the support of the United Nations, the OECD, the IMF, the World Bank Group, and the EC. Since September 2014, in the European division, the corresponding variant is supported by the ESA2010.

National accounts are a set of macroeconomic financial records, allowing the comparison between countries while enabling decision making. The structure of ESA 2010 is in line with the global national accounting guidelines employed in the SNA2008. The GFS information guidelines govern both SNA2008 and ESA2010 (González *et al.*, 2018). Statistical accounting is a comprehensive framework that provides a reliable and flexible macroeconomic chart of accounts for decision making and research purposes. In the European Union, the significance of GA practices being in accordance with the NA, specifically ESA2010, is inescapable. These practices serve as the foundation upon which the EU's fiscal discipline and macroeconomic convergence requirements are evaluated. (Jorge *et al.*, 2019).

This study primarily aims to highlight the contribution of the ESA accrual accounting framework to the value relevance (thus the quality) of statistical reporting of governmental NA. It aims to foster the analysis of accrual accounting harmonization processes in European division using the accounting frameworks of NA as key elements. In order to improve social, political, and economic decision making and accountability, it advocates value relevance tools that facilitate the examination and comparability of financial, budgetary, and aggregated statistical reports. With its findings, this study has practical implications as it i) concludes that ESA2010 generates value relevant (thus qualitative) NA financial reporting in EU member states and the United Kingdom (UK) on an accrual basis; ii)

[1] This chapter is part of the research entitled "Value relevance of general government national accounts with ESA2010 accrual accounting framework. Association of ESA2010 reporting quality with decision making and accounting standardisation" which has been published in the Journal of Accounting and Management Information Systems, 21(4), pp.546-574, http://dx.doi.org/10.24818/jamis.2022.04005
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highlights the financial variables that better interpret bond returns, and therefore governments' necessity to borrow money iii) endorses the usefulness of the ESA2010 conceptual framework for the decision and policy making process considering that accounting frameworks shape the quality of the financial reporting; iv) discusses the value relevance results in association with the harmonization and alignment process of accounting standardisation with the ESA2010 accrual accounting framework during the decision making process.

5.2 Value relevance literature

According to international literature, value relevance is defined as the ability of accounting figures to reflect the financial value of each legal entity. It can reflect accounting methods and accounting standards, auditing and legislation, and standard interpretation (Hung and Subramanyam, 2007). Strong value relevance implies high quality accounting information (Ball and Brown, 1968; Ohlson, 1995, 2001). In the relative value relevance analysis, using the same value relevance model but with different accounting values corresponding to different standards or different periods or diverse groups, the R^2 value of the equations determines whether there is a significant value relevance difference and consequently qualitative variance in the accounting information (Lin and Chen, 2005).

Value relevance refers to the advantageous characteristics of financial statements to provide reliable and relevant accounting information as the primary criteria for enabling standard setters to choose between accounting practices and standard alternatives (Barth *et al*., 2001). From a measurement and disclosure perspective, accounting information is relevant if there is a statistical association between financial information and prices or returns. This concept positions equity and debt holders as the focus of the definition. From Francis and Schipper's (1999) approach, value relevance influences investors' decision making as to whether or not to invest in companies' shares. So far, numerous specification models have varied in their treatment and perceptions of accounting practices and financial information depending on the valuation models used (Easton and Harris, 1991; Ohlson, 1995). Based on Kothari and Zimmerman (1995), even though price models are less biased, returns models are less problematic for econometric analysis and are commonly favoured. To associate accounting figures with returns, the accounting literature has used regression analysis of modified valuation models as a theoretical framework for this relationship.

Hung and Subramanyam (2007) defined value relevance as the ability of accounting to convey and reflect the fiscal value of legal entities, their corresponding accounting methods, and their accounting standards (auditing and legislation). Ball and Brown (1968), studying the relevance of earnings to shareholders' returns, concluded that the higher the value relevance is, the greater the quality of accounting information and therefore of earnings. Their research has established the basis for future studies to compare different accounting practices or standards. Easton and Harris (1991) contributed to the discussion by associating changes in earnings with returns, using a book valuation model to determine earnings levels' relationship with returns. Ohlson's (1995) valuation model is based on the principle that a firm's weighted value is linearly associated with owners' equity and earnings. Ohlson's model relates pricing to the major components of balance sheets and income statements. Francis and Schipper (1999) further investigated value relevance and correlated a firm's value with major components of equity and earnings. The value relevance of balance sheet measures is sensitive to the valuation principles applied to the various asset and debt components. Barth *et al.* (2001) claimed the balance sheet's distinctive roles were to provide information on liquidation values to facilitate loan decisions and monitor debt contracts.

Certain limitations of the study are acknowledged. The value relevance of earnings and book value of equity on share prices and stock returns is a private sector technique to assess the quality of accounting information. The GAAP of the US and the IFRS have long been competing for international acceptance around the world as financial reporting standards. Due to the interrelationship of institutional setting and the quality of accounting information, financial reporting and disclosure are considered to be an important part of the institutional setting that affects transparency (Tarca, 2013). The Securities and Exchange Commission has been exerting pressure on numerous countries (including the US), to mitigate the differences of these two standards and converge them. This initiative has impact -among others- on accounting standards setters, investors, and stock markets. Subject cross-country comparisons of the value relevance of earnings and book values have been investigated between IFRS and US GAAP by Barth *et al*. (2012). Cross-country relative value relevance has also been studied during the IFRS convergence (Srivastava and Muharam, 2021). Literature from a value relevance perspective has also focused on the transitioning period from local accounting standards to IFRS (Clarkson *et al*., 2011; Kadri *et al*., 2009; Tsalavoutas *et* *al*., 2009). Evaluation of financial performance in terms of the value relevance of IFRS was considered significant not only for investors or stakeholders but also for those who wanted to invest at the international level (Temiz and Güleç, 2017). As accounting information is mostly related to debt markets (Ball and Shivakumar, 2008; Givoly *et al*., 2017) this research deploys debt, equity, income and Euribor figures in association with bond returns figures.

With the introduction and adoption of the accrual accounting system in the public sector as a result of NPM (NPM) reforms, which attempted to emulate the accounting practises and procedures used in the private sector, value relevance analysis is initiated in the public domain employing the accrual accounting framework ESA2010, to assess the quality of statistical reporting via bond returns regression models.

5.3 Research questions

The discussions for a harmonized integrated accrual-based financial reporting, reconciling public accounts and GFS, have taken place in the EU context, as it is anticipated to broaden the Whole of Government Accounts (WGA) reporting scope. Since September 2014, GA information has been converted to NA by ESA2010 principles. In general, Eurostat focuses on the compliance of the statistical NA in output terms. There is not a certain requirement on particular inputs to be used, though some are common because these are based on other European statistical legislation. All EU member state governments are obliged to use ESA 2010. Government accounting and in general microeconomic accounting systems of EU member states vary in their source data (administrative, regulatory, surveys etc). From a statistical perspective, despite the variance, the results will follow ESA standards and ensure comparability, and this is checked by the statisticians (Eurostat, 2013). From statisticians perspective, as far as the ESA2010 is concerned, there is the recognition that commercial and public accounting approaches should be examined when formulating the statistical approach to an issue. Understanding the relationship between commercial and public accounts and NA is crucial since they are a significant source of data for NA.

This study introduces value relevance models in the public sector to study the impact of the ESA2010 accrual accounting framework on the general government financial statement information of NA in the European Union member states and the UK. The research proposes the analysis of the value of the general government NA for assessing the return on bond prices. The compilation method used for general government NA becomes less statistical and more accounting oriented (Lequiller and Derek, 2007). It investigates whether the accounting framework introduction in statistical financial reporting resulted in financial statement information that better serves its primary objective, which is to provide high quality information on a public entity's performance and financial position both for internal and external stockholders and enable comparability.

Using the ESA2010 statistical indicator, this research employs empirical data in addressing the following research questions to investigate the quality of statistical financial reporting using bond return association models in relevance with the balance sheet, income figures, debt and Euribor figures.

RQ1: What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with the ESA2010 accrual accounting framework in EU member states and the UK?

RQ2: Which variables provide stakeholders with high quality governmental statistical reporting that strongly associates and correlates with bond returns in the EU member states and the UK?

This study contributes empirically, as it introduces value relevance models that measure the quality of the general government NA towards a harmonized methodology with ESA2010 statistical indicator in relevance with decision and policy making and theoretically as it endorses the perception that the accrual accounting basis sets the breeding ground for high quality statistics.

5.4 Data selection and methodology – Relative value relevance models

Relative value relevance analysis of EU member states and the UK was conducted for the period 1999–2019. In EU member states, the new ESA has been in force since September 2014 (González *et al.*, 2018). The full NA time series in the Eurostat database is based on the ESA 2010 statistical indicator. Regardless of the year when the EU member states joined the European Union, countries are legally required to re-transmit back a series of data when a new ESA is introduced, so they work backwards to adjust their data to the new rules. All EU member states published ESA 2010 data (including backwards compatible time series) for the first time in 2014 – this was the legally binding moment for them to do it.

Data for long-term government bond yields were collected from the European Central Bank's statistical data warehouse. Governmental data regarding governments' deficits/surpluses, revenues, expenditures, main aggregates, financial net wealth and government debt, expressed as a percentage of GDP, were derived from the NA indicators (ESA2010 indicator) in the Eurostat database. As the period for which the ESA2010 accrual accounting framework is assessed on its quality of reporting is until 2019, the UK is also included in the analysis of EU member states as Brexit occurred in 2020.

The bond return valuation models, apart from variables related to balance sheets and income statements, include Euribor rates. The Euribor (Euro InterBank Offered Rate) is a benchmark rate calculated based on contributions made by a panel of banks, which submit daily an interest rate representing the cost of lending to another large bank, known as the interbank market (Abbassi and Linzert, 2012).

The Euribor rate does not apply to all countries in the study. An example case is the UK, which is not a member of the Euro and therefore the Euribor rate will not apply. However, Barclays UK is among the panel banks and is a primary dealer in Gilts (UK government bonds), U.S. Treasury securities and various European Government bonds. Panel banks ensure that they reflect adequately the diversity of the euro money market and that Euribor represents its underlying market. Direct impact on banks is not the only effect changes in Euribor may produce. This is also an issue for Croatia since it will only join the Euro in 2023. Zaja *et al.* (2018) studied the determinants of government bond yields in the Republic of Croatia to find that the Euribor as an independent variable has a positive association with interest rates on government bonds and that its growth increases the yield on government bonds.

In this context, the study deems Euribor rates relevant for all sample countries, as these interest rates, within governments are impacted, directly reflect the conditions of an economy and its interbank market. Blommestein *et al*. (2011) underline the increasing reliance of those markets on central banks and government support in both Europe and the United States.

Taking as starting point the equation of the relevance is examined between return on bonds and financial components of the government sector. For the specification of the first bond return regression model and the purposes of this study, the following econometric model is proposed as a basis for estimation and conclusions:

$$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3 (EXP_{it}) + e_{it} \qquad (1)$$

Where BR_{it} is the annual adjusted return of a 10-year Long-Term Government Bond i the fiscal time period t. Bond return values are analyzed in association with expenditure EXP_{it} and financial equity FE_{it} or financial net worth.

Secondly, following Easton *et al*. (2009) and Givoly *et al*. (2017), the bond return (BR) model as appropriate for relating bond returns to net income figures and the book value buffer as follows:

$$BR_{it} = \delta_{0,t} + \delta_{1,t} NI_{i,t} + \delta_{2,t} \Delta NI_{i,t} + \delta_{3,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t} Eur_{i,t} + e_{it} \qquad (2)$$

Where BR_{it} is the annual return of a 10-year long-term government bond i (in per cent) the fiscal period t. For the independent variables, $NI_{i,t}$ (difference in revenue-expenditure or deficit/surplus) and the difference in the net income ($\Delta NI_{i,t}$) within consecutive years, is employed. The cluster of government financial equity (FE_{it}) and government debt ($D_{i,t}$) figures is used to check the ability of equity to cover government debt (both variables are expressed as a percentage of GDP). The last independent variable is the Euribor rate.

The third regression analysis model evaluates the association of the aforementioned buffer and the Euribor rates with bond returns.

$$BR_{it} = \delta_{0,t} + \delta_{1,t}\frac{(FE_{i,t}-D_{i,t})}{D_{i,t}} + \delta_{2,t}Eur_{i,t} + e_{it} \qquad (3)$$

For more details on measuring control variables, all the variables of our models are analysed in Table 5.1

Table 5.1 Description on variables

Variable	Symbol	Source/Measures
Long-term government bond returns	BR	European Central Bank statistical data warehouse
Government financial equity as % of GDP national currency	FE	National accounts indicators (ESA2010) in Eurostat database
Government expenditure as % of GDP in values, national currency	EXP	National accounts indicators (ESA2010) in Eurostat database
Net Income	NI	Government deficit/surplus, revenue, expenditure, and main aggregates, National accounts indicators (ESA2010) in Eurostat database
Difference in NI	ΔNI	Difference is calculated in consecutive years for the period 1999–2019
FE-Debt/Debt	FE- D/ D	Ability of government financial equity to cover government debt. These figures are expressed as % of GDP, National accounts indicators (ESA2010) in Eurostat database
Euribor rates	Eur	Euribor is short for Euro Interbank Offered Rate. The Euribor rates are based on the average interest rates at which a large panel of European banks borrow funds from one another.

To address the first research question, we investigate the impact of the accounting frameworks as they are shaped throughout the years, between 1999-2019, in EU countries and the UK. We assess the countries' differential response of bond returns to accounting frameworks by comparing their explanatory power, the adjusted R-squared (R^2), of regressions (1, 2, 3) and the probability value of the variables. The explanatory power measures the relevance (thus quality) of accounting frameworks' information with respect to bond returns, based on the ESA 2010 statistical indicator in the European Union. The bond return association results for each of the subsamples demonstrate which figures, thus independent variables, better interpret the variations in the dependent variable for each country dependent variable for each country. Relative value relevance models enable comparability of the NA statistical quality of the EU member states and the UK.

To address the second research question, the aforementioned models are split into individual analyses. Therefore, using regression and Pearson correlation analysis, we check which coefficient best interprets bond returns and how bond returns correlate with individual figures. In the analysis, to determine strong regression and correlation results, we consider 0.7 as the cut-off point that underlines the high quality of financial statistical reporting (Moore *et al*., 2015). Beyond the statistical reporting quality, the econometric analysis displays the statistical financial reporting elements, that have throughout the period 1999-2019, established strong association and correlation with long-term government bond yields. Significance degree is elaborated in Table 5.2.

Table 5.2. Interpretation of regression models and Pearson correlation analysis

Regression models analysis
The (R^2), also called the coefficient of determination, which is the proportion of variance (%) in the dependent variable that can be explained by the independent variable. Hence, as a rule of thumb for interpreting the strength of a relationship based on its R^2 value (we use the absolute value of the R^2 value to make all values positive).
if the value of $R^2 < 0.3$, then the statistical reporting is considered of No or Very weak quality if $0.3 \leq R^2 < 0.5$, then the statistical reporting is considered of a weak or low quality if $0.5 \leq R^2 < 0.7$, then the statistical reporting is considered of a Moderate quality if the value of $R^2 \geq 0.7$, then the statistical reporting is considered of strong/high quality
Note: Asterisks indicating significance at the 10% (*), 5% (**) and 1% (***) levels
Pearson correlation analysis
Perfect: If the value is near ± 1, then it said to be a perfect correlation: as one variable increases, the other variable tends to also increase (if positive) or decrease (if negative). High degree: If the coefficient value lies between ± 0.70 and ± 0.90, then it is said to be a strong correlation. Moderate degree: If the value lies between ± 0.50 and ± 0.69, then it is said to be a medium correlation. Low degree: If the value lies between ± 0.30 and ± 0.49, then it is said to be a medium correlation. Little if any (linear) correlation: When the value is less than ± 0.29

5.5 Conversion of GA to NA

The Excessive Deficit Procedure (EDP) Tables that each European country prepares, and Eurostat publishes for deficits and government debt, reflect the adjustments made for the ESA deficit from working balance thus the public accounting balance. Working balance is the only public figure that Eurostat publishes and is the broad national definition of the difference between revenue and expenditure. EDP tables record the variations between public budgetary accounting and NA for net lending/borrowing and permit the investigation of the discrepancies between the two systems through appropriate adjustments. These adjustments, made at a national level, are an indication of the deviation of public accounting standards from ESA 2010. Since this difference varies definitionally in each member state, statisticians get corresponding information from EDP inventories. Recognition criteria of the working balance (budgetary balance), whether cash, accrual, mixed or otherwise is also indicated (Dasí *et al.*, 2013; Eurostat, 2014).

Alignment of the GA practises and statistics is necessary to relegate the adjustments considerably when converting data from (GA) into (NA). The variance in the accounting base and the materialism of adjustments question both the comparability and reliability of ultimate budgetary balances conducted by EU member states within the EDP requirements (Jesus and Jorge, 2014).

Statisticians convert source data from different accounting systems into their NA. Thus, the link from commercial and public accounts to NA is not specific to a particular set of accounting standards (whether IFRS, IPSAS, or GAAP). The NA and IPSAS communities regularly discuss how the two standards can be aligned to facilitate the use of PSA information in the compilation of NA (IPSASB, 2014a). Therefore, as far as standardisation is concerned, disparities between the accruals-based standards under IPSAS/IFRS/GAAP can be addressed since they share a common genealogy (IFRS from GAAP, IPSAS from IFRS), although certain standards are more particular, such as the ones under IPSAS that are applied in the public sector. A recent study (Bott and Rüdiger, 2021) from the Hessian Ministry of Finance showed the close link between IPSAS and the German Commercial accounting code, in the context of the EPSAS project. It clearly stated that differences between current national GAAP (HGB) and IPSAS are manageable on the premise that accounting options are used appropriately.

5.6 Results of statistical reporting quality in the context of ESA2010 accrual accounting framework

5.6.1 Value relevance (quality) of governmental NA of European Union member states and the UK

Driven by the perception that decision making cannot rely only on cash accounting data, and that public sector accrual accounting practices are gradually considered by both practitioners and researchers (Bergmann *et al*., 2019), value relevance analysis is performed on the accrual-based accounting frameworks of NA. We investigate whether the quality results justify the efforts for GA and NA alignment and the standardisation and harmonization process. The requirement for transparency and the significance of GFS in the EU is reflected in ESA 2010 which analyses its development and the reconciliation of the magnitudes of income, expenditure, and net lending/borrowing.

Based on the value relevance results of the first regression model, out of 27 EU member states and the UK, 23 governments have a significant interpretation of bond return figures with equity coefficient, while in 17 governments, expenditure coefficient strongly interprets bond return. Value relevance results of which both coefficients fully interpret bond returns are observed in governments of Austria, Croatia, Finland, France, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, and the UK. In the latter one, estimates and government total public expenditure measurement methods are on an accrual basis. Statistical reporting of the governments of Greece and Spain has low explanatory power. The value relevance results of the government of Luxemburg and Cyprus are not relevant. In the majority of EU member states and the UK, stakeholders derive qualitative statistical reporting through financial equity and expenditure figures. Therefore, out of the 28 sample countries, in 14 governments, both the EXP and the FE variables interpret bond returns.

From the second value relevance model, net income and Euribor rates seem to strongly interpret bond returns as 21 governments associate their net income figures with bond returns and 18 governments associate their Euribor rates with bond returns. Differences in net income during consecutive years do not provide a strong interpretation of bond returns. This second model differs from the first one, as it includes debt figures and Euribor rates apart from the balance sheet and income figures. The excess of financial equity over government debt is a significant variable only for ten governments. In this second association model, the results from all the sample governments are value relevant. Strong value relevance is confirmed for all governments, with the exemption the results of the governments of Hungary and Greece.

The third model is simplified, using the Euribor rates and the excess of financial equity over government debt. Again, in this simplified model, Euribor rates have a significant interpretation with bond returns for 17 out of the 28 sample countries while only 11 governments confirm an association of the aforementioned buffer with bond returns. The statistical results of governments of Austria, Finland, France, Italy, Lithuania, Slovakia, Spain, and Sweden show a great interpretation of their independent variables with bond returns. Overall, out of the 28 sample countries, 15 governments have strong value relevance.

Taking into consideration that we use the relative value relevance approach, the regression model that best confirms the bond returns' assessment, is the second one showing strong value relevance for almost all EU member states and the UK (except for the governments of Greece and Hungary that have a moderate effect). Table 5.3 illustrates the value relevant results.

Table 5.3 Value Relevance results in EU member states and the UK

EU Countries and UK	**RQ1:** What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with ESA2010 accrual accounting framework in European Union and UK?													
	1st model				**2nd model**						**3rd model**			
Regression Models	$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3(EXP_{it}) + e_{it}$				$BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + \delta_{2,t}\Delta NI_{i,t} + \delta_{3,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t}Eur_{i,t} + e_{it}$						$BR_{it} = \delta_{0,t} + \delta_{1,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{2,t}Eur_{i,t} + e_{it}$			
Variables/ BR	**B_1**	**FE_1**	**EXP_2**	**R^2**	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{NI_{i,t}}$	$\boldsymbol{\Delta NI_{i,t}}$	$\boldsymbol{\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	R^2	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	R^2
Austria	-7.56 (5.90)	0.16*** (0.01)	0.36*** (0.11)	**84%**	18.98*** (5.02)	-0.36*** (0.07)	0.11 (0.06)	10.72*** (2.93)	0.55*** (0.10)	97%	31.02*** (5.79)	17.41*** (3.42)	0.36** (0.12)	**92%**
Belgium	8.45 (8.06)	-0.75*** (0.02)	-0.23 (0.14)	**38%**	-6.96 (5.44)	-0.65*** (0.13)	0.26** (0.10)	-3.67 (2.82)	1.21*** (0.11)	**90%**	4.98 (7.39)	1.70 (3.93)	0.88*** (0.13)	**73%**
Bulgaria	0.20 (5.31)	0.27*** (0.06)	0.08 (0.14)	**54%**	4.81** (1.97)	-0.60*** (0.18)	0.22 (0.17)	2.20 (1.90)	0.66 (0.39)	**71%**	7.02*** (2.10)	3.83* (2.03)	0.07 (0.42)	**43%**
Croatia	-0.35*** (9.23)	0.07*** (0.01)	0.87*** (0.19)	**72%**	3.46 (0.64)	-0.48*** (0.10)	-0.12 (0.18)	0.57 (4.72)	0.28 (0.58)	**73%**		NR		
Cyprus		NR			-7.73 (0.21)	-0.47*** (0.09)	0.17* (0.08)	-6.43 (0.10)	0.80*** (0.19)	**72%**		NR		
Czech	-0.54 (3.76)	0.09*** (0.01)	0.08 (0.08)	**80%**	2.34 (1.53)	-0.27** (0.11)	0.04 (0.10)	0.55 (1.10)	0.47 (0.29)	**83%**	4.84*** (1.23)	2.18** (0.93)	0.19 (0.29)	**77%**
Denmark	-0.78 (6.42)	-0.10*** (0.02)	0.54 (0.12)	**57%**	0.54 (0.93)	-0.19** (0.08)	0.02 (0.10)	-0.63 (0.89)	1.07*** (0.14)	**89%**	4.98 (0.50)	1.70 (0.67)	0.88*** (0.13)	**84%**
Estonia	-30.32** (10.89)	0.64*** (0.17)	0.38 (0.230	**47%**	-2.01 (1.23)	-1.57*** (0.27)	0.28 (0.22)	1.27** (0.47)	0.35 (0.44)	**84%**	1.05 (2.02)	-0.04 (0.76)	1.30* (0.73)	**43%**
Finland	23.35*** (3.21)	-0.04*** (0.01)	-0.034*** (0.06)	**72%**	0.85** (0.37)	-0.30 (0.17)	-0.02 (0.09)	-0.42 (0.43)	1.48*** (0.30)	**87%**	1.43*** (0.23)	-0.37 (0.47)	0.95*** (0.10)	**83%**
France	2.11 (3.29)	0.10*** (0.00)	0.11* (0.06)	**95%**	12.07 (6.92)	-0.23 (0.15)	0.10 (0.12)	6.54* (3.68)	0.64** (0.25)	**91%**	20.26*** (4.26)	10.66*** (2.43)	0.32** (0.14)	**90%**

Table 5.3 Value Relevance results in EU member states and the UK

EU Countries and UK	**RQ1:** What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with ESA2010 accrual accounting framework in European Union and UK?													
Regression Models	**1st model**				**2nd model**						**3rd model**			
Variables/ BR	**B1**	**FE1**	**EXP2**	**R^2**	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{NI_{i,t}}$	$\boldsymbol{\Delta NI_{i,t}}$	$\boldsymbol{\frac{(FE_{i,t}-D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{\frac{(FE_{i,t}-D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	$\boldsymbol{R^2}$
Germany	-28.84** (9.27)	-0.01 (0.05)	0.67*** (0.18)	**41%**	4.15 (0.23)	-0.40*** (0.06)	0.14* (0.07)	1.97 (2.13)	0.74*** (0.06)	**96%**	-5.24 (0.340	-4.08 (3.48)	0.91*** (0.10)	**85%**
Greece	-12.46 (9.74)	0.06* (0.03)	0.54** (0.21)	**24%**	56.28*** (18.18)	-0.14 (0.23)	0.46 (0.29)	27.90** (9.93)	-0.55 (0.50)	**55%**	62.79*** (13.45)	31.18*** (7.71)	0.44 (0.44)	**54%**
Hungary	-24.24** (10.89)	0.07** (0.03)	0.69*** (0.21)	**49%**	19.62 (13.52)	-0.26 (0.24)	0.28 (0.26)	8.41 (7.23)	0.19 (0.42)	**51%**	19.07 (0.11)	7.64 (6.15)	0.45 (0.36)	**45%**
Ireland	-1.14 (1.50)	0.02 (0.01)	0.16*** (0.03)	**49%**	0.81 (2.10)	-0.26*** (0.02)	0.23*** (0.03)	-0.21 (1.20)	1.15*** (0.19)	**90%**	8.54* (4.80)	3.34 (2.84)	0.19 (0.42)	**25%**
Italy	-22.57** (8.70)	0.13*** (0.02)	0.85*** (0.19)	**64%**	43.60*** (8.73)	-0.05 (0.21)	0.08 (0.17)	21.38*** (4.40)	0.28*** (0.09)	**82%**	44.59*** (6.74)	21.81*** (3.54)	0.27*** (0.08)	**82%**
Latvia	-28.96*** (5.85)	0.28*** (0.05)	0.91*** (0.15)	**72%**	2.83* (1.47)	-1.12*** (0.09)	0.19 (0.12)	1.68 (1.15)	0.48 (0.30)	**92%**		NR		
Lithuania	-19.38*** (4.45)	0.10*** (0.02)	0.66*** (0.12)	**73%**	5.49* (3.00)	-0.81*** (0.15)	-0.04 (0.21)	2.84 (2.14)	-0.04 (0.64)	**77%**	-19.38*** (4.45)	0.10*** (0.02)	0.66*** (0.12)	**74%**
Luxembourg		NR			1.68*** (0.43)	-0.15 (0.14)	-0.11 (0.12)	-0.20 (0.18)	1.21*** (0.25)	**82%**	1.40*** (0.38)	-0.08 (0.18)	1.00*** (0.21)	**80%**
Malta	-20.60*** (3.48)	0.02 (0.03)	0.63*** (0.10)	**75%**	7.41 (5.15)	-0.37*** (0.08)	0.18* (0.10)	3.04 (2.93)	0.38** (014)	**86%**	7.22 (7.54)	2.70 (4.28)	0.78*** (0.16)	**66%**
Netherlands	4.33 (6.94)	0.19*** (0.05)	0.12 (0.16)	**44%**	1.48 (3.62)	-0.27*** (0.06)	0.02 (0.08)	0.35 (2.18)	0.99*** (0.08)	**93%**	8.60* (4.30)	4.38 (2.61)	0.83*** (0.10)	**84%**
Poland	-15.04 (14.25)	0.09* (0.04)	0.52* (0.30)	**65%**	-3.27 (5.07)	-0.57*** (0.16)	0.09 (0.19)	-3.00 (2.76)	0.99*** (0.22)	**80%**	8.55* (4.63)	2.76 (2.70)	0.73** (0.26)	**63%**
Portugal	-11.38* (6.35)	0.04** (0.01)	0.41** (0.14)	**36%**	62.41*** (8.26)	-0.02 (0.11)	0.07 (0.12)	32.67*** (4.38)	0.14 (0.110	**88%**	64.29*** (5.24)	33.63*** (2.93)	0.13 (0.10)	**88%**

Table 5.3 Value Relevance results in EU member states and the UK

EU Countries and UK	**RQ1**: What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with ESA2010 accrual accounting framework in European Union and UK?													
	1st model				**2nd model**						**3rd model**			
Regression Models	$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3(EXP_{it}) + e_{it}$				$BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + \delta_{2,t}\Delta NI_{i,t} + \delta_{3,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t}Eur_{i,t} + e_{it}$						$BR_{it} = \delta_{0,t} + \delta_{1,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{2,t}Eur_{i,t} + e_{it}$			
Variables/ BR	**B_1**	**FE_1**	**EXP_2**	**R^2**	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{NI_{i,t}}$	$\boldsymbol{\Delta NI_{i,t}}$	$\boldsymbol{\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	R^2	$\boldsymbol{\delta_{0,t}}$	$\boldsymbol{\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}}$	$\boldsymbol{Eur_{i,t}}$	R^2
Romania	-9.97** (3.86)	0.07*** (0.01)	0.45*** (0.10)	**84%**	5.97*** (0.87)	-0.57*** (0.08)	0.27** (0.12)	1.87*** (0.58)	-0.03 (0.27)	**90%**	7.25*** (1.84)	1.38 (1.25)	0.14 (0.60)	**43%**
Slovakia	-0.44 (4.13)	0.13*** (0.01)	0.17 (0.10)	**76%**	4.56* (2.17)	-0.41*** (0.09)	0.11 (0.08)	2.12* (1.18)	0.53** (0.18)	**88%**	8.77*** (2.82)	3.67** (1.64)	0.48* (0.26)	**71%**
Slovenia	-7.10** (3.14)	0.10*** (0.01	0.24*** (0.06)	**78%**	8.27* (4.29)	-0.39*** (0.10)	0.13 (0.09)	5.68 (3.34)	-0.18 (0.80)	**77%**	14.46** (5.37)	9.37** (4.30)	-1.27 (1.01)	**51%**
Spain	-1.58 (5.90)	0.05** (0.02)	0.20 (0.14)	**25%**	5.07 (3.66)	-0.31*** (0.06)	0.31*** (0.08)	2.44 (1.98)	1.04*** (0.15)	**84%**	10.95* (5.59)	4.61 (3.16)	0.40** (0.18)	**44%**
Sweden	-2.07 (7.59)	-0.08*** (0.02)	0.11 (0.14)	**81%**	0.40 (0.34)	-0.28* (0.13)	0.04 (0.11)	-1.86*** (0.62)	0.77*** (0.15)	**94%**	0.09 (0.33)	-2.52*** (0.54)	0.55*** (0.10)	**91%**
United Kingdom	17.20*** (2.15)	0.07*** (0.01)	-0.26*** (0.05)	**88%**	15.10*** (4.5)	0.31*** (0.07)	-0.04 (0.08)	7.02*** (2.29)	0.59*** (0.19)	**96%**	0.14 (4.52)	-0.14 (2.47)	1.27*** (0.15)	**90%**

5.6.2 Value relevance and Pearson correlation results of bond returns association with individual financial figures

To address the second research question, in addition to the aforementioned models, this study section also analyses the value relevance of bond returns in governmental NA with the ESA2010 accounting framework individually with financial equity, net income, Euribor, government debt, expenditure, excess of financial equity over government debt (see Table 5.4). Pearson correlation of individual figures with bond returns is investigated as well (see Table 5.5). This research perspective intends to highlight the coefficients that correlate with long-term government bond yields, the figures that a stakeholder should examine to interpret the return configuration of bonds and that provide stakeholders with statistical reporting of high quality.

As far as the financial equity variable is concerned, there is cohesion in the association with bond yields. Governments that are non-value relevant are those of Cyprus, Germany, Greece, Ireland, Latvia, Luxembourg, and Portugal. Based on OECD/ IFAC (2017) Portuguese and Greek governments were still in the transitioning phase from cash to accrual financial reports in 2016. The rest of the governments extend cash financial reports. Outcome in Latvia, whose government is based on accrual basis accounting, is irrelevant. During the Eurostat EDP dialogue visit to Latvia (European Commission, 2019a) Eurostat highlighted the need for the compilation of annual financial accounts based on ESA rules, prioritizing the GA over other data sources. Results that provide high qualitative statistical report, over 70%, concern the governments of Austria, the Czech Republic, France, Slovakia, Sweden, and the UK. Their Pearson correlation is also of a high degree. Financial equity in the Netherlands has a qualitative and significant association with bond returns but not from an income perspective. In the Netherlands, the statistical office prepares the balance sheet that relies on entities' individual financial reports. These also encompass national public agencies, whose accounts base on an accrual basis.

Income association figures are not value relevant in the cases of the governments of Belgium, Bulgaria, Denmark, Finland, France, Ireland, the Netherlands, and Spain. Out of these cases, the governments of Bulgaria, Finland, the Netherlands, and Spain are also not value relevant from an expenditure approach. Even though the governments of Belgium, Denmark, France, and Ireland are not value relevant from the net income approach, these are relevant from the expenditure approach.

In Ireland, the budget includes fiscal estimates for general government revenue and expenditure prepared in accordance with the European Statistical Standard ESA 2010. Conversely, value relevance results show no relevance from the expenditure perspective. Value relevance is confirmed only from the net income approach in the cases of Cyprus, Estonia, Portugal, Slovakia, and Slovenia. Pearson correlation results for these two coefficients range from low to moderate scale. The difference in net income is not relevant for EU member states and the UK (therefore not presented in Table 5.4) and also has no linear correlation in the EU division (see Table 5.5). From NI perspective, this variable is significant statistically for all the governments that are value relevant with the exception the government of Germany. Regarding governments' debt coefficient, the regression results of 19 governments interpret bond returns. Excess financial equity over government debt coefficient is confirmed for 23 governments out of 28. Value relevance results of France, Luxembourg, and the UK not only show relevance but have the highest explanatory power in both variables. In France, accrual-based data is used to establish the NA (statistics), albeit after several restatements. Corresponding to these two variables, the average correlation analysis for EU member states and UK is of little and low degree.

The governments of Austria, Czech Republic, Lithuania, Malta, Romania, Sweden, and the UK demonstrate statistical reporting of high quality and association of bond returns with all coefficients. Respectively, a high degree of correlation is evidenced in the governments of Austria, and the UK and both high and moderate in the governments of the Czech Republic and Romania, which follow an accrual basis in governmental accounting for over a decade. Value relevance results hereby endorse the efforts of Austria and the UK to harmonize the accounting basis and coverage of fiscal reports (budget, financial statements, and statistics). This harmonization allows greater use of the accounting data for financial analysis and greater transparency of the state of public finances (OECD/IFAC, 2017) and this is hereby confirmed. In the case of Romania, the consolidation of subsidies, transfers and interests, non-financial and financial accounts are made by the Ministry of Finance, the National Institute of Statistics, and the National Bank of Romania, following the ESA 2010 requirements. The Swedish government which seems to generate qualitative statistical reporting, measures the net lending and budget balance, based on statistical standards. As OECD/IFAC (2017) highlights, these are key fiscal elements that draw most the political and public consideration.

Table 5.4 Value Relevance results of individual financial figures in EU member states and the UK

RQ2.: Which variables provide stakeholders with financial statistical reporting that best associate with bond returns in EU member States and the UK?

EU MSs	Financial Equity $BR_{it} = \delta_{0,t} + \delta_{1,t}FE_{i,t} + e_{it}$			Net Income $BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + e_{it}$			Euribor $BR_{it} = \delta_{0,t} + \delta_{1,t}Eur_{i,t} + e_{it}$			Government debt $BR_{it} = \delta_{0,t} + \delta_{1,t}G.Debt_{i,t} + e_{it}$			Expenditure $BR_{it} = \delta_{0,t} + \delta_{1,t}EXP_{i,t} + e_{it}$			Excess of FE over G. Debt $BR_{it} = \delta_{0,t} + \delta_{i,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + e_{it}$		
Variables	$\delta_{0,t}$	**Fe**	R^2	$\delta_{0,t}$	**NI**	R^2	$\delta_{0,t}$	**Eur**	R^2	$\delta_{0,t}$	**Debt**	R^2	$\delta_{0,t}$	**Exp**	R^2	$\delta_{0,t}$	***(FE-Debt) G. Debt***	R^2
Austria	11.22*** (1.12)	0.17*** (0.02)	74%	1.17*** (0.57)	-0.71*** 0.20)	35%	1.40*** (0.24)	0.95*** (0.10)	79%	15.00*** (3.28)	-0.16*** 0.04	35%	-30.40*** (8.73)	0.65*** (0.16)	39%	45.18*** (3.63)	25.67*** (2.21)	87%
Belgium	-4.09 (2.44)	-0.08*** (0.02)	40%	NR			1.63*** (0.27)	0.90*** (0.12)	73%	-5.89 (3.70)	0.08** (0.03)	21%	18.62** (8.58)	-0.28* (0.16)	11%	-19.56 (12.49)	-12.16* (6.54)	13%
Bulgaria	3.20*** (0.38)	0.27*** (0.06)	53%	NR			2.92*** (0.51)	0.79** (0.28)	32%	NR			NR			7.35*** (1.06)	4.12*** (1.21)	43%
Croatia	6.06*** (0.05)	0.05* (0.02)	26%	2.72*** (0.45)	-0.53*** (0.10)	67%	NR	NR		7.54*** (1.77)	-0.50* (0.02)	20%	-27.05* (13.97)	0.66** (0.29)	28%	NR		
Cyprus	NR			4.04*** (0.42)	-0.27** (0.10)	30%	3.96*** (0.48)	0.46* (0.23)	18%	NR			NR			NR		
Czech Republic	3.08*** (0.17)	0.09*** (0.01)	78%	1.99*** (0.37)	-0.49*** (0.10)	55%	2.01*** (0.29)	0.83*** (0.13)	69%	8.69*** (1.59)	-0.16*** (0.04)	42%	-10.97 (6.85)	0.33* (0.16)	20%	5.62*** (0.38)	2.74*** (0.37)	76%
Denmark	2.11*** (0.39)	-0.11*** (0.02)	56%	NR			1.28*** (0.23)	0.99*** (0.10)	83%	-2.93** (1.32)	0.14*** (0.02)	50%	-11.71 (8.38)	0.28* (0.15)	12%	-1.82 (1.96)	-4.06** (1.70)	24%
Estonia	-15.13** (5.52)	0.62*** (0.17)	40%	4.23*** (0.84)	-0.98* (0.51)	16%	0.94 (0.860	1.26*** (0.35)	43%	9.47*** (2.75)	-0.81** (0.39)	19%	NR			-1.96 (2.01)	1.44*** (0.47)	34%
Finland	6.41*** (1.26)	-0.06** (0.02)	28%	NR			1.34*** (0.22)	0.97*** (0.10)	84%	9.65*** (2.13)	-0.12*** (0.04)	27%	NR			NR		
France	7.85*** (0.25)	0.08*** (0.00)	95%	NR			1.49*** (0.23)	0.90*** (0.10)	79%	12.02*** (0.75)	-0.11*** (0.00)	85%	36.24*** (8.97)	-0.59*** (0.16)	37%	29.26*** (2.42)	15.72*** (1.45)	85%

Table 5.4 Value Relevance results of individual financial figures in EU member states and the UK

RQ2.: Which variables provide stakeholders with financial statistical reporting that best associate with bond returns in EU member States and the UK?

EU MSs	**Financial Equity** $BR_{it} = \delta_{0,t} + \delta_{1,t}FE_{i,t} + e_{it}$			**Net Income** $BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + e_{it}$			**Euribor** $BR_{it} = \delta_{0,t} + \delta_{1,t}Eur_{i,t} + e_{it}$			**Government debt** $BR_{it} = \delta_{0,t} + \delta_{1,t}G.Debt_{i,t} + e_{it}$			**Expenditure** $BR_{it} = \delta_{0,t} + \delta_{1,t}EXP_{i,t} + e_{it}$			**Excess of FE over G. Debt** $BR_{it} = \delta_{0,t} + \delta_{i,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + e_{it}$		
Variables	$\boldsymbol{\delta_{0,t}}$	**Fe**	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	**NI**	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	**Eur**	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	**Debt**	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	**Exp**	$\boldsymbol{R^2}$	$\boldsymbol{\delta_{0,t}}$	***(FE-Debt) G. Debt***	$\boldsymbol{R^2}$
Germany	NR			2.14** (0.30)	-0.63 (0.10)	62%	1.02*** (0.22)	1.00*** (0.99)	83%	NR			-24.47*** (5.27)	0.59*** (0.11)	55%	-25.86** (10.69)	-18.17** (6.74)	26%
Greece	NR			5.35*** (1.71)	-0.39* (0.22)	12%	NR			NR			-12.02 (10.16)	0.40* (0.20)	14%	65.83*** (15.57)	32.79*** (8.80)	38%
Hungary	10.03*** (2.11)	0.07* (0.03)	17%	3.91*** (0.88)	-0.49** (0.17)	32%	4.75*** (0.50)	0.88*** (0.24)	43%	NR			-28.37** (12.04)	0.70** (0.24)	33%	30.21*** (7.16)	13.55*** (4.04)	40%
Ireland	NR			NR			2.68*** (0.60)	0.65** (0.26)	23%	NR			-1.93 (1.66)	0.17*** (0.04)	49%	11.23*** (1.98)	4.78*** (1.34)	35%
Italy	14.73*** (3.04)	0.09*** (0.02)	33%	0.62 (0.84)	-1.22*** (0.24)	53%	2.93*** (0.29)	0.55*** (0.13)	47%	12.73*** (4.29)	-0.07* (0.03)	13%	NR			82.89*** (13.07)	41.63*** (6.95)	60%
Latvia	NR			2.14*** (0.53)	-1.03*** (0.15)	72%	3.27*** (0.91)	0.84* (0.42)	19%	NR			NR			NR		
Lithuania	4.93*** (0.71)	0.10** (0.04)	25%	2.44*** (0.62)	-0.81*** (0.16)	57%	2.79*** (0.84)	0.96** (0.40)	24%	8.33*** (2.17)	-0.14* (0.06)	19%	-20.63*** (5.86)	0.68*** (0.16)	51%	7.10*** (1.56)	2.70* (1.34)	19%
Luxembourg	NR			2.42*** (0.58)	0.43* (0.22)	14%	1.14*** (0.25)	0.95*** (0.11)	78%	6.58*** (0.66)	-0.24*** (0.04)	58%	22.18*** (7.82)	-0.45** (0.18)	20%	0.76 (0.51)	0.64*** (0.13)	52%
Malta	-1.55 (2.45)	-0.11* (0.05)	21%	2.40*** (0.28)	-0.51*** (0.07)	72%	2.30*** (0.31)	0.88*** (0.14)	66%	-6.83*** (1.73)	0.16*** (0.02)	67%	-19.98*** (3.33)	0.58*** (0.08)	75%	23.88** (10.01)	11.66* (5.76)	19%

Table 5.4 Value Relevance results of individual financial figures in EU member states and the UK

RQ2.: Which variables provide stakeholders with financial statistical reporting that best associate with bond returns in EU member States and the UK?

EU MSs	**Financial Equity** $BR_{it} = \delta_{0,t} + \delta_{1,t}FE_{i,t} + e_{it}$			**Net Income** $BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + e_{it}$			**Euribor** $BR_{it} = \delta_{0,t} + \delta_{1,t}Eur_{i,t} + e_{it}$			**Government debt** $BR_{it} = \delta_{0,t} + \delta_{1,t}G.Debt_{i,t} + e_{it}$			**Expenditure** $BR_{it} = \delta_{0,t} + \delta_{1,t}EXP_{i,t} + e_{it}$			**Excess of FE over G. Debt** $BR_{it} = \delta_{0,t} + \delta_{i,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + e_{it}$		
Variables	$\delta_{0,t}$	**Fe**	R^2	$\delta_{0,t}$	**NI**	R^2	$\delta_{0,t}$	**Eur**	R^2	$\delta_{0,t}$	**Debt**	R^2	$\delta_{0,t}$	**Exp**	R^2	$\delta_{0,t}$	***(FE-Debt) G. Debt***	R^2
Netherlands	9.35*** (1.67)	0.18*** (0.04)	42%	NR			1.26*** (0.23)	0.96*** (0.10)	81%	NR			NR			24.82*** (7.66)	13.56** (4.75)	29%
Poland	9.97*** (1.01)	0.16*** (0.03)	59%	2.87*** (0.83)	-0.59*** (0.19)	35%	3.64*** (0.38)	0.99*** (0.18)	61%	18.43*** (4.39)	-0.27*** (0.08)	37%	-37.63*** (8.83)	0.98*** (0.20)	58%	18.21*** (3.42)	8.13*** (2.12)	46%
Portugal	NR			3.30*** (1.04)	-0.38* (0.19)	14%	NR			NR			NR			64.12*** (5.37)	33.39*** (3.01)	85%
Romania	6.66*** (0.35)	0.09*** (0.02)	60%	4.16*** (0.67)	-0.52*** (0.16)	44%	5.16*** (0.44)	0.78*** (0.25)	40%	9.48*** (1.05)	-0.12*** (0.03)	48%	-15.59** (6.70)	0.59*** (0.18)	45%	7.66*** (0.65)	1.65*** (0.52)	43%
Slovakia	6.59*** (0.52)	0.12*** (0.01)	72%	1.24 (0.72)	-0.63*** 0.16	46%	3.78*** 0.39)	0.73*** (0.23)	44%	8.33*** (2.52)	-0.10* (0.05)	18%	NR			12.92*** (1.75)	5.95*** (1.14)	64%
Slovenia	4.42*** (0.36)	0.10*** (0.02)	59%	3.09*** (0.65*)	-0.24* (0.13)	17%	2.57*** (0.54)	0.94*** (0.28)	39%	6.82*** (1.04)	-0.06*** (0.01)	39%	NR			6.88*** (1.43	2.56* (1.34)	20%
Spain	6.84*** (1.03)	0.05** (0.01)	25%	NR			2.61*** (0.37)	0.62*** (0.16)	41%	7.52*** (1.38)	-0.04** (0.01)	21%	NR			NR		
Sweden	3.78*** (0.19)	-0.10*** (0.10)	80%	3.67*** (0.44)	-0.55** (0.21)	23%	1.33*** (0.23)	0.94*** (0.10)	80%	-5.52*** (1.24)	0.19*** (0.02)	70%	-27.20*** (3.33)	0.58*** (0.06)	79%	1.31 (1.08)	-2.59** (1.09)	19%
United Kingdom	7.51*** (0.57)	0.09*** (0.01)	76%	5.34*** (0.64)	0.54*** (0.13)	43%	0.40 (0.24)	1.26*** (0.10)	90%	9.15*** (0.63)	-0.10*** (0.01)	82%	23.36*** (3.53)	-0.49*** (0.08)	60%	33.93*** (4.26)	17.45*** (2.42)	71%

Table 5.5. Pearson Correlation analysis

RQ2: Which variables provide stakeholders with financial statistical reporting that best correlate with bond returns in EU MSs and the UK?							
EU MSs	**Financial Equity**	**Net Income**	**Euribor**	**Gov't Debt**	**Expend.**	**Diff. in Net Income**	**(FE-DEBT)/ DEBT**
Austria	0.86	-0.59	0.89	-0.59	0.63	-0.27	0.94
Belgium	-0.55	0.04	0.89	0.44	-0.41	-0.26	-0.41
Bulgaria	0.73	-0.39	0.57	-0.05	0.10	-0.47	0.66
Croatia	0.51	-0.82	0.43	-0.45	0.53	-0.15	0.42
Cyprus	0.23	-0.55	0.43	-0.35	0.09	-0.25	0.20
Czech Republic	0.89	-0.75	0.84	-0.60	0.45	-0.22	0.87
Denmark	-0.75	-0.15	0.91	0.74	0.35	-0.34	-0.49
Estonia	0.63	-0.40	0.67	-0.44	0.20	-0.10	0.59
Finland	-0.53	0.18	0.91	-0.52	-0.05	-0.31	0.10
France	0.98	0.03	0.89	-0.92	-0.61	-0.16	0.92
Germany	0.10	-0.79	0.91	-0.33	0.74	-0.09	-0.51
Greece	0.27	-0.35	-0.27	0.10	0.38	-0.01	0.61
Hungary	0.42	-0.57	0.66	-0.22	0.57	0.16	0.63
Ireland	0.22	-0.29	0.48	0.15	0.63	-0.45	0.59
Italy	0.57	-0.73	0.69	-0.37	0.30	-0.32	0.78
Latvia	0.37	-0.85	0.47	-0.17	0.42	-0.47	0.32
Lithuania	0.50	-0.76	0.49	-0.44	0.72	0.06	0.44
Luxembourg	0.25	0.37	0.88	-0.76	-0.45	-0.10	0.73
Malta	-0.46	-0.85	0.81	0.82	0.86	-0.23	0.44
Netherlands	0.65	-0.33	0.90	0.09	0.32	-0.24	0.54
Poland	0.77	-0.60	0.79	-0.60	0.76	-0.10	0.68
Portugal	0.29	-0.38	0.20	-0.24	0.09	-0.22	0.93
Romania	0.77	-0.67	0.63	-0.70	0.67	0.13	0.65
Slovak Republic	0.85	-0.68	0.66	-0.42	-0.07	0.05	0.80
Slovenia	0.77	-0.41	0.63	-0.63	0.41	0.24	0.45
Spain	0.49	-0.21	0.64	-0.46	0.12	0.29	-0.33
Sweden	-0.90	-0.48	0.90	0.84	0.89	-0.29	-0.44
United Kingdom	0.87	0.66	0.95	-0.91	-0.78	0.03	0.84
Average of EU	**0.35**	**-0.40**	**0.67**	**-0.25**	**0.28**	**-0.15**	**0.43**

5. 7 Significance of ESA2010 reporting quality on decision and policymaking.
Statistics undoubtedly play a significant role in the international economy and are a valuable resource for policymakers, business leaders and the general public. They support evidence-based decision making, allow comparisons over time between policies, countries, and economies, and help increase transparency and accountability. Statistical indicators such as ESA2010 must be commonly accepted by EU member states and based on a methodology of common acceptance. As highlighted in the ESA 2010 implementation and data quality, statistics, as produced and disseminated by Eurostat and the EU national statistical institutes, meet the highest quality requirements. The fact that the ESA2010 accounting framework relies on an accrual accounting basis is itself a precondition for high quality information for fruitful decision making. Previous studies have globally perceived the usefulness of accrual accounting based financial information for accountability and for supporting decision making in public sector organizations (Andriani *et al*., 2010; Ismail, 2022; Kober *et al*., 2010). This thesis applies relative value relevance method, to affirm the quality and usefulness of European accrual accounting framework, considering that other authors (Brusca and Montesinos, 2013; Caruana and Farrugia, 2018) find higher usefulness of cash data.

Further to this approach, the basis of high-quality statistics is not the absolute precondition for making relevant indicator policy and statistical reports. Formal statisticians, researchers and experts need to be aware of the impact of the growing role of statistical reporting in policymaking and adapt the statistical indicators and accounting frameworks that justify the methodology from which they emerge. They need to work with decision makers to understand their needs and expectations, but also to guide the correct interpretation and use of these indicators, as well as their limitations. The growing role of statistics in policymaking and decision making requires quality assurance, even if the primary data source arises from different accounting methods (cash or accrual) but also from different accrual-based standards under IFRS/IPSAS/GAAP. This study demonstrated econometric models that confirm the high quality of the NA of General Government financial statements of EU member states and the UK through their indicators, which is in line with stakeholders' expectations for a high standard of excellence from NA. However, this study shows which data are most important for better decision making by decision-policy makers and all pertinent stakeholders since indicators need to provide information that fulfils individual needs, be precisely assessed, fast, comprehensive, and simple.

5.8 Conclusions

Financial reporting and statistical accounting consist of two individual GA approaches that have been integrated under the influence of international agencies (Heald and Hodges, 2018). The GFS is capable of providing a unified structure of the whole economy, its components, and its relationships with other total economies owing to the international standards ESA2010 and SNA2008 (Lorson *et al.*, 2019). High relative value relevance results in the majority of sample governments, clearly demonstrate the quality of statistical reporting, perceiving the evident European efforts for the "unconcealed ambition to build a uniform accrual-based budgeting and accounting system for all EU member states" to achieve unification in the context of the EPSAS project (Mussari, 2014). This study does not overlook the discrepancies between GA and NA. It does not connive that envisaging compilation of GFS as a result of expedient IPSAS reconciliation entails awareness of issues of entity concept, consolidation, recognition, and measurement valuation. Neither it implies that EPSAS can be expected to fully align with ESA.

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This research section investigates the quality of GFS reporting with the ESA2010 accrual accounting framework. It presents the theoretical and practical implications of national account information on evaluating bond returns, constructed on global standards of accrual accounting premise. It considers an incentive the contribution of accrual accounting frameworks to the quality of statistical reporting for the interconnectedness of EPSAS with ESA2010 when formulating standards (IPSASB, 2014b). This study endorses harmonization efforts of EPSAS with the ESA framework as the alignment of micro-macro will lead to ESA changes where necessary fostering both financial and statistical reporting quality. In line with the 2015 EPSAS workshop (Directorate-General for Internal Policies – Policy Department D: Budgetary Affairs, 2015), it endorses the efforts for harmonizing the accounting basis and coverage of fiscal reports (budget, financial statements, and statistics) and shows that indeed this harmonization has allowed greater use of the accounting data for fiscal analysis and greater transparency of the state of public finances and also endorses that in such cases (e.g., governments of Austria and the UK) provides fiscal reporting of high quality (OECD/IFAC, 2017). This study underlines ESA2010 as a significant event in NA, further validating their critical economic function, and emphasising the calibre of their reporting. It is in line with Caruana *et al*. (2019), that despite the different objectives of NA, budgetary and financial reporting, aggregated systems should enable comparability. These should be integrated into a comprehensive financial and management information system (Barton, 2011) that produces adequate reports on governments' performance.

Evidence of value relevance analysis shows that cash-based governments yield qualitative results when converted to accrual, confirming the statistical perspective, that despite the variance in input terms, results will follow ESA standards and ensure comparability facilitating policy and decision making. As budgetary and accrual accounting systems have been integrated to a great extent and contain budgetary and ESA 2010 codes, an account of budget implementation needs to be drafted, complementary to the financial statement reporting (Christiaens and Vanhee, 2007).

This section aimed to provide accounting academics and practitioners with opportunities to compare the quality of public sector governmental accounting with corresponding statistics data, using promoted value relevance tools. Bergmann (2021), underlines that "if financial statements do matter economically, their quality should also matter" and approaches this issue from an audit surveillance perspective ensuring their quality. Indeed, improvements in the alignment between government and national accounts reporting should always strive to improve their mutual reporting quality in an initiative-taking way to facilitate both reporting and audit purposes. Governments employ drivers to assure successful accrual accounting reforms and facilitate improvements in the public sector. Having evidenced the quality of the ESA2010 as technical external driver, this thesis investigates in the following chapter how governments modernize their IT/ERP systems to support the mandatory statistical reporting with ESA2010 framework under the normative and coercive pressures of the Directive 2011/85/UE for accrual accounting implementation and of the international organizations for the IPSAS and EPSAS adoption.

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6. Enterprise Resource Planning (ERP) systems modernization towards PSA reforms[2]

6.1 Introduction

Enterprise Resource Planning (ERP) software is considered a vital technological solution for government agencies and the public sector in general. More than a technological upgrade, software implementation brings about corresponding organizational and operational changes in all areas of government. According to Dechow and Mouritsen (2005), ERP accounting systems facilitate the processes of integrating accounting and budgetary data and related reports into one central database, allowing information to be retrieved from various organizational positions. The implementation of IT innovations also contributes to better analytical tools that produce enhanced data quality and analytical capabilities and to accounting changes.

The transition to accrual based IPSAS is not just an accounting change. It entails changes in all aspects of government. The transition affects not only public sector parties but also accounting and financial practices. It also entails the transformation of government organizations that require broader financial reporting and budgetary surveillance. IT reforms are often a key component of such transformations that contribute to greater audit and financial performance management. IT solutions concern multiple areas, such as finance, controlling, accounting, audit, budgeting, management reporting and procurement. Governments need to upgrade their current ERP systems to meet accounting reform demands. The modernization of IT systems enhances information transparency, as it supports the sharing of data and knowledge and enables comparison (Erat *et al.,* 2006). Sandoe *et al*. (2001) considered the non-financial benefit factors that comprise visibility and flexibility. Scapens and Jazayeri (2003) linked software packages to accounting methods and shed light on the gap that exists in the theoretical approaches of these two domains.

On this premise, this study presents a longitudinal case study of the implementation of ERP systems in the European Union (EU) division at the central government level, in which technological capacity

[2] This chapter is part of the research entitled "Enterprise resource planning system reforms of European Union member states in association with central government accrual accounting and IPSAS adoption", which has been published in the Journal of Public Budgeting, Accounting and Financial Management, Vol. 35 No. 1, pp. 115-140,
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change is viewed as technical driver for accrual accounting implementation and consequently as a breeding ground for potential IPSAS adoption. It associates the increased levels of accounting and IT maturity scores (PricewaterhouseCoopers, 2014, 2020) with the setup or upgrade of ERP systems and endorses their interdependency. It fosters the perception that IT capacity is among the drivers of PSA reforms and it highlights that ERP systems facilitate accrual accounting reforms. It contributes to the theoretical debate as it identifies evidence of mimetic isomorphism on ERP vendors among EU central governments in their process to implement accrual accounting. As ERP systems are highly complex information systems, the implementation of which is a challenging and expensive process that necessitates corporate time and resources and therefore can be barrier to accounting change, this longitudinal study in the EU division aims to showcase the ERP reforms that have successfully contributed to accrual accounting change for central governments who are about to embark on ERP and accrual accounting reforms.

6.2 Research questions

Several European countries have adopted accrual accounting over the last decade, mainly based on the universally recognized IPSAS (Manes-Rossi *et al.,* 2019). Developed by IPSASB (Aggestam-Pontoppidan and Brusca, 2016), the IPSAS introduced recommendations for considering and evaluating governments' accounting practices, regardless of their political and economic structures, to achieve harmonization and foster accountability. However, the effect on harmonization remains limited because of the non-mandatory applications, and the true contribution of IPSAS to improving PSA remains highly debatable (Harsanyi *et al.*, 2016; Oulasvirta and Bailey, 2016). Research on harmonization in European accounting and implementation of the IPSAS-based EPSAS in the EU indicated that the European Commission (EC) aims to enhance transparency, comparability, and cost efficiency, provided its member states willingly apply the newly developed standards (Frintrup *et al.*, 2020).

Single- and cross-country studies (Tanjeh, 2016; Brusca and Martinez, 2016) have investigated the stimuli and barriers in terms of adopting the IPSAS as well as the associated environmental factors that influence a country's adoption of the same (Sellami and Gafsi, 2019). Factually, governments that have conducted an accounting modernization project owing to severe financial problems have also, in several cases, invested in modern IT/ERP systems and streamlined their internal processes. Beyond all the milestones that characterize accounting reforms, the modernization of IT systems has been key to the implementation of accrual accounting, especially because ERP systems enabled the efficient enforcement of new standards by facilitating the automation of the production of financial statements (European Commission, 2018a).

According to PricewaterhouseCoopers (2014, 2020), robust accrual accounting reforms entail a build-up of reliable management information systems (MIS) for accounting and auditing surveillance. Governments that upgrade their accounting systems willingly purchase contemporary software and modernize their systemic processes to increase operational efficiency and reduce operational costs. Through questionnaire surveys, PricewaterhouseCoopers (2014, 2020) assesses all EU general government subsectors to check whether their current practices reflect the IPSAS. Accounting maturity reflects the estimated current degree of compliance with the government's accounting rules using an IPSAS-based benchmark. IT maturity in the central government sector is measured and scored in relation to its corresponding framework and ability to sustain accrual accounting implementation, which is the focal point of the IPSAS. Since an adapted accounting maturity was considered as a proxy for IT maturity in the PricewaterhouseCoopers surveys (2014, 2020), this study investigates the association of increased maturity scorings with ERP practices of the EU member states at the level of their respective central governments through the following research questions:

RQ$_1$: What is the association between increased accounting, IT maturity scores, and the establishment or upgrading of ERP software systems?

RQ$_2$: Do ERP systems facilitate changes in accounting?

RQ$_3$: Are there similarities between EU member states in terms of their ERP vendors' choices of accounting reforms?

6.3 Theoretical framework and literature

6.3.1 ERP systems as drivers of PSA reforms and their facilitator role

To address the first research question, this study analyses the ERP solutions, their implementation, or upgrades as drivers of accrual reforms. Based on the World Bank (2021, p.9) "drivers are one of the main things that influence something or cause it to happen, make progress, develop, change, or grow stronger". These can be technical and non-technical. The former distinguishes between internal and external drivers. The latter includes international standards, such as IPSAS and EPSAS, as an external requirement for compliance with fiscal rules or indicators. ERP solutions also consist of an external technical driver (World Bank, 2021).

To address the second research question, this study investigated the facilitative role of ERP solutions to accounting reforms. Based on previous studies (Schwarze *et al*., 2007; Karlsson *et al*., 2019), drivers of change can function as barriers or facilitators, can simultaneously have a facilitating and impeding function. Conducive to accounting-related changes, ERP solutions linked to accounting function as facilitators that affect the success of accounting reforms and pave the way for initiatives toward accounting-related changes (Wanderley and Cullen, 2013).

In terms of IT capacity, ERP consists of a centralized system that provides tight integration with all major enterprise functions, reduces processing time, and increases quality assurance within the organization (Scapens and Jazayeri, 2003). The implementation of a new ERP system or adopting of existing solutions accompanied by building IT capacity contributes toward the transition to accrual accounting reform in the public sector. From an early stage, it is crucial to assess the adoption of accrual accounting-based IPSAS, to identify IT capacity, and determine whether accounting-related changes require the purchase of new computer systems, upgrades, or other IT changes. Sound information management practices may facilitate the cost-effective adoption of IPSAS and strengthen a government's business practices (Ouda, 2004).

Accounting reforms are not related only to technological innovation and capacity. The implementation of accrual accounting extends beyond adopting new standards. Most challenges reside in implementing principles related to accounting standardization. Accrual accounting reforms are influenced by varied factors beyond IT application, such as training, assistance from consultants, cost of the accrual process, funding, and assistance from other international organizations. These factors have different effects, but these are all important in transforming the accounting system from being cash-based to accrual-based (Phuong-Nguyen *et al.*, 2020). Such processes require the collection of additional data, reforms in business processes, modernization of IT systems, and capacity building within and outside the government (Flynn *et al.*, 2016).

6.3.2 Institutional isomorphism of ERP software vendors in the EU toward accrual accounting and adoption of the IPSAS

Addressing the third research question, this study analyses the similarities between European Union member states' governmental choices of ERP vendors and presents the implementation frameworks of ERP systems that are associated with the increased accounting and IT maturity scorings of the PricewaterhouseCoopers (2014, 2020) surveys. Institutional isomorphism is employed to elaborate on ERP reforms aimed toward accrual accounting as a premise for potential IPSAS adoption.

According to institutional theory, organizations face the same external pressures, which are regulative, normative, and cognitive. The institutional organization theory focuses on institutional isomorphism, which explains the homogeneity of organizations and how they become similar to their competitors. DiMaggio and Powell (1991) suggested the distinction between the three mechanisms of institutional isomorphism in this organizational process: coercive, mimetic, and normative. Their antecedents derive correspondingly from political influence and the problem of legitimacy as well as from typical responses to uncertainty and professionalization (DiMaggio and Powell, 1983, 1991).

Polzer *et al.* (2021) referred to various aspects of isomorphism and how international organizations exert pressure to implement the IPSAS. Examples of mimetic isomorphism were identified in a two-country comparison by Timoshenko and Adhikari (2010) in their PSA reforms. They emphasized that mimetic isomorphic pressures might be combined with normative and coercive pressures that flow from numerous international organizations, such as the World Bank and International Monetary Fund, which have somehow been involved in the transformation process as an outcome of governmental efforts to imitate the so-called best practice to ensure legitimacy and modernity (Adhikari *et al.,* 2013; Lassou and Hopper, 2016). This is in line with the perception of Ada and Christiaens (2018), who stated that the influence of the IFAC and IPSASB entails examples of normative forces exerted for the adoption of the IPSAS. Directive 2011/85/EU already made governments have accounting systems in place that enable them to generate accrual data with a view to preparing the ESA2010 reporting. Although these forms of isomorphism do not produce the same effects and are not equally significant, they can coexist (Argento *et al.*, 2018).

Considering the abovementioned information and the diffusion of the *Systems Applications and Products in Data Processing* (SAP) ERP in central governments with high accounting and IT maturity, this study draws on the theory of institutional isomorphism (DiMaggio and Powell, 1983, 1991) and cognitive pressures to consider mimetic ERP isomorphism practices as a viable solution for central governments to achieve accrual accounting goals. This section suggests that during their transition to accrual accounting, central governments model themselves after governments with high accounting maturity in their ERP practices to avoid collateral costs and confront uncertainty. Emulating the best financial and accounting reforms occurs through interactions between finance and software practices, presenting paradigm cases to governments that wish to proceed with accounting and ERP reforms.

A valid concern when it comes to isomorphic mimicry is related to capability traps. The so-called best practices often lead governments to imitate practical solutions that make them seem more efficient than they really are, or, governments might not be mature enough to sustain the burden of the new mechanism owing to their existing weaknesses (Andrews *et al.,* 2017). Considering these capability traps, this study also presents the ERP mimicry challenges faced during IT modernization and their outcomes at the EU level. A characteristic example is the case of the government of Croatia, which managed to support the transition to accrual accounting. It identified the drawbacks based on its SAP ERP implementation because of incompatibility with existing systems.

6.4 Methodology, data collection, and source analysis

This study focused on the central governments of 27 EU member states and the UK and conducted a qualitative analysis. First this study used the previous findings of PricewaterhouseCoopers (2014, 2020) and Ernst and Young (2012) on behalf of the Eurostat, the financial reporting bases and frameworks of IFAC and the Chartered Institute of Public Finance and Accountancy (CIPFA) (2018, 2021). Then these were associated with ERP practices to analyze the European trends and similarities in ERP reforms and vendors in terms of accrual accounting-related changes and potential IPSAS adoption (see Table 6.1). Appendix A provided a descriptive overview of the technological and accounting frameworks of all EU central governments from 2014 to 2025.

PricewaterhouseCoopers (2014, 2020) conducted surveys on the accounting and IT maturity of EU member states. Maturity level is the degree to which the public sector is able to assess and record balance sheet items, such as fixed assets and net income figures, on an accrual basis and determine whether the existing infrastructure facilitates the transition from being cash-based to accrual-based. Specifically, the PricewaterhouseCoopers (2014, 2020) surveys defined accounting maturity as the degree of EU member states’ compliance with accrual accounting, which is the focal point of the

IPSAS and EPSAS (with the IPSAS being considered as a proxy for the EPSAS). In these, 70%≥ indicated high accounting maturity, 40–70% indicated average maturity, and ≤40% indicated low maturity. IT maturity reflects the degree of maturity of the IT systems and the infrastructure of a government with respect to their capacity to support full accrual accounting implementation. The PricewaterhouseCoopers (2014) survey also referenced ERP vendors. Ernst and Young (2012) studied European public accounting and auditing practices, in terms of which bookkeeping systems were recorded by central governments.

In its official report, PricewaterhouseCoopers (2020, p.12) recorded that the unweighted accounting maturity scores for the central government by 2020, compared to 2014, increased from 51% to 65%. According to the scorings of PricewaterhouseCoopers (2014, p.96), the weighted average accounting maturity was 58%. The weighted average IT maturity during this period increased from 59% to 66%. Table 6.1 presents the weighted scores of PricewaterhouseCoopers (2014, 2020). The PricewaterhouseCoopers (2020) survey also covered the expected state of play of the EU 27 central government accounting practices at the end of 2025 and based the provisional accounting maturity scoring on governments' expectations of planned reforms until that date. Regarding IT maturity, an adapted accounting maturity was again used as a proxy for IT-maturity scoring.

The IFAC and CIPFA (2018, 2021) recorded the financial reporting basis and framework. The methodology of subject classification varied from an academic study (Polzer *et al.*, 2021) and previous surveys (OECD, 2017). The Polish government accounting system is highly compliant with the IPSAS (Polzer *et al.*, 2021), however, based on the IFAC and CIPFA (2021) methodology, this is classified as other accounting standards. Same classification applies to the government of Romania that implemented accrual accounting in 2006 and has supported the implementation of the EPSAS based on the IPSAS (European Commission, 2015). Based on the authors' email correspondence with Romanian government authorities (Appendix B), the Romanian government has assessed but did not confirm the compliance with IPSAS disclosure requirements. The partially implemented IPSAS are 1, 2, 4, 5, 9, 12, 17, 19, 23, 24. In the case of the Swedish government, which is classified as having national standards with reference to IPSAS (IFAC and CIPFA, 2021), the accounting concept and standards are highly compliant with IPSAS although make no explicit reference to them (Polzer *et al.*, 2021). OECD (2017) classified governments of Greece, Portugal, and Slovenia as accrual reporting basis but highlighted that these were transitioning from cash-based to accrual-based financial statements. Based on the IFAC and CIPFA (2021), these countries were classified as partially accrual. Considering the diversity in the degree to which EU member states' central governments, with different administrative principles, translated the IPSAS into their accounting standards and what is actually known about the IPSAS adoption (Polzer *et al.,* 2021), governmental classification based on the reporting and framework status of the IFAC and CIPFA (2021) has not been investigated further. It has only been stated in relation to accounting and IT maturity and ERP practices.

This study aimed to associate the increased accounting and IT maturity scores of PricewaterhouseCoopers (2014, 2020) with factual ERP reforms and vendors. For this, we emailed the Ministry of Finance (MoF) of EU member states. The content of the survey explored i) the ERP systems/vendors associated with the central government's accounting practices and ii) in what way these ERP systems were a facilitating factor in accounting-related changes. These emails were redirected by the European Ministry of Finance (MoF) to the corresponding departments (e.g., software and administrative) capable of responding to the survey. Responses were received from only 10 out of the 27 central governments. The respective information was also retrieved from the MoF database or web data of seven governments (Appendix B).

The results enabled us to update the ERP bookkeeping vendors/systems of the earliest surveys on behalf of the Eurostat (see Table 6.1. "ERP vendors updated"). These helped us record similarities in ERP practices among EU member states and identify the pervasive ERP vendors that stood out (see Table 6.2). This was done to provide EU member states' central governments with the ERP reform experience of accounting-related changes and acknowledge the challenges faced during the same. Finally, the findings suggested that ERP systems were reform-driven facilitators for the accounting-related changes in central governments. Considering that an adapted accounting maturity was considered as a proxy for IT maturity in PricewaterhouseCoopers surveys (2014, 2020), this study endorses the findings of these surveys, the interdependence between accounting and IT maturity and provides factual examples of their association with ERP system implementation or upgrade.

Table 6.1 Financial Reporting Basis and framework - Accounting and IT maturity scores in timelines 2014/ 2020/2025
Source: IFAC/CIPFA (2021), PWC (2014, 2020), Ernst and Young (2012)
Abbreviations: Accounting Maturity (A.M), IT maturity (IT.M), Financial Reporting Basis (FRB), Financial Reporting Framework (FRF)

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020[3] FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors [4]	ERP Vendors updated[5]
Austria	77%	77%	73%	IPSAS modified for the local context	IPSAS as a reference point	Primary method although no explicit reference	Accrual	Accrual	79%	79%	74%	SAP	SAP
Belgium	79%	78%	67%	IPSAS as a reference point	Other	Source of inspiration	Accrual	Accrual	80%	80%	69%	Fedcom and SAP	SAP
Bulgaria	76%	76%	56%	IPSAS with no modifications	Other	Not used	Partial accrual	Partial accrual	80%	80%	57%	SAP, CONTO and AJUR	SAP, CONTO and AJUR
Croatia	66%	66%	34%	Other	Other	Source of inspiration	Partial accrual	Partial accrual	69%	69%	34%	not available	SAP
Cyprus	89%	37%	14%	IPSAS modified for the local context	IPSAS with no modifications	Source of inspiration	Accrual	Cash	91%	37%	12%	FIMAS	Unit4

[3] IFAC and CIPFA (2021) reporting framework varies in its methodology and classification from an academic study (Polzer *et al*., 2021). See also “Appendix A.”
[4] This column is based on former surveys (Ernst and Young, 2012; PricewaterhouseCoopers, 2014) on behalf of Eurostat.
[5] This column concerns updated ERP vendors based on collection of information. (See Appendix B: respondents list).

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020[6] FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors	ERP Vendors updated
Czech Republic	85%	83%	75%	IPSAS as a reference point	IPSAS as a reference point	Source of inspiration	Accrual	Accrual	87%	84%	77%	Mixed ERP vendors	Mixed ERP vendors
Denmark	80%	79%	72%	Other	Other	Source of inspiration	Accrual	Accrual	82%	81%	74%	SAP and Navision	SAP and Navision
Estonia	91%	91%	92%	IPSAS as a reference point	IPSAS as a reference point	Explicit reference to IPSAS	Accrual	Accrual	92%	92%	93%	SAP	SAP
Finland	77%	77%	72%	Other	Other	Not used	Accrual	Accrual	82%	82%	76%	SAP and Oracle	Kieku information system based on SAP
France	90%	90%	89%	Other	Other	Source of inspiration	Accrual	Accrual	91%	91%	90%	Chorus (based on SAP)	Chorus (based on SAP)
Germany	23%	23%	22%	Other	Other	Not used	Cash	Cash	19%	19%	18%	Kameralistic	HKR

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020 FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors	ERP Vendors updated
Greece	88%	13%	12%	IPSAS as a reference point	IPSAS as a reference point[7]	Not used	Partial accrual	Partial accrual	87%	10%	11%	Mixed ERP vendors	SAP
Hungary	71%	71%	66%	Other	Other	Not used	Accrual	Partial accrual	74%	74%	68%	Mixed ERP vendors	Forrás, CT-EcoSTAT, SAP
Ireland	57%	57%	54%	IPSAS as a reference point	Other	Not used	Partial accrual	Cash	58%	58%	55%	J D Edwards Financial Management System	J D Edwards Financial Management System
Italy	76%	39%	31%	IPSAS as a reference point	Other	Not used	Partial accrual	Partial accrual	77%	40%	31%	Mixed ERP vendors	"InIt" (based on SAP technology)
Latvia	93%	88%	73%	IPSAS as a reference point	IPSAS as a reference point[8]	Primary method although no explicit reference	Accrual	Accrual	94%	90%	76%	SAP	SAP

[7] Status in 2018 (IFAC/CIPFA, 2018), was "Other national financial reporting standards"
[8] Status in 2018 (IFAC/CIPFA, 2018), was not available

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020 FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors	ERP Vendors updated
Lithuania	91%	91%	88%	IPSAS modified for the local context	IPSAS modified for the local context	Explicit reference to IPSAS	Accrual	Accrual	90%	90%	88%	Navision and FIMAS	Navision and FIMAS
Luxembourg	23%	23%	19%	Other	Other	Not used	Cash	Cash	21%	21%	18%	SAP	SAP
Malta	92%	24%	22%	IPSAS modified for the local context	Other	Not used	Accrual	Cash	92%	24%	21%	Mixed ERP vendors	Unit4
Netherlands	38%	38%	31%	Other	Other	Not used	Cash	Cash	39%	39%	31%	IBOS	IBOS[9]
Poland	72%	72%	66%	Other	Other	Not used	Accrual	Partial accrual	76%	76%	70%	Mixed ERP vendors	Mixed ERP vendors
Portugal	100%	59%	55%	IPSAS modified for the local context	IPSAS modified for the local context	Explicit reference to IPSAS	Accrual	Partial accrual	100%	61%	59%	(SIC-ORACLE, SQL)	(SIC-ORACLE, SQL)

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020 FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors	ERP Vendors updated
Romania	75%	71%	63%	Other	Other	Source of inspiration	Accrual	Partial accrual	77%	72%	64%	Mixed ERP vendors	Mixed ERP vendors- MoF has developed Forexebug
Slovakia	83%	78%	75%	IPSAS as a reference point	IPSAS as a reference point	Primary method although no explicit reference	Accrual	Partial accrual	86%	79%	77%	Mixed ERP vendors	Mixed ERP vendors- SAP ERP covers 50%
Slovenia	72%	72%	62%	Other	Other	Source of inspiration	Accrual	Partial accrual	75%	75%	65%	MFERAC	MFERAC
Spain	78%	78%	70%	IPSAS as a reference point	IPSAS as a reference point	Explicit reference to IPSAS	Accrual	Accrual	78%	78%	68%	SAPand SIC	SAPand SIC
Sweden	84%	84%	81%	IPSAS as a reference point	IPSAS as a reference point	Primary method although no explicit reference	Accrual	Accrual	83%	83%	81%	Mixed ERP vendors	Hermes

EU MSs	A.M 2025 (PwC 2020)	A.M 2020 (PwC 2020)	A.M 2014 (PwC 2014)	2025 FRF Forecast IFAC/CIPFA (2021)	2020 FRF IFAC/CIPFA (2021)	2014 IPSAS status (PwC 2014)	FRB Forecast 2025 IFAC/CIPFA (2021)	FRB 2020 IFAC/CIPFA (2021)	IT. M 2025 (PwC 2020)	IT. M 2020 (PwC 2020)	IT.M 2014 (PwC 2014)	ERP Vendors	ERP Vendors updated
United Kingdom	96%	96%	96%	National standards based on IFRS	National standards based on IFRS	Source of inspiration	Accrual	Accrual	95%	95%	95%	Oracle and SAP	Oracle and SAP
Average:	**76%**	**65%**	**58%**						**77%**	**66%**	**59%**		

6.5 Results on the collection of information on ERP systems and vendors in EU countries and the UK

6.5.1 ERP system implementations or upgrades and their facilitator role to accounting change.

Central governments (Austria, Czech Republic, Denmark, Estonia, Finland, France, Latvia, Lithuania, Slovakia, Spain, Sweden, and the United Kingdom) of the first timeline, by 2014, record a high correlation between accrual accounting and IT maturity from an early stage on. Governments of Belgium, Bulgaria, Hungary, Poland, Romania, and Slovenia managed to upgrade their accounting maturity from average to high by 2020, whilst Croatia increased from low to average accounting maturity. PricewaterhouseCoopers (2020) considers that governments of Cyprus, Greece, Italy, Malta, and Portugal will increase their accounting maturity from average to high by 2025. This section displays the results of the collection of information of only 17 (Appendix B) out of 27 European central governments on their ERP systems' modernization in practice. To address the first research question, it provides evidence that the setup or upgrade of ERP systems was reform driver toward accounting change justifying the inextricable association of accounting and IT maturity of PricewaterhouseCoopers (2014, 2020). To address the second research question, it provides with evidence that in their majority the ERP systems function as facilitators of accounting changes.

6.5.1.1 ERP systems of EU central governments and the UK with increased accounting and IT maturity by 2014

In Austria, SAP safeguards that the uniformity, comparability (internal service charges) and minimization of implementing expenses of cost and performance accounting is assured through technical standardization in the form of a "master-system." The master is the basis for the more specific detailing in the single ministries (Promberger *et al*., 2004). The accrual reform in the Austrian central government involved an upgrade of the existing SAP system to acquire new modules and accrual based elements (European Commission, 2018a).

In Estonia accrual-based accounting was in place before government started using unified SAP ERP system. But with unified SAP they have accrual-based budget and from last year they have activity-based budget at state level. These projects were easy implement with unified SAP ERP system.

In France, the core software of the FIS (called Chorus) is based on the SAP ERP system. It was initiated in 2011 and throughout six consecutive phases, all the French Ministries used this financial information system to manage, gather, archive, assess the financial information, and proceed with financial targeting plans. The implementation was not an easy task as it involved organizational changes and the necessity of shared service centres. Not only did it facilitate the administrative purposes such as the budget restrictions but also contributed to digitalization. (e.g., e-invoicing with Chorus Pro). Ministries improved their collaboration on budgetary discussions by having a common repository which enabled them to decision making and policy design.

In Latvia, SAP software is used as the bookkeeping enterprise resource system. This double-entry system is recorded daily. As it uses the IPSAS report, Latvia has conducted reforms either to improve its existing accrual accounting and associated systems (e.g., budgeting systems) or to apply accrual accounting. Accrual elements can be applied for both financial and budgeting reporting. Latvia is among the countries that have implemented accrual accounting for more than 10 years and have embedded it into the public sector. The Comprehensive Central Government Budget Planning and Implementation Information System maintained by the Treasury (developed based on SAP software product) ensures a full central government budget management cycle: from budget planning to the implementation monitoring. The Comprehensive Central Government Budget Planning and Implementation Information System has been developed both for the support of planning functions of the MoF and for the budget implementation of the central government budget institutions. In 2019, the Treasury commenced a gradual shift of SAP versions to the latest system version S/4HANA, providing the opportunity to carry it out in stages.

In Slovakia, reform of accounting was based on IPSAS. Ministry of Finance considered Slovak legislative. Also, in connection with reform (after the finish of it in 2008) ERP processes (not strictly defined by law) upgraded. The reform was not established on new IT system, was only upgraded. After the transition to accrual accounting, the MoF recommended SAP ERP not only at accounting level for bookkeeping practises but in other domains.

In Sweden, the nature of accounting handling varies. As the budget preparation and accounting consists of both cash and accrual elements, cameralistic or accrual approach is not something that the IT system favours or facilitates. The processes are managed more from a theoretical/policy-perspective and then implemented into the system. Therefore, the IT system would in theory be able to manage and support either one. Swedish government has a single budgeting and reporting system for the general government which is called "Hermes" and which provides a large database for public funds with various functionalities, among them accounting/bookkeeping.

Central governments in the United Kingdom use financial accounting ERP to ensure that skilful accountants post financial accounting transactions in real time. Central government sectors that use Oracle and SAP, which are the dominant ERP software providers, ensure that budgetary transactions are assessed and recorded when they take place. Local governments also use different bookkeeping systems. United Kingdom ranks the highest in accounting and IT maturity, establishing an accrual preparation method for both financial statements and budgets. The central government departments use IFRS as the accounting standard, but they also rely on IPSAS when they need support in further understanding and/or customising for the public sector content. In general, their applied accounting standards are compliant with IPSAS.

The sooner the IT aspects are integrated, the easier the accrual reform implementation will be. Accrual accounting reforms are more difficult to implement when the system adaptations are demanding, time consuming and costly. Austrian and Estonian governments are example references of close coordination of administrative officials for the accounting change with IT companies in order to support and facilitate the accounting requirements from an early stage on (European Commission, 2018a).

6.5.1.2 ERP systems of EU central governments with increased accounting and IT maturity by 2020

As far as government of Belgium is concerned, the SAP ERP system is the tool that made possible the transition from cash accounting to accrual accounting in the federal public services. This transition was imposed by the budgeting and accounting reform Law of 2003. The implementation of the ERP system necessitated the introduction of a harmonized chart of accounts, uniform budgeting, transactional and accounting procedures and policies and accounting principles. In this way, the ERP system facilitated the accounting and budgeting reform. The objectives of this reform being, amongst others, to timely draw up budget reports and financial statements for federal government, Court of Auditors and Parliament and to generate data as input for statistical reporting.

In Croatia, the primary information system for the MoF is the SAP government fiscal management system that is used for budget preparation, state accounting, budget execution and management of funds. MoF records drawbacks though from the reforming experiences. The interface compatibility of the SAP ERP with the rest systems was not integrated and therefore transactions from budget users of the rest systems had to be manually transferred in the SAP ERP. The incompatibility with the public debt management and cash management recording were aspects that necessitated further development for improvement (Kraan *et al*., 2006). Despite these impediments, Croatian government's consecutive steps towards modernization (European Commission, 2018b) seem to confirm PricewaterhouseCoopers (2020) as IT maturity increased 35% in latest survey of PwC (2020).

In Hungary there are some accounting systems used at central governments, which are the Forrás, CT-EcoSTAT and the SAP. All these systems are developed and maintained by external companies. If there are any changes in accounting regulations the improvements are asked separately from the affected entities. In case of reforms, these companies are not involved in the decision-making processes. In 2013 accrual-based accounting rules were inducted in case of Hungarian government entities. The data transformation and mappings between corresponding data are controlled by KGR system, maintained by the Hungarian State Treasury.

In Romania, accrual accounting in public sector was introduced on 1st of January 2006. The new reporting system of MoF called Forexebug increases the reliability of the collected information, through cross validation with treasury data and provides reliable information for the internal use of MoF, of the public institutions, or other authorized institutions or for public use, both at a detailed level, as well as aggregated at various levels. The government has assessed but did not confirm the compliance with IPSAS disclosure requirements. It partially implements IPSAS.

In Slovenia, state budget users and their business books are incorporated in custom made software, called MFERAC. The system enables procedures within budget execution, accounting (bookkeeping), human resource management, it provides variety of reports and statements, it is interactive and interrelated with other important state systems. Since this system is under renovation, meaning that are moving it towards innovative technologies, some parts are Oracle based (Forms and Power Builder) and some parts of the system are Java based. An aim is to implement Java technology in the system as whole. The system is also used at a local level, in some municipalities and other indirect budget users. However, it has possibilities to be expanded broadly. Slovenian government uses modified cash-based accounting with accrual elements while transitioning to accrual accounting.

6.5.1.3 ERP systems of EU central governments with provisional increased accounting and IT maturity by 2025

Governments of Cyprus and Malta adopted both Unit4. As far as Malta is concerned, mainly financed by the European Union, this is an important project that will facilitate the accrual based IPSAS adoption and ensure all ministries and government departments keep their books according to international standards. This is an EU project described as revolutionary due to the changes it will bring. It will enable government of Malta to be in line with the rest accrual-based EU governments. With this ERP implementation, access will be more accurate, dependable, and timely, and provide consistency over how each department administers its finances. The Unit4/Grant Thornton consortium took the time over a five-year period to fully understand requirements, needs and culture in order to propose a complete and cost-effective solution that is proven in Government.

Accordingly, in Cyprus, Unit4/Grant Thornton Cyprus and GCC Computers Ltd delivered a thorough response to detailed requirements. Using Unit4's modern ERP technology, greater efficiency shall be achieved, saving time and money, and simplifying both business and financial management procedures. With this system, personnel will be freed from administrative tasks and will focus on more valuable and productive tasks. Additionally, data will be assessable and visible in an enhanced way to public officials enabling them to better decision making and service provision to the Republic of Cyprus.

In Greece, SAP ERP has already been introduced as the fundamental pillar of reforms in the General Accounting Office. Recently the MoF introduced the Gov-ERP project "Reform of the Financial System in Central Administration and Other General Government." One of the targets is the fulfilment of the needs of the new Accounting Framework for the General Government. The new system will support the implementation of accrual basis accounting, according to the new accounting framework, which is based on internationally recognized Accounting Standards for the Public Sector (such as IPSAS).

In Italy, a unique ERP system, based on SAP technology, covering the main administrative and accounting areas, has been launched in 2019. The first step of the Program (called "InIt"), regarding the accrual accounting (with double entry bookkeeping method) and the analytical cost accounting, has been put in place in April 2021. The InIt program was foreseen then to be completed in the following 3-4 years at central government level. Further steps, aimed to extend the use of the new system to the other government sectors (at central or local level), are foreseen in the years to come. Among the objectives is the support to the accounting harmonization in the Italian Government Sector and to support the future development in the Government sector accounting framework, with reduction of the current complexity and fragmentation, namely with the possible adoption of a full accrual accounting for the whole general government sector, consistently with the European guidelines (Directive 2011/85/UE) and with the international trends (IPSAS).

6.5.1.4 ERP systems of EU central governments with no provisional increased accounting and IT maturity by 2025

Out of the 27 EU MSs, governments of Croatia, Germany, Ireland, Luxemburg, Netherlands are not provisioned to increase their accounting and IT maturities by 2025 (PWC, 2020). As aforementioned, the Croatian central government managed to level up by 2020. Based on the feedback received, in the Federal Government of Germany, existing systems, such as specialist systems or ERP systems, have no impact on possible reforms. If necessary, sub-components are expanded or replaced, and new ones are added and connected via standardized interfaces. In the case of government of Netherlands, feedback is limited to the IBOS system used to monitor budget execution. Governments in Germany, Ireland, and the Netherlands are still experimenting with new budgeting and accounting concepts.

6.5.2 Similarities in ERP vendors of EU member states

To address the third research question, this section presents the similarities of the EU member states' central governments and the UK regarding their ERP vendors that are associated with increased accounting maturity in accordance with the timelines of PricewaterhouseCoopers (2014, 2020). It also showcases pervasive ERP vendors.

Through the qualitative documentation of consultancy firms' surveys, web data, and the responses received, this study speculated that institutional isomorphism drives European central governments to adopt the same IT/ERP vendors as those of high accounting maturity to facilitate accrual accounting, assuming that central governments might mimic each other under the normative pressure of accrual accounting transition and adoption of the IPSAS. The SAP ERP appeared to be the most popular vendor choice.

Table 6.2 ERP vendor analysis in EU MSs and the UK

EU MSs	ERP VENDORS	Qt	%
Bulgaria, Czech Republic, Denmark, Hungary, Lithuania, Poland, Portugal, Romania, Slovakia, and Spain	Mixed ERP vendors	10	36.00%
Austria, Belgium, Croatia, Estonia, Finland, France, Greece, Italy, Latvia, Luxemburg, and the United Kingdom	SAP ERP	11	39.00%
Cyprus and Malta	Unit4	2	7.00%
Slovenia	MFERAC	1	3.60%
Ireland	J D Edwards Financial Management System	1	3.60%
The Netherlands	IBOS	1	3.60%
Germany	HKR	1	3.60%
Sweden	Hermes	1	3.60%
	Total	**28**	**100%**
Mixed ERP vendor analysis in EU MSs			
EU MSs	Mixed ERP Vendor Analysis	Qt	%
Bulgaria, Denmark, Hungary, Spain, and Slovakia	Mixed ERP systems including SAP ERP	5	50%
Lithuania, Portugal, and Romania	Mixed ERP systems - other ERP vendors	3	30%
Czech Republic and Poland	Mixed ERP systems unknown	2	20%
	Total	**10**	**100%**

This consideration relies on the facts that i) by 2014, out of the 12 central governments (Austria, Czech Republic, Denmark, Estonia, Finland, France, Slovakia, Latvia, Lithuania, Spain, and Sweden and the UK) that had high accounting maturity from an early stage, 9 of them (Austria, Denmark, Finland, Estonia, France, Slovakia, Latvia, Spain and the UK) referred to the SAP ERP, either as a uniform practice or in combination with other ERP systems; ii) by 2020, out of the 7 central governments that increased their maturity (Belgium, Bulgaria, Croatia, Hungary, Poland, Romania, and Slovenia), 4 (Belgium, Bulgaria, Croatia, and Hungary) referred to the SAP ERP; and iii) by 2025, Greece and Italy will have established the SAP ERP, while making explicit reference to Cyprus, which followed the Malta project and implemented the Unit4 ERP. Portuguese government is the remaining central government that it is provisioned to increase its IT and accounting maturity scores by 2025, but its ERP practices need further investigation.

Overall, out of the 28 central governments, high accounting and IT maturity is provisioned by 2025 for 24 central governments, out of which 15 central governments either established, upgraded, or referenced the SAP ERP, 2 of them adopted Unit4 ERP, and the remaining 7 had various ERP vendor systems that were adopted or adjusted to support accounting-related changes. With its diffusion, the SAP ERP proved to be the most pervasive ERP vendor (see Table 6.2).

These findings align with previous findings (Heinzelmann, 2017) that focused on the prevalence of the SAP ERP and its dominant diffusion into management accounting practices in local entities. Kelemen (2014) examined ERP modular implementation in the public defence, healthcare, and education sectors to identify 10 articles in which SAP ERP was dominant across all central government territories. According to Quattrone and Hopper (2005), the SAP ERP demonstrates not just technological advancement, but also a dominant two-ledger accounting system related to the accrual method. This accounting perception has been a vital inspiration for establishing a financial and controlling modular SAP ERP system (Leimbach, 2009; Quattrone and Hopper, 2006) at the level of the central government.

6.6 Conclusions

Studying ERP implementation solely as a technological advancement is insufficient. ERP system reform entails corresponding public sector expenses, which lead to increased costs per gross domestic product. This is certainly a drawback, as public sector IT costs come with the burden of additional taxes (PricewaterhouseCoopers, 2014, 2020). Apart from excessive costs and complex issues, a failed ERP upgrade project can have serious repercussions. This is because such a reform affects a government's organization, policies, personnel, processes, and guidelines. Costs relevant to IT modernization should not be attributed to projects related to accounting standards, such as the EPSAS or IPSAS, which have accrual accounting as their focal point. As EU member states are obliged by Article 3 of Directive 2011/85/EU to have in place accounting systems that enable the preparation of ESA reports, a suitable IT infrastructure that can support accrual accounting seems inevitable (PricewaterhouseCoopers, 2020).

Focusing on central governments with increased accounting and IT maturity scores (PricewaterhouseCoopers 2014, 2020), we observed that their association is reasonably interdependent, as the existing software systems were upgraded or new ERP systems were established to support accrual accounting reforms. Characteristic cases of remarkable increases in IT maturity include the governments of Malta, Cyprus, Greece, and Italy, which can be explicitly attributed to IT innovation. This interdependence is further endorsed through the collection of information regarding the facilitating role of ERP systems in accounting-related changes, which underlines the perspective that ERPs are reform drivers of PSA-related changes (World Bank, 2021). The relevance of ERP systems with the increase of EU member states' accounting maturity endorses the perception of a positive association between ERP software and financial benefit (Matolcsy *et al.*, 2005; Nicolaou and Bhattacharya, 2008) that it is difficult to dissociate.

Considering institutional theory and the diffusion of SAP ERP in central governments with high accounting and IT maturity, this study drew on the theory of institutional isomorphism (DiMaggio and Powell, 1983, 1991) and cognitive pressures to look at mimetic ERP isomorphism practices as a viable solution for central governments moving toward accrual accounting goals. The perspective of governments' mimicry of each other in their ERP reform was further enhanced by information regarding Cyprus, which explicitly highlights that its ERP choice was influenced by the Malta project.

ERP choice proves to be of major significance and counteracts accounting reforms that reflect economic and business frameworks and characteristics (Torres et al., 2005). Political and cultural pressures seem to cause differences in accrual accounting implementation (Hyndman and Connolly, 2011; Lapsley *et al*., 2009). Additionally, IT and accounting-related changes are interrelated. The last research chapter of this thesis, chapter 7, investigates further the facilitator role of the ERP systems and qualitative findings in association with IPSAS and EPSAS accounting standardization to confirm their interrelated impact, the in between pressures and their combined efforts in terms of institutional isomorphism towards accounting reforms in EU and the UK.

7. International and regional standards as external drivers towards PSA reforms. Association with ESA2010 and ERP systems.

7.1 Introduction

The advent of the economic crisis in the EU member states resulted in their fiscal support through the "Six-Pack" legislative framework and Council Directive 2011/85/EU of November 2011. The package aimed to strengthen economic governance in the EU. The adverse economic conditions made even more imperative the need for IPSAS accounting standardization. The initial recommendation of the EU (EU Commission, 2011) to its member states envisaged their implementation within a period of three years. In March 2013, the EC started a project aimed at harmonizing accrual-based PSA systems through a set of harmonized accrual-based PSA standards. However, it was deemed appropriate then, mainly by Eurostat, to prepare a preliminary study on the suitability of IPSAS. This assessment and investigation concluded that these accounting standards were not suitable for immediate adoption, however, it was considered that IPSAS can form the basis for the development of EPSAS in accrual accounting with the required revisions to financial management legislation (European Commission, 2013). In some countries, the hesitancy towards the implementation of these international standards were quite intense (e.g., Oulasvirta, 2014) as the challenge due to variance in national traditions and avoidance of implementation cost persevered sovereignty (Manes Rossi *et al*., 2016).

The consensus on the implementation of IPSAS involved multiple factors, both technical and non-technical, internal, and external to manage such a complex accounting reform and it was reasonable that governments were reluctant to such an innovation. Baskerville and Grossi (2019) stated that implementation organizations might modify the accounting innovation to meet specific local and organizational needs. The expected benefits of the accounting transition, the fit with the adopter's existing values are the premises for persuasion for governments to proceed with accounting implementation. Once persuaded and convinced, governments proceed with the implementation which involves the knowledge transfer to confirm a meaningful application (Jackson and Lapsley, 2003). Opportunities for change are traced where is the resistance to reform, thus setting the drivers and barriers to reform as two sides of the same coin. In light of the above, the present chapter aims to highlight barriers and stimuli in the adoption of (IPSAS-(like) accrual accounting in EU MSs, the facilitator role of international and regional to accrual accounting innovation and their interplay with the technical external drivers analysed in the two previous sections.

7.2 Background information on stimuli and barriers of accounting standardization

7.2.1 Harmonization in public sector accounting

Although EPSAS is essentially an attempt to simulate IPSAS adapted to a European context, with the accrual basis as the dominant common feature, the transition from IPSAS to EPSAS is considered difficult when domestic accounting frameworks are prevalent and are based on cash basis accounting. Those countries that are willing to implement IPSAS strongly consider the harmonization of PSA stimulus for IPSAS adoption (Brusca and Martinez, 2016). Accounting harmonization between nations is an overly critical point. Indeed, if all general governments released financial statements according to the same standards, it would be possible to understand and compare the financial position, debt level and deficit of each country. The objective is also to avoid hiding negative performance and improve financial stability in Europe. By providing a more comprehensive and fair view of the financial position of governments, accrual accounting (one of the principles of the IPSAS) is a tool to reduce uncertainty for rating agencies and other users of financial statements. Harmonized accounting standards would also help investors to compare financial activities of governments. Finally, the IPSAS would reduce the risk of political influence. These are the aspects that this thesis aims to analyse and focus so as to facilitate the interaction between governments, investors-citizens, monetary-lending organizations policy.

7.2.2 Transparency in Financial Reporting

Aim of the accrual basis accounting, as focal point of IPSAS and EPSAS accounting standardization is the need for transparency. So far, several attempts have been made to assign the meaning of the term. The reformers promote the issue of fiscal transparency in the context of good governance. Heald (2006) identifies many interpretations of the term transparency approaching it through its positive pursuits mainly in matters of trust and legitimacy. However, its effects in the context of political governance remain controversial (Finkelstein, 2000). Koppell (2005), stated that the transparency of budgets presupposes the accounting monitoring of it, attributing costs to outputs and measuring these outputs with quality indicators. The concept of transparency is linked both to the concept of good governance and to the strengthening of accountability, as a prerequisite to gain international recognition (Gomez et al., 2004) and in order for public policy to be exercised in an accepted way (Shah et al., 2003). Advocates of IPSAS are at the same time proponents of their main feature, namely the accrual accounting as it allows the evaluation of the economic performance and position of the government making it more transparent (Cangiano, 1996, p. 15)'. More specifically, it points out whether the shift in the balance between capital consumption and new investment causes movements in the government's net position, or if the government is depleting its net position to maintain current consumption. As transparency is analysed through the merits of accrual accounting methods, its superiority is still a controversial fact as there are also proponents of the accrual method in the public sector and therefore question its connection with transparency. They therefore consider that this privileged status derived from the "interrelated" relationship of the accrual method with transparency is a constructed fact and not real as it is not confirmed in all circumstances (Guthrie *et al*., 1999). There are also issues with the nature of transparency, as in order to achieve this interconnection, there should be a distinguish of the whole of an organisation, government, entity and this this distinction to be reflected in financial reporting. The greater the complexity of an organization and its sub-sectors, the more difficult it is to achieve transparency if their integration ignores formal characteristics. In addition, the consolidation is based on the availability of information provided by governments and therefore this fact may lead to subjective results for the availability of information. Even when all available accounting information is provided, individual characteristics, such as the measurement and valuation of assets may differ, and this is a fact that creates reservations (Barton, 2009). Therefore, the mere existence of the accrual method is not sufficient to achieve transparency. But it is at least a starting point towards transparency (Cangiano, 1996; Kondo, 2002; Nielsen and Madsen, 2009) as well as the immediacy of access to accounting information. Considering the adoption of a more managerial culture in the public service and bearing in mind that transparency is a multi-layered approach and achievement, there are some subtle levels of transparency that can be achieved.

7.2.3 Good governance

Osborne (2010) has sought to initiate a debate on what constitutes “good public governance”. This section contributes to that debate. Specifically, this section examines whether accounting standards can be used as an enhancement tool for “good governance” through the lens of transparency. Both accounting (Hood, 2006) and transparency (Casey, 2006, p. 176) are essential parts of what constitutes “good governance”. Transparency has become a key concept which encapsulates long standing attributes of good practice into a modern concept of good governance (van Bijsterveld, 2005, p. 13). Many suggested that the absence of high quality accounting numbers fuelled bad governance, mismanagement, and lack of accountability (Serafeim, 2015). However, transparency is a complex phenomenon, which requires a nuanced understanding to explore effective governance.

7.2.4 Comparability and decision making

The adoption of an accounting basis and accounting standardization, principles of which are unanimously accepted by EU member states is a prerequisite for comparable financial statements. It is significant that there are qualitative fiscal figures for numerous reasons. However, at the moment there is no consensus towards IPSAS adoption albeit on EPSAS adoption since auditing and accounting firms, international organizations favour subject adoption but there are governments that oppose to their implementation. There is the perspective that a unique accounting standardization framework might not be necessary on the premise that governments use accrual accounting basis. This might be sufficient to provide the transparency and comparability needs of the public sector and enable public accounts to foster government accountability and improve decision making (Bellanca, 2014). As there is the perception that a European accounting framework with the involvement of the member states would be more suitable is reasonable to study how financial reporting with the usage of ESA2010 accrual accounting framework associates with IPSAS accounting standardization and its impact on decision making. The diversity and materiality of accounting basis among EU MSs are certainly important starting points for the development of a common framework. These should be considered by policy and decision makers -such as accounting standard-setters and statistics agencies- in order to confront with these differences (Manes-Rossi et al., 2016).

7.2.5 Austerity measures

Since early 1980s austerity measures motivated scholars to research fiscal management cut offs. In the beginning of the 2007, the worldwide fiscal crisis, led to measures that held public services back greatly signifying neoliberalist values (Whitfield, 2012). The economic crisis forces governments to take fiscal measures which may be intertwined with austerity policies. This fact and the dissatisfaction that is created leads countries to review the way of drafting the budget, the financial reports and also the accounting methods of measurement. The austerity policies therefore demand a significant revision of the accounting practices and the accompanying social measures even if this implies the adoption of a new theoretical government policy. It is particularly important that the financial data that are displayed into financial and statistical reporting are compiled in an accounting manner that strengthens accountability and facilitates the work of accountants. In all this context, the accrual method appears to be the only one that can provide reliable accounting information about a government's balance sheet and performance, recording movements in assets and liabilities, revenues, and expenses as they actually occur.

As the EC highlights (European Commission, 2013b), the sovereign debt crisis has underlined the need for governments to clearly demonstrate their financial stability and for more rigorous and more transparent reporting of fiscal data. Council Directive 2011/85/EU (the Budgetary Frameworks Directive) recognizes the crucial role in EU budgetary surveillance of complete and reliable fiscal data, comparable across Member States. Debt and deficit figures have mandated the need to produce measures that cut back the debt but at the same establishing social harmonization and fair allocation of resources between all social time. Therefore, this contradictory issue led to debates between economists over the health of political and social measures and to the strategies that should be adopted for social (Chapman et al., 2012). There is little doubt that public sector accountability and accounting systems are in core implicated in these developments and debates (Sikka, 2015) since they form, defend, resist, and counter, discourses, and measures of austerity (Cooper, 2015).

Austerity measures, loans under monetary funds' disguise are linked with the governments' borrowing practices of thesis. If the accountability and accounting practices have the potential to destabilize the way in which governments are administered (Morales *et al*., 2014), then this analysis matters as it serves to shows how IPSAS can help in practice, enhance social stabilization, and improve austerity measures, to suggest and promote practices and understanding of the public interest and services. Nevertheless, accounting should be the tool for transparency, for compatibility, for fair consolidation between different practices, for enhanced decision making, for good governance, for cost worthy implementation cost and not a technique that justifies reduction choices by representing them as financially essential under austerity's disguise. The NPM model, tried to convert the governmental practices from expenditure reduction to the pursuance of enhanced efficiency for value for money policy. This thesis showcases whether governments practices following the NPM -with accrual accounting framework being the dominant trait- have led to the convergence of the government and statistical reporting in a way that has attested to be transparent and accountable.

7.2.5.1 Greek government case as an example of austerity measures towards PSA reforms

Greece had a long history of failed attempts to adopt accrual accounting. In 1992, the Greek ministry of economy announced that Greek government agencies would adopt accrual accounting, but such adoption never happened. In 2003, the Greek government announced plans for public hospitals to implement accrual accounting. In 2008, the EC recommended that Greece implement IPSAS, but in 2015 the country had yet to prepare financial statements according to IPSAS. Low level government employees began training in IPSAS starting in 2010. Many suggested that the absence of high quality accounting numbers fuelled bad governance, mismanagement, and lack of accountability (Serafeim, 2015). Since, the debt markets create a demand for financial reporting that scores highly on traditional metrics (i.e., explanatory power and ERCs) analysis is made to examine value relevance with reference to bond yields from borrowing perspective.

In Greece, discussion about the correlation of debt figures and accounting standards implementation was triggered by a statement made in May 2015. It was then, that the Greek finance minister stated that the Greek debt would not be so high if IPSAS were to be implemented. It is a fact that in the past, in early 2010, European countries such as Greece and Italy, "disguised" loans which they received by banks, as swaps, hiding liabilities and consequently hiding their borrowing. Eurostat at that time ignored statistics involving financial derivatives. More specifically, a German derivatives dealer had commented that "The Maastricht rules can be circumvented quite legally through swaps," and "In previous years, Italy used a similar trick to mask its true debt with the help of a different U.S. bank." In May 2010, the Greek government deficit was again revised and estimated to be 13.6%, the second highest in the world relative to GDP with Iceland in first place at 15.7%. Public debt was forecast to reach 120% of GDP during 2010. As a consequence, there was lack of international confidence in Greece's ability to repay its sovereign debt and Greece was unable to access market financing due to increased borrowing rates (Serafeim, 2015).

Therefore, indicators correlating GDP with deficit and loans were not accurate and as a result international comparison of fiscal policies could not be trustworthy. Due to aforementioned and taking into consideration the public sector debt and its different concepts, the variance in public sector definitions and respective instruments, in methods for measuring debt in relation to its valuation and accounting rules, it was found that the debt of the public sector often does not abide to international standards.

Because of the differences, it was an objective to discuss and try to determine more standardized definitions and valuation for GFS as well as a way to improve the quality of data. Because the exclusive focus of Eurostat on two indicators, Gross debt to GDP and Deficit to GDP, provide only a partial view on the government finance situation, this may lead to less than adequate policy decision. Therefore, two alternative indicators were discussed and suggested (OECD paper Government Finance Indicators: Truth and Myth) proposed two alternative indicators: a) net worth changes due to saving and capital transfers (b) and net financial debt. These two alternative indicators combined with additional information may provide a more complete picture of the status of a government's finances.

7.2.6 Barriers of IPSAS and EPSAS adoption

Research on international accounting harmonization, majority of which focus on IPSAS, has already studied the adoption of international accounting standards and implementation process. Both single-country studies (Tanjeh, 2016) and cross-country studies have investigated the stimuli and barriers of IPSAS adoption (Brusca and Martinez, 2016). In addition to research on IPSAS, studies have examined European accounting harmonization. Focal point of both IPSAS and EPSAS is the accrual basis accounting. However, various governments are still reluctant to adopt accrual accounting (Christiaens, 2010), let alone IPSAS. Those countries that have adopted some form of accrual accounting did not adopt IPSAS in full; rather they preferred to choose from the accounting standards available. Such reluctance relies on the fact that the implementation of IPSAS is not an effortless process. In order to achieve IPSAS convergence, governments must go through many changes. Significant institutions and organizations must cooperate and whatsoever GFS, OECD, SNA and IPSAS should comply with each other. There should be consolidation of methods and approach so as to enable transparency and comparability. Accrual basis accounting, on which IPSAS and EPSAS are based, should be pervasive not only on General Governments' National Accounts Balance sheet statements but in Budget Statements as well. In that way all financial statements through macroeconomic data are derived, will be based on comparative accounting principle and method. However, this is a costly procedure which takes time. Analysis is needed and research has been made so far to check if this transition is cost- worthy for all countries to implement IPSAS, as well as, if this is suitable to all countries. IPSAS carrying all these benefits are supposed to enhance good governance (Serafeim, 2015). This thesis aims to promote practical tools that measure accrual accounting frameworks' value and the impact on Governments' decision making on political, social, and economic issues. Austerity measures are basic research fields so as to relate austerity measures with accounting standards. The emergence of IPSAS is described as the most significant development among the many government accounting changes that are happening (Sutcliffe, 2003). But the adoption of IPSAS by governments is completely voluntary because the IPSASB does not have the power to force any jurisdiction to endorse them (IFAC, 2010)

Implementation of the IPSAS, has been a time consuming and costly procedure. The nature of cash basis, with budgetary accounting, makes it easier for end use compared with the complicated and not concrete nature of IPSAS. This fact consists of a barrier in IPSAS adoption, especially by small- and medium-sized entities as IPSAS' arbitrary nature raises concerns over accounting standards interpretation and jeopardises the goal of international comparability of accounts. Due to misalignment of ESA2010 with IPSAS, the latter was considered inappropriate to meet the needs of member states due to its incomplete and sometimes unsuitable nature. It is also worth noting that politicians emphasize on budgets and not on balance sheets fiscal figures. Based on the fact that IPSAS do not focus deeply enough on cash accounting, it is considered that the IPSAS do not deal with some public sector specificities (social benefits, pension, taxes, and historical heritage) (Bellanca, 2014)

A survey conducted in 2012 (EY, 2012) on public accounting and auditing in EU member states, highlighted the practical issues linked to the implementation of IPSAS. Beyond the time consuming process, these practicalities involve additional impediments. Among them are the training costs for all the stakeholders involved to the accounting standards transition, such as accountants where the accounting education level is low. Information systems adequacy such as ERP/IT systems, capable to sustain the accrual accounting transition also involves equipment costs which also worsen the difficulty of the change for all users and make the reform process expensive. Especially, in a period of budget constraints and deficits, implementation costs this can be a further barrier to PSA change, especially in those countries with a low degree of accounting and subsequent IT maturity where the need to train civil servants and adapt IT systems is high. It is also interesting to underline that such cost seems to be one of the major impediments to the application of IPSAS. This reflects the fact that, given that they already have an accrual accounting model, these public entities deem the cost of moving to IPSAS too high compared to its benefits. Indeed, the cost associated with the implementation of IPSAS is less of an issue for their modified accrual-based counterparts for which the cost could be expected to be higher. Christiaens (2010) reveals an important move to accrual accounting, particularly to IPSAS accrual accounting, for which there still remains a level of reluctance mainly in central governments, especially in some "mature" countries where business like accrual accounting has been developed or due to the fact that these principles have not been considered suitable to satisfy the information needs of the public sector. In some mature countries, this unsuitability is further endorsed due to the preference to the traditional use of historical cost for asset evaluation to support the fair value logic implied by IPSAS. In some European countries, there is limited political support to an accounting reform that deviates from local accounting standards and therefore trend to international accounting standards implementation is restricted. As far as concerns the legislation and clarity in rules, diversity of local legislation from international accounting standards certainly consists of barrier to IPSAS adoption that supranational institutions must consider if the willingness to adopt a common set of international accounting standards is to prevail in Europe. The situation within the different countries has also pointed a strong role for the rules set out by the European Union: the need to comply with the Stability Pact requires an improvement in fiscal coordination between levels of government; committing to new fiscal rules; medium-term budget frameworks; reporting requirements and therefore increases the consultation needs and requests for technical support (Brusca *et al*., 2015). The substantial estimated and variable costs across the EU countries represent a barrier to the adoption of full accrual accounting across Europe, creating further resistance in the member states (Heald and Hodges, 2015). Such accrual basis accounting implementation costs with IPSAS - based benchmark as part of the EPSAS project were the objective of PWC surveys (2014, 2020) on behalf of Eurostat. Despite the impediments, the updated PwC report on accounting maturity in the member states (PwC, 2020) showcases a second round of stock-taking regarding the existing accounting systems in the member states, with the IPSAS as a reference point.

Overall, the aforementioned barriers alert the politicians and standard setters to consider the implementation challenges of EPSAS and act proactively to find solutions to overcome them. As the status of IPSAS adoption shows a positive correlation with EPSAS reform expectation, the EC might initiate the necessary and suitable steps while encouraging the voluntary introduction of accrual accounting within the first stage of EPSAS implementation by providing financial support (Frintrup *et al*., 2022).

7.3 Accounting standards as drivers of PSA reforms in terms of the institutional theoretical framework

In terms of institutional isomorphism, adoption of IPSAS seems to be led by normative, mimetic, and coercive pressures, which can explain governments' endorsement of this accounting standardization. This section analyses subject pressures that have affected the adoption or adaptation of IPSAS and the terms that have contributed to IPSAS being driver towards PSA reforms. Normative pressures relate with the actions of political groups and professional institutions such as IPSASB and IFAC, coercive pressures relate with international organizations such as the OECD, NATO, the European Commission, Interpol, INTOSAI, the United Nations and the IMF that promote sound financial management, accountability and transparency and ultimately mimetic pressures associated with governments; need for credibility and trust.

From the perspective of the accounting literature, Sellami and Gafsi (2017) used institutional isomorphism both in public and private sectors to explicate accounting standards' reforms and adoption processes and Neves and Gómez-Villegas (2020) stated that the IPSAS adoption is seen as a legitimization procedure rather than a technical rationalization one. The improvement of PSA and financial reporting frameworks in accordance with international standards (namely IPSAS and EPSAS) has been promoted and endeavoured as good practice (World Bank/PULSAR, 2021). In an effort to support governments that wish to embark on PSA reforms, they include international (IPSAS), regional standards (EPSAS) and ESA (statistical framework) as key technical drivers such to improve the strategic resources management which are grounded in basic principles and therefore are easier to objectively measure and assess.

7.4 Research questions and methodology

Governments are adopting IPSAS across different jurisdictions world widely, driven by the perception that public sector accrual accounting would enhance public sector information - reporting quality (Rincon-Soto and Gomez-Villegas, 2021). In the context of public fiscal management reforms, and under NMP model, the PSA reforms have been promoted through the IPSAS accounting standardization adoption as a strategy to facilitate public sector decision and policy making, transparency, and accountability. IPSAS appear as a technical innovation because they incorporate the accrual accounting criterion into public information systems, which traditionally practised the cash criterion.

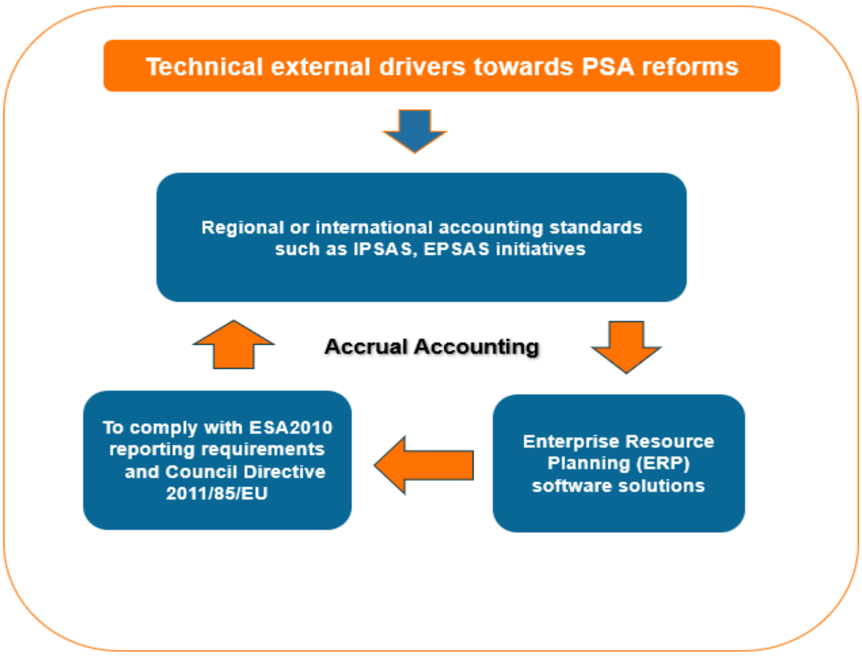
This section investigates the role of accounting standardization, namely IPSAS and EPSAS, in association with ESA2010 accrual accounting framework and ERP systems as PSA technical external. Therefore, we investigate the interrelation of these three external drivers towards the common goal of public sector accrual accounting reforms by addressing the below research questions:

***RQ*₁:** What is the association of IPSAS and EPSAS accounting standardization with the ESA2010 accrual accounting framework?

***RQ*₂:** What is the association of IPSAS and EPSAS accounting standardization with the ESA2010 accrual accounting framework and IT modernization efforts of EU MSs and the UK?

To address the first research question, the results of chapter 5 that confirm the quality of ESA 2010 accrual accounting framework are employed in relation with the discussion for IPSAS and ESA2010 interconnectedness in terms of the EPSAS project. To address the second research question, we employ the results of chapter 6 in the context of the global trend of transitioning toward accrual accounting. Therefore, we combine the quantitative and qualitative result analysis both of ESA2010 reporting quality of General Government NA and the facilitator role of ERP systems reforms towards accounting reforms in the EU MSs.

Figure 7.1 Interrelation of technical external drivers towards PSA reforms



7.5 Results on the interrelation of the technical drivers towards PSA[10]

7.5.1 Results and discussions on the association of IPSAS and EPSAS with ESA2010 reporting quality

The statistical and accounting community regularly discuss how to converge macro and micro-economic government accounting information through harmonized, integrated reporting on an accrual basis (European Commission, 2013a; IPSASB, 2014a). Bracci *et al*. (2015) underlined that in most European countries, cash accounting persisted at the centre of the budget process, which prevailed over financial reporting in its significance (Heiling *et al*., 2013).

The variance between financial and statistical reports is traced in terms of measurement, timeline, recording and conceptual framework (Chan and Heiling, 2012). At the European level, the alignment effort is reflected in the harmonization of IPSAS by those governing the European system (ESA2010). PricewaterhouseCoopers's (PwC's) (2014) survey on behalf of Eurostat, confirmed the suitability of IPSAS as a reference to developing EPSAS in EU member states (European Commission, 2013b, 2014) which in turn can contribute to improving the reliability of ESA. In the EU, IPSAS as the reference point of EPSAS development was initiated to achieve a homogeneous EU-landscape of PSA governance and reporting (Lorson *et al*., 2019) aimed at harmonization (Pontoppidan and Brusca, 2016). EU authorities are creating policies and projects like EPSAS, based on the SNA, in an effort to close the information gap between GA and NA (Dasí *et al*., 2013). The integration of national accounts, budgetary and financial reporting standardizes conciliation on their information, facilitates the internal use of national accounts and constitutes EPSAS a comparative source among EU countries (Manes-Rossi *et al*., 2016).

In the EPSAS workshop that took place in Brussels (Directorate-General for Internal Policies – Policy Department D: Budgetary Affairs, 2015), the interconnection of EPSAS with the ESA was highlighted as a facilitator of translating public sector accounts into financial statistics that would enable Eurostat to check fiscal data more easily. The same workshop considered that GFS would improve its quality on the premise that the interconnectedness of PSA and ESA strengthens, setting prerequisites that

[10] This section is part of the research entitled "Value relevance of general government national accounts with ESA2010 accrual accounting framework. Association of ESA2010 reporting quality with decision making and accounting standardisation" which has been published in the Journal of Accounting and Management Information Systems, 21(4), pp.546-574, DOI: http://dx.doi.org/10.24818/jamis.2022.04005

EPSAS base on ESA and suggesting changes to ESA where needed. Verrinder (2021) endorses the EC proposal (European Commission, 2014) of the Framework Regulation which includes fundamental EPSAS principles such as accrual-based accounting, double entry book-keeping and therefore endorses accounting standards consistent with ESA principles, having IPSAS as the first reference base. Regarding EPSAS, the importance of the alignment of GA with the NA, namely ESA2010, became prevalent, considering that the figures from the former are input for the latter, based on which, the EU fiscal discipline and macroeconomic convergence criteria are assessed (Jorge *et al.*, 2019). Essentially, financial reporting and statistical reporting have separate yet complementary functions in terms of the interconnection of EPSAS and ESA2010. Both are needed, EPSAS cannot be expected to fully align with ESA but by utilizing IPSAS convergence efforts with NA, some differences may be eliminated.

Value relevance results endorse the quality and therefore the usefulness of statistical reporting information to decision and policymakers. The NA proves to be a rich statistical source, with legislated rules in Europe (ESA 2010) to ensure comparability. Given the importance of statistical reporting to policymakers, debt managers, ratings agencies, and investors in determining the progress being achieved in an economy, the contribution of the ESA accounting framework is of high quality resulting in statistical reporting of great value relevance, reliability, and perceiving the interconnection efforts of accounting standardisation with ESA2010 to improve their mutual quality.

7.5.2 Results and discussion on the association of IPSAS and EPSAS with ESA2010 and ERP systems[11]

Studies that simply seek to identify the "impact of ERP systems" through surveys of the outcomes of the implementation process will not be able to address the nature and complexity of the process of transition. Longitudinal cases of ERP system implementation are needed for this purpose (Scapens and Jazayeri, 2003). Thus, to explain the challenges and outcomes of ERP system implementation and their association with accrual accounting reforms, we documented the processes of change in the

[11] This section is part of the research entitled "Enterprise resource planning system reforms of European Union member states in association with central government accrual accounting and IPSAS adoption", which has been published in the Journal of Public Budgeting, Accounting and Financial Management, Vol. 35 No. 1, pp. 115-140, DOI: https://doi.org/10.1108/JPBAFM-06-2021-0104

context of EU member states' respective central governments. In EU member states, the PSA reforms appear to have been driven mainly by external factors, such as EU guidelines (Directive 2011/85/UE) that require accrual accounting for fiscal reporting under the ESA 2010 and the EUROSTAT initiative to develop and implement the EPSAS (World Bank, 2021). Hence, as perceived low IT maturity is related to higher anticipated IT costs (PricewaterhouseCoopers 2014, 2020) and considering a previous study (Frintrup *et al.*, 2020) that identified IT costs as a potential barrier to implementing the EPSAS, it was of interest to investigate the perspective of central governments on the role of ERP systems in accounting-related changes.

Finding a positive and inextricable association of accounting changes with IT modernization does not overlook the fact that, in some cases, governments faced issues of interface compatibility (Croatia) or time-consuming organizational changes (France) dedicated toward accrual accounting reforms. The introduction of an extensive system, such as an ERP system in an organization, usually affects the structure and internal processes, thus changing the basis of responsibilities while also presupposing the training of the appropriate personnel (accountants) to manage these IT systems. It does not overlook that IT capacity alone cannot drive accrual accounting implementation. Evidently, how management accounting is practised, how accounting information is used, and the role of accountants depend on the institutions within the organization (Burns and Scapens, 2000). This thesis presents opportunities for ERP systems to open up within governments, but it would be inappropriate to think of ERP systems as the sole drivers of change.

For future reference, the trend of transitioning toward accrual accounting is expected to continue globally, considering that accrual accounting is supported and promoted by international institutions, such as the International Monetary Fund, Organisation for Economic Co-operation, and Development (OECD), and the World Bank (European Commission, 2019b). Sellami and Gafsi (2019) found that external public funding is positively associated with a country's decision to adopt the IPSAS. Public authorities of Cyprus and Malta have positive opinions on the suitability of the IPSAS (Polzer and Reichard, 2020). Additionally, and the European Commission (2015) noted that it was already supporting projects implementing accrual accounting in Cyprus, Malta, and Portugal at the central government level, in terms of which modernization of IT solutions was a key factor. The EU financially supported public entities or governments that opted for the voluntary use of IPSAS until

2020, as it sought to develop EPSAS using IPSAS as a reference point. It tends to consider the timeframe of 2020-2025 as indicative of EPSAS implementation to establish a homogenous accounting framework that enables comparability within and between member states (Lorson *et al.,* 2019; Frintrup *et al.,* 2020). Considering this timeframe, pressures and demands for the public sector accrual accounting harmonization process will continue to persevere to ensure legitimacy and modernity. Under these conditions, IT modernization will coexist, and it is of interest to examine the diffusion of ERP systems and vendors at a wider longitudinal level.

The results of this study indicate that mimetic isomorphic pressures combined with normative and coercive pressures derived from the aforementioned international organizations, in combination with the facilitator role of ERP systems, have a positively significant influence on the implementation of accrual accounting in EU member states' central governments. These findings are important for the governments to conduct the appropriate actions to manage IT modernization challenges in order to achieve successful implementation of accrual accounting and improve their planning programs to overcome barriers as well as to ensure that the purposes of the accounting reforms are rectified.

7.6 Conclusions

Studying the role of the technical external drivers towards PSA reforms, is evident that their facilitative and contributing role towards public sector account change is inescapable. The more intense the institutional pressures are, the closest the interrelation of the external drivers. The accounting change demands not only the existence of individual key technical drivers but the joined effort of all drivers. In the future, prominent international organizations will continue to exert pressures to politicians towards accrual accounting at a global level and to urge governments to seek and mimic best accounting international practices (such as IPSAS) in an effort to improve the quality and reliability of their public financial information.

This set of accounting standards, with accrual accounting basis being its focal point, enable governments to follow up their cash flows, provide consistency, allow comparability with peers at both regional and global levels, to empower public investment planning and state assets management, to achieve greater levels of fiscal transparency and accountability and to foster decision and policy making (Gourfinkel, 2021).

From the analysis made so far, the accrual accounting basis, does not only consist of the accounting trait of the PSA reforms and common pursuit of EU member states. It is also the common accounting method linking the adoption of the (EPSAS) inspired by the (IPSAS) and the ESA2010 framework endorsing their interrelation and interconnectedness efforts. This section offers critical perspective as it showcases the high quality of the statistical reporting with ESA2010 providing an incentive for this interplay. Institutional pressures as evident from the European Parliament and the EU council' s actions for the enforcement of accrual accounting basis, have confirmed their unconcealed ambition for the establishment of "a uniform accrual-based budgeting and accounting system" compulsory for all EU Member States, for the Whole of Government Accounts. Regional standards (EPSAS) are promoted by Eurostat as the best solution to meet the reporting needs of the EU authorities, sufficient to control the aggregated figures of public debt and expenditure and to avoid future sovereign crisis. In this context of institutional pressures for accrual accounting practises, the key technical drivers are also posing pressure with each other so that they can support accrual accounting change. IT modernization is the result not only of the institutional pressures but also of strong interrelation of key technical external drivers as ERP systems that will be able to support the accrual accounting practises are of outmost significance.

8. Conclusions

8.1 Summary and overview of the thesis stages

The first stage of this research, chapter 5, provides an empirical assessment of the reporting quality of General Government National Accounts with ESA2010 accrual accounting framework in EU member states and the UK. With the introduction and adoption of the accrual accounting system in the public sector as a result of NPM reforms, which attempted to emulate the accounting practises and procedures used in the private sector, we initiate value relevance analysis in the public domain employing the accrual accounting framework ESA2010, to assess the quality of statistical reporting via bond returns regression analysis. We introduce econometric tools that enable stakeholders to check financial reports in the European division and the UK and showcase which statistical financial reporting elements (i.e., net income, debt figures, financial net worth, Euribor rates) have gradually throughout the period 1999-2019, established strong relevance and correlation with long-term government bond yields. We assess the quality of statistical reporting considering that it makes use of the ESA2010 accrual accounting framework. In EU member states, the PSA reforms seem to have been driven principally by external factors, such as EU guidelines (Directive 2011/85/UE) that mandate accrual accounting for fiscal reporting under the ESA 2010 and the Eurostat initiative to implement and develop the IPSAS-based (EPSAS). In these terms, of their mandatory application, it was of outmost significance to assess the quality of ESA2010.

The second stage of this research, chapter 6, presents a longitudinal case study of the implementation of ERP systems in the European Union member states and the UK at the central government level, in which technological capacity change is viewed as technical external driver for accrual accounting implementation and consequently as a breeding ground for potential IPSAS adoption (benchmark as part of the EPSAS project). Respective methodology is based on a qualitative field study of 27 EU member states and the UK. The research questions concerned the central governments. We used the previous findings of PricewaterhouseCoopers (2014, 2020) and Ernst and Young (2012) on behalf of the Eurostat, the financial reporting bases, and frameworks of International Federation of Accountants (IFAC) and the Chartered Institute of Public Finance and Accountancy (CIPFA) (2018, 2021). We then associated these results with our qualitative research outcome on ERP practices to analyse the European trends and similarities in ERP reforms and vendors in terms of accrual accounting-related changes and potential IPSAS adoption. Findings associate the increased levels of accounting and IT maturity scorings (PricewaterhouseCoopers, 2014, 2020) with the setup or upgrade of ERP systems and endorse their interdependency. Evidence fosters the perception that IT capacity is among the drivers of PSA reforms and underlines that ERP systems facilitate accrual accounting reforms.

The third stage of this research, chapter 7, demonstrates the role of accounting standardization (IPSAS and EPSAS) as technical external driver towards PSA reforms. In the context of public financial management reforms, and under NPM, the public accounting systems' reform has been promoted by the accounting standardization adoption, namely the IPSAS, as a strategy to improve public sector decision and policy making, transparency, and accountability. In an effort to support governments that wish to embark on PSA reforms, we outline key technical drivers, such as IPSAS and EPSAS which are grounded in basic principles and are easier to objectively assess. For this purpose, we combine the high quality of ESA2010 accrual accounting framework (as evidenced in chapter 5) and the facilitator role of ERP systems (as evidenced in chapter 6) and associate the results with accounting standardization to prove the interplay of the technical drivers. More specifically, value relevance results endorse the contribution of the ESA accounting framework as the outcome is of high quality resulting in statistical reporting of immense value relevance, reliability, and perceiving the interconnection efforts of accounting standardisation (IPSAS and EPSAS) with ESA2010 to improve their mutual quality. Also, finding a positive and inextricable association of accounting changes with IT modernization, we showcase that ERP systems' upgrade or implementation is a prerequisite for governments that wish to embark on PSA reforms and IPSAS/EPSAS accounting standardization. This chapter highlights the joined efforts of varied factors towards global public accounting effort to achieve government financial accountability and transparency.

8.2 Discussion on findings and avenues for further research

8.2.1 Discussion on findings and avenues for further research for ESA2010 framework

When applying our value relevance framework to assess the quality of statistics reporting with ESA2010 accrual accounting framework, our findings demonstrated that stakeholders could derive reliable information regarding the financial figures of Eurostat database. Evidence enables comparability as the stakeholders are able to evaluate financial figures with diverse government accounting basis input. The trend of EU governments towards unification of accrual budgeting and public accounting system will continue to exist due to the perception that a unified accrual and budget accounting system will enable macro-economic decision-making processes and budgetary surveillance and improve statistical calculations and reporting (Jones and Caruana, 2014). At the European level, annually, governments are driven by the pursuit of monitoring the balance between revenues and expenditures which is the core value of the budgetary equilibrium. This public accounting system is a useful tool to support governments to identify and correct any deviation. This thesis adds to the statistical calculations and reporting by promoting value relevance tools that can be applied to financial figures aggregated government financial statements between various countries for the same period. For future research and reference, same tools can apply to OECD membership countries. Another avenue for future research in EU MSs is the application of the econometric tools to balance sheet and income figures of governments accounts so as to compare it with the quality results of the statistical figures.

8.2.2 Discussion on findings and avenues for further research for ERP systems

When applying our institutional framework to assess the institutional isomorphism and the driven role of the IT modernization towards PSA reforms, our findings out of the qualitative research demonstrated that there is mimetic isomorphism on the vendor's choice regarding the ERP systems towards accrual accounting change and that these facilitate indeed PSA reforms. We add a qualitative resource to the correlation of accrual accounting maturity and IT maturity in the context of -IPSAS based- EPSAS project. We add to the literature of IPSAS implementation barriers by providing examples of governments that describe the contribution of ERP systems as core solution and determinant key driver towards accounting change. As this research focused on EU MSs and the UK, considering that the Brexit took place in 2020, there is avenue for further research on the ERP practices in other membership countries such as OECD. It would be of interest to see whether ERP systems consist of accrual accounting drivers or barriers, to highlight the dominant ERP vendor choices and to investigate whether institutional isomorphism exists in governments' accounting practises.

8.2.3 Discussion on findings and avenues for further research for IPSAS and EPSAS as reform drivers

When applying our framework to assess the literature on the driven role of the accounting standardization, ESA2010 and the IT modernization towards PSA reforms, our findings demonstrated that there is joint effort towards accrual accounting change. The institutional pressures impose the contribution of all technical external drivers to accomplish accounting innovation forcing them to interact to accomplish accrual accounting change. With this outcome, there is avenue for future research on the interplay amongst reform drivers in governmental accounting changes in EU from institutional perspective. Governments tend to follow the trend for accounting change and mimic best accounting practices to achieve accounting goal. As EU has interpreted the sovereign crisis as an accounting problem, solution to this became part of the PSA regulations (Bruno, 2014) and in conclusion IPSAS-based EPSAS became the solution of EU authorities to monitor public debt and to avoid future public finance crises. Therefore, research can be extended on the strategy that governments follow regarding the interplay of key technical drivers towards PSA reforms.

8.3 Research limitations

Governments under the institutional pressures of PSA reforms, develop strategies and roadmaps, which support the definition and implementation of improved legislation, accounting standards, IT systems, and tools in the respective countries. Severe crises have been a reform driver that serve as a defence for politicians to justify the cost of accounting change considering that this burdens the general public. Due to the pervasive impact of accrual accounting, the involvement and participation of all public sector stakeholders during the design of regulatory reform policies is considered vital. Studying the role and the contribution of the technical external drivers, certain limitations are acknowledged.

- Regarding the ESA2010 technical driver and its statistics quality, the value relevance of earnings and book value of equity on share prices and stock returns is a private sector technique to assess the quality of accounting information. Modified value relevance models and their application to public sector might raise concerns on their suitability.
- Concerning the ERP systems and their facilitative role towards PSA reforms, the limitations lie in the incomplete overview of EU member states' updated ERP solutions and their reform-driven

role in accounting-related changes. Information is collected only from 17 member states. Having an overview from all member states regarding the ERP systems' contribution and ERP vendor choices linked with accounting change would provide a complete overview on this key technical external driver.

- Reforms in most European countries were driven by a combination of government changes. Budget pressure and the financial crisis have served as a major driver of reform as the latter allows politicians to justify the necessity and cost of change. The switch from cash to accruals was characterised by an organised effort, mainly driven by international organisations (IMF, OECD, World Bank), international accounting and auditing standards setters (IFAC, EUROSTAT) and accounting associations and firms (FEE, EY, and PwC), to promote harmonisation and standardisation of public accounting systems through the adoption of IPSAS (Adhikari and Gårseth-Nesbakk, 2016; Oulasvirta and Bailey, 2016). This resulted in the widespread use of the standards as references for accounting reforms (ACCA, 2017). IPSAS reforms are interconnected to a wider range of PSA and public sector reform activities, i.e., improving accountability systems or internal auditing capacities (Nerantzidis *et al*., 2020). Public sector reform activities have also triggered a momentum towards developing a separate set of EPSAS, especially focusing on the European context, as part of harmonising PSA (Manes Rossi *et al.*, 2016). The benchmarking guide aims to integrate PSA and GFS and the ESA2010 to provide an integrated view of the two sets of reporting guidelines and outlines a process to align them more closely (Schwaller *et al*., 2019). There is limitation therefore to define proper drivers to PSA reforms as these are defined based on governments' individual needs and characteristics. It is evident that institutional pressures are linked with specific key technical drivers but it would be inappropriate to consider ESA2010, international and regional accounting standardisation and ERP systems as the most significant ones. It is difficult to define the impact of individual drivers to accounting change. It would be inappropriate to consider that the evidence of their strong association and interplay is adequate for governments that wish to embark on accrual accounting reforms.

8.4. Research contribution

This thesis contributes both at theoretical and practical level as it focuses on three technical external drivers (ESA2010, IT/ERP systems modernization, IPSAS & EPSAS accounting standards implementation) with accrual accounting being the centrepiece of PSA reforms and identifies how these drivers motivate and facilitate the accounting change of EU member states. Conclusively, this thesis contributes in the following ways.

Table 8.4 Research contribution

External technical drivers	Contribution at theoretical and practical level
ESA2010	➢ It endorses the quality of accrual accounting basis in the public sector. ➢ It provides an empirical and practical contribution by introducing relative value relevance econometric models that provide stakeholders with reliable information on the financial position and performance of the government. ➢ It showcases significant financial variables and coefficients of statistical reporting for each government. With its value relevant results, it supports evidence-based decision making, allows comparisons between EU governments and the UK, and contributes to increased transparency and accountability.
IT/ERP systems	➢ It sheds light on the impact of mimetic isomorphism on ERP vendor choices directed toward accounting-related changes ➢ It endorses IT's capacity to facilitate accrual accounting reforms and the inextricable association between accounting and IT modernization ➢ It demonstrates successful ERP reforms, experiences, and challenges faced by EU member states as paradigm cases for governments that wish to embark on ERP and accrual accounting reforms.
IPSAS/EPSAS	➢ It provides evidence to support the interconnectedness efforts of IPSAS and EPSAS with ESA2010 accounting framework ➢ It highlights the interdependence of accounting standardization with ERP systems and confirms that ERP systems are facilitators towards accrual accounting, thus the focal point of IPSAS and EPSAS adoption. ➢ It highlights the interplay of technical external drivers, namely ESA2010, IT/ERP systems, IPSAS/EPSAS accounting standardization towards PSA reforms and accrual accounting adoption

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Appendix A: Technological and accounting characteristics of central governments that increased the degree of accounting and IT maturity from 2014 until 2025. (Descriptive supplementary notes on Table 6.1)
Source: IFAC/CIPFA (2021), PWC (2014, 2020), E&Y (2012), Respondents' list and web data (Appendix B)

EU MSs and the UK	Central governments with high accounting and IT maturity by 2014
Austria	SAP ERP is the transaction software system used for bookkeeping processes. Its accrual accounting practice was initiated with a corresponding modular upgrade, which lasted five years to accomplish the full adoption of accrual elements. Austria, which uses accrual accounting, has fully integrated budgeting and accounting system functionalities since 2013.
Czech Republic	Czech Republic government applies accounting standards based on IPSAS in all its sub-sectors. These standards are defined by local regulations and legislations. There is no common or mandatory ERP software per entity.
Denmark	Accrual-based accounting in Denmark covers both financial statements and budgets. The central government uses Navision ERP with some exceptions. In terms of these exceptions, five entity offices, namely tax authority, defence, Danish rails, Danish roadworks and the National Institute for Health Data and Disease Control, are allowed to use the SAP ERP accounting system to enable reconciliation application.
Estonia	Since 2009, Estonia has established SAP software standardised functionalities in the financial and human resources domains of its central government sector. The consolidation of public sector financial statements accounts with the Ministry of Finance is a monthly obligation. Accrual preparation is practised for both financial and budget statements. The national accounting standards set by the MoF require these statements to be based on IPSAS for the public sector.
Finland	Accrual-based accounting has been in place in Finland for 20 years now in all general government sectors. Balance sheets and financial statements are prepared according to the accrual method. However, the budget is drawn on a cash basis, including accrual

	elements. Oracle and SAP systems were customised to meet the specific requirements of all entities. The central government and its municipalities tend to implement common ERP platforms. Based on the General Government fiscal plan 2022-2025, financial and human resources administration operating practices will be enhanced by the Kieku information system, which bases on SAP technology. The national standards do not use IPSAS, not even as a source of inspiration. Instead, they are based on national private sector accounting standards set by the MoF.
France	The central government of France established the so-called chorus bookkeeping system in the ministries of its central government sector. This implementation was completed in six phases. The SAP ERP integrated financial and controlling modules were initiated along with the budgeting modules to serve performance management purposes. This procedure was conducted from 2008 to 2011. The first accrual-based statements were initiated in 2006. In France, a national advisory council, which is an independent standard body, sets the accounting standards that conform with local regulations.
Latvia	SAP software is used as the bookkeeping enterprise resource system in Latvia. This double-entry system is recorded daily. As it uses the IPSAS report, Latvia has conducted reforms either to improve its existing accrual accounting and associated systems (e.g., budgeting systems) or to apply accrual accounting. Accrual elements can be applied for both financial and budgeting reporting. Latvia is among the countries that have implemented accrual accounting for more than 10 years and have embedded it into the public sector. This extended period of adoption has enabled the principle introduction of accruals across most levels of government sectors and their corresponding application in financial statement reporting. However, it is difficult to determine the budget preparation method because mixed practices are used. National accounting standards are pervasive throughout the general government sectors, apart from public corporations. In the public sector, IPSAS is used as a primary reference and IFRS as a source of inspiration. No direct reference has been made to the accounting legislation of Latvia regarding these accounting standards.
Lithuania	Lithuania's central accounting and local reforms lasted eight years and were pervasive at all government levels, including social security funds and controlled government services. The transition to accrual basis took place simultaneously in all government sub-sectors governed by a common accounting standard. The incentive for the transition was the enhancement in the monitoring of

	balance sheet items, fixed assets and liabilities and legal contracts. Lithuania uses accrual-based financial reports and cash-based budget reports. The MoF uses Microsoft Navision, and each entity has its own software. The bookkeeping system the country uses is the financial and management accounting system, according to which transactions are recorded daily.
Slovakia	In Slovakia, accrual-based accounting for financial statements helps to establish common accounting procedures in all central sub-sectors. In Slovakia there is not a unified system on bookkeeping in public sector yet. However, in 2008, after the transition from cash accounting to accrual accounting was completed, the MoF recommended SAP ERP not only at accounting level for bookkeeping practises but in other domains as well (human resources, asset management). Currently almost 50% of organizations of the central government use the SAP ERP and progressively, assumed date 2023, bookkeeping practises will be unified in SAP.
Spain	Spain uses accrual accounting to prepare financial statements. All subsectors have undergone the consolidation process to IPSAS. Spain has adopted a universal implementation approach for its reform from cash to accrual accounting for all subsectors at the same time. The SIC bookkeeping system is used for autonomous bodies in the central government subsector and the State. SAP software, with its double-entry postings, is used by public corporations and non-profit entities. Transactions are recorded online. However, some entities do not use software at all, as they only update an Excel file with transactions. Spain is one of the EU countries where its accounting legislation clearly reflects IPSAS. The Spanish Ministry of Economy and Finance maintains accrual based IPSAS for public sector financial reporting.
Sweden	The central government of Sweden considers accrual-based accounting a prerequisite for being able to improve information on financial management reporting. Improving reporting tools was the incentive for proceeding towards accrual reform. Although Sweden implements accrual-based accounting for all government entities, the nature of accounting handling varies. Budget preparation and accounting consist of both cash and accrual elements. Swedish government has a single budgeting and reporting system for the general government which is called "Hermes" and which provides a large database for public funds with various functionalities, among them accounting/bookkeeping. The system has been developed by the MoF together with the national financial management authority and has been functional since the early 2000's. The domestic accounting standards are close to IPSAS

	at the basic level. The discrepancy between standards depends on the supplementary information needed, which is greater in the case of IPSAS.
United Kingdom	United Kingdom had an IT and accounting maturity over 90% from an early stage on. The introduction of accrual accounting led to a more professionalised finance function across government as cash was considered not to provide enough to understand properly assets and liabilities of government and it was not giving a sense of accountability. The UK produces Whole of Government Accounts (WGA), which is a consolidated set of financial statements for the entire public sector, as defined by ONS-based classification (central government, local government, and public corporations). Having accomplished the major task of transitioning to accrual accounting, the process of producing WGA for the UK public sector was successful in a relatively straightforward way with restricted resources. The presence of numerous accountants and financial experts in operational departments contributed to this transition. Entities within the central government use a variety of different bookkeeping systems. The most commonly used is Oracle alongside other systems such as SAP. Some of these systems will automatically update and reconcile budgets. UK public sector applies accounting guidance that is broadly consistent with IPSAS. The accounts of the central government departments and entities in the central government and health sectors have been produced using IFRS as adopted by the EU from 2009/10 onwards. IPSAS form the second level of standards in the hierarchy used in developing the IFRS-based accounting guidance and are relied on where they cover issues not covered by IFRS or IAS, or where they provide additional guidance on interpretations or adaptations for the public sector context.
EU MSs	**Central governments that increased the degree of their accounting and IT maturity by 2020**
Belgium	Government of Belgium is recorded as having accrual accounting whilst rest governments publish partial accrual financial reporting statements. The current ERP system for the federal public services is a customized SAP system.
Bulgaria	As far as the IT systems are concerned, in Bulgaria, the central local level and social fund and public hospitals have the same policy for bookkeeping system. There are many different bookkeeping systems, with double entry, principally SAP, CONTO and AJUR. The transactions are mainly processed daily, and relevant staffs are selected according to the requirements of the Accountancy Act

Croatia	Croatian government uses modified accrual accounting and thus reports accrual financial statements. In Croatia, the compilation of the working balance of the budgetary central government in the EDP reports is based on data from the budget execution (SAP IT system of the State Treasury). The working balance for central government is on a pure cash basis and does not include any financial transactions or any accrued element.
Hungary	In Hungary there are some accounting systems used at central governments, which are Forrás, CT-EcoSTAT and SAP. Modernisation of IT being a key factor, was pervasive in 2016 for Hungary.
Poland	In Poland, all public units are free to choose the IT system for book-keeping. The Polish delegate clarified that they were not planning or implementing any public sector accounting reform. Polish government issues partial accrual financial reporting based on national financial reporting standards.
Romania	Based on the respondents' list information, in Romania there are approximately 14.000 public institutions, which belong to the central administration, local administration, and social security administration. All of them apply the same accounting rules, the same Chart of accounts and budgetary classification, the same model of financial statements. The legislation has no provisions regarding the unique accounting software to be used by various levels of public entities. Each public institution has its own accounting software acquired from the market, which must answer to legal requirements. The Ministry of Finance has developed a new integrated reporting system for public entities, called Forexebug, used for reporting, validation and aggregation of trial balances and financial statements, as well as for budget, budgetary execution, and commitment control, sent into the system by each public institution. This new IT reporting system is implemented and it is used in parallel with an old reporting system. The old reporting system does not contain detailed budgetary execution information at COFOG3 level, nor the individual accounts from trial balances of public institutions. Regarding implementation of IPSAS: The government has assessed but did not confirm the compliance with IPSAS disclosure requirements. A new Chart of Accounts improved with new elements of accrual accounting. The main changes were based on transposing of some provisions of the International Accounting Standards for Public Sector (IPSAS 1, 2, 4, 5, 9, 12, 17, 19, 23, 24).

Slovenia	In Slovenia, State budget users and their business books are incorporated in custom made software, called MFERAC. The system enables procedures within budget execution, accounting (bookkeeping), human resource management, it provides variety of reports and statements, it is interactive and interrelated with other important state systems. Slovenian government uses modified cash-based accounting with accrual elements while transitioning to accrual accounting. Slovenian government issues National standards based on IFRSs.
EU MSs	**Central governments that are provisioned to increase their degree of accounting and IT maturity by 2025**
Cyprus	With its cash-based accounting and budgeting, Cyprus is currently moving towards a public sector modernisation along with Malta and has directly adopted cash basis IPSAS. Cyprus government seems to follow Malta on IT systems by introducing Unit4 software. This will help modernise and standardise the Cypriot government's IT systems for finance, budgeting, HR, payroll provision and pensions administration.
Greece	Greece has already established the SAP ERP and shown interest in moving towards accrual accounting.
Italy	In Italy no ERP accounting system had been put in place at the central government level (i.e., the ministries included in the State Budget) by 2020. Following a preliminary study issued in November 2018 by the General Accounting Department of the Italian Ministry of Economy and finance, aimed to support strategic decisions on the evolution of the IT landscape related to financial and accounting management of the Italian Government sector, a large multiyear program aimed at implementing a unique ERP system (based on SAP technology), covering the main administrative and accounting areas, has been launched in 2019.
Malta	Malta is currently using modified accrual accounting while undergoing accrual reform. By 2020, it was classified as publishing cash financial statements. This justifies the basis for the cash classification of financial statement information. Governments of Malta established the Unit4 ERP system. It is provisioned to publish accrual financial statements and IPSAS modified for the local context by 2025.
Portugal	In Portugal, the entities on a cash basis accounting and reporting budget execution, the bookkeeping system used is SIC which is a single entry system. Government of Portugal is transitioning from cash to accrual accounting and is provisioned to complete the

	process until 2025. This fact justifies the leverage to high accounting maturity level. National standards other than IPSAS are forecast for 2025.The transaction system is called Oracle and transactions are recorded in real time
EU MSs	**Central governments that are provisioned to maintain average and low accounting and IT maturity by 2025** Note: Government of Croatia managed to upgrade from low to average degree by 2020 and is not provisioned to further upgrade by 2025
Germany	Germany has no intention of adopting accrual accounting. In Germany, the Federal Budget, Cash Management and Accounting System (the HKR IT system) supports budget execution for all authorities that manage federal budget funds nationwide and rendering of accounts. Germany's heterogeneity in committing to accrual accounting still shows a low accounting maturity score. Hessen Federal state in Germany implemented SAP ERP acting as a pioneer in accrual accounting adoption.
Ireland	The central Irish government uses J D Edwards Financial Management System as bookkeeping system, which is a double entry and double accounting for budget system that records transactions online.
Luxembourg	Luxembourg is undergoing the process of adopting accrual accounting, although its progress is limited. Luxembourg government adopts the SAP ERP in their bookkeeping practices. Luxembourg adopts cash-based accounting to prepare their financial statements and budgets.
Netherlands	The Netherlands remains reluctant to adopt accrual accounting. IBOS system mentioned in previous survey (Ernst and Young, 2012) cannot be considered a bookkeeping system. It is the system of the MOF to monitor the budget execution. The line ministries (cash accounting) have their own financial administration as well as state agencies (accrual).

Appendix B: Respondents' list and web data

EU MSs	Respondents' list
Belgium	Bart Menschaert, Team Compliance, DG Federal Accountant and Procurement
Estonia	Marek Ilves, Head of department Economic Software Development department
Germany	Jens Grütz, General Government Sector, EU Stability Pact Fred Kellermann, Federal Ministry of Finance
Hungary	Customer Office, Ministry of Finance
Italy	Fabrizio Mocavini, Head of Unit in the Italian Ministry of Economy, and Finance (MEF), State General Accounting Department
Netherlands	Léonard Haakman, Department of Government Finance Statistics
Romania	Viorica Ilie and Attila Gyorgy and Oana Dragan, Ministry of Finance, Secretary of State
Slovakia	Ing. Marcela Císarová, Ministerstry of finance Slovak Republic
Slovenia	Mateja Oman, Secretary, Ministry of Finance, Directorate for Public Accountancy
Sweden	Cornelius Raapke-Eckert, Budget-department, Ministry for Finance
EU MSs	**Web data**
Austria	Eva-Maria Eienbach and Bernhard Schatz, "The accounting system (regulation and system), The path towards IPSAS" PowerPoint-Presentation (mef.gov.it)
Croatia	European Commission, Eurostat, EDP standard dialogue visit to Croatia, 2017 https://ec.europa.eu/eurostat/documents/1015035/8054610/Final-findings-EDP-dialogue-visit-HR-18-20-January-2017.pdf
Cyprus	Steve Brooks, Cyprus follows Malta to Unit4 ERP, 2019, Enterprise times https://www.enterprisetimes.co.uk/2019/01/23/cyprus-follows-malta-to-unit4-erp/
France	Samuel Defacqz, Chorus: An Integrated Financial Information System for Policy Design in France, 2019 https://tropico-project.eu/cases/administration-costs-for-bureaucracy/chorus-an-integrated-financial-information-system-for-policy-design-in-france/
Greece	Ministry of Finance, ΔΗΜΟΣΙΑ ΔΙΑΒΟΥΛΕΥΣΗ (gsis.gr)
Latvia	The Treasurer's Statement, Legal Status and Structure of the Treasury, Treasury Operational Strategy, The Treasury Public Report of 2019 https://www.kase.gov.lv/en/reports/treasurys-annual-public-reports
Malta	Steve Brooks, Unit4 and Grant Thornton bring new dawn to finances of Malta government, 2017, Enterprise times https://www.enterprisetimes.co.uk/2017/09/13/unit4-and-grant-thornton-bring-new-dawn-to-finances-of-malta-government/