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E-Government Adoption Process: XBRL Adoption in HM Revenue and Customs and Companies House

By

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BIOGRAPHY & ACHIEVEMENTS

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A research report titled, XBRL: The Views of Stakeholders, has been co-authored by Christine Helliar, Theresa Dunne, Andy Lymer and Rania Mousa. This project has been funded by the Association of Chartered Certified Accountants (ACCA). The research paper was published in December 2009. ISBN: 978-1-85908-454-0.

Rania has been awarded Robin Cosgrove Prize by the Observatoire de la Finance (Geneva, Switzerland) in recognition of writing a paper on innovative ideas for ethics in finance. The paper was published in the Journal of Finance and The Common Good/Bien Commun, No. 27, September 2007, p.41-51 (in English and French).

This thesis has been represented by an academic poster that has been awarded the Deanery Prize for winning the Best Research Poster at the 2nd Annual Research Poster and Networking Conference organised by the Graduate School, University of Birmingham, 11th June 2008.

ABSTRACT

The last two decades have seen an evolution of Information and Communication Technology (ICT) capabilities in the public sector which facilitates the adoption of several IT innovations. Electronic government is one of these strategic innovations that many government agencies have considered adopting to deliver government information and services and support the modernisation of government's administrative tasks. This research investigates an e-government adoption process as represented by the Extensible Business Reporting Language (XBRL) adoption process. XBRL constitutes one of the key components of the electronic regulatory reporting process in HM Revenue and Customs (HMRC) and Companies House (CH). A comprehensive conceptual framework is developed to examine XBRL adoption process and the influential technological, organisational, environmental factors and e-government challenges that affect this process. The contribution of this comprehensive framework is that it develops various relationships among these factors, challenges and stages of the adoption process which have not been identified in the IT adoption or e-government literature. The framework for e-government adoption in the public sector is useful in multiple ways. The major benefit is to contribute to understanding the adoption process, identify the technological infrastructure, and emphasise the importance of the organisational readiness and impact of the environment on the adoption process. The framework can also help government decision makers to visualise a suitable strategic action plan for the future of electronic government by identifying the key issues and potential challenges associated with adopting e-government projects.

Keywords: Extensible Business Reporting Language (XBRL), Adoption process, E-government, Case study, Organisational factors, Technological Factors, Environmental factors, E-government challenges, HM Revenue and Customs, Companies House.

DEDICATION

To Mom and Dad,

Thank You.

والدي ... والدتي

مع

الشكر والتقدير

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INTRODUCTION

1.0 Research Background

Electronic government initiatives have been considered as a powerful mechanism to improve the performance of the administrative and data processing tasks of government agencies (Kraemer and King, 2003). Governments are increasingly aware of the potential of the Internet to improve their performance and facilitate the delivery of regulatory information and services. Electronic government has emerged as a process that utilises Internet reporting facilities to bring potential benefits for government agencies. These benefits include cost savings, improved communication and coordination among government authorities and increased government accountability (Heeks, 2006).

E-government is the utilisation of Internet and Information and Computer Technologies (ICTs) such as "database, networking, discussion support, multimedia, automation, tracking and tracing, and personal identification technologies" (Snellen, 2002 quoted in Jaeger, 2003, p.323). In the specific context of online services delivery, Brown and Brudney (2001, p.1) define e-government as the "use of technology, especially web-based applications to enhance access to and to efficiently deliver government information and services." Hwang et al. (1999), Jonas (2000) and Heeks (2006) believe that these definitions focus on the government's ability to use and benefit from the technology, and ignore the evolving nature of adopting the technology. Heeks (2006) believes that the adoption of e-government is not a simple process and cannot be done over a short time period. The e-government adoption process governs the delivery of online or web-based regulatory services,

where different components including technical structure, organisational resources, business partners and other government entities interact and influence such a process. In addition, adopting electronic government initiatives requires a clear vision of the objective of the e-government initiative, effective planning and management. Electronic government initiative should be viewed as a process that leads to an end rather than the desired end itself. Therefore, the adoption process of e-government requires an integrative approach to assist government agencies to deliver online information and services. This is one of the reasons why many government agencies are still in the early stages of e-government adoption (Ebrahim and Irani, 2005). Another important reason for this delay is that e-government requires significant changes in the technology infrastructure, the management of the organisational resources, relationships with the government's stakeholders to adopt an e-government initiative (Schedler et al. 2004; Khosrowpour, 2005). In addition, Brown and Brudney (2003), Jiang and Klein (2000) and Margetts and Dunleavy (2002) also emphasise that e-government initiatives are often hampered by many challenges that could restrict the progress of e-government adoption process. For these reasons, an integrated conceptual framework for e-government adoption in this study is developed to address the technological, organisational and environmental perspectives and the potential challenges affecting the e-government adoption process.

The e-government adoption will be represented by the adoption process of Extensible Business Reporting Language (XBRL). XBRL has become one of the key components for regulatory reporting by businesses to government in the UK, following the recommendations of Lord Carter to mandate the usage of XBRL for business and company tax filings by April 2011. This thesis will investigate XBRL adoption process by two major UK government

bodies, HM Revenue and Customs (HMRC) and Companies House (CH), and analyse the influential technological, organisational, environmental factors and e-government challenges that affect this process. The development of an integrated adoption framework will contribute to the existing body of knowledge in the e-government discipline.

This chapter introduces the main focus of this research. In the following sections of this chapter, the background of regulatory reporting process in the UK and a brief discussion of XBRL will be explained. The research motivations will also be introduced to justify the selection of the theoretical background of this thesis. The research aim, objectives, approach and the thesis outline are presented at the end of this chapter.

1.1 Electronic Regulatory Reporting: UK Context

During the early 1990s, UK government agencies relied mainly on a complex network of information systems. According to Margetts (2006), these systems did not receive significant public attention until the introduction of the Internet to government services in the late 1990s. In 1997, modernising the structure of the public sector was one of the main targets of UK government. The government took an initial step to modernise the structure of the central government agencies (Cabinet Office, 1999). However, a particular interest in developing the process of e-government was part of the modernisation agenda (Hart and Byrne, 2005). The government set a target of delivering 100% of online services by 2008 (Cabinet Office, 1999). This target was revised to enable the delivery of online services by government agencies by 2005 (Cabinet Office, 2000a) as announced by the Former Minister, Tony Blair:

> *"This will mean that people and businesses will be able to access Government services 24 hours a day, seven days a week. It is a challenging target, which will require joined up working between departments, less reliance upon paper trails, and the development of new ways of working."* (Source: Cabinet Office, 2000b quoted in Hart and Byrne, 2005, p.1)

Following the release of the Cabinet Office's report in March 1999, a physical technical infrastructure was designed to develop the first phase of 'UK's e-government agenda.' In the same year of 1999, the Office of the e-Envoy was established, as the Cabinet Office's IT flagship. The e-Envoy Office was charged with the responsibility to develop and implement the e-government strategy to enable the electronic delivery of government services by 2005 and coordinate the UK's e-government agenda across different departments. To implement the e-government agenda, the e-Envoy office's technical experts were appointed to draft and develop the 'Electronic Government Interoperability Framework' or e-GIF.[1] The e-GIF framework defined the IT policies, standards and strategies governing the delivery of online services by UK central and local government authorities. The e-GIF also defined the physical infrastructure of the UK government portals and gateway to support web-enabled government.

E-GIF's IT policies were based on using the Internet as the main vehicle for delivering online services to improve the exchange and processing of information filed by individual and business users. The first e-GIF, drafted in 1999, mandated the use of an Extensible Mark-up Language, known as XML, for all government transactions (Cabinet Office, 2000a). XML

[1] http://www.egifcompliance.org/

was promoted as an efficient tool that would facilitate the processing of "many-to-one and many-to-many" transactions, which are typical of public sector interface.[2] The development of XML specifications allows for accommodating the changes in data volumes and number of transactions. In e-GIF, the selection of XML was driven by market support and openness. "XML specifications are widely supported by the market, likely to reduce the cost and risk of government information systems ... and are available to the public" as indicated by (Guijarro, 2005, p.166). XML would also structure "information objects" such as web pages, forms (e.g. government filings) in a standardised way. This would facilitate the transfer and recognition of processed data easily among different computer platforms over the Internet. Officials at the e-Envoy office were particularly interested in XML as technology that would specify parts of the data in any document with clear "tags" that describe both their use and their relationship with other elements in the document (Cabinet Office, 2000a). XML applies these standardised "tags" to the "web objects" to enable browsers and other web tools, used for searching across multiple platforms, to recognise common sets of terms and descriptors (Lymer and Debcreceny, 2003). The selection of XML by the e-Envoy Office was based on its potential to provide better data integration, systems interconnectivity and interoperability, and access to information (UK Online Report, 2000).

In 2001, the e-Envoy Office announced that the government took steps towards implementing the 'UK e-government initiative' (UK Online Report, 2001). The e-Envoy Office followed-up on some central government agencies' plans for utilisation of the Internet as to modernise their electronic reporting regimes. Two of these government bodies were HMRC and CH. Plans were devised following the commencement of the 'UK e-government

[2] http://www.archive.official-documents.co.uk/document/cm43/4310/4310.htm

initiative' in 1999, and both agencies were advised by the e-Envoy Office to participate in this initiative. Strategic and technical support was provided by the e-Envoy Office to assist HMRC and CH with the development of their electronic filing systems. The main plan devised for both agencies recognised the extent to which each agency's long-established computerised legacy systems can be adapted to allow communication using web-based standards. This process was called 'web-enabling' computer system, where individual and business users electronically accomplish transactions such as submitting regulatory filings (NAO, 1999). The e-Envoy supported this process by facilitating the adoption of XML as "the primary standard for data integration[3] and management,"[4] at HMRC and CH. The e-GIF provided a list of recommended XML-based products and services and produced guidance on the use of XML-based forms and the data that would be exchanged using XML (Cabinet Office, 2000a).

With the technical support of the e-Envoy to achieve the e-government initiative, HMRC developed its XML-based electronic filing system to enable the filing of Self-Assessment tax returns. In 2001-2002, the National Audit Office (NAO) conducted a review of HMRC's online reporting services (NAO, 2002). In this review report, the NAO recommended a re-design of HMRC's existing systems by investing in new 'software' that would link those systems, and would primarily facilitate the processing and risk assessment of the information that accompany the tax returns filed by companies.

Technical experts at HMRC and the e-Envoy office worked on developing the technical capability of the XML to support HMRC's electronic filing facilities. They also

[3] Legacy systems that were tightly integrated or systems that were internal to government agencies (such as batch processing systems) were enabled to use other processing environments.
[4] http://cms.cdlr.strath.ac.uk/guidelines/appendices/egifinterop.html

sought to share regulatory reporting experience with representatives of international tax authorities to identify and discuss a possible technological solution that would be easily compatible with HMRC's existing XML-based reporting systems. In February 2001, HMRC was introduced to XML-based "technical solution," XBRL, during an XBRL International conference held in London. Subsequently, HMRC's technical experts championed the adoption of XBRL at their organisation and discussed its technical capabilities with members of the e-Envoy Office. In October 2002, XBRL received e-GIF's recommendation status so that it would be adopted by HMRC for filing XML-based forms and corporation tax taxonomy would be developed.[5] In September 2005, XBRL usage was granted full approval for adoption.[6] Representatives from CH approached HMRC's technical experts in 2004 seeking their advice on developing CH's web filing facility to enable the electronic filing of the unaudited accounts. Both government agencies acknowledged the potential of XBRL to support their electronic systems and enable a future single entry point for companies to file their tax returns and accounts.

In 2006, Lord Carter of Coles announced the government's recommendation to mandate the submission of the companies' supporting accounts and computations, which are part of company tax filings (CT600), in XBRL format by April 2011 (Lord Carter Report, 2006). Lord Carter also supported establishing a joint filing facility by HMRC and CH that would be XBRL-enabled. XBRL was identified as a reporting technology tool that would facilitate government reporting process and reduce regulatory administrative burden, which were the main targets of 'UK e-government initiative.'

[5] http://www.epractice.eu/files/media/media_915.pdf
[6] http://www.cabinetoffice.gov.uk/media/258681/TSCv6.2_2005_7_14_final.pdf

1.2 XBRL: Main Concepts

XBRL is an extension of XML, and stands for Extensible Business Reporting Language. XBRL has the same tagging feature of XML that has been explained earlier, giving definitions to texts and symbols. XBRL uses XML Schema to describe the structure of business and financial reports, and introduces additional business "semantics" or meanings which were not provided by XML alone (Hoffman and Strand, 2001). With XBRL, these semantics can link each data element with multiple resources (such as labels, definitions and calculations) (Hoffman and Strand, 2001). These semantics can be communicated to and used by other users, enabling the exchange of these semantics between humans or computer systems (Debreceny and Gray, 2001). It allows users to prepare financial and business data in a standardised and machine-readable format.

Companies can prepare XBRL instance documents, which include all tagged data elements using an XBRL-compatible software application, which could be submitted directly to government bodies (HMRC, CH) for automatic validation and processing with minimum human intervention. Tagged data could be automatically read, understood and manipulated by a variety of computer programmes that could understand the same tags by using taxonomy (Hoffman and Strand, 2001). Taxonomy is a financial and business dictionary of all data elements included in regulatory filings submitted by companies. The taxonomy also introduces and presents the relationships between data elements, references and information about the way each element is represented (Hussein and Tam, 2002).[7]

[7] For more information on XBRL, please see Appendix 1.

1.2.1 XBRL International and XBRL UK

In 1997, Charles Hoffman proposed the usage of XML for financial reporting (Deshmukh, 2004, p.198). Hoffman's idea was supported by the American Institute of Certified Public Accountants (AICPA) to develop the first prototype (Phillips and Colvard, 2007). Funding was provided by the AICPA and an XBRL steering committee was established to start developing XBRL technology. Many financial institutions, accounting firms, software providers and other business organisations joined XBRL steering committee. In February 2001, networks of financial, accounting, software and government communities met in London and supported the establishment of XBRL International Inc. as a non-profit organisation (Malhotra and Garritt, 2004). XBRL International Inc. has been established to promote XBRL adoption and support the development of XBRL specifications. The organisation's membership reached approximately 550 companies, associations and government agencies in 23 jurisdictions worldwide in November 2008 (XBRL Progress Report, 2008). Established in 2001, the International Accounting Standards Board's XBRL team is responsible for "developing and maintaining the XBRL representations of the [country-specific] International Financial Reporting Standards (IFRSs) taxonomy, [which] is used around the world to facilitate the electronic use and exchange of financial data prepared in accordance with IFRSs."[8] The members of the UK jurisdiction of XBRL International Inc., XBRL UK, worked on developing UK GAAP (Generally Accepted Accounting Principles) and IFRS taxonomies to cover the main reporting requirements of the commercial and industrial sector, including the primary financial statements and notes.[9] Technical expert members of XBRL UK assisted HMRC and CH with XBRL technical issues and development during the process of adopting XBRL at their agencies. In November 2009,

[8] http://www.iasb.org/The+organisation/About+XBRL/About+XBRL.htm
[9] http://www.xbrl.org/uk/Taxonomies/

HMRC and XBRL UK issued HMRC's minimum tagging requirements, which will be followed by companies filing their tax returns and accounts in XBRL format in 2011. In January 2010, XBRL UK released UK-IFRS taxonomy with additional data for specific industry sectors.

This section has briefly explained main concepts of XBRL and has identified the major authorities which support the development of XBRL standards. The discussion of the case studies in chapter 5 will elaborate on the role played by XBRL UK, among other important stakeholders such as top government bodies and IT suppliers, to support the XBRL adoption process at HMRC and CH. Having explained the main concepts of electronic government, regulatory reporting and XBRL, the next section will present and justify the research motivations.

1.3 Research Motivation

This study seeks to develop an integrated e-government adoption process framework that takes into consideration the factors and challenges influencing such a process. The motivation behind this study is to bridge the gaps and address the problems that stem from both theoretical and practical perspectives.

1.3.1 Research Motivation: Theoretical Perspective

From a theoretical perspective, there are three broad areas that have been covered by the e-government adoption literature.

First, there are substantial research studies on the success factors of e-government projects or systems. Such studies focus on assessing the effectiveness of such projects in enabling government agencies to determine if they are capable of delivering the objectives and deriving the benefits of e-government projects (Gupta and Jana, 2003; Wang and Liao, 2007). Some other studies assess the "success" indictors of online filing through investigating the benefits derived from electronic taxation systems (Hung et al., 2005; Floropoulos et al., 2010; Schaupp et al., 2010). Some studies analyse the content of government agency's websites and list different types of online services provided by government agencies. They also present best practice cases for benchmarking (Cohen and Eimicke, 2001; West, 2003). Although these studies are useful in practical terms, they are mainly descriptive in nature (Jonas, 2000).

Second, the adoption of electronic government projects allows public administration to introduce significant organisational changes, which cause a large number of challenges. Brown and Brudney (2003) indicate that public sector agencies are often faced by problems as they make the decision to adopt technologies. Gil-Garcia and Pardo (2005) argue that unless public agencies identify and prepare for the challenges that could face them during the adoption of technologies, they [government agencies] cannot make the "best" use of such technology to improve regulatory performance or reduce regulatory burden. Although there is no single list of challenges affecting the adoption of electronic government initiatives, many consistencies exist across the e-government literature. Existing e-government research suggests that these challenges fall into the data, information technology, organisational, legal and environmental categories. The challenges associated with information and data are inaccuracies, inconsistencies, and incompleteness of data (Redman, 1998) and lack of

appropriate data (Tayi and Ballou, 1998). Challenges associated with information technology category include technology incompatibility and complexity (Brown, 2001), the shortage of relevant technical skills and personnel in the project team (Caffrey, 1998; Heeks and Davis, 1999). Organisational challenges include the lack of the business case of the e-government initiative for potential stakeholders (Dawes and Pardo, 2002) and resistance to new technologies (Jiang and Klein, 2000; Edmiston, 2003). Finally, government agencies could be also subject to restrictive laws and regulatory constrains (Dawes and Nelson, 1995), and environmental challenges which include privacy and security concerns raised by public users of e-government projects (Andersen and Dawes, 1991; Caffrey, 1998).

Third, in terms of discussing adoption process, models suggested by Cooper and Zmud (1987), Iacovou et al., (1995) and Thong (1999) depict the adoption process and the technological and organisational factors influencing this process at an organisational level. Since the adoption of electronic government projects are generally complex in nature, and require interaction between the government agency and its stakeholders including business partners, citizens and other government agencies (Heeks, 2006), these models cannot be applied in governmental context as they do not address the environmental setting of an e-government adoption process. Through a critical review of the information technology literature (Rogers, 1995; Chau and Tam, 1997; Cahill et al., 1999; Kuan and Chau, 2001; Zhu et al., 2003), it has been found that Rogers (1995) and Tornatzky and Fleischer (1990) have both strong theoretical foundations for information technology adoption that can be applied to any type of government setting. Cahill et al. (1990, p.59) note that the combination of the technological, organisational and environmental factors affecting the adoption process

provides "explanatory power" for the use of Tornatzky and Fleischer model (1990), known as TOE model, in various governments' settings than any one single category of factors.

1.3.2 Research Motivation: Practical Perspective

From a practical perspective and since the purpose of this research is to investigate the process of adopting an Internet-based technology in a government setting, the first research area, which covers successful factors is not the most relevant because it focuses on output-and outcome-oriented e-government studies (Morcol, 2006). They examine the output of e-government efforts, the artefacts such as regulatory web sites and online government services (Yildiz, 2007, p.647). Outcome-oriented studies explain success factors and performance indicators of the "success" of an adopted e-government initiative. The limited focus of these studies is generally "accompanied by the purpose of determining best practice for benchmarking" (Yildiz, 2006 cited in Morcol, 2006, p.397). The objective is to find "successful" cases to follow. Such examination is deductive and rather non-organisational approach to investigate the adoption of e-government projects, and it does not thoroughly analyse the government setting of the adoption process, which is an important component of understanding the e-government adoption (Agranoff, 2004).

1.3.3 Review of Theoretical and Practical Perspectives

The research studies discussed above to explain the theoretical perspective of the research motivation, contribute to the body of knowledge of the adoption process of an e-government initiative, particularly in the UK context. Research has discussed the importance of studying the process of adopting e-government initiatives by UK public sector organisations (Margetts, 1999; Jones and Hughes, 2001; Dunleavy, 2002; Beynon-Davies and Williams, 2003;

Beynon-Davies, 2005; Irani et al., 2005; Waring and Maddocks, 2005). Other researchers investigate the barriers that hamper the adoption of UK-based e-government initiatives and the factors that could facilitate them (Jiang and Klein, 2000; Margetts and Dunleavy, 2002; Gilbert et al., 2004; Ebrahim and Irani, 2005; Gil-Garcia and Pardo, 2005; Sarikas and Weerakkody, 2007).

Combining the theoretical and practical perspectives shows that studying the adoption of an e-government initiative requires more than investigating the technology employed in its making. Technology is just a means to achieve the outcome of the e-government initiative, which is a fundamental change in the way that governments conduct business with the stakeholders. Researching the processes, through which e-government initiatives are adopted to deliver regulatory online information and services, exceeds the limited 'e-government's outcome' research which rather focuses on the artefacts (such as the content of regulatory web sites or the use of certain technologies to interact with the government) (Yildiz, 2007). Hwang et al. (1999) argue that if the research focuses on the technology itself, it will not be possible to appreciate and understand the developing nature of the e-government concept, regardless of the technology employed to deliver government online services. Heeks (2001) supports Hwang et al. (1999) by emphasising that research should rather focus on enabling government process to be more efficient to provide an opportunity to reduce regulatory burden which is not possible with the utilisation of the old technological tools.

(Willcocks, 1994 cited in Murray et al., 2004, p.3-4) explains that the adoption of the information technology initiative is "narrowly focused on the installation of technical systems, ignoring the wider organisational characteristics" of the adoption process. The

adoption of e-government has unique characteristics, particularly with reference to technological, organisational and environmental elements that could impact the adoption process. Technological and organisational elements that are associated with e-government adoption requires mobilising a large volume of organisational resources including heavy funding, sophisticated technical expertise and complicated technical infrastructure (Heinteze and Bretschneider, 2000; Chen et al., 2007). E-government projects also require strong collaboration between government agencies and stakeholders represented by private sector IT suppliers, corporate and small businesses and professional bodies (Dawes and Pardo, 2002). In addition, the sophistication of the e-government projects requires strong political backing from top government authorities to facilitate the adoption of new technologies within government agencies (Margetts and Dunleavy, 2002; Joseph and Ketlan, 2008). During the process of adopting new e-government initiatives, many technological, organisational, environmental challenges are faced by adopting government agencies (Dawes and Nelson, 1995; Gupta et al., 2004). Therefore, an e-government adoption process framework that identifies and examines the factors and challenges affecting this process will be developed in this thesis. This framework will provide a foundation upon which relationships can be derived and analysed in greater detail and in-depth than it is typically provided by different bodies of knowledge.

In addition and in the specific context of XBRL adoption research, Debreceny and Gray (2001) recognise that XBRL provides a rich research opportunity to investigate the global adoption phenomenon of XBRL, and how it has been adopted. However, literature on XBRL has been mainly descriptive in nature. Recent research studies focus on the companies' motivations to disclose XBRL-based information (Bonson et al., 2009), XBRL perceived

benefits by adopters (DiPiazza and Eccles, 2002; Malhotra and Garritt, 2004; Pinsker and Li, 2008) and potential difficulties (Vun Kannon and Hannon, 2004; Williams et al., 2006; Miller, 2008; Pinsker and Li, 2008). Other research focus on auditing and assurance issues associated with XBRL reporting (Pinsker, 2003; Shin, 2003; Boritz and No, 2009), and technical issues raised by adopters (Escobar et al., 2009). In the Australian context, Doolin and Troshani (2007) examine the organisational adoption of XBRL by identifying the influential factors that affect companies' decision to adopt XBRL. These studies discuss different aspects of XBRL adoption. However, they do not investigate how XBRL has been adopted in the first place as suggested initially by Debreceny and Gray (2001). An in-depth study depicting XBRL regulatory adoption process that identifies and explains the dynamic relationship(s) among this process and the key influential factors and challenges has not been thoroughly conducted in the UK context. This thesis fills this research gap.

The previous discussion of the research background and motivations has provided clear guidance on the main research context and theoretical framework. In the next section, the research aim, objectives and approach will be explained.

1.4 Research Aim, Objectives and Approach

As discussed in the previous section, there is a need to develop a comprehensive frame of reference to identify the adoption process of an e-government initiative, represented by XBRL adoption process in HMRC and CH. The frame of reference provides better understanding of XBRL adoption process, and the factors and challenges impacting this process. Accordingly, the aim proposed for this research is:

To develop a frame of reference that will outline the different stages of XBRL adoption process, the influential factors which could affect this process and the challenges that could restrict the progress of this process.

In order to address the research aim, the following research objectives will be met:

- To review and analyse the literature in the area of IT adoption, with particular emphasis on literature on e-government adoption.
- To identify and analyse the challenges to e-government adoption process.
- To propose a conceptual framework, based on the literature and empirical analysis that can be used to support the adoption process in government agencies.
- To test the proposed framework through an empirical study of the experiences of XBRL adoption process in HMRC and CH.
- To analyse how XBRL adoption process has been carried out at both agencies and to identify how and what stages they have followed and the factors and challenges that have affected this process.
- To revise and develop a frame of reference, based on the empirical analysis, that emphasises the relationships among each stage of the adoption process, factors and challenges.

A qualitative approach has been employed to achieve these objectives. The theoretical backbone of this thesis is based on developing a conceptual framework that integrates Rogers's adoption process (1983 and 1995), Tornatzky and Fleischer's (1990) TOE framework and e-government challenges. The qualitative approach is appropriate for this research since the purpose of this research is to develop a process-based adoption conceptual framework, which requires a thorough understanding of XBRL adoption process and factors

and challenges that influence it. An interpretive research philosophy is used in this thesis to provide guidance in gathering and building knowledge about the underlying factors and challenges –using the proposed conceptual framework- influencing the adoption process. An explanatory interpretive case study method will be used to establish appropriate qualitative explanations for the process examined (Orlikowski and Baroudi, 1991; Dubé and Paré, 2003; Pare, 2004). In addition, explanatory interpretive case studies often answer the "how" question (Yin, 1994), which is consistent with the research objectives that aim to address how XBRL adoption process has been carried out. Dubé and Paré (2003) argue that having a prior theoretical framework is considered an essential requirement to conduct explanatory case studies. Dubé and Paré's (2003) concept is applied in the selection of the conceptual framework used in this thesis since it combines Rogers's adoption process, TOE factors and e-government challenges. The combination of this prior theoretical knowledge provides a basis for building a conceptual framework that is derived from all these bodies of knowledge and supported by empirical evidence.

Methodologically, Heeks (2006) supports Fountain's (2001) research approach on examining e-government adoption. In her book, *Building the Virtual State,* Fountain (2001) supports the use of a qualitative research approach by conducting interviews while performing in-depth case studies. Heeks and Bailur (2007) report a major weakness in e-government research. They find that less than 20% of e-government researchers have used a combination of research methods, such as case studies and documentation analysis. The research approach in this thesis has avoided this methodological "pitfall." This has been overcome by interviewing key officials in charge of adopting XBRL within HMRC and CH. In addition, a case study database has been built and is composed of internal documents provided by

research participants, archived organisational documents, and other Internet-based information such as government public documents among other sources. Combining the usage of interviews and documentation analysis provides better evidence for data triangulation, especially with the application of qualitative methodologies, than it would be if a single data collection method has been used (Yin, 1994; Sawyer, 2001). This triangulation provides a strong foundation for achieving research rigour and validity of the outcome of the research.

Two case studies have been used as examples of the only two UK government bodies, which have adopted XBRL. HMRC and CH have been chosen because of their established history of adopting technologies to support their electronic filing process. Since the purpose of this research is to develop a conceptual framework of the adoption of an e-government initiative, the selection of two government bodies will inform the case analysis and provide an opportunity to draw comparative observations about HMRC and CH's XBRL adoption process. Finally, the outcome of this research will test the proposed conceptual framework and present a finalised developed framework that could be applied by government bodies, having similar organisational context and intending to apply a technology under similar circumstances as with HMRC and CH. Therefore, studying and comparing more than one organisation's adoption experience helps to avoid the research mistake of being unintentionally "biased" or "led" by the limited research findings which are built on the experience of a single organisation rather than multiple organisations.

1.5 Summary

While there is a value for pursuing research that focuses on XBRL to examine how it can contribute to the development of regulatory online reporting, explaining the process of adopting XBRL will put this research into the main stream of e-government adoption context and will likely bring substantial research contribution. This process investigation requires conducting empirical analysis following Debreceny and Gray's (2001) suggestion to examine XBRL in a global adoption context and Heeks' (2006) recommendations to study technology adoption processes in an e-government context. This analysis entails the examination of the technological, organisational and environmental factors and e-government challenges that are theorised to have an impact on the XBRL adoption process at HMRC and CH. A conceptual framework will be developed based on the integration of Rogers' adoption process (1983 and 1995), Tornatzky and Fleischer (1990) TOE framework and e-government challenges affecting XBRL adoption. The main research approach applied in this thesis follows qualitative research methodology, which employs multiple case studies as a research method and uses interviews and documentation to inform the case analysis. The outcome of this thesis will contribute to the general understanding of the UK regulatory XBRL adoption process, and therefore will assist in deriving some implications that would contribute to e-government-based XBRL adoption literature.

1.6 Thesis Outline

Chapter 2

The purpose of this chapter is to review the literature associated with IT adoption and e-government adoption process in the public sector. The literature review reveals a gap in identifying the factors that could influence the adoption process in the e-government context.

As a result, the chapter presents an analysis of Rogers' adoption process (1983 and 1995), Tornatzky and Fleischer's (1990) TOE framework and a broad discussion of e-government challenges. The chapter concludes by presenting a conceptual framework for e-government adoption in the public sector.

Chapter 3

The research philosophy and the main schools of thought regarding e-government research are presented in this chapter. The research strategy and the rationale behind its selection are presented. This chapter identifies the research methodology used in this research. The selection of the qualitative research approach and methods to collect the data is also justified. The chapter also explains the research design followed during the data collection process.

Chapter 4

The organisational setting of the case studies selected in this research is introduced and discussed. This discussion traces the organisational development of the electronic filing processes in HMRC and CH and draws comparative remarks on their adoption experiences.

Chapter 5

An analysis of the case studies' findings is presented in this chapter based on the application of the proposed conceptual framework discussed in Chapter 3. A conceptual framework is introduced for each agency in relations to the findings of this research. These frameworks demonstrate the developed relationships among Rogers' adoption process, TOE factors and e-government challenges and suggest some modifications to the proposed framework. The frameworks have been examined on a comparative basis to identify how XBRL adoption

process has been carried out at HMRC and CH, and how this process has been influenced by the TOE factors and e-government challenges discussed in Chapter 3.

Chapter 6

This chapter brings all the findings derived from case studies' analysis and presents them in the form of a revised and combined conceptual framework that includes the suggested modifications to the proposed conceptual framework discussed in Chapter 2. The major research outcomes are explained in this chapter and compared with the literature reviewed in Chapter 2. Finally, this chapter presents the research implications, limitations, and the recommendations for future research.

1.7 Conclusion

This chapter introduces the background of this research study and provides an overview of e-government, online regulatory reporting with emphasis on the UK context, and a brief background of XBRL as a technology being adopted by HMRC and CH as part of 'UK e-government agenda.' One of the main objectives of this research is to understand how the XBRL adoption process has been carried out in HMRC and CH, and identify the technological, organisational, environmental factors and e-government challenges influencing this process. The chapter reveals that there are theoretical and practical perspectives on investigating the subject of the adoption process of technologies in e-government literature. However, the e-government research has been mainly driven by the study of e-government success factors, usage and outcome. The research that has been conducted to investigate e-government adoption process, represented by XBRL adoption process, is limited. This thesis fills this research gap, and develops a conceptual framework that combines XBRL adoption

process and influential factors and e-government challenges affecting this process in the UK regulatory context. This conceptual framework will be presented and explained in the next chapter.

CHAPTER 2

LITERATURE REVIEW

&

DEVELOPMENT OF CONCEPTUAL FRAMEWORK

2.0 Introduction

In Chapter 1, it has been discussed that to study the adoption of a technology in an e-government context requires analysing the underlying adoption process of that technology to identify the main players that affect such a process, and analyse their impact. To achieve this aim, a conceptual framework of the e-government adoption process will be developed. In this chapter, the relevant theoretical background underlying this framework will be introduced and discussed. In this chapter, the developed conceptual framework is introduced to illustrate the adoption process and integrate the factors and the challenges influencing this process.

The chapter starts with explaining the main definitions of electronic government and technology adoption as identified in the literature. It addresses the concept of the adoption process with relation to electronic government context. It also reviews the literature on IT adoption process emphasising the technological, organisational and environmental factors that could facilitate and/or hamper the adoption process. Electronic government barriers that could affect the adoption process are drawn out of the e-government literature.

2.1 Electronic Government Definitions

Electronic government has been broadly defined in the literature (Hu et al., 2003; Sanchez et al., 2003; Joia, 2004). There is no standard definition of e-government that clearly explains

what it really represents. In the existing literature, there are a number of definitions which explain the main concepts of e-government according to their research perspectives. Therefore, a conceptual thinking is established in this section to explain different definitions of e-government, where the most relevant concept that represents the context of the thesis is identified.

2.1.1 Public Administration Definition

E-government has been defined as using technology in the area of public administration to streamline public management procedures, reduce organisational layers and re-engineer business processes (Teicher et al., 2002; Garson, 2004). This in turn will facilitate the delivery and performance of daily administrative tasks of government bodies. E-government is therefore viewed as a potential "solution" to some government administrative problems, such as bureaucracy and lack of accountability" (Sanchez et al., 2003; Tambouris and Wimmer, 2005).

2.1.2 Business Definition

National Research Council (2002), Ebrahim and Irani (2005) and Heeks (2006) define e-government as not only the usage but also the adoption process of Information and Communication Technologies (ICTs) including Internet-based technologies and network and communication infrastructure by government agencies. This definition is therefore different from the public administration definition of e-government, which narrowly focuses on the utilisation of rather the adoption of the technology. Such technologies are adopted to improve the informational and transactional exchanges within the government and between stakeholders such as individuals, businesses and IT suppliers among others (Heeks, 2006).

These technologies can serve a variety of government needs such as efficient government management and improved interactions with the government's stakeholders. According to this definition, the e-government research is conducted to analyse the process of adopting the technology to reduce regulatory administrative burden and minimise the cost of delivering government services (Heeks, 1999; Garson, 2004; Brown, 2005).

2.1.3 Political Definition

Baker and Panagopoulos (2004) and Fletcher (2004) define electronic government from a political perspective. They indicate that e-government represents a new policy opportunity for government where it can present new channels for the political participation of citizens. By performing this role, electronic government is viewed as formalising the relationship between government agencies and citizens. In addition, this interaction facilitates governance, which covers the areas of e-democracy and citizens' political rights and duties (Osborne and Plastrik, 1997; Frederickson, 2000; Cordella, 2007).

According to the above definitions of e-government, the business one of e-government is the most relevant definition to the research context of this thesis. XBRL as an XML-based technology is analysed in this thesis by investigating its adoption process. This process is not just confined to delivering online service to facilitate the submission of regulatory filings, which is merely the outcome of the process. However, this process incorporates the interaction of members of the adopting government bodies (HMRC and CH) with groups of stakeholders such as top government bodies, professional bodies, software vendors and users. The adoption process of XBRL in HMRC and CH has been established through linking the technology together with the organisational setting, where it has been adopted along with the

environment in which technical and non-technical support can be sought to facilitate the adoption process.

2.2 Innovation Adoption Process

Technology by definition is a replicable tool or tool systems, derived from human knowledge, to transform and manipulate parts of the environment that could be used for human purposes (Betz, 2003). Technology is manifested in new products, processes, and systems that could be utilised to provide knowledge and capability to deliver reproducible functionality. Freeman and Soete (1997) argue that technology has to be "exploited" or used to realise its potential. They further explain that organisations adopting a technology often "create a new idea that includes all the activities required to *commercialise* a technology" (Freeman and Soete, 1997, p.2). These activities include technological, organisational and financial activities leading to the commercial introduction of a new or improved technology. The "successful" *commercial* exploitation of the new ideas is referred to as an innovation (Freeman and Soete, 1997). Given the definitions of technology and innovation, technological innovation involves the creation, commercialisation, usage and development of a knowledge-derived tool, artefact or device by which potential users interact with their environment (Gold et al., 1980; Carter et al., 2001).

Tornatzky and Fleischer (1990), Burton and White (2007), Ettlie (2006) and Damanpour et al. (2009) also indicate that technological innovations can be divided into two types: product and process. Product technological innovations by themselves are terminal for their adopters or users. They are an end in themselves. However, process technological innovations are rather those adopted as instrumental to some other end, such as an improved process or service operation for producing an organisational product or rendering a client

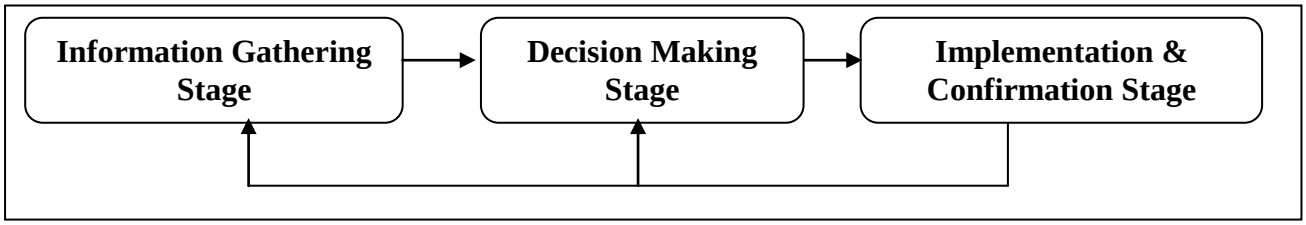
service (Damanpour et al., 2009). Process technological innovations are therefore for improving processes and systems and often associated with information technologies (Barras, 1990; Tornatzky and Fleischer, 1990; Meeus and Edquist, 2006). Most often process technological innovations are introduced to support an existing product technological innovation, such as the introduction of a computer technology to support an organisation's main internal processing system (Tornatzky and Fleischer, 1990).

In the context of the adoption of information technologies, process –rather than product- technological innovations require more complex adoption-focused models (Tornatzky and Fleischer, 1990; Thong, 1999). This is due to the fact that process innovations tend to include different individuals and stakeholder groups, requiring "much more difficult system change" (Tornatzky and Fleischer, 1990, p.21). In this regard, the adoption process of such innovations requires the participation of different players in an organisational context. As indicated previously, the adoption of electronic government initiatives requires the inclusion of people, technology, organisational resources as well as government's stakeholders in that process. In addition, electronic government initiatives improve the capabilities of the government agency's existing systems and help to introduce new ways of interactions with the government's stakeholders (Cabinet Office, 2000a; Andersen, 2001; Brown, 2001). Since process innovations require potential adopters to interact with their environment in order to create or modify their own products and services (Tornatzky and Fleischer, 1990), electronic government initiative has the characteristics of process innovations, and hence the innovation adoption literature can be applied in the e-government adoption context.

Rogers' (1983) innovation adoption process has been investigated by many scholars in IT adoption in the public sector literature (Perry and Danziger, 1985; Bugler and Bretschneider, 1993; Brudney and Selden, 1995; Norris and Kraemer, 1996; Moon, 2002). In addition, Tornatzky and Fleischer (1990) indicate that Rogers' adoption process (1983) is "analytically appropriate" to investigate the adoption of process innovations, which characterises the adoption of e-government initiatives.

Rogers (1983) describes the innovation adoption process as "the process through which an organisation passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea." (p. 21). The following figure illustrates this definition.

Figure 2.1: Rogers' Innovation Adoption Process:



Source: Rogers (1983), Rogers (1995)

Rogers (1983 and 1995) recognises the adoption of an innovation as a process of not only accepting the idea of an innovation but also to physically putting it into use by its adopter. This definition goes in line with Zaltman et al. (1973) and Damanpour (1987), who consider that an innovation is not adopted unless it has been physically implemented. Tornatzky and Fleischer (1990) support this idea by stating that the adoption process is often made up of a series (or even parallel sets) of stages that are not visible to all participants in the organisation. In such cases, the adoption process involves making the technology available to potential users, raising their awareness about the "change" that the technology will bring to the

organisation's practices, and engaging organisation's members to participate in the process of adopting this technology. The process also involves planning and deploying organisational resources to support the adoption of the technology (Tornatzky and Fleischer, 1990). The innovation adoption process, it is argued, can only be "considered a success to the extent that innovation is integrated into the organisation" (Frambach and Schillewaert, 2002, p.164). To be integrated within the organisation, the process of adopting an innovation is divided into three stages, according to Rogers (1995):

1- The knowledge gathering stage is when the information and awareness of an innovation exist in an organisation. Rogers (1995) explains that this knowledge is a function of the adopter's education and exposure to mass media channels of communication and change agent contact. Knowledge could be also acquired through advertising, word of mouth, formal education and/or training. Rogers indicates that the knowledge-finding activity is not a passive exercise and would be initiated when the need for innovation exists.
2- The decision stage is when the organisation reaches a decision whether to adopt or reject the innovation, and whether it will continue/discontinue to adopt it. There are four types of decisions that could be made during this stage (Rogers, 1995, p.28-30):

    a. Optional decisions: Refers to decisions, to adopt or reject an innovation, which are made by individuals independent of the decision made by other members in the organisation (p.28).

    b. Collective decisions: Refers to decisions to adopt or reject an innovation made by consensus among organisation's members (p.28).

c. Authority decisions: The decisions to adopt or reject an innovation are made by a relatively few members in the organisation who possess power, status, or technical expertise (p.28).

d. Contingent decisions: The decisions to adopt or reject can be made only after a prior sequential combination of two or more of the three previous decision types (p.30).

3- The implementation and confirmation stage is when the organisation employs an innovation to a varying degree depending on its usefulness, and subsequently reaches a final decision that confirms the use of the innovation. The activities within the organisation shift from strictly "mental" to "physical" deployment of resources (Rogers, 1995, p.179). The implementation stage ends when the innovation becomes an integrated part of the adopting organisation or the innovation is perceived as useless. The decision-making unit within the adopting organisation confirms or reverses the decision that has been made in the previous stage, depending on whether the innovation has fulfilled the needs of the adopting organisation (Rogers, 1995, p.189).

Rogers' innovation adoption process also incorporates the conditions prior to the knowledge stage that influence the knowledge stage itself. These conditions are pre-existing adoption experiences, the need to be fulfilled or problems to be solved. Rogers (1995) assume that the adoption process is continuous. A decision to adopt or reject an innovation could be changed in the future if more knowledge or better substitutes have become available which would therefore changes the decision to adopt. It is assumed that every innovation is desirable and therefore rejection of an innovation would be considered as resistance to change (Robertson et al., 1996; McMaster and Kautz, 2002).

Rogers also indicate that a number of technological and organisational factors influence the innovation adoption process. This is supported by the research studies conducted by Carter et al. (2001), Henrikson (2004) and Joseph and Ketlan (2008), who use Rogers' innovation adoption process to investigate the adoption of e-government initiatives. These studies emphasise that the multiple stages of the e-government adoption process are affected by many factors. In the next section, Rogers' suggested technological and organisational factors will be drawn from the IT adoption literature to determine their impact on the adoption process in an e-government context.

2.3 Review of Factors affecting Innovation Adoption Process

As mentioned earlier, studying the adoption process of electronic government initiatives requires examining the factors that could affect such a process. The complex nature of the e-government context presumes coordinating the efforts of different organisational members and government body's stakeholders.

In the literature of IT adoption, technological and organisational factors have been identified in many studies. Technological factors including relative advantage, technological complexity, compatibility, observability, and trialability have been identified and examined by Zaltman et al. (1973), Rogers, (1983) and Kwon and Zmud (1987). The IT adoption literature also have identified organisational factors which include top management support (Rai and Howard, 1994; Thong and Yap, 1995), organisation structure (Lai and Guynes, 1994), centralisation and formalisation (Zmud, 1982; Grover and Goslar, 1993), organisation size (Grover and Teng, 1992; Damanpour, 1992), and organisation slack (Grover et al., 1997).

Literature also identifies environmental factors which include external pressure (Iacovou et al., 1995) and competition (Grover, 1993).

A total of 75 articles have been examined by Tornatzky and Klein (1982) to identify ten technological factors identified in Rogers (1983) and the literature on innovation adoption. The authors have performed a meta analysis to investigate the impact of the technological factors on the adoption of an innovation. The main research findings have shown that three of Rogers' ten innovation attributes reviewed are consistently found in other studies to correlate with adoption. Based on Tornatzky and Klein's statistical analysis of the impact of the factors on the adoption as covered in the research studies, two of the three technological factors; relative advantage and compatibility have been positively related to adoption, while technological complexity has been found to be negatively related to adoption.

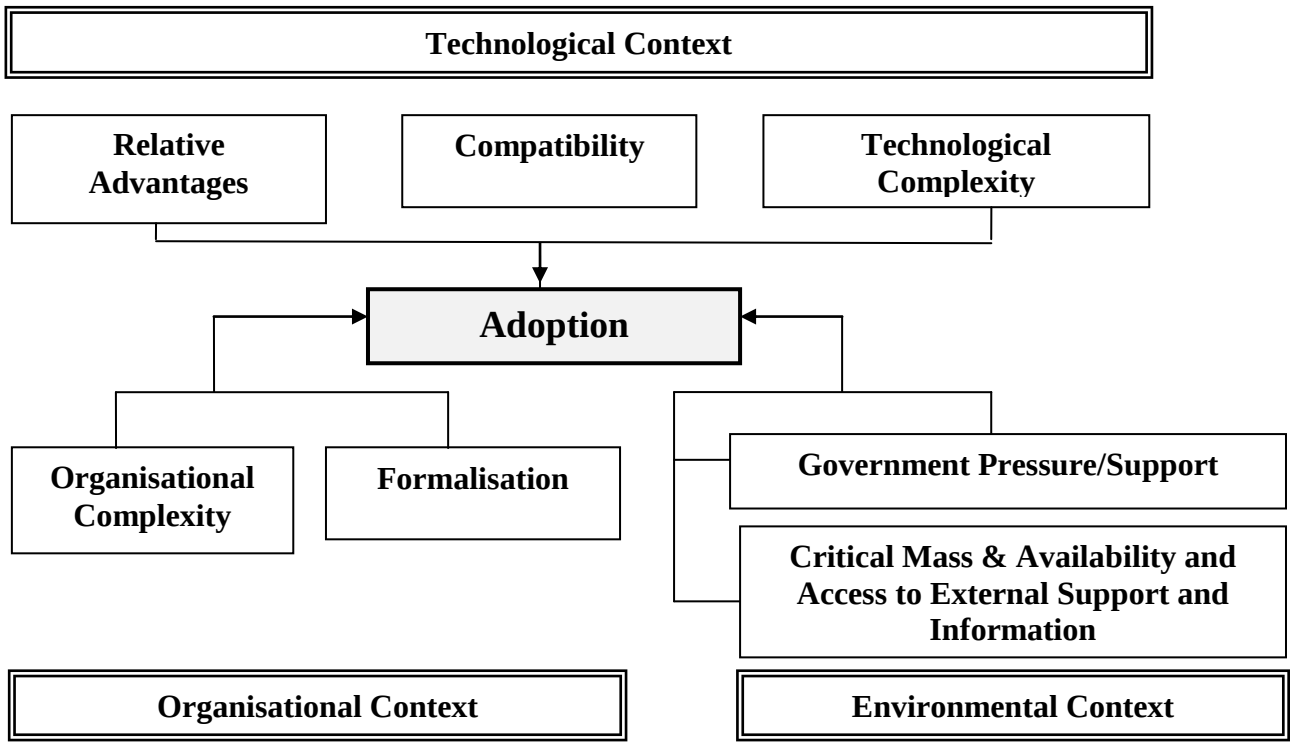
In a review of IT adoption studies, Fichman (1992) and Lyytinen and Damsgaard (2001) argue that additional factors should be added to the technological and organisational ones suggested by the IT adoption literature. The additional factors should reflect the adoption of certain technological innovations as indicated by Fichman (1992), where technologies' adoption process is supported by a network or a critical mass of stakeholders. A further review of the IT adoption has been conducted to refine and tailor factors that match the context of application (Tornatzky and Fleischer, 1990; Chau and Tam, 1997; De and Mathew, 1999; Jeyaraj et al., 2006; Hackney et al., 2008; Janssen et al., 2008; Thomas et al., 2008; Reddick, 2009), which is the examination of the adoption process of an e-government initiative. The purpose of this review is to identify the most relevant adoption framework for the study of XBRL adoption in a complex context like a public sector organisation, which is a

multi-disciplined context. This requires the inclusion of environmental factors that identify the role played by the government body's stakeholders including top government bodies and business partners in the e-government adoption process (Heeks, 2006), whilst identifying the technological and organisational factors drawn from the IT adoption literature.

2.4 TOE Framework: Tornatzky and Fleischer (1990)

In their book on the "Processes of Technological Innovations," Tornatzky and Fleischer (1990) provide a comprehensive framework for understanding technology adoption in an organisational context. In this book, DePietro et al. (1990) have developed a model defining a "context for change" consisting of three contexts. Within the technological context, DePietro et al. (1990) have used the technological factors initially identified by Rogers (1983). The organisational context identifies the formalisation and organisational complexity factors. The environmental context identifies the government pressure, the availability of external skills and information and critical mass factors. The three contexts, which are often referred to as "TOE," are posited to influence the adoption of technological innovations in organisations. The following figure illustrates Tornatzky and Fleischer's (1990) TOE theoretical framework:

Figure 2.2: TOE Theoretical Framework:



Sources: Tornatzky and Fleischer (1990) and Tornatzky and Klein (1982)

Cahill et al. (1990) find that TOE framework is a useful starting point for understanding the technological, organisational, environmental factors affecting the adoption process of technological innovations in any organisational context. (Kraemer and Perry, 1989 cited in Cahill et al., 1990, p.74) indicate that the "configuration of hardware, software applications, individuals, and procedures which together comprise information system technology in any organisation is a "complex package," which is highly unique and differentiated among and between public sector organisations with varying purposes, charters, resource levels and access to technology." Based on the analysis of these previous contexts, Cahill et al. (1990, p.59) further emphasise that the "unique" combination of these three categories of factors give greater explanatory power for the understanding IT adoption process in various government settings than any one single category of factors.

In the e-government and IT adoption literature, many studies have been conducted to examine the factors proposed in TOE model to determine their impact on the adoption of electronic government initiatives (Damanpour and Schneider, 2006; Thomas, et al., 2008); particularly computer technologies (Buglar and Bretschneider, 1993; Brudney and Selden, 1995; Hu et al., 2002). TOE has been also used to investigate and test the factors that could affect the adoption of computer technologies systems by local government authorities in the US and UK (Walker, 2008; Reddick, 2009).

2.4.1 XBRL Adoption in Relevance with TOE Framework:

In XBRL adoption literature, most of the research conducted on XBRL adoption has been descriptive in nature; highlighting XBRL espoused benefits (DiPiazza and Eccles, 2002; Hannon, 2003; Bergeron, 2003; Malhotra and Garritt, 2004; Willis, 2005; McGuire et al., 2006; Pinsker and Li, 2008) and potential hurdles to its adopters (Jones and Willis, 2003; Vun Kannon and Hannon, 2004; Williams et al., 2006; Miller, 2008; Pinsker and Li, 2008). Other research studies have focused on the auditing and assurance issues raised by XBRL's potential adopters (Pinsker, 2003; Shin, 2003; Gunn, 2007; Plumlee and Plumlee, 2008; Boritz and No, 2009) and XBRL's technical aspects associated with XBRL reporting (Escobar et al., 2009). Bonson et al., (2009) assess the potential XBRL voluntary adoption's motivations by companies, which have participated in the Securities and Exchange Commission's (SEC) voluntary reporting programme. These studies discuss some aspects of the XBRL adoption process as the perceived benefits and challenges of XBRL, and relevant technical and environmental issues. However, they do not provide empirical evidence on how XBRL has been adopted in the first place.

The need to research the complex relationships developed between XBRL stakeholders such as regulators, information services providers and end users to determine their impact on the adoption of XBRL on "a global level" has been initially suggested by Debcreceny and Gray (2001). Troshani and Rao (2007) and Doolin and Troshani (2007) have examined the drivers and inhibitors to XBRL adoption by using interviews and identified TOE factors as pertaining to the adoption of XBRL in the Australian context. These studies provide a preliminary analysis of the factors that affect XBRL adoption based on the viewpoints of research participants representing accounting firms, software developers, academics, regulatory agencies and XBRL Australia. Doolin and Troshani's (2007) study focuses on developing interrelationships between identified TOE factors to emphasise the complex nature of XBRL adoption in Australia. Doolin and Troshani (2007) suggest that studying the effects of TOE factors on XBRL adoption provides better understanding of XBRL adoption. This thesis follows Doolin and Troshani's suggestion and further conducts a broader investigation of UK regulatory-based XBRL adoption process by developing relationships between TOE factors, stages of Rogers' adoption process and e-government challenges.

2.4.2 TOE Framework: Technological Context

Technological context defines the characteristics of an innovation and its relevance and "fit" to an organisation's internal landscape (Tornatzky and Fleischer, 1990). In Rogers' (1995) study, the perceived attributes of the technological innovations are the major category of factors that determine the speed of innovation adoption. The decision to adopt a technological innovation depends on what functionality such an innovation can provide and how it will fit into the organisation. In their study, Tornatzky and Klein (1982) identify compatibility,

relative advantage and complexity as the major technological factors that influence the adoption of an innovation. These factors will be investigated to determine their relevance to XBRL adoption context.

2.4.2.1 Relative Advantage

Relative advantage is defined as "the perceived costs and advantages involved in the adoption of an innovation, mostly in terms of economic return but also in terms of immediacy of reward, social prestige, or savings in time and effort" (Rogers, 1995, p.216). The degree of relative advantage may be measured in economic terms such as faster development, less maintenance, cost savings, but strategic advantages and prestige for using technologies are also important factors. The adopting organisation's perception of the relative advantage of technological innovation is "influenced by the degree to which all of the "systemgoods" components such as (terminal, networks, and contents) work together" (Mahler and Rogers, 1999, p.723). Until they do, the relative advantage of the adopted technology cannot be accurately measured by the adopting organisation.

The perception of web-based technologies to be superior to the existing technologies within organisations is "closely related to the degree of perceived importance of standard compliance and interoperability," which contributes to the compatibility and flexibility of information system infrastructure (Hackney et al., 2006, p.1164). According to the Institute of Chartered Accountants in England and Wales's (ICAEW) progress report, XBRL benefits pertinent to potential adopters are interoperability, reliability, consistency, comparability and timeliness (ICAEW, 2004). This has been supported by XBRL literature emphasising the benefits of XBRL to regulatory authorities (Rezaee and Turner, 2002; Ball, 2007; Willis, 2007). Other benefits include the improvement of the efficiency of government's reporting

processes by facilitating the processing of information received from companies filing their regulatory information (Boyd, 2004). Efficient government performance has been identified as one of XBRL's main advantages as XBRL provides fast data access, time savings, increased productivity and reduced operating costs (Kull et al., 2007; Kull and Abraham, 2008; Rogers, 2010). In addition, XBRL's flexibility to accommodate existing accounting standards (Willis, 2007) and the facilitation of further standardisation of international reporting standards (Premuroso and Bhattacharya, 2008) have been recently identified as potential advantages of XBRL that could be realised by government agencies. XBRL also allows government bodies to establish their own websites that contain financial data and performance measures (Abdolmohammadi et al., 2002). Such information could be downloaded for analytical and comparability purposes. In this thesis, XBRL relative advantages will be investigated in the context of HMRC and CH's government setting, and will be compared to those found in the literature.

2.4.2.2 Compatibility

Compatibility is defined as "the degree to which using an innovation is perceived as consistent with the existing values and beliefs, past and present experience, and needs of potential adopters" (Rogers, 1995, p. 223). Tornatzky and Klein (1982) elaborate on this definition by suggesting two types of compatibility: normative compatibility referring to compatibility with what people feel or think about an innovation, and operational compatibility, which reflects the extent to which a technology "fits" with an adopting organisation's current work process.

To support the adoption process of XBRL at HMRC and CH, XBRL has to be integrated in the existing internal reporting systems of these agencies. A criticism that has been posed by potential XBRL regulatory adopters is the lack of trust in XBRL's capabilities, resulting from its "inconsistencies with existing languages and tools" in adopting organisations (Bonson et al., 2008, p.3). XBRL will be investigated to examine whether it can be integrated within HMRC and CH's existing electronic filing systems.

2.4.2.3 Technological Complexity

Technological complexity is defined as "the degree to which a technological innovation is perceived as difficult to understand and use" (Rogers, 1995, p.242). Although a technological innovation may appear to be useful to the adopter, many organisations may not be able to adopt due to the technical intricacies associated with the innovation's infrastructure or components. Rogers (1995) considers technological complexity as an inhibitory to the adoption.

Applying Rogers's (1990) definition, XBRL's technological complexity can be examined through studying its relative ease of use. Some technical complexities to integrate XBRL into existing IT systems processes have been identified in the literature. For example, the lack of available XBRL-compatible software (rendering and analysis tools) and the continuous proliferation of XBRL taxonomy versions are among the barriers that could slow down XBRL adoption process (Rezaee and Turner, 2002; Cushing, 2003; Vun Kannon and Hannon, 2004; Dunne et al., 2009). In this thesis, the technical complexity encountered by HMRC and CH during the process of adopting XBRL, developing taxonomies and enabling their reporting systems to receive regulatory filings in XBRL format will be investigated.

2.4.3 TOE Framework: Organisational Context

According to Tornatzky and Fleischer (1990) the organisational context is a set of measures or characteristics of an adopting organisation that defines the structures and processes that either constrain or facilitate the adoption of a technological innovation. Tornatzky and Fleischer point out that the organisation itself provides a "rich source" of financial and human resources, which could reduce the barriers to adopting technological innovations. If the relative advantage of a technological innovation cannot be realised due to the lack of organisational resources, the adoption process will be inhibited, regardless of how important the benefits are. Tornatzky and Fleischer (1990) emphasise that when sufficient organisation resources, including sufficient funding and technical skills, are available within the organisation, the adoption process will be facilitated.

2.4.3.1 Organisational Complexity

Organisational complexity is defined as "the degree to which an organisation's staff members possess a relatively high level of knowledge and expertise (such as IT expertise)" (Rogers, 1995, p.380). Complexity is usually measured by the members' range of occupational specialities and their degree of professionalism acquired by formal training. Hiring and retaining qualified human resources who have the educational background and/or professional experience contribute to the organisation's ability to conceive, propose and adopt innovations (Brudney and Selden, 1995; Heeks, 1999; Lee et al., 2003). Thus, complexity is positively related to the adoption of an innovation. In this thesis, the technical and non-technical expertise of key figures within HMRC and CH will be investigated to decide whether this experience has assisted in adopting XBRL, and whether certain level of technical expertise and training was –or needed to be- acquired to support the process of XBRL adoption.

2.4.3.2 Formalisation

Formalisation is broadly defined as "the degree to which an organisation emphasises following rules and procedures in the role performance of its members" (Rogers, 1995, p.377). High levels of formalisation act to inhibit the adoption of innovations by organisation (Bretschneider and Wittmer, 1993; Rogers, 1995; Gopalakrishnan and Damanpour, 1997; Lee et al., 2003). Tornatzky and Fleischer (1990) argue that organisations which are formal in terms of roles and procedures are less innovative, and less willing to adopt technological innovations.

However, the empirical evidence shows that the negative relationship derived in TOE model is not supported by some researchers. In their study on the adoption of information systems, Chau and Tam (1997) find that formalisation is an information system-specific function rather than an organisational trait. They conclude that organisations which have "formal policy on system-related matters are better prepared to adopt [information] systems" (Chau and Tam, 1997, p. 8-9). In the specific context of technological innovation adoption, Chau and Tam (1997), Raus et al. (2009) and Yang et al. (2009) emphasise that formalisation factor is associated with the presence and usage of documented technical manuals that define the rules, procedures and specifications that support the implementation of information systems. Documentation for technologies includes providing "standard documents and online reference manuals" to organisations intending to adopt new technologies (Berglund and Priestley, 2001; Berglund, 2003). In this thesis, formalisation will be particularly investigated in the technological innovation context, to identify the importance of preparing technical rules and procedures for XBRL and the implication of providing such documented technical guides on XBRL adoption process.

2.4.4 TOE Framework: Environmental Context

Environmental context is defined as the arena where the organisation operates: the industry, suppliers, customers and the government (Tornatzky and Fleischer, 1990). Tornatzky and Fleischer (1990) argue that all of these factors influence innovation adoption. They report that building critical mass, the existence of a relevant technology support infrastructure and government pressure influence the adoption of technological innovation. In the following sections, each factor will be identified and explained to identify its impact on the adoption process.

2.4.4.1 Critical Mass and Access to External Support and Information

Rogers (1995) argue that the technological innovation is of little use to an adopter unless other individuals or organisations with whom the adopter wishes to communicate in order to facilitate the adoption process. Unless there is a critical mass of adopters and stakeholders, an innovation has little advantage (and considerable disadvantage) of being adopted by a potential organisation. Tornatzky and Fleischer (1990) indicate that the presence of a critical mass provides potential adopting organisations with the availability and access to external support and information, which are important components of e-government adoption process (Heeks, 2006).

One of the main characteristics that could hamper technological innovations from reaching critical mass is the lack of standardisation (Mahler and Rogers, 1999). A higher degree of standardisation entails having less variety of new innovations available to adopters, which consequently will reduce the innovation's utility and discourage many potential adopters. However, Mahler and Rogers (1999) find that adopting organisations perceive this

utility differently, and many base their decision to adopt an innovation on the decisions and experiences of other adopters in the marketplace. Therefore, forming an opinion about whether an innovation will reach critical mass beyond adoption depends primarily on the 'collective' opinions of adopters rather than the perceived utility of the innovation.

Critical mass has been identified in XBRL literature (Locke and Lowe, 2007; Doolin and Troshani, 2007). The proliferation of XBRL among XBRL International Inc.'s members, which are represented by more than 550 companies, associations and agencies in 23 jurisdictions around the world, has contributed to building a "mass" of XBRL stakeholders (XBRL Progress Report, 2008). XBRL consortium has supported the global adoption of XBRL by building a network of regulators, consulting and accounting firms, information services providers, professional bodies and business organisations. The diversity of XBRL International Inc.'s members has contributed to the XBRL taxonomy development process (Chang and Jarvenpaa, 2005). Researchers have claimed that the technology basis of XBRL, XML knowledge, could encourage many adopting organisations already having strong XML technology infrastructure to be more receptive towards XBRL adoption (Gray and Miller, 2009). Gray and Miller (2009) also claim that regulators, tax authorities and stock exchanges help XBRL stakeholders to gather and share information on XBRL capabilities through their participation in the annual conferences and meetings organised by XBRL International Inc. Dye (2009) believes that the acceptance of XBRL as technology requires continuous improvements to follow the development of XBRL taxonomy. Dye notes that, "the standards and taxonomies are constantly evolving based on the industry and IT input. XBRL International Inc. oversees global cooperative efforts, and different national chapters work on the ground to lobby for and actively promote the implementation of XBRL reporting" (Dye,

2009, p.9). This statement indicates that the support of different interest groups is an important component of XBRL adoption.

Tornatzky and Fleischer (1990) emphasise that organisations adopting technological innovations require different types of external support. For example, they indicate that cooperating with private sector information services' providers through IT outsourcing is one of the most efficient tasks that could be undertaken by adopting organisations. Heeks (1999), Norris (1999) and Lee et al. (2003) argue that external support could be also provided through software testing, product demonstration, and IT-tailored training to enhance the existing organisational skills of the adopting organisation's staff members. Tornatzky and Fleischer (1990) also note that collaborating with stakeholders is a precursor to the organisation's ability to have an access to the "best" available information, talent and know-how. Top government's support could be also represented by providing sufficient funding to facilitate the process of adopting new technologies (Irani, 2002; Dembla et al., 2003). In this thesis, building a critical mass of different stakeholders, such as top government bodies, IT suppliers and other groups, and acquiring potential support from these stakeholders will be analysed to explain their impact on XBRL adoption process at HMRC and CH.

2.4.4.2 Government Pressure/Support

Tornatzky and Fleischer (1990) argue that regulations play a dual role in facilitating or inhibiting the adoption of an innovation. For example, regulations sometimes incorporate explicit technology requirements, which are formulated to rationalise existing practices, leading to support the adoption of innovations (Teo et al., 1997). Tornatzky and Fleischer (1990) provide an example of the importance of regulations in the areas of health, safety and

environment, which could stimulate adoption of innovations by organisations operating in such industries. However, in other cases, regulations could restrict the adoption of technological innovations in business organisations as identified by Kuan and Chau (2001), Zhu et al. (2003) and Grandon and Pearson (2004).

In the context of XBRL regulatory adoption, Abdullah et al. (2009) support the assumption that mandating XBRL by regulators will facilitate the process of adopting XBRL at mandating organisations (HMRC and CH). Abdullah et al. (2009) believe that XBRL adoption is a function of top government's funding and political backing. Therefore, mandating XBRL by the government can help to "reassure" regulatory entities that they will receive adequate funding and support from top government agencies to mobilise their resources and invest in the new technology. In addition, the mandate will "urge" potential users, agents and software vendors to prepare their accounting systems and software products to be XBRL-compatible (Rezaee and Turner, 2002; Chang and Jarvenpaa, 2005; Cohen, 2006). These views have been shared by Doolin and Troshani (2007) who believe also that regulatory entities could play a role in XBRL adoption if they choose to mandate XBRL reporting through legislative requirements. In this thesis, the implication of mandating the use of XBRL, as recommended in Lord Carter's Report (2006), will be investigated to determine its impact on XBRL adoption process at HMRC and CH.

TOE's technological, organisational and environmental factors have been discussed based on the review of IT adoption literature. As noted previously, these factors could facilitate and/or hamper the adoption process of technological innovations. In the context of e-government, many studies include that the process of adopting e-government initiatives could

be also restricted by the existence of certain challenges, which are particularly relevant to public sector organisational context. As this thesis investigates the adoption process of an e-government initiative, these challenges will be introduced and discussed.

2.5 Challenges of E-Government Initiatives

A number of challenges experienced in public sector organisations that affect the adoption of electronic government initiatives have been identified in the e-government literature (Margetts and Dunleavy, 2002; Jaeger and Thompson, 2003; Gupta et al., 2004; Pavlichev, 2004; Beynon-Davies, 2005; Ebrahim and Irani, 2005; Sarikas and Weerakkody, 2007; Ghapanchi et al., 2008; Schwester, 2009). Although there is no single list of e-government challenges, some consistencies exist across the disciplines. These consistent challenges will be identified and analysed as potential challenges to e-government adoption.

Five common categories of e-government challenges have been found to affect the adoption of e-government projects in the public-sector organisations literature. These include (1) Information and data; (2) Information technology; (3) Organisational; (4) Legal and regulatory and (5) Environmental challenges.

2.5.1 Information and Data Challenges:

One of the core functions of electronic government initiatives is data capturing, managing, using and sharing process (Pavlichev, 2004). A number of the challenges relate to the information and data structure and content received and processed by government entities. According to (Redman, 1998 cited in Gil-Garcia and Pardo, 2005, p.190), “data quality problems include inaccuracies, inconsistencies and incompleteness of data.” Kaplan et al. (1998) emphasise that the importance

of producing quality information is relevant not only to the government agency only, but also to different stakeholders. Ambite et al. (2002) and Dawes (1996) identify the complexity -and sometimes- the lack of appropriate data structure and definitions, which cannot be easily processed by government's legacy processing systems. This causes a challenge when government entities are required to process and use this data for analytical and decision making purposes. In this regard, this challenge will be investigated in this thesis to identify whether HMRC and CH have faced a problem, during the course of adopting XBRL, with the data structure and content of the XBRL-based data filed by companies and agents.

2.5.2 Information Technology Challenges:

The complexity of the technology adopted by government agencies is one of the constraints that could potentially affect the process of adopting this technology (Barki et al., 1993; Caffrey, 1998). The ability of government agencies to adopt technologies that could be integrated into the agencies' existing reporting systems could be hampered by the potential technical incompatibility of the newly adopted technology (Dawes, 1996; Holden et al., 2003). The complexity of the technology adopted could require certain level of IT expertise, which some staff members at government agencies could not acquire, is another challenge that has been reported by Caffrey, (1998), Dawes and Pardo (2002) and Moon (2002). In this thesis, the information technology challenges will be investigated to determine whether HMRC and CH have faced any challenges while building the technical infrastructure of XBRL and whether these agencies have acquired the technical expertise and resources to support the adoption of XBRL.

2.5.3 Organisational Challenges:

Identifying potential stakeholders' needs during the process of adopting technologies, especially end-users is reported in the electronic government literature to be one of the organisational

challenges facing government agencies (Barret and Green, 2001; West and Berman, 2001; Dawes and Pardo, 2002; GAO, 2001). These studies indicate that government agencies, intending to adopt a technology, should make a technology business case for potential users and raise public awareness among those users (Sarikas and Weerakkody, 2003). Schwester (2009) argues that the apparent lack of public support for the technology may create an obstacle to e-government initiatives. Jaeger and Thompson (2003) suggest that government bodies should work to make end users aware of the espoused benefits of e-government projects. This will likely encourage citizens to seek to use e-government services and support the purpose of developing e-government information and services (GAO, 2001).

2.5.4 Legal and Regulatory Challenges:

Electronic government literature indicates that public managers could face some restrictive laws that could affect the adoption of technologies in government entities (Dawes and Nelson, 1995; Harris, 2000; Dawes and Pardo, 2002). These studies indicate that some public managers have to secure legislative approval for adopting certain technologies within their organisations. Dawes and Pardo (2002) and Fountain (2001) also emphasise that government bodies could be faced by limited regulatory/government budget allocated for adopting e-government initiatives, which could restrict the progress of e-government adoption.

2.5.5 Environmental Challenges:

E-government literature depicts privacy and security concerns as among the most important issues influencing the adoption of e-government (Andersen and Dawes, 1991; Caffrey, 1998; Irvine, 2000; Moon, 2002; Holden et al., 2003). Jarvenpaa et al. (2000) argue that government agencies are often challenged by the citizens' concerns about the security and privacy risks that could face them when they use government-run websites. Some researchers argue that public users of online

government services are sometimes sceptical of using these services because of the potential sharing and disclosure of their personal information (Milner, 2000; Joshi et al., 2002; Duncan and Roehrig, 2003). Bonham et al. (2003) emphasise that UK data protection and privacy laws could hamper the progress of e-government initiatives as many regulatory authorities struggle to comply with these laws. In this thesis, the security and privacy issues will be investigated to determine their impact on XBRL adoption process at HMRC and CH.

In the following section, the need to develop a conceptual framework that integrates Rogers' adoption process, TOE factors and e-government challenges will be introduced and explained. This discussion will be followed by an illustration and explanation of the proposed conceptual framework.

2.6 Need for a Conceptual Framework for an E-Government Adoption Process

The importance of information technologies to improve the organisational performance has been recognised by some researchers (Rogers, 1995; Gallivan, 2001). While primary awareness has been raised about the benefits of information technologies in public sector organisations, many government leaders are increasingly aware of the potential of e-government to improve the regulatory administrative performance (Heeks, 1999). E-government as a process supporting the adoption of technological innovation has emerged as a process that can provide potential benefits for public sector organisations, such as cost saving, improvement in communication and coordination between organisations and expansion of citizens' participation (Heeks, 2006). Hence, the adoption of e-government is an

important strategic action plan for the public sector, as it is a fundamental framework in developing government processes (Ebrahim and Irani, 2005).

However, the adoption of electronic government initiatives is not "straightforward" and cannot be undertaken over a limited period of time (Heeks, 2006). It requires a systematic approach to prepare and integrate adopted technologies into existing government's information systems. In addition, many public sector officials need to increase their awareness of the critical factors that could affect the adoption of technologies (Chau and Tam, 1997; Franzel, 2008). The adoption process of an e-government initiative impacts many aspects of the government organisations, not only the technology, but also the need to "re-engineer" the way that organisations conduct their "business" in terms of making decisions about adopting technologies and managing organisational resources and relationships with the government's stakeholders during the process of adopting e-government initiatives. While most public managers tend to support an e-government initiative, many managers become concerned about how much that initiative is likely to change the traditional organisational structure of their agencies (Cabinet Office, 2000; Heinteze and Bretschneider, 2000; Heeks, 2001). This is one of the reasons why some government agencies are still in the early stages of e-government adoption (Milner, 2002; Ebrahim and Irani, 2005). The delay in e-government adoption process could be caused by different challenges that have been previously discussed. Hence, if government agencies are not prepared for the adoption and usage of technologies, the adoption process of electronic government initiatives could be disrupted or phased out (Ebrahim and Irani, 2005).

E-government studies focus on the fundamental aspects of motivations, requirements and "effectiveness" of e-government in public sector organisations. In addition, most of the

existing e-government studies are not empirical but rather descriptive in nature (Yildiz, 2007). A void exists in the literature regarding the existence of a comprehensive framework for the e-government adoption process. Therefore, there is a need to develop a conceptual framework that can be used as a guiding "tool" by public sector organisation' decision makers who consider adopting e-government projects. In addition, this framework will contribute to the researchers' understanding of different factors and challenges that affect the adoption process of e-government initiatives.

The proposed framework outlines and establishes the relationships among Rogers' adoption process, TOE factors and e-government challenges. A number of studies have used TOE framework to examine the factors that influence the organisational adoption of technologies in public sector organisations, but none of these studies have empirically tested the relationships between TOE factors and the adoption process. Rogers' adoption process and TOE factors have been treated as "separate theoretical entities." The proposed conceptual framework provides additional clarity by combining these entities and identifying specific relationships between each TOE factor and stage of Rogers's adoption process. It has to be noted that e-government challenges have been broadly discussed in the e-government literature. These challenges are often mapped out based on the context of each government setting and the adoption experience of each government agency. In Chapter 5, the analysis of the research findings will in part focus on identifying the e-government challenges which are particularly relevant to the context of this research and establish the relationships between these challenges and the developed conceptual framework.

2.6.1 Reasons of Using Conceptual Framework

The reasons that have motivated to use the conceptual framework in this thesis can be summarised as follows:

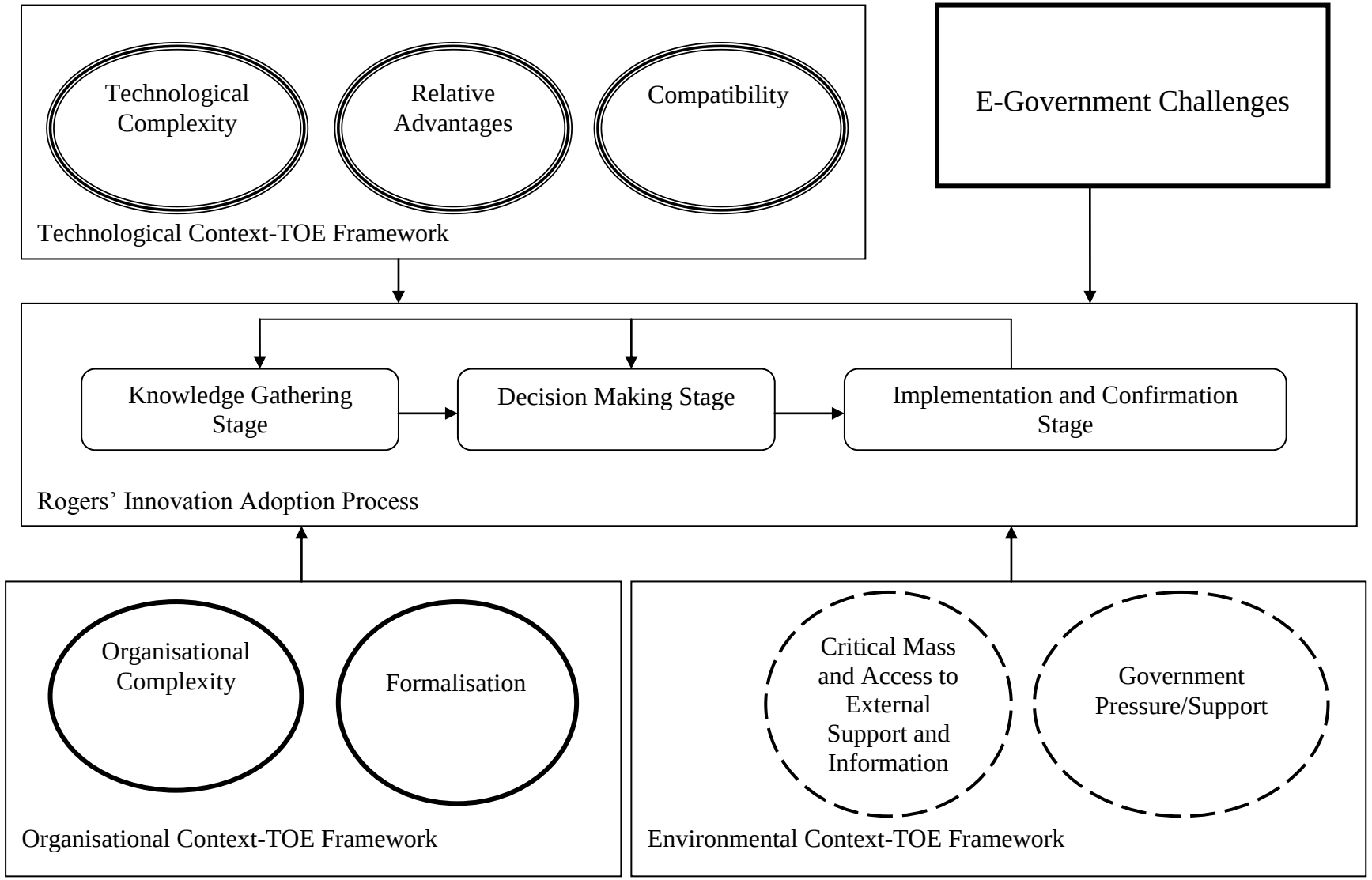
- E-government project is viewed as a strategic framework that could not be adopted in one stage and in a short period of time. It should be applied as a process, with organisations going through a number of stages before they can fully implement the technology.
- Traditionally, the progress of any adoption of IT strategy in a public sector organisation is slow-going, due to the bureaucratic process of government; the proposed conceptual framework will represent the typical progression of public sector organisations as they move towards an electronically-enabled organisation, which is part of the "UK e-government agenda."
- The proposed framework highlights three influential contexts in public sector organisations that play a significant role in e-government adoption process (i.e. technological, organisational, and environmental).
- Adopting e-government initiatives requires several information and communication technologies infrastructures and organisational resources that support the adoption process, which is explained through the inclusion of technological and organisational factors of TOE framework.
- The adoption of e-government process depends to a great extent on the engagement of and the support provided by the government body's stakeholders, which is explained through the inclusion of the environmental factors of TOE framework.

- As any technology adoption, the adoption of e-government initiative is often hampered by some barriers as indicated in the literature. These barriers have been clustered as ‘e-government challenges’ as illustrated in the conceptual framework.
- Finally, the combination of three different bodies of knowledge (Rogers’ adoption process, TOE factors, e-government challenges) will provide a comprehensive –and comparative- overview of the adoption process of e-government in a UK regulatory context.

2.7 The Conceptual Framework

Based on the discussion outlined in this chapter, IT literature has explained the adoption process of e-government initiatives by identifying the factors that could influence this adoption process. In this section, Figure 2.3 illustrates the conceptual framework that integrates Rogers’ adoption innovation process, TOE factors and e-government challenges.

Figure 2.3: Proposed Conceptual Framework:



The proposed conceptual framework presented in Figure 2.3 integrates three different bodies of knowledge that represent a comprehensive framework for e-government adoption. The conceptual framework broadly presents basic relationships among Rogers' adoption process, TOE factors and e-government challenges. The literature reviewed in this chapter did not identify specific relationships among Rogers' adoption process, TOE factors and e-government challenges. The conceptual framework will fill the research gap discussed in Chapter 1. As stated in Section 2.4, this thesis will conduct a comprehensive examination of UK regulatory-based XBRL adoption process by developing relationships among TOE Rogers' adoption process, TOE factors and e-government challenges. Relationships will be developed to emphasise the influence of each factor and challenge on each stage of the adoption process. In Chapter 5, the conceptual framework will be revised for HMRC and CH based on the empirical evidence acquired in this research to develop the required relationships and provide appropriate explanations for these relationships. This examination will provide better understanding and clarity of the e-government adoption process and emphasise the interrelationships between the factors and challenges that affect this process. It will also represent a frame of reference that could be used as a guiding "tool" for decision makers at government agencies intending to adopt e-government initiatives.

2.8 Summary

This chapter reviews the literature to establish a conceptual framework that combines Rogers' innovation adoption process, TOE framework and e-government challenges. A gap has been identified in the literature, which is the absence of a comprehensive framework for e-government adoption in public sector organisations. Accordingly, this chapter explores the adoption of e-government by analysing Rogers' innovation adoption process to develop an appropriate model that can be used as a significant part of the conceptual framework for e-government adoption. However, Rogers' innovation adoption process is not a sufficient model for e-government adoption, so there is a need to integrate additional models that can identify the factors and challenges that influence the adoption process, and support the implementation of each stage of this process.

It has been also identified in the literature that most adoption frameworks for the study of IT adoption in a complex context like public sector organisations require additional factors such as the nature of the technology, and the capabilities of the organisation and the external environment, as several studies consider them as explanatory factors. These factors are similar to those explained in the three contexts of the Tornatzky and Fleischer's TOE framework (1990), which has been integrated into the conceptual framework for e-government adoption. Tornatzky and Fleischer's (1990) framework has a solid theoretical basis, empirically tested, and has been found to be a useful starting point for understanding the adoption of e-government innovations, and can be applied in any type of organisation.

In addition, the critical review of e-government literature reveals that e-government barriers could hamper the progress of e-government initiatives. These barriers have been

broadly discussed in this literature and clustered as “e-government challenges” as illustrated in the conceptual framework in Figure 2.3. These challenges will be further investigated based on the research findings to identify the most relevant challenges to the research context.

The integration of Rogers’ adoption process, TOE factors and e-government challenges leads to the formulation of a conceptual framework for e-government adoption that will help to provide useful insights into the process of adopting e-government initiatives. As a result, it will facilitate the process of e-government adoption by identifying the fundamental adoption stages, and the factors and challenges that influence them. The conceptual framework presented in this chapter contributes to the e-government’s body of knowledge and the contribution of this thesis. The conceptual framework will be investigated and analysed according to the empirical analysis conducted in Chapter 5. This analysis requires the collection of the empirical data to test the developed conceptual. In order to collect these data from fieldwork, an explanation of the research methodology and methods will be provided. In the next chapter, the research approach, methodology and methods will be introduced and explained in the context of this thesis.

CHAPTER 3

RESEARCH METHODOLOGY AND METHODS

3.0 Introduction

As indicated in Chapter 2, the validity of the proposed conceptual framework for e-government adoption requires collecting empirical data to contribute to the formulation of an e-government adoption conceptual framework. In order to collect data from fieldwork successfully, the mechanism to collect empirical data for achieving the aim of this thesis will be introduced and explained.

This chapter lays out the main research philosophies, methodology and methods, used during the course of this study, that could facilitate the process of fulfilling the research aim and objectives. This chapter begins by discussing the reasons of selecting the research philosophy and epistemological underpinning of this research. The research apporach, strategy and design will be introduced and justified. In the final parts of the chapter, the methods of data analysis, research limitations and ethical considerations will be addressed.

3.1 Selecting Appropriate Research Approach

An important stage in this thesis is to select the most appropriate research approach for the empirical inquiry, as there are many information systems research methodologies and strategies that have been identified in the literature. Kock et al. (1997) argue that the growing

importance of information technology and systems research in the last two decades has led to a number of different research approaches and methods, which have been adapted from other disciplines such as social and natural sciences. As a result, different types of information systems researches have been proposed. In addition, IT is a multi-discipline field and there are several philosophical assumptions that could explain the underlying nature of the phenomenon investigated by the researcher (Orlikowski and Baroudi, 1991 cited in Kamal and Themistocleous, 2006). Thus, there is no single framework that encompasses all the domains of knowledge needed for the study of IT (Galliers, 1992). Within the range of different IT adoption studies, research on IT adoption in the public sector context is one of the emerging research disciplines since the late 1990s (Norris and Lloyd, 2006).

Myers and Avison (2002) argue that the most important philosophical assumptions are those that relate to the underlying epistemology which guides the research. Epistemology is the branch of philosophy that addresses the philosophical problems that surround the theory of knowledge. It answers many questions concerning the nature of knowledge and how it can be acquired (Fetzer, 1993). In the next section, a review of the main research philosophies that have been investigated in the e-government literature will be provided to determine the epistemological stance that will be most relevant to the purpose of this research.

3.2 Research Philosophies: E-Government Context

Research philosophies span over a continuum of philosophies that are restricted at its extremes by positivism and interpretivism. This type of continuum that ranges from the objective to the subjective mode of research is considered a theoretical basis for categorising e-government research (Chen et al., 2007; Miller and Yang, 2007).

Positivist studies focus on adopting empirical epistemology, in which a pre-determined set of assumptions about data gathering is established and accepted. Based on this observation, a body of knowledge about underlying relationships is built (Lee and Baskerville, 2003, p.229). Inferences about a phenomenon could be drawn from selecting a representative sample from a stated population. Knowledge consists of facts which are independent from the researcher. Positivist researchers assume that the researcher is independent of the data being gathered (Crotty, 1998; Sekaran, 2000; Crano and Brewer, 2002). This epistemological stance assists in testing or evaluating an existing theory in order to enhance the "predictive understanding of phenomena" (Orlikowski and Baroudi, 1991, p. 5).

Interpretive studies would rather embrace a subjective reality. Data that can be gathered are gained through social constructions of knowledge, such as consciousness, shared meaning, and language (Myers, 1997) and not linked to priori theories. The interpretive research approach seeks to understand and translate phenomena through meanings that people assign to them (Walsham, 1995). Those meanings are socially constructed subjective creations which are the outcome of the researcher's interaction with the research setting or environment (Crotty, 1998, p. 67-68). Interpretivism was stated by Orlikowski and Baroudi (1991) to be a general research approach, where an in-depth discussion of the epistemology, methodology and ontology assumption surrounding it was provided. In interpretive e-government studies, key variables such as technology and organisational expertise can be found as part of investigating the e-government setting. In addition, relationships could be identified and developed among key variables using underlying theories or frameworks (Heeks and Bailur, 2006).

According to Irani et al. (199), those who agree with the positivist view believe that knowledge may be learned or communicated, and those who agree with the interpretivist view believe that knowledge can only be acquired through observation and personal experience. The two views have an impact on empirical research strategy, as the positivist dictates that the researcher takes the role of the observer, whilst the interpretivist dictates that the researcher acquires knowledge by participating in the subject of the empirical study.

It is useful to distinguish between interpretivist and positivist to understand the philosophical approaches that would strengthen the decision made by the researcher towards the research process.

Table 3.1: Comparison between the Positivism and Interpretivism Approaches

Approach	Description	Characteristics	References
Positivism	Assumes reality is objectively given and can be described by measurable properties, independent of researcher and his/her instruments.	• Tends to produce quantitative data • Concerns hypothesis testing, formal propositions, quantifiable measures of variables • Seeking to test theory • Drawing inferences about phenomenon from sample to stated population • Knowledge consists of independent facts • Data is highly specific and precise	Denzin and Lincoln (1998) Gaillers (1992) Hussey and Hussey (1997) Lee and Baskerville (2003) Myers (1997) Orlikowski and Baroudi (1991) Remenyi et al. (1998) Walsham (1993) Yin (2003)

Interpretivism	Seeks to describe, understand and translate phenomena through meanings that people assign to them which produce understanding of IS and the process whereby IS influences and is influenced by context.	• Understanding deeper structure of phenomenon within cultural and contextual situation • Data is rich and subjective that can be gained through social constructions such as consciousness, shared meaning, documents, and language. • What is researched can be affected by process of research. • Tends to produce qualitative data. • Focus on full complexity of human sense-making as situation emerges. • Concerned with generating theories	Denzin and Lincoln (1998) Gaillers (1992) Hussey and Hussey (1997) Lee and Baskerville (2003) Myers (1997) Orlikowski and Baroudi (1991) Remenyi et al. (1998) Walsham (1993) Yin (2003)

Based on the previous discussion, the interpretivist epistemological stance will be selected in this thesis. Interpretive approach allows to empirically investigate the XBRL adoption process by two government agencies in a more holistic picture through close investigation and face-to-face contact. It will also allows for exploring the factors that promote and/or inhibit the adoption process in a natural setting. Furthermore, This will be done through evaluating and linking three different bodies of knowledge, which consist of Rogers' innovation adoption process, Tornatzky and Fleischer's (1990) TOE framework and e-government challenges. This analysis allows for developing a conceptual framework that integrates them to explain an

existing phenomenon, which is the e-government adoption process in a regulatory context. The analysis of the research findings will emphasise the relationships that will be developed among each stage of Rogers' adoption process, TOE factors and e-government challenges. Hence, the usage of Rogers' process, TOE factors and e-government challenges serve as the "researcher-devised constructs and measures," (Orlikowski and Baroudi, 1991, p.9), which is a suitable approach to investigate an e-government adoption process. Fountain (2001), Heeks (2006) and Naranjo-Gil (2009) aruge that to study an e-government adoption process in a complex context, represented by HMRC and CH in this thesis, requires combining the organisational and environmental aspects of this process. This is supported by the inclusion of Tornatzky and Fleischer's (1990) TOE factors. In addition, the integration of e-government challenges provides additional clarity towards understanding the potential barriers that affect the e-government adoption process (Jaeger and Thompson, 2003), and in the UK regulatory context, as supported by Gilbert et al. (2004) and Weerakkody and Choudrie (2005).

- Since the unit of analysis in this research is two government bodies (as will be explained in detail in Section 3.4.1) which is a complex social structure context that is managed and controlled by different people's sense-making, the e-government adoption process influences and is influenced by them. Therefore, the interpretivist approach is the proper approach to understand the adoption process of e-government for the reasons explained.
- The adoption of e-government is concerned with certain dependent issues (e.g. technological, organisational, environmental), and could not be taken as one where facts and values are independent. Thus, the positivist approach cannot be used in this research; as stated in Table 3.1, the positivist approach assumes that knowledge consists of independent and distinct facts.

- As mentioned in Table 3.1, the evidence for IS research to be positivist is if there is hypotheis testing, quantifiable measure of variables or formal propositions, and since there are none of these in this research, the positivist approach cannot be used.

3.3 Adoption of Qualitative Research Methods

Qualitative research is often confused with the interpretive approach, and the same confusion goes for quantitative and postivist. The qualitative and quantitative research methods both refer to a variety of methods of inquiry (Myers and Avison, 2002). The two methods are derived from different scientific traditions. Quantitative research methods are "developed in the natural sciences to study natural phenomena" (Myers and Avison, 2002, p.4). Qualitative research methods, on the other hand, are originally "developed in the social sciences to enable researchers to study social and cultural phenomena" (Myers and Avison, 2002, p.4). In addition, Benbasat et al. (1987, p.382) notice that there is an increasing interest in the application of qualitative research methods due to the "general shift in IS research away from technological to managerial and organisational issues," and this is mainly the scope of this research. Black (1999) and Marshall and Rossman (2010) provide a distinction between qualitative and qunatitive research methods. The quantitative method is based on observations that are converted into distinct units of knowledge that can be compared to other units by using statistical testing and analysis (Black, 1999). Qualitative reserach examines people's actions and reactions in narrative ways to represent the situation as experienced by researchers (Marshall and Rossman, 2010).

Since one of the objectives of this research is to identify and examine technological, organisational, environmental factors and e-government challenges that influence e-

government adoption process, qualitative research methods will be more appropriate than quantitative. This is due to the fact that qualitative methods are designed to help researchers understand people's decisions, actions and organisational context within real life, which are difficult to explain in quantitative terms (Strauss and Corbin, 1990; Maykut and Morehouse, 1994; Myers and Avison, 2002).

Strauss and Corbin (1990) argue that qualitative research methods can be used to better understand any phenomenon, which has not been thoroughly explored, as well as to gain new perspectives on existing issues about which much is already known. These methods could be also applied to acquire more in-depth information that may be difficult to analyse quantitatively. Therefore, the usage of qualitative research methods fits the research context of this thesis. The phenomenon of e-government adoption process, particularly XBRL adoption, is an under-researched area (Troshani and Rao, 2007), where there is not much empirical information to explain it. In order to apply qualitative research methods more productively in this research and to be aware of the problems that might be raised during empirical enquiry, the strengths and weaknesses of qualitative research methods are presented in the following table:

Table 3.2: Strengths and Weaknesses of Qualitative Research

Strength	**References**	**Weaknesses**	**References**
Research can study IS phenomena in their natural setting which little is known.	Benbasat et al. (1987) Maykut and Morehouse (1994) Silverman (2000)	Sample size is smaller than in other types of research, which reduces generalisability, controllability and deductibility.	Cornford and Smithson (1996) Lee (1991) Maykut and Morehouse (1994) Silverman (2000)
Allows researcher to investigate meanings	Silverman (2000)	Interviews with participants can place	Miles and Huberman (1994)

given by specific audience, and thus is able address this issue to some extent.		considerable demands on time, making it difficult to recruit managers and others for whom "free" time is often scarce.	
Allows barriers between researcher and user to be lowered.	Creswell (2007)	Collected unstructured data and unbounded.	Lee (1991)
Allows researcher to have thick and close description of phenomena in context-specific setting.	Creswell (2007) Myers (1997) Silverman (2000)	Time-consuming in that researcher must spend lengthy amount of time involved with research in terms of data collection process and data analysis.	Lee (1991) Miles and Huberman (1994).
Allows researcher to gain in-depth understanding of nature and complexities of processes.	Benbasat et al. (1987) Maykut and Morehouse (1994) Silverman (2000)	Data open to a number of interpretations which can reduce accuracy of interpretation results.	Cornford and Smithson (1996) Silverman (2000)

Based on the previous discussion, the qualitative method is the appropriate one to be used in this research. In addition to the strengths and benefits presented in Table 3.1, the following key points will summarise the reasons for using qualitative method:

- The purpose of this research is to examine e-government adoption in a regulatory context. Examining such a process requires an approach that is suitable for identifying the underlying factors and challenges that affect it. Therefore, the qualitative approach is employed in this research. This approach enables the researcher to study the

phenomenon within its context and reveal rich and complex process (Leedy and Ormrod, 2005; Heeks, 2006).

- Since e-government adoption, particulary XBRL adoption, is a little-known phenomenon, the qualitative method will allow to understand and examine in depth the adoption process. It will also determine the existing adoption stages and develop a conceptual model for e-government adoption based on the literature of IT adoption and e-government.
- Studying and analysing the factors facilitating and/or hampering the adoption process requires building a close connection with the research subject and participants involved in adopting the e-government initiative within their organisation. Therefore, the qualitative research will support the process of collecting sufficient empirical evidence on the research subject.
- Qualitative research methods assist the researcher to study e-government adoption process in its natural setting, which is represented by the organisational setting of HMRC and CH, to investigate the influential factors and challenges affecting the adoption process. The natural setting is the place where the researcher is most likely to discover what is to be known about the "phenomenon of interest" (Denzin and Lincoln, 1994, p.152).

Having justified the qualitative research methods, considered their strengths and weaknesses, this study will employ a research strategy for the purpose of developing a conceptual framework, with a positivist epistomological approach, which entails collecting data through qualitative research methods. In the next section, the research strategy will be introduced and explained.

3.4 Adoption of Research Strategy: Case Study

Consistent with the principles of interpretive research, some information system researchers have developed a set of methodological research approaches for conducting case studies. Benbasat et al. (1987, p. 380) and Dubé and Paré (2003) mention that case studies provide better descriptions of where case research topics could fit into the process of building knowledge, determine the details of case selection and provide in-depth information about data collection. Previous scholars' contributions present general principles with regard to conducting case research in information systems (Benbasat et al., 1987; Lee, 1989; Dube and Paré, 2003). Dubé and Paré (2003) note that conducting case study helps to develop causal relationships and determine the extent to which case research findings could be generalised. In the next section, an explanation of the use of the case study research method will be introduced.

3.4.1 Explanation of the Components of the Case Study

Understanding case study research is important when studying an event in its natural environment. Davey suggests that the case study method involves an in-depth, longitudinal examination of a single instance or event (Davey, 1991, p. 1). He also explains that "the case study is a method of learning about a complex instance through extensive description and contextual analysis" (p. 2). Yin (2003, p.2) indicates that case studies are concerned with "the rigorous and fair presentation of empirical data," that allow the researcher to identify and "maintain the holistic and meaningful characterstics of real-life events such as organisational and managerial processes" (Yin, 1989, p.14). According to Yin (1994) and Benbasat et al. (1987), the case study method could be used for exploring a contemporary phenomenon. Yin (2003) believes that it can also be used to explain "the causal links in real-life interventions

that are too complex for the survey or experimental strategies"[10] and to describe such an intervention in the real-life context where it occurred. For case studies, Yin (2003, p.21) suggests that the components of the case study consist of:

- A study's questions;
- Its propositions, if there are any;
- Its unit(s) of analysis;
- The logic linking the data to the propositions; and
- The criteria for interpreting the findings.

By studying Yin's five components, the study's questions, or research questions component, determine the type of research method that could be used. A study that poses "how" questions entails employing a case study strategy. Yin (2003) suggests that the researcher can develop propositions that could guide the researcher to examine a particular component of the study. He points out that by forcing oneself to write propositions, Yin believes that the researcher will move in the right direction with his/her research study. The propositions help to point researchers to the areas that need to be studied and where to look for the relevant data (Yin, 1994, p. 22). Miles and Huberman (1994, p.91) believe that a pre-determined theoretical framework becomes a "researcher's first cut at making some explicit theoretical statements."

The importance of having a prior thoeretical foundation to lead a case study investigation has been noted by Yin (1994). Yin notes that it is important to have a theoretical "replication" logic, by which conditions of the case could lead to predicting different and/or

[10] http://www.sagepub.com/upm-data/24735_Chapter1.pdf

similar results to those derived from the literature represented by the conceptual framework. The objective of this logic helps to draw conclusions that may not be organisation-specific, or even technology-specific. Eisenhardt (1989) believes that a case study, that is built of an early identification of possible factors, could facilitate the process of "measuring" these factors in an interview setting. The reliance on a thoeretical foundation is considered a basic feature of positivist explanatory case study research (Benbasat et al., 1987; Olikowski and Baroudi, 1991). This type of case study is suitable for doing causal studies and to explain theories within specific research context. It is distinguished from other types of case study, mainly the descriptive and exploratory ones (Yin, 1994), by maintaining a "theory of interest, prediction from theory and the possibility of using rival theories" (Dube and Pare, 2003, p.506). As this thesis is guided by a conceptual framework, the positivist explanatory case research method has been employed.

The "case" is defined by the unit of analysis. The unit of analysis impacts the type of data needs to be collected and helps to avoid the over collection of data. Yin explains, "the definition of the unit of analysis (and therefore of the case) is related to the way the initial research questions have been defined" (Yin, 1994, p. 22). Yin (1994) believes that the unit of analysis can be an individual, a group, a city, a small town, an event, or an entity. In information systems area, a case may not only be concerned about a particular technology or system, but it could also investigate an IT strategy or an organisation that is adopting an emerging technology (Yin, 1994; Pare, 2004). Th organisations where XBRL has been adopted are considered the units of analysis as suggested by (Yin, 1994) as both organisations are the only XBRL regulatory adopters in the UK.

Linking data to theoretical propositions and the criteria for interpreting the case findings represent the last two components of the case study method. Yin (1994, p.24) suggests the use of "pattern matching" technique initially introduced by Campbell (1975), where different pieces of information collected from the case study can be related to the pre-defined theoretical propositions. Linking the data to theoretical propsitions can be conducted by using time-series or pattern matching techniques (Yin, 1994). This thesis does not intend to conduct a time-series analysis, as this type of analysis suits an experimental research type (Tellis, 1997). This thesis rather employs a pattern-matching technique for linking the data collected to the proposed conceptual framework in order to interpret them, as suggested by Trochim (1989) and Yin (1994). Pattern matching results in identifying an "effects" pattern and a "no effects" pattern (Yin, 1994, p. 25). By creating an effects proposition pattern and a non-effects proposition pattern, rival propositions are created. The next step in the process is to take the pattern created by the case study data and determine which "effects" pattern to it is most similar to. This process is followed in this research as the empirical evidence and data collected from the two organisations will be "matched" and interpreted according to the proposed conceptual framework. Then, based on the initial analysis of the case studies conducted at the two organisations, similarities and/or differences between XBRL adoption process at both organsaions will be identified to facilitate the comparative analysis of the case studies. The importance of conducting a comparative analysis is therefore dependent on the selection of multiple case studies, which is explained in the next section.

3.4.2 Selection of Multiple Case Studies

The study of a single case enables the researcher to investigate and "get close" to the phenomenon, which enables the rich description of primary data, full analysis and identification of the structure of phenomenon (Irani et al., 1999). However, a single case has

limitations since it reduces the generalisability of the conclusions or models developed based on the investigation of a single case study. In addition, using a single case study entails taking the risks of misjudging the phenomenon that is being investigated, and exaggerating easily available data (Lee, 1989). On the other hand, although a multiple-case study approach may reduce the depth of the study when resources are constrained and may not enable the same degree of rich analysis of phenomenon as single case studies, it helps to guard against potential research bias. Multiple-case study also enables the identification of the difference in contexts allowing for conducting an informed comparative analysis among the multiple case studies (Lee, 1989; Voss et al., 2002).

In this thesis, a multiple-case study approach is suitable to the research context. A single case study may not provide sufficient data that would justify the formulation of a developed conceptual framework of e-government adoption. Using multiple cases helps to internally validate and cross-check findings through conducting a comparative analysis of the case findings (Eisenhardt, 1991; Yin, 2003). In addition, the analytical conclusions dervied from multiple case study will be more powerful and "robust" than from a single case study, as it will be able to move the investigation from one organisational context to another and will isolate idiosyncrasies that contribute to exploring the phenomenon (Yin, 2003). Therefore, the multiple case study will contribute to expanding the degree of generalisability of findings compared to a single case study.

3.4.3 Relevance and Justification of Using Case Study in IS Literature

The usage of case study research method has been supported by information systems literature. For example, the case study research method has been identified as the most

common qualititave research method used in information systems' researchers (Orlikowski and Baroudi, 1991; Alvi and Carlson, 1992). Choudrie and Dwivedi (2004) conduct analysis of research approaches adopted in the IS field of 633 articles published in peer-reviewed IS journals over the period 1992-2003. Choudrie and Dwivedi (2004) find that researhcers involved in technology adoption research use predominantly two research approaches. The first appraoch is the survey method which is most widely used in the individual technology adoption domain. The second approach is the case study method that is employed exclusivley to study organisational adoption of technology, which is relevant to the context of this thesis. Paré and Elam (1997) also suggest the usage of case study method to investigate the adoption and implementation of information systems. Paré and Elam (1997) believe that the usage of case study helps to focus their research efforts on understanding the courses of actions that are taken by the organisation's staff members, and assess the role of the organisation's key figures in adopting information systems. It also provides the frame through which the IT adoption process could be investigated and identified.

3.4.4 The Usage of Case Study in XBRL Adoption Context

The usage of case study method has been also supported by the researches conducted on XBRL adoption. Doolin and Troshani (2007) conduct case-study based interviews with potential organisational adopters of XBRL including regulatory authorities, accounting firms and members of XBRL Australia. The explanatory qualitative nature of Doolin and Troshani's study provides the researchers with the opportunity to conduct "a preliminary analysis of the findings," one of which has an implication for "XBRL adoption strategies of governments and adoption decision makers in Australia and similar national contexts." (Doolin and Troshani, 2007, p.207). A similar study has been conducted to investigate the

difficulties faced by XBRL stakeholders in the Australian financial sector (Williams et al., 2006, p. 95). Williams et al. (2006) explain that the case study method and the semi-structured interviews help to "draw attention to some of the emerging challenges for both research and practice" (Williams et al., 2006, p.96).

Another case study has been used by Troshani and Rao (2007) to identify the contextual factors that influence the adoption of XBRL. Troshani and Rao (2007) aruge that the case study approach is supported by Elliott (2002) to conduct research that examines the factors influencing XBRL potential organisational adopters. One of the key reasons behind selecting the case study method by Troshani and Rao (2007) is to enable the researchers to explain the limited usage of XBRL by its Australian potential adopters. This thesis will conduct an in-depth case study research to examine the adoption of XBRL, as an e-government initiative, in the UK context.

To sum up, Benbasat et al. (1987), Remenyi et al. (1998), and Yin (2003), provide four main reasons that have been found to be relevant to the case study research strategy in this thesis:

- The case study research is particularly suitable to be used in IS research. Since one of the objectives of this thesis is to examine the adoption process of XBRL in an organisational setting, the main focus here is "shifted to organisational rather than technical issues," (Benbasat et al., 1987, p.382), which is supported by the research motivation discussed in Chapter 1 (Section 1.3).

- E-government phenomeon can be studied in its "natural" setting, which provides insightful implications towards understanding the actual decision-making practices towards e-government adoption.
- The research objective, aiming to examine XBRL adoption process at HMRC and CH and the influential factors and challenges affecting this process, could be answered with a relatively thorough understanding of the organisational setting of the government bodies and the adoption process taking place in these organistaions.
- Since e-government adoption in public sector phenomenon is not investigated in depth, the case study lends itself to early explanatory investigations where the factors are pre-defined in the literature, while the phenomemon itself is not thoroughly understood.
- Since this research aims to develop a conceptual e-government adoption framework, the case study provides an opportunity to explain the different stages of the adoption process as well as to detect (potential) different patterns of organisational practice and decision making, which will facilitate the comparative analysis of the two organisations investigated in this thesis.

Based on the data required to validate the proposed conceptual framework, the epistemological stance is determined, which is interpretive, and the type of the research method is determined, which is qualitative. The selection of the case study, particularly the multiple case study method has been justified through the employment of qualitative research methods. The following section of this chapter will discuss the research design that will be used to analyse the empirical data.

3.5 Research Design

Once the research strategy has been decided for this work (i.e. case study research), it is necessary to decide upon the manner in which evidence will be collected. The case study's data collection methods will be introduced and explained in the following sections.

3.5.1 Case Study Data Collection

An underlying principle in collection of data in case study research is that of triangulation, the use and combination of different methods to study the same phenomenon to provide stronger substantiation of theory. Some of such methods or sources include, as Yin (2003) lists them: (1) interviews; (2) documentation analysis and (3) archival records among other sources. The multiple methods of data collection make the conclusions and findings of research more reliable and consistent than a single method to collect data (Voss et al., 2002; Yin, 2003).

The follwoing table provides three major sources of evidence in case studies. It also considers their comparative strengths and weaknesses as identified by Yin (2003), and provides examples of the use of these sources in this research in the last column. There is no single source that has a complete advantage over all the others, so as the table illustrates the research methods to collect data have been used.

Table 3.3: Data Collection Methods: Strengths, Weaknesses and Sources Used in this Research

Sources of Evidence	Strengths	Weaknesses	Sources Used for this Study
Documentation	Stable - can reviewed repeatedly. Unobstructive - not created as a result of	Restrictive – can be low. Biased selectively, if collection is	Performance progress reports about e-government initiatives.

	case study. Exact- contains exact names, references and details of events. Broad coverage – long span of time, many events and many settings.	incomplete. Reporting bias – effects are unknown, bias of researcher. Access maybe deliberately blocked.	Government reports. Annual reports of HMRC and CH. Reports issued by professional bodies. References material downloaded from organisation website. Opinion articles.
Archival Records	Same as above for documentation. Precise and quantitative.	Same as above for documentation. Accessiblity for privacy reasons.	Organisational records such as material provided by research participants (minutes of meetings, consultations papers, presentations). Archived issues of CH's Register magazine (few are publicly available but most are personally provided by CH's customer care staff members).
Interviews	Targeted – focuses directly on case study topic. Insightful – provides perceived causal interfaces.	Bias due to poorly constructed questions. Response bias. Inaccuracies due to poor recall. Reflexivity – interviewee gives what interviewer wants to hear.	Semi-structured interviews.

Adapted from Yin (1994, p.80)

According to Table 3.2 and research on qualitative research methods (Lee, 1991; Maykut and Morehouse, 1994; Walsham, 1995, Silverman, 2000; Voss et al., 2002), interviews and document analysis of archival records are the most commmon and powerful data sources for qualitative case study research. Therefore, the qualitative interviews and document analysis

and other accessible secondary sources (e.g. government reports and web site resources) are used for data collection of this research. Each data collection method will be explained in the following sections.

3.5.1.1 Interviews and Participant Selection

Interviews are one of the qualitative data collection tools utilised in this research. Inteview is central to most qualitative data collection efforts (Lee, 1991). Hussey and Hussey (1997) describe interivews as a method of collecting data in which selected participants are asked questions in order to find out what they do or think. Interviews facilitate the process of comparing research participants' answers (Maykut and Morehouse, 1994; Hussey and Hussey, 1997).

A personal interview encourages the interviewee to relate experiences and attitudes relevant to the research problem. Personal interviews also provide an opportunity for the researcher to "probe deeply to uncover new clues, to open new dimensions of a problem, and to secure vivid, accurate, inclusive accounts based on personal experience" (Burgess, 1982, p.165).

There are three major types of interviews, depending on the amount of structure imposed by the researcher, that have been discussed by research studies (Maykut and Morehouse, 1994; Hussey and Hussey, 1997; Denzin and Lincoln, 1998). Interviews could be structured, semi-structured or unstructured (Denscombe, 1998; Gillham, 2000; Creswell, 2003; Yin, 2003; Leedy and Ormrod, 2005). The structured interview resembles the questionnaire as the interview is conducted face-to-face with respondent, and it is often

associated with survey that requires collecting a large volume of data from wide range of respondents (Gillham, 2000). The structured interview is more similar to questionnaire methods than to the other types of interviews (Creswell, 2003). With Semi-structured interviews, the interviewer is prepared with a pre-constructed set of issues to be addressed and questions to be answered. However, Denscombe (1998, p.113) points out that with the semi-structured interview the "interviewer is prepared to be flexible in terms of the order in which the topics are considered, and perhaps more significantly, to let the interviewee develop ideas and speak more widely on the issues raised by the research." The answers are open-ended, and the interviewee is provided with the opportunity to elaborate on further points that could be further discussed. Unstructured interviews mainly focus on the interviewee's thoughts, experiences and feelings. This type of interviews allows the researcher to prepare few key questions prior to the interview (Denscombe, 1998, p.113).

In regard to the context of this research and throughout the investigation of the case organisations, the semi-structured interview technique has been used in this research. Face-to-face semi-structured interviews are widely recognised as a powerful tool with which to generate rich data regarding the e-government phenomenon under investigation (Fountain, 2001). In addition, semi-structured interviews assist in exploring participants' experiences and views of XBRL adoption, yet at the same time it allows the interviewer to explore participants' response further or to clarify issues emerging during the interview (Gillham, 2000; Sekaran, 2000). Jankowicz (2000) notes that the semi-structured interview is a suitable data collection technique if it is used within the context of multiple case study research method since it allows the researcher to dictate both the topic and issues to be investigated, whilst minimising or preventing data bias through the careful pre-design of the interview questions.

The conceptual framework of Rogers' adoption process, Tornatzky and Fliescher's (1990) TOE framework and e-government challenges constitute the foundation to develop the semi-structured interviews conducted for data collection in this thesis. The questions are developed to inquire about the participants' experience and views of adopting XBRL within their organisations. Most of the interviews' questions are based on the adoption process's stages, TOE factors and e-government challenges presented as illustrated in Figure 2.3 in Chapter 2, but they have been forumlated to be open-ended ones.[11] Open-ended questions do not have any prescribed answer to be selected by participants as it is the case with the closed questions used in surveys (Cooper and Schindler, 1998; Creswell, 2003; Leedy and Ormrod, 2005). Open-ended questions also enable participants to express their ideas and opinions in their own words (Miles and Huberman, 1994; Gillham, 2000; Yin, 2003). The detailed questions allow the interviewer to pay more attention to participants' opinions and experiences, while the open-ended answers allow participants and the interviewer to follow up specific issues, dismiss them as insignificant, or suggest additional views during the course of the interview (Gillham, 2000; Sekaran, 2000; Leedy and Ormord, 2005).

The participants have been selected based on their job affiliation and role in XBRL adoption process within their organisations. Participants working at HMRC were interviewed at three different work premises: Telford, Peterborough and London. Participants working at Companies House were all interviewed at CH's headquarters in Cardiff. They are all staff members at both organisations, who have been responsible for introducing and adopting XBRL. The staff members who have been invovled in XBRL adoption process at HMRC and

[11] Please see the list of interview questions in Appendix 3.

CH represent the key members of "XBRL project"[12] at both organisations. The participants' selection is purposive or judgemental (Sekaran, 2000; Leedy and Ormrod, 2005; Saunders et al., 2006). This method could be used when working with "very small samples such as in case study research ... to select cases that are particularly informative" (Saunders et al., 2006, p. 230). The other sampling method that has been adopted for selecting participants has been based on snowballing (Saunders et al., 2006). Some of the research participants who have been interviewed at an early stage of the data collection have been approached to identify other potential participants, who could be working in other departments, but have taken part in XBRL projects.

The interviewees' professional backgrounds vary depending on the role they play in "XBRL project." Participants' backgrounds cover the strategic, advisory, customer services and technical areas. The diversification of the professional backgrounds of "XBRL project" members allows to provide 'sufficient' data about different aspects of XBRL adoption process that has taken place in HMRC and CH. However, it has to be noted that the data collected from the interviews has been validated through the usage of document analysis as it will be explained in Section 3.5.1.2. Table 3.1 provides a list of brief information about interviewees, their job titles and relevance to the case study. All the research participants in this study have been exposed to the usage of IT in their work place, whether at IT design, operational or advisory level

Table 3.4: Summary of Interviewees' Details

Interviewee	Position	Relevance to the Case Study
HMRC 1	**Manager of Online Services**	**Responsible for implementing XBRL project at HMRC. The participant has 37 years of experience working for HMRC, and has been involved in many HMRC's major**

[12] The term 'XBRL Project' will be used throughout this thesis to refer to XBRL adoption project

		information technology projects. Since 2001, he has been involved in HMRC electronic filing projects, and initiated HMRC's first online CT system.
HMRC 2	**Technical Architect**	**Works as a software strategy architect for HMRC's CT online service. He is Chartered Information Technology Professional with over 28 years of experience as a software engineer.**
HMRC 3	**Process Advisor**	**Used to work as a corporation tax inspector in the Large Business Services area. Currently working in the corporation tax and VAT directorate, and responsible for interpreting tax elements that go into the taxonomy, and interpret them to tax software developers.**
CH 1	**Senior Project Manager**	**Used to be the project manager of the e-Accounts programme, responsible for implementing electronic filing systems at CH.**
CH 2	**Head of Development**	**During the initial stage of launching e-Accounts programme at 2005, she used to work as the Service Transformation Programme manager.**
CH 3	**Business/Systems Analyst**	**Used to work as a senior analyst at one of UK's telecommunications companies and joined CH in 2005 as a system analyst responsible for interpreting XBRL elements, validation rules and rendering issues with accountants.**
CH 4	**Director of Accountancy Profession**	**Provided introductory information about XBRL adoption process at CH. He also facilitated conducting interviews with other staff members involved in XBRL project at CH.**

All interviews were conducted during the period May-November 2008. The potential participants were invited by using electronic mail. The information sheet for project initiation and consent forms were provided to participants before the commencement of the interviews.

The information sheet included a brief description and purpose of the study and guidelines for gathering information and protecting participants' confidentiality.[13]

Interviews have averaged approximately 90 minutes. Gillham (2000) suggests that this amount of time allows a sense of security and rapport to develop between the researcher and participant. All interviews -except for the interview with CH3- have been conducted in person at the organisation site in a closed office or conference room. Interviewee (CH3) has not been able to be interviewed in person due to his busy work schedule, which requires constant travelling and mobility. Instead, the interviewer has been asked to send a list of questions via electronic mail to which a prompt response has been provided by the research participant (CH3).

3.5.1.2 Documentation Analysis

Documentation plays an explicit role in any data collection in conducting qualitative case studies. Therefore, systematic searches for relevant documents to the research context are important in any data collection plan (Yin, 2003). The most important use of documents in this research is to validate and augment evidence from other resources, particularly interviews. For example, documents are helpful in verifying and providing other specific and relevant details and facts about the different stages of the electronic filing process at HMRC and CH. Thus, government reports, consultation documents, organisational presentations and archived documents provided by the research participants themselves have facilitated the collection of technical and non-technical information which has enriched the description and explanation of the organisational setting of the case organisations.[14]

[13] Information sheet for Project Initiation and Consent Form are provided in Appendices 2A and 2B.
[14] The lists of HMRC and CH's archived documentation are available in Appendices 4A and 4B.

3.6 Data Analysis

The process of analysing qualitative data may take many forms, but it is fundamentally non-mathematical in nature. According to Bogdan and Biklen (2003, p.153), "qualitative data analysis is about working with data, organising them, breaking them into manageable units, synthesising them, searching for patterns, discovering what is important and what is to be learned."

This section will discuss the procedures and steps taken to analyse the data from the field study. The conceptual framework illustrated in Figure 2.3 in Chapter 2, has been used to develop the semi-structured interviews as explained in the research design and data collection sections. After the interviews, all the recordings have been transcribed. The interview transcripts have been analysed using the following two steps:

1. Coding and identifying research themes
2. Gap analysis

These steps will be discussed in the following sections.

3.6.1 Coding and Identifying Research Themes

All the interviews have digitally been recorded and transcribed. All the participants' identities have been removed from the transcripts and a code has been assigned as a means of identification (e.g. HMRC1, CH1). A separate list of participants and the codes assigned to them is kept confidential. From the transcripts, an analysis has been conducted to identify TOE factors and e-government challenges affecting XBRL adoption process (Weber, 1985; Boyatzis, 1998; Neuendorf, 2002). Nvivo, which is a qualitative analysis software tool, has been utilised to support the analysis process of the data collected during the interviews

(Welsh, 2002). As much of the literature emphasise (Kelle and Laurie, 1995), computer-aided methods can "enhance the validity of research findings from qualitative studies in two ways" (Kelle and Laurie, 1995, p.27). First, these methods can help to manage a large amount of data and samples. Second, given that a reliable and consistent code is applied, they can facilitate the information retrieval process about a certain topic. Nvivo database has been created for each government agency. All interview transcripts have been loaded and saved in the tool as documents. Nodes have been created prior to analysing the data collected, to reflect the factors and challenges investigated in the conceptual framework.

Coding in this study is a process to generate research themes that contain pointers to the actual data (Morse and Richards, 2002; Richards, 2005). The process of coding has started by using descriptive coding (Miles and Huberman, 1994; Morse and Richards, 2002) where phrases, words, and sentences from interview transcripts have been labelled using relevant words according to the stages, factors and challenges discussed in the proposed theoretical framework. Therefore, an "axial coding" has been used to systematically develop the research themes (Strauss, 1987; Saunders et al., 2006). Axial coding has been achieved by developing relationships and core categories according to priori research model (Creswell, 2003, p.152). This helps in reducing the data that needs to be analysed. Throughout this coding process, the transcripts have been revisited to ensure that axial codes and meanings have been interpreted in context and according to the conceptual framework. Coding has been conducted by reading individual interview transcripts. Sentences, phrases, and words have been highlighted as they comprise the answers to the interview questions. Answers have been mapped to a particular question, and compared to other respondents' interview transcripts. The interview questions

have been developed based on the conceptual framework. Data has been observed where it would fit into the initial framework and gaps have been identified

3.6.2 Gap analysis

Gap analysis attempts to find differences between the proposed conceptual framework and the findings derived from the field study. By mapping the answers to the interview questions, the differences and irrelevant elements from both literature and findings can be identified. The qualitative evidence, used as part of the case study database, can be developed through the documentation process. Such database can be structured by following a particular line of thinking or inquiry or research question, so the evidence associated with each question is presented in the same place. Yin (2003) proposes the usage of documents as one of the case study's data collection methods. In this thesis, the documents of relevance to the research questions or participants' responses have been collected during the course of the research. A specific folder has been established for each organisation to keep all the organisation's documents and government reports that had been produced and found to be of relevance and importance to the research. Some of these documents have been retrieved as they would pertain to specific interviews, or explain some of the issues that have been referenced by research participants but have not been covered in-depth during the interview. Factors and challenges affecting XBRL adoption process have been identified. This allows to conduct a comparative analysis among the factors and challenges at both government organisations. The analysis has been conducted to find out which factors and challenges have (not) been supported by the study findings. Any differences found in the gap analysis has been evaluated by reference to the literature to find any supporting theoretical explanations (Miles and Huberman, 1994; Creswell, 2003).

3.7 Limitations of Research Design

As in any study using the qualitative approach, there are inherent limitations to the research design. The qualitative approach is more concerned about the detail of the sample studies rather than the representation of a population (Morse and Richards, 2002; Creswell, 2003; Leedy and Ormrod, 2005). In other words, the research results may not be applicable to other contexts.

There is a limitation in the data collection tools regarding the application of semi-structured interviews. The participants' accounts have been based on their perception, memory, and experiences. It is possible that their responses have not described accurately what happened. From the participants' responses, verification can be made and a further clarification can be sought from the participants. Two strategies have been adopted to overcome this limitation. First, a comparison between individual participant's responses has served as a verification tool. Second, the accounts of research participants have been analysed and compared to relevant government assessment and progress reports and strategies regarding the electronic reporting services in the UK. This data triangulation has helped in subsequent analysis of the interviews and assisted in improving the reliability and validity of research findings.

3.8 Ethical Considerations

Before conducting the case study, the research design had to be approved by Birmingham Business School's Research Ethics Coordinator, in accordance with the Economic and Social Research Council's Ethics Framework. An application was prepared and submitted to the Ethics Committee. The approval was granted in April 2008. All the participants should be

protected from harm, loss of privacy, and deception. A consent form was prepared and signed by participants prior to commencing the course of interviews. The participants were also free to select the place and time of interview. All the data collected during the study have digitally been recorded, and kept in secure storage. The PhD researcher and supervisors are the only people who have access to the data collected.

3.9 Conclusion

The aim of this chapter is to propose a rationale for the use of an appropriate research methodology in this thesis. Since the research in e-government has been developed relatively recently, attention is given to the methods employed to justify the claim that potential research outcome and contribution has been added to the body of knowledge. Therefore, the research in e-government undertaken for this thesis requires that the methodologies and methods used should be clearly explained, so the results of the research are convincing and credible.

The objective of this research is to develop a conceptual framework for e-government adoption that is proposed in Chapter 2 within the confines of the empirical study. Therefore, the thesis has employed a research strategy for the purpose of developing a conceptual framework that is built on pre-defined existing theories, with an interpretive epistemological stance, utilising qualitative research methods. Qualitative research method is a proper method to investigate a contemporary phenomenon such as e-government adoption. It also allows to examine in depth the adoption process of e-government through studying this phenomenon in its organisational setting. In order to apply the qualitative research methods productively in this research, the differences between qualitative and quantitative research have been discussed.

The research strategy used in this thesis has been discussed and justified. The strategy is to conduct a case study to investigate e-government adoption process, since generally, it provides the researcher with the opportunity to investigate the organisation's information and reporting systems in depth through a series of semi-structured interviews and documentation analysis. Furthermore, multiple case studies are used in this research to explore and understand in comparative terms the adoption process of e-government. Using multiple case studies provides insightful conclusions in this research and supports the validity of the revised conceptual framework.

In addition, the use of research methods has been outlined and discussed, and arguments for the suitability of particular methods have been provided. Interviews and documentation analysis are main data collection methods utilised in this research. The data collection stage has been also explained as well as the methods of data analysis. The interview process has been described and how the research data has been managed. In the data analysis section, the coding technique, tools for identifying themes and gap analysis have been presented to explain the methods of analysing the data collected. In the next chapter, the organisational setting of the case studies undertaken in this research will be introduced and discussed based on the guidelines described in this chapter.

CHAPTER 4

CASE STUDY SETTING

4.0 Introduction

Chapter 1 has introduced the general research background of this thesis, where the main concepts of e-government, regulatory online reporting and XBRL have been introduced and discussed. This chapter examines in-depth the organisational setting of the two case studies selected in this research: HMRC and CH. The discussion in this chapter is represented by an examination of the history of each government agency's electronic filing process. This examination provides rich information about the surrounding "environmental" conditions and key organisational players and their impact on the development of HMRC and CH's electronic filing systems. Discussing the electronic filing history of each agency should precede the analysis of the process and the factors and challenges affecting this process.

There is no universal model that can be applied in all government settings. This is due to the differences in the history, functionality, experience and the rapid adoption of electronic governments as well. Explaining the "historical" stages of electronic filing process provides insightful understanding of how XBRL has been adopted by each government agency and the key players who have performed different roles in the adoption process. These are two important issues that need to be investigated while conducting e-government adoption studies (HMRC and CH) as indicated in Chapter 1. Finally, exploring the organisational setting of XBRL adoption process in detail will help to inform the analysis of the case studies, which will be conducted in Chapter 5.

This chapter summarises the qualitative data gathered about HMRC and CH's electronic filing history and XBRL adoption process. Information gathered during the data collection process has been based on the research participants' experiences and views of XBRL adoption within their organisation. A database of internal documents, provided by the research participants has informed the analysis. Archived issues of the "Register" magazine covering the period (1998-2009) were provided by CH's XBRL project team and customer care staff members. Other Internet-based information resources have been used to identify other "external" and non-organisational viewpoints regarding the XBRL adoption process.

The chapter starts by providing a historical outline of each organisation's existing electronic filing process. This history assists in identifying the development of the electronic filing processes at each agency. The chapter also highlights and discusses the features of the contextual organisational setting that are important for HMRC and CH's decision to adopt XBRL. Due to its relevance to XBRL adoption project in each government agency, the issue of the joint filing facility is also discussed. The chapter is finalised by providing relevant comparative remarks of HMRC and CH's XBRL adoption process as observed and identified in the discussion.

4.1 HM Revenue and Customs Background

"Prior to 1833, the national revenue of the UK was collected by four boards: the Boards of Customs, Excise, Stamps and Taxes" (Shah et al., 2010, p.124). In 1834, the Board of Stamps and Taxes merged. "In 1849, the Board of Stamps and Taxes was in turn [merged] with the Board of Excise to form the Board of Inland Revenue [IR]" (Shah et al., 2010, p.124). The IR was responsible for collecting direct taxes corporation tax, income tax, capital gain tax and

other direct taxes. HM Customs and Excise (HMCE) department was established in 1909, when Excise was removed from the Board of the IR and was merged with the Customs as one Board.[15] HMCE was responsible for administering indirect taxes such as "Value Added Tax (VAT), custom duties, and excise duties" and other minor indirect taxes (Shah et al., 2010, p.124).

The subject of merging the IR and HMCE was initially proposed in the Treasury Committee's report on the Inland Revenue in May 1999.[16] In this report, an assessment of the feasibility of merging the two departments was conducted to examine the savings in public expenditure and compliance costs resulting from the merger. In April 2000, the government responded by accepting the Treasury's proposal citing that the merger "would improve compliance with taxation, reduce businesses' compliance costs and reduce the government's revenue collection costs."[17] In March 2004, the former Chancellor of the Exchequer, Gordon Brown, officially announced the government's decision to merge the two agencies into a single entity, HM Revenue and Customs (HMRC)[18]. The purpose of this merger, which was supported by the earlier Treasury Committee report's findings, was to "reduce level of duplicated effort on the part of employers and streamline communication with tax authorities"[19] for the smooth delivery of tax filing services. In October 2004, the Paymaster General was announced to be the departmental minister for HMRC.[20] The Paymaster General's responsibilities include "strategic oversight of the UK tax system as a whole

[15] http://www.financerecords.org/topics/Customs-and-Excise-department?PHPSESSID=153om41jilm0uqf5p321pabvf3
[16] Treasury Committee, Sixth Report of Session 1998-1999, Inland Revenue, para. 81.
[17] Treasury Committee, Second Special Report of Session 1999-2000, HM Customs and Excise: The Government's Response to the Committee's Second Report of Session 1999-2000 (page 5). Available at: http://www.publications.parliament.uk/pa/cm199900/cmselect/cmtreasy/53/5307.htm
[18] http://www.guardian.co.uk/business/2004/mar/17/politics.budget2004
[19] http://www.itif.org/files/UK_Parliamentary_Taxation_Group-Future_of_Income_Tax_Administration.pdf (page 17).
[20] http://www.publications.parliament.uk/pa/cm200304/cmselect/cmtreasy/556/556.pdf and http://www.hm-treasury.gov.uk/d/Deptrep03_Chapt2_64kb.pdf

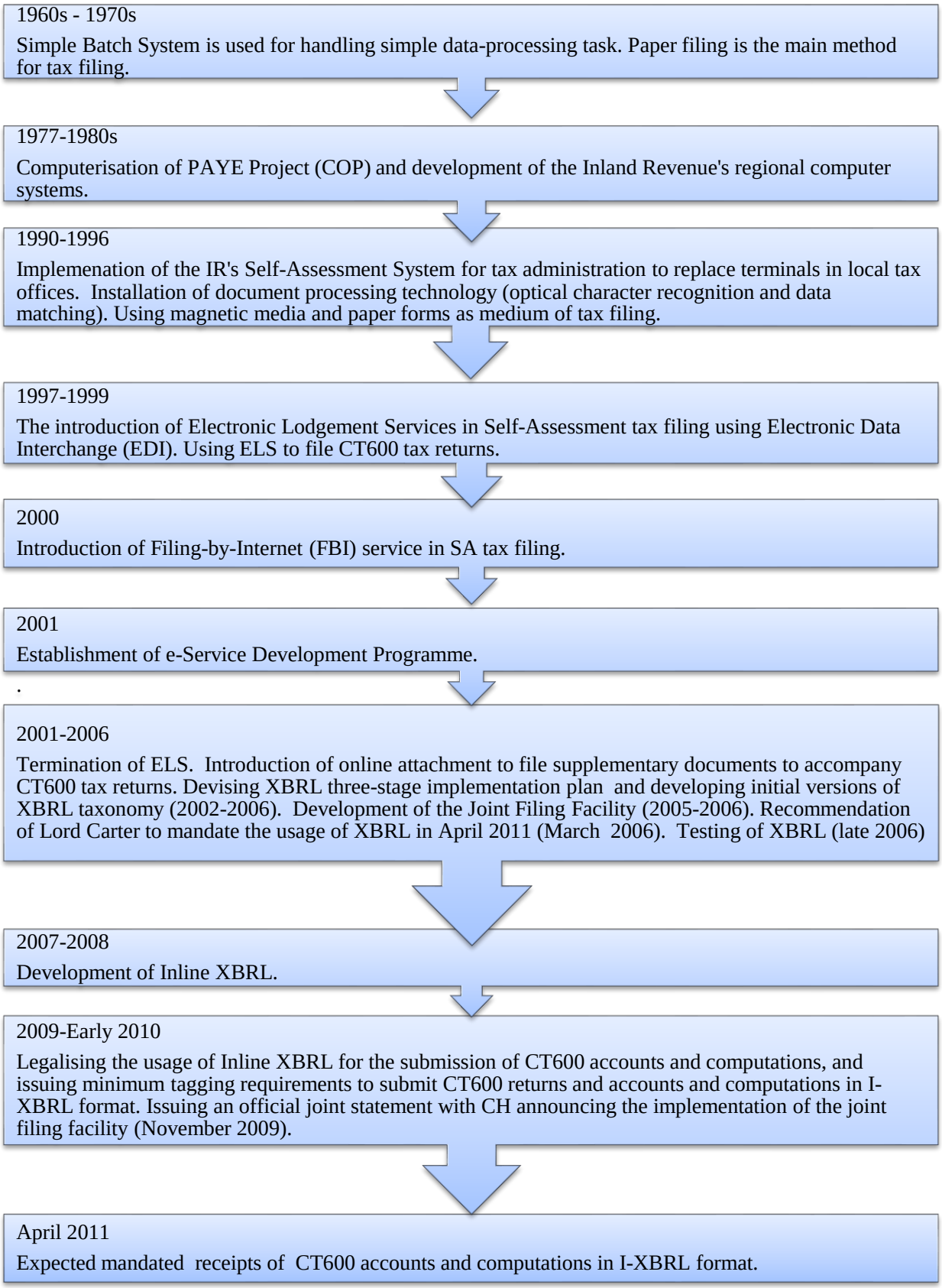
including income tax, corporation tax, capital gains tax as well as custom duties and a number of other types of taxes."[21] The merger was implemented and HMRC was established in 2005 as a UK government agency responsible for the administration and collection of the previously mentioned taxes.[22]

As it will be explained in the next section, the IR had a long-standing history of developing information systems since the early days of computer technology during the 1960s. In addition, during the 1970s, the agency undertook a programme of computerisation to eliminate manual procedures and reduce compliance burden. These historical endeavours of computerising HMRC reporting process constitute the foundation of the agency's existing electronic filing process. Therefore, it is important to explore the history of HMRC's reporting process to provide "a contextual preface" of the adoption process of XBRL at HMRC.

In the next Section 4.1.1, an illustration is provided to summarise the timeline of the history of HMRC's electronic filing process over the period (1960 - April 2011). The illustration is followed by detailed description and explanation of this history.

[21] http://www.publications.parliament.uk/pa/cm200304/cmselect/cmtreasy/556/556.pdf (page EV 68).
[22] http://www.opsi.gov.uk/acts/acts2005/ukpga_20050011_en_1

4.1.1 Timeline of HMRC's Electronic Filing History



4.1.2. History of HMRC Online Filing Process:

4.1.2.1 Inland Revenue Electronic Filing System: 1960s-1970s

The former Inland Revenue (IR) began investing in information technology in the early 1960s. The IR developed its information system and ran one of the largest administrative computer networks in Europe (NAO, 2000). The first IR's computer system was responsible for handling simple data-processing tasks. In 1965, the first plan to computerise the main tax system was drawn up as a batch system for Pay-As-You-Earn (PAYE), which would run from nine computer centres across the UK (Margetts, 1999). The first, "Centre 1," was implemented in Scotland in 1968 and a second centre in Liverpool, "Centre 2", was built and staffed. However, in 1970, the government planned radical changes to the tax system to include a tax credit system, with a single interface between the government and the citizen in the giving and taking of money (Margetts, 1999). This policy change meant a merger of revenue, national insurance and benefits. The batch system for PAYE was deemed inappropriate for the policy changes and "Centre 2" was never opened. In 1974, the government abandoned the plans for the tax credits as it proved to be expensive to implement (Margetts, 1999). The Permanent Secretary of the Inland Revenue at that time, Sir William Pile, "felt that the manual system was close to breakdown" and that service would decline with the "sheer weight that is being put on it" (Dyerson and Roper, 1992, p.304).

In 1977, the Inland Revenue reconsidered its original plans to automate the tax system. Steve Matheson from the Treasury Department was given the task of investigating new possibilities for computerising the PAYE system, and the approval was given to initiate "a very limited on-line system" (Matheson, 1984, p.92), and a feasibility study took place from 1978 to 1979.

4.1.2.2 Computerisation of Pay-As-You-Earn Project: 1980s

In 1980, a decision was made to implement the "Computerisation of PAYE" or COP project to "improve the service to the public through greater accuracy, reliability and speed of response to communications ... and to create a system offering greater flexibility for the implementation of future changes within the present tax structure" (NAO, 1987, p.7). In April 1984, the COP project was extended to include assessment of Schedule D Tax, the counterpart for the self-employed to the PAYE tax. The implementation of COP was regarded as an IT success, and operated at 99% reliability. Minor problems were reported during installation (Dyerson and Roper, 1992).

During the implementation of COP project, the IR suffered from shortages of skilled labour during the development of IR's computer systems, in response to which local office users were trained as programmers. Despite its high cost, this training strategy improved the connections between the tax agents and system designers (programmers) (Morris and Hough, 1987). Furthermore, the involvement of staff at the highest level of the organisation was evident. Dyerson and Roper (1992) indicate that it was unusual for a government IT initiative to display the high level of personal commitment that was given by the senior management at the IR on the COP project. A committee structure was set up to manage the project and a co-ordinating committee chaired by the Project Director met monthly to monitor progress. Steve Matheson, who directed the project from the beginning of a feasibility study in 1978 until 1984, took the role of "project champion." IT support contracts with two outside consultancy firms, Computer Sciences and Pactel, were signed at the beginning of 1981 to review the implementation plan of COP Project (NAO, 1987, p.15).

The project's completion coincided with the end of the government's preferred procurement policy. Mr. Matheson recommended in a feasibility study that the project should be left for an open tender (Morris and Hough, 1987). Matheson's study recommended the integration of a full mainframe system and a full distributed system. This was considered to be a difficult task due to the necessity of keeping the local system synchronised with the central one. No software vendor was capable of undertaking such a task. ICL, an American supplier of computer hardware for the COP project, offered to engage in such a task, but it needed to develop new hardware and software from scratch (Morris and Hough, 1987). However, they had no experience with distributed systems, and they did not develop suitable recovery software that could provide protection against database corruption. Despite the concerns over the reliance on a foreign IT supplier, the IR was told to "refashion" the system specification that ICL could do. The IR's contract with ICL marked an important step towards the agency's IT implementation strategy as it highlighted its need to seek external non-UK IT support. This importance stemmed from the realisation of seeking IT supplier that is capable of meeting the agency's prioritised need to undertake large-scale IT projects in the future. This was evident with the IR's decision to implement latest technologies in tax filing, which was the main highlight of the 1990s era in the IR's filing system history (Margetts, 1999).

4.1.2.3 Inland Revenue Electronic Filing System: 1990s

In April 1991, the Information Technology Office of the IR that had been built up to oversee the COP project became an Executive Office of the Inland Revenue, known as the Information Technology Office (ITO) (Margetts, 1999). The ITO was responsible for developing, maintaining and operating all the IR's computer systems. During 1991-1992, the ITO developed and ran all IR's computer systems with an annual budget of £250 million and

operated 13 regional computer centres (NAO, 2000), including the oversight of COP project. The centres were split into smaller and more manageable projects to reduce complexity. These smaller individual systems needed to be capable of integration to maintain efficient and coherent support systems (Inland Revenue, 1992, p.42).

The IR initiated its biggest tax reform by the adoption of a self-assessment system of tax administration during the period 1992-1993 (Beynon-Davies, 2005). The system was similar to that used in the United States, where tax payers estimate their own tax liability and submit their tax forms to the IR along with payment. The system was planned to apply to 9 million higher-rate tax payers and the self-employed and others who had to file individual tax returns, in an attempt to cut red tape, reduce costs and make the system more accurate. The National Audit Office (NAO) noted that IR's computer systems became more complex over the years and "they [computer systems] cannot be enhanced to provide the functionality needed to support all the changes the Department wants to make" (NAO, 1996, p.19). To improve the functionality of its IT systems, the IR spent nearly £80 million in 1991-1992, including £17 million on IT consultancy support (HM Treasury, 1992, p.63).

Meanwhile, as it was planned for the introduction of self-assessment, in July 1992, the Director of the Information Technology Office announced a strategic partnership with Electronic Data Systems (EDS), making it IR's sole IT services supplier (Inland Revenue, 1992, p.42). Starting 1994, all the computers and information systems of the ITO have been owned by EDS (Beynon-Davies, 2005). Inland Revenue studied also the possible uses of installing optical character recognition, electronic data matching and imaging technologies. However, there was little effort to implement any of these technologies at a decentralised

level (Margetts, 1999). Document-processing technology was tested but problems with the technology discouraged implementation of any plan. In 1994, tax software packages were introduced by tax software vendors.[23] The software showed a copy of a tax return complete with the IR's own guidance notes. According to the Independent, tax agents used computerised versions of tax returns instead of paper forms for about a million personal tax payers, but the electronic filing of such forms was not enabled.[24]

The IR's strategy to reform its tax administration systems was guided by the former Prime Minister, Mr. Tony Blair, who announced in 1997 that by 2002, 25% of government services will be electronically enabled and by 2005, 100% of such services should be digitised (Beynon-Davies, 2005). In late 1997, and following the UK's e-government initiative, the IR established a new Electronic Business Unit (EBU) to provide support to customers that is compatible with HMRC's own electronic services (NAO, 2002). The IR set out key features for its e-business strategy that included using intermediaries such software developers to provide bespoke services to HMRC's filers. The strategy also emphasised transforming its staff roles to focus on supporting the use of electronic tools (Beynon-Davies, 2005).

4.1.2.4 Introduction of Electronic Lodgement Service: 1997

Until October 1997, HMRC relied on magnetic media and paper forms to be the medium of tax filing. Data communication problems such as keying and processing filers' data and information meant -up to 60% of taxpayers' records- would be inaccurate, generating delays and further paperwork (NAO, 1999). EBU's team worked alongside with EDS to develop new means of electronic communication with employers and payroll operators. In 1997, the

[23] For example, Quicktax for Windows application showed a copy of a tax return complete with the IR's own guidance notes (Margetts, 1999).
[24] Independent, 21 April 1994.

Electronic Lodgement Service (ELS) was introduced to enable "tax agents and accountants to file Self-Assessment (SA) annual returns electronically on behalf of their clients using an Electronic Data Interchange (EDI) service."[25] The service aimed to reduce the burden on employers of compliance with PAYE regulations and reduce routine manual data processing. "Over 267,000 returns were submitted through ELS in 2000-2001, equivalent to 7% of the target audience" (Beynon-Davies, 2005, p.15).

The Corporation Tax on-line self assessment regime was introduced in July 1999 as part of the Electronic Lodgement Service system. According to the Office of National Statistics, there were 2.15 million business enterprises in 2009, 52% of which represent corporate businesses.[26] HMRC deals with 2,400 of the largest businesses through its Large Business Service (LBS) division (NAO, 2007). Of the 2,400 businesses, the LBS division deals with Corporation Tax for 900 businesses (including banking, insurance, retail and telecommunication sectors). Each UK Company has to prepare an annual return of its taxable profits on the Corporation Tax return (CT600 Form). This form is only part of the required filings for the Corporation Tax, which also includes statutory accounts and supporting documents (computations). Agents and tax filers dealing with Corporation Tax had the choice to file CT600 returns using HMRC's self-assessment web filing facility for tax returns or to complete returns in paper form.

[25] http://www.hmrc.gov.uk/workingtogether/publications/wt_5.htm
[26] http://www.statistics.gov.uk/cci/nugget.asp?id=1238

HMRC commissioned a market research study to assess business interest in ELS. It was found that ELS did not offer added value to the user.[27] It was also found that individuals had high expectations that ELS would "enable them to complete their return quickly, in less than 15 minutes" (NAO, 2002, p.16). HMRC was alarmed because of the significant low take-up of ELS as only 49 out of 660 organisations were utilising ELS to send their PAYE tax returns. The rest of the organisations approached HMRC to enquire about using the service, but they were found to be too small to be suitable to accommodate EDI's needs to file their tax returns (NAO, 2002).

At the time of NAO's assessment of ELS at HMRC during the period 1999-2001, HMRC had five account managers working for its Electronic Business Unit, responsible for supporting and promoting the usage of ELS. After ELS became widely available in April 2000, "these managers received a substantial number of enquiries" (NAO, 2002, p.16). They were not also able to initiate contact with many companies who were not aware of the ELS service (NAO, 2002). HMRC had to provide more resources to its EBU to meet the EDI's needs of the large business organisations segment. Another constraint was HMRC's struggle with the "availability of electronic data interchange payroll software applications" that required functionality in the payroll products (NAO, 2002, p.30). Agents filing attachments (accounts and computations) to SA tax returns also complained about the form's small space designated for computations and comments.[28] HMRC needed a new electronic system that has more built-in filing functionalities than ELS that would allow tax agents to use sufficient white space for information disclosure.

[27] Inland Revenue Internet Filing Survey Market Research Report, Continental Research, October 1999.
[28] http://hmrc.gov.uk/workingtogether/publications/wt_6.htm#e

4.1.2.5 Introduction of Filing by Internet Service: 2000

HMRC originally planned in the 1990s to use the Internet as a medium for electronic filing service which could be part of the Government Gateway project.[29] The Gateway Project was the cornerstone of the Government's Internet infrastructure and a key to meeting the former Prime Minister, Mr. Tony Blair's target of enabling the electronic delivery of government services by 2005.[30] In 2000, the Government Gateway project encountered some technical problems as the digital certificates system[31], which was central to the project, blocked all non-Microsoft users. Because of this technical difficulty, it became unclear when an Internet filing service would become available through the Gateway. HMRC realised that it was important to support its ELS during the tax filing peak by providing an alternative electronic filing channel (NAO, 2002). In April 2000, Filing by Internet or FBI electronic facility was introduced. Many tests of the new filing system had to be performed due to security problems on HMRC's website, which caused a delayed implementation of the system until July 2000.

FBI subsequently became part of larger HMRC electronic filing project named as "Agents on-line project" (Lymer et al., 2005). HMRC supported the usage of the new Internet-based filing service to encourage the population of filers -90% of self-assessment return filers- who file their tax returns using tax software packages.[32] Time needed for processing tax returns, and receiving confirmations on them was reduced from a day with ELS to few seconds with FBI system. In addition, FBI allowed for minimising keying errors

[29] Government Gateway Project is part of UK Government' IT infrastructure strategy aimed to enable central government departments (including HMRC) to provide electronic services by year 2005. Please see: http://www.gateway.gov.uk/
[30] http://www.theregister.co.uk/2001/05/28/msbuilt_uk_government_gateway_locks/
[13]http://www.theregister.co.uk/2001/05/28/msbuilt_uk_government_gateway_locks/
[32]http:// www.tax.org.uk/

by HMRC's staff, as the new electronic filing system instantly captured data as they are submitted by tax filers and agents.[33]

4.1.2.6 Establishment of HMRC's e-Services Programme: 2001

The Committee of Public Accounts published its fifty-second report on HMRC's electronic filing services.[34] The report assessed the progress of HMRC's FBI facility. The report indicated that only 32% of individual taxpayers and 28.5% of tax agents filing on behalf of taxpayers used the facility during the period 2000-2001.[35] "Among the key factors behind this low take-up were teething problems in users gaining access. Four out of five attempts to submit tax forms electronically were unsuccessful."[36] Some taxpayers found it difficult to register because they did not know their tax number, and Mac users were unable to use the service as well.[37] Many tax agents received error messages and delayed submission responses while using the service. They also encountered problems viewing client lists and enabling the online agent authorisation.[38] In recognition, HMRC carried out an e-Services programme of work between 2001 and 2005 to improve the performance of its electronic filing facility (NAO, 2002).

4.1.2.7 Development of Corporation Tax Filing & Introduction of XBRL: 2001-2005

As part of implementing the e-Services programme, HMRC introduced a Corporation Tax filing portal to enable companies and their agents to see what payments they have made and tax liabilities remaining. Mr. Stephen Banyard, who is the Director of the Business Customer

[33] http://www.icaew.com/index.cfm/route/139590/icaew_ga/DOC
[34] http://www.parliament.the-stationery-office.co.uk/pa/cm200102/cmselect/cmpubacc/707/70703.htm#note11
[35] Ibid.
[36] Ibid.
[37] Ibid.
[38] Tax Faculty weekly newswire No 438 - TAXline weekly news update No 261

Unit[39] at HMRC, responsible for tax filing services to HMRC's business taxpayers, was one of HMRC's key figures involved in the e-Services programme. He also had good experience with tax agents and advisers through his work with HMRC's Working Together E-group when he was the Director of Operations.[40] Mr. Banyard established the 'Carter Agent Steering Group,' part of which is the 'Working Together' group, that is responsible for meeting with tax agents and have representative members from different accounting professional bodies. Through such meetings, concerns were raised by agents who represent large business companies, required to submit large amounts of data within their supplementary documents, accompanying the CT600 tax returns.

In recognition, HMRC introduced online attachments option to the CT600 tax return filing service that took place in early 2003.[41] Tax agents are allowed to complete CT600, attach supporting documents and post them to HMRC over the Internet using CT online application. Electronic returns and supporting documents were also filed from third party tax software applications over the Internet. However, by the end of the tax year of 2005-2006, only 2% of companies took advantage of such facility.[42] This 2% represented 900 Large Business Services groups of companies (£18 billion of tax return), which were allowed to send their accounts and supporting documents as online attachments.[43] This very low rate of online filing was due to the fact that the web filing facility was not enabled to accept PDF-based supplementary documents such as accounts and tax computations. The online filing facility did not accept such documents because the online attachment service is intended only for accompanying documents and HMRC does not process the data in that kind of attachment.

[39] http://www.mynewsdesk.com/uk/view/pressrelease/hm-revenue-customs-the-business-inspector-gets-boost-from-hmrc-374542
[40] http://www.hmrc.gov.uk/workingtogether/publications/wt-27.htm#4
[41] http://www.tax.org.uk/attach.pl/6695/7840/026-027_Acc_0408.pdf
[42] http://www.hmrc.gov.uk/workingtogether/publications/wt-25.htm#9 and http://www.hmrc.gov.uk/sa/attachments.htm
[43]http://www.hmrc.gov.uk/workingtogether/publications/wt-25.htm#9 and http://www.hmrc.gov.uk/sa/attachments.htm

For HMRC, the usage of information contained in the accounts and tax computations is crucial for the risk assessment procedures carried out by a network of 68 tax inspection and risk assessment offices. This network deals with 1.1 million tax returns from companies, who paid £15 billion in 2004-2005.[44] This Corporation Tax work costs HMRC £220 million or 1.4 pence/pound of revenue.[45] Each risk assessment area is responsible for assessing non-compliance risks. Cases selected for further tax enquiries are usually required by HMRC to submit additional information, which is disclosed in the selected company's accounts and tax computations documentation, which cannot be filed electronically (HMRC web site, H1 and HMRC1). HMRC normally conducts two types of tax enquiries in such cases (HoC, 2005). Full enquiries focus on the disclosure of accounting for the entire income and assets of a business, and this is typically associated with small companies. Aspect enquiries examine accuracy and tax treatment of one of more particular features of the CT600 tax returns, and this type of enquiry is more typically associated with larger and complex companies. However, aspect enquiries could be also applied to smaller companies if only limited aspects of the tax returns are considered necessary to examine. Enquiries may result in securing additional Corporation Tax or profit adjustment for HMRC. Table 4.1 indicates HMRC's results on the full and aspect Corporation Tax enquiries.

[44] http://www.parliament.the-stationery-office.com/pa/cm200506/cmselect/cmpubacc/967/96705.htm
[45] Ibid

Table 4.1: Cost/Yield Analysis of Full and Aspect Corporation Tax Enquiries:

	Full Enquiries	Aspect Enquires
Number completed	4,500	39,200
Average Yield	£26,700	£12,300
Average staff cost	£5,600	£500
Average yield/cost ratio	4.8:1	22.6:1
Proportion of enquiries resulting in a tax or profit adjustment	81%	58%

Source: C&AG's Report[46], Corporation Tax: companies managed by HM Revenue and Customs' Area Offices (HC 678, Session 2005-2006), paragraph 1.1; Q 31, *Budget 2006 (*HC 968, Session 2005-06), Table C8.

HMRC found out that even though aspect enquiries generate less yield than full enquiries, they produced a better pay-back rate because they are much less costly than full enquiries. This variation in yield and cost of case enquiries prompted HMRC to focus particularly on deploying more skills and resources into the processing of aspect enquiries which deal with Corporation Tax for the large and complex companies (HoC, 2005). HMRC explored different options to improve the risk assessment techniques in order to expedite the processing of the case enquiries of large business companies. One such way was to allow companies to submit their accounts and computations in a structured format that could facilitate the risk assessment process (HMRC 1). HMRC's XML-based reporting system did not allow for the submission of the accounts and computations which were submitted in different formats by corporate filers. HMRC's technical experts worked on finding an alternative reporting medium that could accommodate the rich and non-standardised structure of the accounts and computations. The improvement of the Corporation Tax portal coincided with the development of an XML-based reporting tool, XBRL.

[46] C&AG's Report, paras 2.18, Q q3, 39.

Since the inception of the e-Services Programme in 2001, HMRC initially started to work on developing its first draft of XBRL taxonomy that contained approximately 1,500 data elements, covering the main financial statements and substantial range of accompanying notes (XBRL Progress Report, 2002). This marked HMRC's need for data for its CT 600's risk assessment and evaluation purposes. XBRL UK discussed the idea of introducing XBRL with the Interoperability Unit of the Technology Strategy Group of the e-Envoy Office, which recognised the benefits of XBRL not only for HMRC but also to be potentially used as a vehicle for wider electronic government systems interoperability.[47] HMRC's membership in XBRL UK gave the opportunity for HMRC's technical experts to discuss XBRL implementation issues with other XBRL UK's members including UK professional bodies, accountancy firms and software vendors.

The ICAEW, as one of the active institutional members of XBRL UK, took on the role of illustrating the practical applications of XBRL at HMRC. The ICAEW was the first UK professional body to raise XBRL awareness as "Level 2 digital reporting," in its published progress report on digital reporting (ICAEW, 2004). The report also introduced HMRC's electronic filing strategy for using XBRL in filing CT600 accounts and computations. This strategy was discussed at length during a Proposal Review Workshop in January 2002, attended by representatives from the IT Faculty of the ICAEW and XBRL UK.[48] The Workshop resulted in drafting a three-phase implementation plan that introduced the idea of XBRL-based filing for CT computations and company accounts to be implemented over the period (2002-2006), illustrated in Table 4.2 (H3, H5).

[47] http://www.oasis-open.org/committees/download.php/1427/XBRL-Taxation-Business-Case-2002-12-07.pdf
[48] http://www.icaew.com/index.cfm/route/139590/icaew_ga/DOC

Table 4.2: Three-Stage Implementation Plan of CT600 Electronic Filing:

	Phase A	**Phase B**	**Phase C**
CT600	XML	XML	XML
Computations	PDF	XBRL	XBRL
Accounts	PDF	PDF	XBRL/XML
Supporting Documents	PDF	PDF	PDF
Timeline	Q1 2003-Q2 2003	Q3 2003-Q3 2004	Q4 2004 – Q1 2005

Source: HMRC, e-Services Programme. Corporation Tax e-Filing, Scoping Workshop, 30th April 2003 (H5).

Following the proposals discussed during the workshop, HMRC started developing XBRL taxonomy that could work seamlessly with its existing XML-based CT600. Improvements to the system entailed tagging and defining the business relationships of such tags. The technical aspects of XBRL were discussed during eleven workshops over the period (2002-2004), conducted by HMRC with a group of software developers and IT specialists emphasising the scope and structure of the CT600 computation taxonomy[49]. XBRL UK originally published an initial XBRL UK's GAAP taxonomy in May 2004. HMRC secured sufficient feedback from its workshops with XBRL stakeholders to determine the presentation of XBRL statutory accounts using style sheets, providing extensions to include additional details where necessary, and introducing the needed tools for tax inspectors to view XBRL documents and facilitate the risk assessment of case enquiries (H3).

[49] By December 2008, HMRC has conducted 225 workshops attended by over 11,000 agents (HMRC Departmental Report, 2009).

The usage of XBRL by HMRC was endorsed by top governmental bodies and professional bodies. In April 2002, the Cabinet Office recommended the use of XBRL by UK government departments as part of its "E-GIF"[50] and subsequently endorsed its usage via the GovTalk[51], with a view to including a wider endorsement in the next version of the e-GIF.[52] HMRC1 met with representatives of the HM Treasury and managed to secure the financial support for XBRL project. During July 2003 – July 2004, the idea of XBRL adoption has been advocated by the ACCA report that supported to reduce compliance cost faced by small business.[53]

In July 2005, the Office of HM Paymaster General asked Lord Carter to conduct an assessment of HMRC's online services. The purpose of the review was to assess different ways of adopting electronic filing services by users, and increasing the efficiency of the electronic filing process for HMRC to focus on compliance and customer support issues (Lord Carter Report, 2006). Implementation of the recommendations mentioned in Lord Carter's review involved the delivery of "robust" online services at HMRC, focusing on the core taxation areas of PAYE, corporation tax and VAT. One of these recommendations stated the introduction of the mandatory use of XBRL by companies to submit their CT600 tax returns and computations by April 2011. This recommendation was introduced as a result of several consultations with representatives of professional bodies, including the ICAEW,

[50] E-GIF is the UK E-Government Interoperability Framework initiated by the Cabinet Office to define the technical policies and specifications governing information flows across government and the public sector which covers interconnectivity, data integration, electronic services access and content management (Cabinet Office Website).
[51] GovTalk is a UK government initiative sponsored by the Cabinet Office, designed to encourage efficient government through the use of the Internet and other modern electronic reporting technologies. For more information, please visit: http://www.cabinetoffice.gov.uk/govtalk.aspx
[52] www.cabinetoffice.gov.uk/media/271264/e-gif3_responses_final.rtf
[53] http://www.oasis-open.org/committees/download.php/9410/ACCA%20e-compliance%20proposal.pdf

ICAS, CIOT and ACCA in addition to separate meetings with the HM Treasury and the Cabinet Office to discuss budgetary and legal requirements.[54]

During a public hearing at the Committee of Public Accounts in the House of Commons (2005), Mr Banyard supported the usage of tagging XBRL data elements in the accounts and computations so they could be more easily processed by HMRC's computer systems than was possible at the time from the paper version of the various elements of the tax return. During this public hearing, Sir David Varney, Chief Executive of HMRC also announced that the usage of XBRL was expected to bring savings equivalent to 30 staff through savings in processing area by year 2007-2008. Mr. Banyard emphasised XBRL's advantages for HMRC; saying it supports the building of an extensive database that includes all financial information in CT600 computations and accounts.[55] He suggested that the database will be used to deliver further automated risk assessment, so HMRC can deploy more resources into non-compliant businesses. He also indicated that HMRC has been working on developing the necessary taxonomy of data elements that need to be tagged in the accounts.

4.1.2.8 Development of the Joint Filing Facility: 2005-2006

Conducting Lord Carter's review of HMRC's online reporting process was part of UK's general strategy of improving regulatory performance of central government agencies. In 2005, the former Chancellor of Exchequer asked Sir Philip Hampton[56] to conduct a comprehensive regulatory review to reduce the administrative cost of regulation. Hampton's

[54] http://webarchive.nationalarchives.gov.uk/20100407044034/http://hmrc.gov.uk/ria/carter-ia-final1.pdf
[55] http://www.tax.org.uk/attach.pl/8720/10339/024-026_TA_1209_Online%2520Filing.pdf
[56] At the time of the review, Sir Philip Hampton served as a non-executive director of RMC Group from 2002-2005. He was appointed as the Chairman of The Royal Bank of Scotland on 3 February 2009. He is also the non-executive chairman of J. Sainsbury plc. For more information, please visit: http://www.cihe.co.uk/about/council-members/sir-philip-hampton-rbs-group/

Review Report on "Reducing Administrative Burden: Effective inspection and enforcement," issued by HM Treasury, indicated that "there are too many, often overlapping, forms and data requirements with no scheme to reduce their number.[57]" (Hampton, 2005, p.4) Mr. Hampton proposed that government bodies should seek ways of reducing regulatory burden.

Building on Hampton's proposal, HMRC and CH considered establishing synergies between them in relation to the data required for filing accounts under company and tax law. The Department of Business, Industry and Skills (BIS), CH's executive agency, conducted a series of consultations (2005-2008) to examine the financial outcome of simplifying regulations in all major policy areas. Implementing the joint filing facility was one of the issues reviewed during these consultations. The BIS published its report on "Better Regulation Simplification Plan,"[58] in which it indicated that the joint filing facility will deliver "potential [administrative] savings of £60 million per annum, which will be shared with HMRC." (BIS, 2009, p.88). However, the BIS's report did not provide any estimates of the associated implementation cost of the joint filing facility.

A regulatory impact assessment was conducted in November 2005 to examine the legal aspects of implementing the joint filing facility.[59] The purpose of this assessment was also to reduce the burden on companies supplying over-lapping information to HMRC and CH. In response to this assessment, it was found that all companies incorporated under the Companies Act 1985 "have to send their full or abbreviated statutory accounts to CH each year."[60] They also have to send their full statutory accounts to HMRC as one element of their

[57] http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/d/bud05hamptonv1.pdf
[58] http://www.bis.gov.uk/files/file53978.pdf
[59] http://www.hmrc.gov.uk/nma/commentary.pdf
[60] http://www.companieshouse.gov.uk/pressDesk/Condoc25_11_05FilingDates.pdf (p.5).

company tax return. When the Companies Act 2006 is enacted[61], "small companies will have to deliver their statutory accounts or abbreviated accounts to CH within 9 months of the accounting date."[62] Public companies, on the other hand, "will have 6 months to send in their accounts."[63] However, the Taxes Act generally requires the "company tax return to be filed with HMRC within 12 months of the accounting date. A copy of the statutory accounts constitutes part of the return."[64] Therefore, the filing requirements of the two agencies overlap separately. This imposes an additional burden, particularly on small companies.

A public consultation took place from November 2005 to March 2006, seeking small and large company representatives' views on reducing the filing period from 12 months to 9 months.[65] As a result, HMRC and CH agreed on shortening the "filing period to 9 months in line with corporation tax payment date and the deadline in the new Companies Act 2006 for small companies to submit their accounts to CH."[66]

In March 2006, Lord Carter reported in his review of HMRC's Online Services[67] that all statutory corporation tax returns should be filed electronically by 2011. He also supported the consultations by HMRC and CH to work together towards a joint filing facility, saying that "consideration should be given to reducing the filing periods for ... company tax returns, to bring them closer to the international norm." (Lord Carter Report, 2006, p.6). During a conference organised by the ICAEW and XBRL UK in June 2006, Lord Carter indicated that the alignment of filing dates will facilitate the implementation of the joint filing facility by

[61] The law has been enacted in October 2009.
[62] http://www.companieshouse.gov.uk/pressDesk/Condoc25_11_05FilingDates.pdf (Pages 9-10).
[63] Ibid.
[64] Ibid.
[65] Ibid.
[66] http://www.companieshouse.gov.uk/pressDesk/RIAdocument.pdf (p.10).
[67] http://www.hmrc.gov.uk/budget2007/carter.htm

2011 by utilising XBRL capability.[68] During this conference, members of XBRL project at HMRC and CH supported the government's plan to build a single gateway to be used for the joint filing facility.[69] XBRL project managers also agreed on developing the technical capability of XBRL to accommodate the filing requirements of both agencies (HMRC1, CH1).

Following Lord Carter's recommendations, the former Department of Trade and Industry (currently known as the Department of Business, Innovation and Skills), HMRC, and CH started co-planning the implementation of the Business Link website, dedicated to facilitate the electronic filing process by businesses. Over 70 central government departments co-funded and supported the offered services including HMRC and CH. Individuals starting (or already running) their own business could use this website to access CH's web filing and HMRC's online CT facilities.[70] Implementation of the Business Link was finalised in late 2009.

4.1.2.9 Testing of XBRL: Mid-2006

During XBRL UK conference in 2006, a live demonstration of XBRL filing was conducted by Adobe Systems and CoreFiling, which became HMRC and CH's main IT business partners during the adoption of XBRL.[71] During the course of adopting XBRL, CoreFiling played an important role in assisting HMRC by introducing its True North validation and processing engine. This tool was necessary in validating and processing XBRL content.

[68] A statement was by HMRC and CH in September 2009, emphasising their commitments towards implementing iXBRL-based joint filing facility. For more information, please visit: http://www.companieshouse.gov.uk/about/pdf/hmrcCommonFiling2.pdf.[68]

[69] http://www.xbrl.org/uk/9June2006/UK-Event-9June2006.htm

[70] For more information on the services offered by the Business Link, please visit: http://www.businesslink.gov.uk/bdotg/action/aboutus?r.s=h&page=AboutUs&r.lc=en

[71] Adobe Systems and CoreFiling. For more Information please visit: http://www.xbrl.org/uk/9June2006/Adobe-9June2006.pdf and http://www.corefiling.com/solutions/hmrc/hmrc.html

CoreFiling provided specialised support in "converting HMRC's business needs, expressed as preliminary taxonomies prepared in Microsoft Excel, into a fully compliant XBRL taxonomy."[72]

In subsequent meetings with software vendors and IT specialists, HMRC's technical team started working on developing XBRL's functionality through improving the human readability of the XBRL-generated reports. HMRC conducted several demonstrations of live XBRL with tax software vendors, after which, it was determined that tax inspectors could face some difficulties in viewing the submitted data in a human-readable form. In March 2006, HMRC provided a viewer of the XBRL tax computation, which could be used by potential companies. However, generating XBRL style sheets was very slow (HMRC 2), and the computations were not easily understood due to the poor display. In addition, many data items were omitted from the style sheet computation.[73] HMRC 2 explained the problem facing HMRC's tax inspectors who need to collect data which stored in HMRC's databases to analyse it for risk assessment purposes. HMRC 2 explained that human element is needed in the risk assessment procedures along with the assistance of technology to run assessment checks on certain companies. HMRC2 admitted that in some cases, risk assessment serviced do not work according to risk rules, which requires human intervention to solve such a problem. A difficulty was faced because the information in the tax computations and accounts had to be understandable by both tax inspectors and filers' systems. This necessitates the need to render XBRL data in a way that it can be "human consumable" and machine readable. This was done traditionally by creating the style sheets that transfers XBRL document into HTML or printed format that is human consumable. However, style sheets technology and XBRL did

[72] http://www.fsn.co.uk/channel_financial_reporting/hmrc_and_corefiling_lead_the_way_with_ixbrl
[73]http://www.taxcomputersystems.com/assets/files/userdocs/Mandatory%20online%20filing%20of%20Company%20Tax%20Returns.pdf

not work together. The problem of rendering XBRL required developing XBRL documents to turn them into human-readable form. This led to the development of Inline XBRL.

4.1.2.10 Development of Inline XBRL: 2007-2008

The rich structure of the tax computations and accounts did not lend itself to the way style sheets work, leading to the generation of un-maintainable style sheets (HMRC 2). As HMRC has around 12,000 data elements[74] of XBRL taxonomy, style sheets' sizes could reach 9 MB, which was complex to understand by tax inspectors. It also took long time to be generated, which did not contribute to the efficiency of data processing and risk assessment process. Realising this data rendering problem, HMRC's XBRL project headed by HMRC 1, along with a group of software vendors co-founded the "Rendering Working Group," to be part of the XBRL International organisation. HMRC's XBRL project members worked in collaboration with other members in the Rendering Group to develop XBRL processing capabilities to accommodate the data requirements of the tax accounts and computations.

In late 2008, HMRC cooperated with IT consultants (including CoreFiling) and members of the Rendering Working Group to develop a human-readable form of XBRL, known as Inline XBRL or iXBRL. Tagged data in iXBRL-reports included all untagged items as well the formatting instructions so they are human-readable and displayed as if in a printed format, together with the tagged data elements. Therefore, the same set of XBRL information could be rendered allowing both the data producer (companies and tax agents) and HMRC tax inspectors to easily read and process the data. Inline XBRL embedded XBRL around the data elements in XHMTL documents so a programme used to generate human-readable output,

[74] http://www.tax.org.uk/attach.pl/6689/7834/008-011_TA_0408.pdf

through the production of PDF-based documents, could also be used for generating XBRL documents. Therefore, when a number appears in the output document (XBRL element), extra XML is embedded around that number. Therefore, the number is easily displayed and any kind of style sheet or process can identify that kind of iXBRL data and create an XBRL document from it. Therefore, data elements are rendered in an iXBRL document and not vice versa. In addition, the rendering is under the control of the data producer (submitting company), so it could present the data in any format and it could be easily readable by tax inspectors (H7). The submitting company's layout and presentation are maintained, while the reports incorporate computer-readable XBRL tags (H3).

While working on data rendering issues, HMRC worked on developing updated versions of XBRL taxonomy to reflect changes in accounting regulations, based on the feedback acquired from XBRL stakeholders[75] during the workshops organised by HMRC. Following XBRL conference held in London (June 2006), XBRL UK started to work on developing UK GAAP and UK IFRS XBRL taxonomies[76]. In January 2007, XBRL UK released two taxonomies, UK GAAP taxonomy and common data taxonomy for trial use and review by all preparers and users including investors, accountants and software vendors (XBRL UK website). The UK GAAP taxonomy covers the main data content and technical features required for UK GAAP reporting by unlisted companies, whereas the common data taxonomy represents standard information such as company name, address and commonly information used in financial reporting. Initially, HMRC developed its taxonomy to be

[75] XBRL stakeholders included representatives from software companies, accounting practice, professional accounting bodies (H1, H3, H4, H5). For more information, please visit: http://www.hmrc.gov.uk/ria/carter-ia-final1.pdf and http://www.hmrc.gov.uk/better-regulation/new-relationship.pdf

[76] XBRL UK's latest taxonomy development project has successfully produced the final version of XBRL taxonomy that covers the reporting requirements for commercial and industrial companies, including financial statements and notes. The Taxonomy was released on the 31st January 2010. For more information, please visit: http://www.xbrl.org/uk/Taxonomies/

conformant with UK GAAP, UK IFRS, UK Common data[77] and HMRC CT600 computational for tax computations[78] (H7). However, with the development of Inline XBRL, it has been indicated that not all XBRL tags have to be used for tax returns submitted in April 2011 (H11).

4.1.2.11 Development of iXBRL Tagging Requirement and the Business Link: 2009-2010

Lord Carter indicated the importance of HMRC being able to extend support to software vendors, who need the time to re-design their tax software to be XBRL-compatible.[79] In addition, the business and financial users community including preparers and analysts have expressed their concerns over the time and effort needed to familiarise themselves with the usage of iXBRL-enabled software products to file company tax returns (Dunne et al., 2009; Singh, 2009; ICAS, 2010). In recognition, HMRC worked on reducing the tagging requirements for tax accounts and computations. A reduced list of tagged CT computations has been created to reflect changes with the new legislations. Table 4.3 illustrates iXBRL tagging requirement list for the tax accounts and computations. HMRC will move gradually to full tagging for the tax accounts (UK GAAP and UK IFRS) in 2013 (H11).

Table 4.3: Minimum Tagging Requirements for iXBRL Taxonomy:

Taxonomy	Initial Full List	Reduced List
UK GAAP	4,3750	1,182
UK-IFRS	3,400 +	Expected < 1600
UK Common Data	900	Not Reduced
CT Computational	4,549	1,350

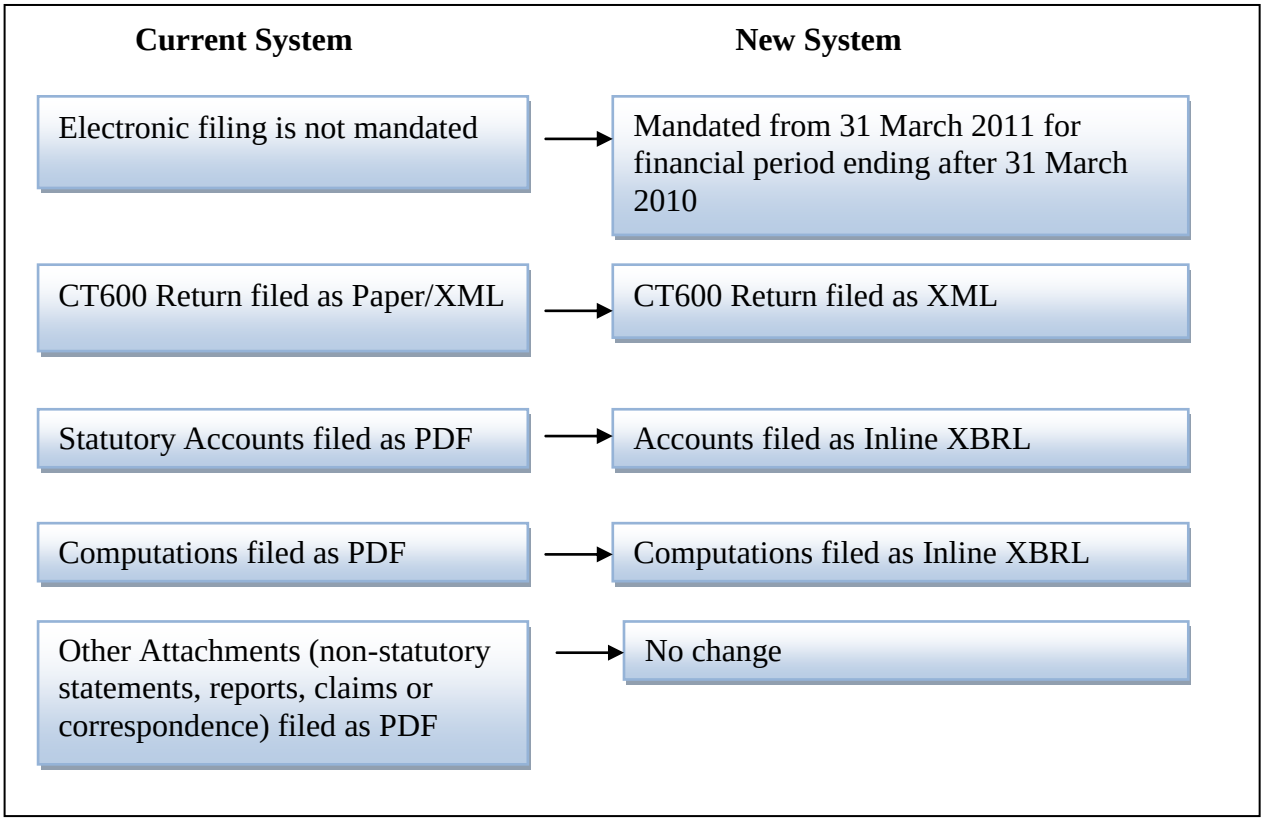
Source: H11

[77] Common data taxonomy is adjunct to the UK GAAP. It provides a number of reporting concepts such as the name of the business entity, language, currency and reporting period.
[78] For more information, please visit: http://www.hmrc.gov.uk/ct/ct-online/file-return/online-xbrltag.pdf.
[79] http://www.icaew.com/index.cfm/route/139607/icaew_ga/DOC and http://www.fsn.co.uk/channel_financial_reporting/xbrl_for_tax_is_a_ticking_time_bomb.html

In November 2009, the HMRC's CT online service became conformant with the 6th candidate recommendation of iXBRL Specification, and is awaiting recommendation status in 2010.[80] In preparation for the April 2011 mandate, HMRC sought the legal approval for receiving CT600 accounts and computations in iXBRL format. In December 2009, the regulation for receiving Corporation tax using Inline XBRL was approved and included in the amendments of the law governing electronic communication and data handling techniques employed by HMRC.[81]

Figure 4.1 summarises HMRC requirements for filing in Inline XBRL:

Figure 4.1: HMRC Requirements for Filing in Inline XBRL:



[80] http://www.hmrc.gov.uk/ebu/inline_xbrl.pdf
[81] http://www.opsi.gov.uk/si/si2009/pdf/uksi_20093218_en.pdf

In 2009, CH announced that it has finalised the development of the Business Link[82] with members of BIS and HMRC, and the iXBRL-based joint filing facility will be ready for use by companies in 2011.

4.1.3 Summary of HMRC's Electronic Filing History

HMRC case study can be viewed as a case of a government agency that has a long-standing history of regulatory reporting process. HMRC's rich experience of utilising technology in regulatory filing made it one of the leading UK government agencies that used technology to improve its administrative and regulatory performance.

HMRC's e-filing history has been characterised by many factors. Throughout the history, it can be concluded that HMRC has relied largely on its in-house IT expertise and utilised such experience to great extent since the implementation of EDI to support the ELS. However, HMRC has supplemented this expertise as necessary with IT consultants and software developers. The development of HMRC's electronic filing starting with the implementation of legacy system and ending with the utilisation of online reporting facilities indicate that HMRC's keen interest in investing in reporting technologies that could accommodate the complexity and sensitivity of the data as detailed as the tax records of the British population (businesses and individuals). In addition, has HMRC prioritised the need for achieving efficiencies through the development of ELS, FBI to provide more processing power and reduce compliance burden on tax payers. In the context of XBRL adoption, achieving efficiencies in conducting risk assessment procedures is one of the main reasons behind HMRC's decision to enable its CT600 accounts and computations to be XBRL-based.

[82] http://www.businesslink.org/bdotg/action/detail?type=RESOURCES&itemId=1084589986

The discussion of HMRC's reporting history has assisted in identifying three main characteristics, found to be relevant to XBRL adoption context. The first characteristic that has been identified is HMRC's rational judgement to utilise existing technologies to initiate future development in its electronic reporting facilities. For example, the existence of XML-based reporting platform has provided an opportunity to XBRL project members to initiate further technical developments that can accommodate the rich data structure of the accounts and tax computations. This judgement has been based on HMRC's strategy to use the existing technologies and available technical expertise to support XBRL adoption.

The second characteristic has been HMRC's strong long-term relationship with its stakeholders (top government agencies, professional bodies, accounting firms), which has been a significant asset and catalyst in HMRC's decision to adopt XBRL. HMRC is adept in making use of the consultations and workshops that have been organised by HMRC's IT experts to enrich their own technical experience (that it might lack) and to share their own IT development strategies and plans to seek external feedback and technical support if needed.

The third characteristic identified has been HMRC's use of its regulatory power and resources as an established government agency to communicate and support the idea of mandating the usage of XBRL and the implementation of the joint filing facility. For example, it has been found that HMRC did not face any legal complexities to mandate the usage of XBRL. Lord Carter report has presented the mandate among other suggestions to improve HMRC's online reporting performance. However, it is HMRC's regulatory role to rationalise and implement the mandate by pushing for the alignment of filing dates and specifying the minimum tagging requirements for iXBRL-based filing.

As this chapter aims to present a comparative description and explanation of the organisational setting of HMRC's XBRL adoption experience, it is necessary to discuss the experience of adopting XBRL at CH. In the next section, a history of CH's electronic filing process will be presented and explained. This comparative overview of HMRC and CH's reporting history will inform the case analysis, which will be discussed in the next chapter.

4.2 Companies House

4.2.1 CH Background

Companies House has become an executive agency of the Department for Business, Innovation and Skills (BIS) on 3 October 1988.[83] "All registered limited companies, including subsidiary, small and inactive companies" are required to file their annual statutory accounts with Companies House.[84] CH also takes on the role of managing the dissolution of companies and ensuring that registered companies follow the statutory information disclosure requirements stated in the Company Acts. CH is also responsible of retaining and making the information available for public use.[85] By the end of 2008-2009, the number of registered companies reached 2.4 million (Companies House, 2008).

CH provides free of charge basic index information of company names and address through its WebCHeck online search facility. WebCHeck enables Internet users to search for information on "more than 2 million registered companies."[86] Searching for company's information can be conducted by either using company name or unique registration number.[87] CH also provides a subscription-based premier search tool (Companies House Direct) to

[83] http://www.companieshouse.gov.uk/about/corporateDocuments/frameworkDocument.pdf (page 2).
[84] http://www.companieshouse.gov.uk/about/gbhtml/gba3.shtml
[85] http://www.companieshouse.gov.uk/about/corporateDocuments/frameworkDocument.pdf (page 2).
[86] http://www.companieshouse.gov.uk/toolsToHelp/WCInfo.shtml
[87] http://www.companieshouse.gov.uk/toolsToHelp/findCompanyInfo.shtml

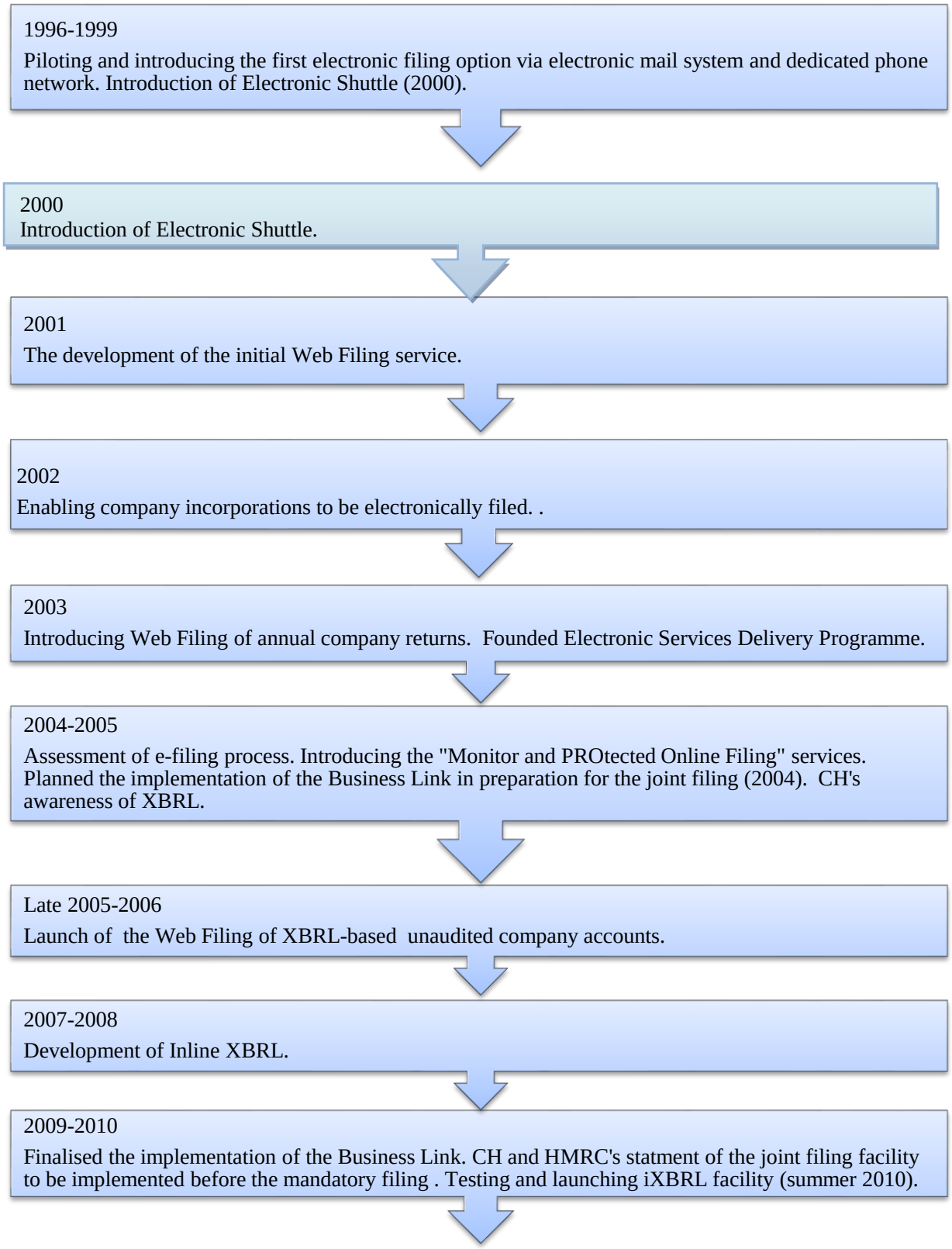
provide over 260 million images of company documents as well as other types of filings.[88] In addition, users can download and pay for a variety of documents such as company reports, document images, certified documents and certificates as well as other types of information.[89] CH also sells 'bulk data' and image products to large users, such as business data aggregators and credit agencies[90], on magnetic data tapes and document image tapes.

By April 2010, around 90% of company incorporations and annual returns and 24% of annual accounts were submitted using CH's web and software filing facilities.[91] This represents a 7% increase in the total number of documents filed electronically since December 2009. By end of November 2009, CH's website received an average of 40 million hits/month, which made it one of the most frequently visited central government's websites.[92]

The late 1990s marked the beginning of developing CH's reporting facility. In 1998, CH had a strategy of receiving 100% of information electronically by the end of 2002 (C3; C4). Before 1998, CH had a strong foundation that allowed presenters to send their information using CH's mainframe computer system. In CH's business plan (2000-2003), CH announced that it would expand the take-up of electronic filing by developing its system architecture to allow for the establishment of an efficient electronic service delivery in 2001. In Section 4.4.2, an illustration is presented to provide a summarised timeline of CH's electronic filing history, followed by a detailed explanation of this history. Explaining CH's electronic filing process assists in understanding the organisational setting of XBRL adoption process.

[88] http://www.companieshouse.gov.uk/toolsToHelp/chdDirectInfo.shtml
[89] http://www.oci-gmbh.net/oci/marktforschung/Companies_House_Example_Aug-2007.pdf
[90] Data aggregators include D&B, Equifax, Experion and ICC information. For more information, please visit: http://www.oci-gmbh.net/oci/marktforschung/Companies_House_Example_Aug-2007.pdf
[91] http://www.companies-house.gov.uk/about/businessRegisterStat.shtml
[92] http://www.bis.gov.uk/files/file53513.pdf (page 17).

4.2.2 Timeline of CH's Electronic Filing History:



4.2.3 History of CH's Electronic Filing Process

4.2.3.1 IT-Supported Filing: Before 1996

Before 1996, CH relied on an IT-supported paper filing method for receiving company documents. Presenters filed paper documents, which were sorted in the Post Room according to document types and assigned a unique barcode. If it was an accounts document, then the document was recorded by an electronic indexing system. It was the barcode that enabled the processing department to track every document received by CH (CH1). Once the document had been assigned a barcode, it was then manually examined to ensure that the relevant sections of the form had been completed (CH1). Forms were then scanned using an imaging system that scanned 2500 documents/hour (C3). The information that identified a particular document with a specific company was updated electronically on CH's main database, where it was available for public access. This reporting process was supported by CH's old mainframe computer system that linked the scanned image to a particular company listed on the Register and enabled customers to request documentation for specific companies.

The paper submission process took 5-6 days to process from the date the filing was received from the presenter. The manual document handling process was time consuming and undermined the efficiency of CH's internal reporting systems. CH looked for an "online reporting solution" that could simplify the process for presenters by reducing postal delays and postage costs. In addition, CH needed to improve the efficiency of the reporting process by handling less paper and reducing the cost and time of checking and processing the filed documents[93]. Reducing the time required for processing paper submission was important to CH as it needed to provide quicker responses to presenters whose filings were rejected, so

[93] http://www.publications.parliament.uk/pa/cm200708/cmselect/cmberr/456/45605.htm

they would make the necessary corrections and send the filings to CH for processing in a timely manner. A system, that would validate the content of the filings and provide instant notification, was one of the reasons behind piloting an electronic filing facility.

4.2.3.2 Electronic Filing beyond 1996 and the Introduction of the Electronic Filing Project: 1996-2000

During the summer of 1996, CH piloted its first electronic filing project, after working with a number of company secretarial software providers. Company annual returns forms (363) and director and secretary changes forms (287 and 288)[94] were enabled to be filed electronically using the pilot project (C3). These forms had to be generated by approved software and sent via electronic mail as PDF-based attachments on the Companies House Direct network (C3). A paper-based pre-registration process was in place, whereby a company registered to use the filing service was supplied an e-mail address and given authentication codes, which were included in their messages. A contract with a network supplier allowed for the transmission of electronic messages at no cost and the network was accessed using modems and telephone lines.

Upon receiving the files containing company data, CH validated the information and updated a specific pilot copy of its main electronic and microfiche databases. If a problem was detected in an electronically filed document, a response was returned to the presenter which indicated the source of the problem. The presenter was then able to modify their information and file the amended document. For accepted documents, the presenter would receive a response indicating that the document had been successfully filed.

[94] Explanation of each form is presented in Appendix 5.

Thirteen companies volunteered to use the pilot project. The pilot ran over the period of July-August 1996, and a total of 2,400 documents were electronically filed. The pilot project proved to be successful (C3). CH conducted a review to its input systems, which entailed assessing the feedback from the pilot project including the views of participating presenters and software providers. In addition, it was recognised that some of the electronic filing aspects had to be accommodated within the law. A consultations document on functions of the Registrar of Companies was issued in August 1996 to seek views on possible legislative framework. Relevant provisions had to be included in the Commercial Law Reform Bill. These provisions included designing a framework whereby the law would determine the circumstances in which information should be delivered to CH. Regulations made by the Secretary of State would specify the precise information to be delivered together with detailed provisions on timing, and the Registrar would determine all matters related to the delivery manner. In addition, the use of alternative forms of authentication and machine-generated signatures on certificates issued by CH had to be approved by the law (C3). The legal complications and CH's review of the input system spanned over two years before the actual implementation of the new system in October 1998 (C4). The new system allowed for the filing of forms 287, 288 and 363.

4.2.3.3 Introduction of Electronic Shuttle

In 2000, CH introduced an "electronic shuttle" service. Through this service, CH would send pre-printed annual returns previously filed by presenters via email instead of the post. Companies would then check the information, decide whether it would need to change and return the document to CH with the recorded changes. The annual return filing fee (£15) could then be paid electronically and the information was authenticated by returning the "e-

shuttle" using a unique PIN number. Images of the documents returned would be generated and accessible online via CH's Direct (CHD) service (C7).

4.2.3.4 Development of Web and Software Filing Facilities: 2001

By the end of year 2000, CH online filing services relied on the assistance of three third party company secretarial software providers to enable the electronic submission of five company forms.[95] All documents received were acknowledged electronically and signatures were provided via pre-submitted company codes, which were sent through Companies House Direct network.

In May 2001, the web filing service was introduced by CH (C11). Forms which had to be downloaded from CH's website, printed out and posted to CH were submitted using the newly introduced web filing service. The service allowed for the filing of 287 and 288 forms, which specify the changes in registered office address, appointment and termination of, and changes to director and secretary details (C11). Over 3000 companies registered to use the web filing service, and by end of October 2001, 2500 documents were successfully submitted to CH (C11). For security reasons, web filing required presenters to provide a unique security code, which was linked to their e-mail address and issued to them by e-mail. Another authentication code was needed and linked to the company number and effectively represented the signature of the company on any document filed. The code was notified to the company secretary at the registered office address by post. Once the code was received, electronic filing process took place.

[95] These include forms 363a, 287 and 288a, 288b and 288c.

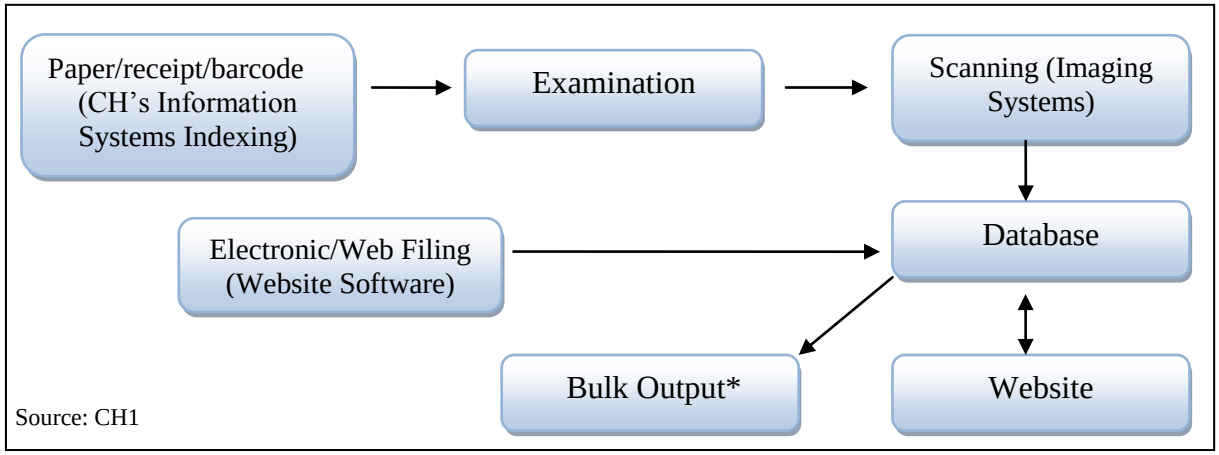
The web filing facility delivered better results than the old system. The forms which were enabled for electronic filing represented 40% of all documents registered at CH (C14). 60% of the electronically filed documents were processed automatically without the intervention of query handlers (C12). The facility provided a secure system for presenters to submit company information. The quick electronic processing the documents removed the risks of information delay or loss in transit and every filing was instantly acknowledged either as accepted or as rejected with reasons. This validation process used to take 4-5 days under the old system. The authentication codes acted effectively as the electronic signature for each document filed. In February 2002, the former Chief Executive of CH, Mr. John Holden, announced that the web filing facility represented "a significant step ... to meet government targets of 100% capability for electronic service delivery by 2005" (C14, p.8). The quick validation contributed to the efficiency of processing the electronically filed documents and assisted in reducing the work load on CH's operations staff, particularly during peak filing period.

In July 2002, CH extended its online filing to include company incorporation service. This service wad developed specifically to target the group of company formation agents who incorporate companies on regular basis (C14). Agents who have developed or procured software that has passed CH's software approval tests for use would use the electronic incorporation service. The list of approved software packages was posted on CH's website. Once the incorporation was successful using one of the approved packages, a PDF-based certificate was generated for electronic return and printed out by the presenter (C12). This facility proved to be very popular and efficient particularly among agents who input large

number of company registration details on behalf of their clients.[96] Agents were particularly pleased with the usage of CH's approved software packages, as they needed to use a single code for all companies they represented, so they did not have to obtain security codes for each company's filing (C13).

Over the period of July-October 2002, 3,366 companies were incorporated electronically, which represented 7% of the total number of company incorporations (C13). Compared to a rejection rate of 15% using paper submission, electronic incorporation generated only 4% (C13). CH continued to run electronic and paper submission in parallel. Figure 4.2 illustrates the CH's paper and electronic filing routes.

Figure 4.2: CH's Paper and Electronic Filing Methods:



Source: CH1

*Bulk output refers to the information (e.g. company's returns) that has been processed and sold "in bulk" to data aggregators.

In 2003, CH started to work on realising the government's target to electronically enable all government services by 2005, with key services achieving high levels of use (C15). The e-Envoy Office identified CH as one of the government agencies that should work on extending its electronic filing services to include the filing of company accounts. In the same year (2003), CH founded its Electronic Services Delivery (ESD) Programme that covered a range

[96] http://www.accountancyage.com/2040574

of development projects focusing on the delivery and take-up of electronic services. The ESD was also responsible for assessing and managing of the security aspects of CH's web filing facility.

4.2.3.5 The Assessment of E-Filing Process and Introduction of Security Measures: 2004-2005

In March 2004, CH conducted a survey to gauge presenters' views of CH's web filing facility. Many benefits were reported by presenters. Key benefits reported were the speed, security, lower cost and the ease of using the facility (C20). However, presenters voiced their concerns about the fact that security and authentication codes have to be sent by post, prior to incorporating companies online. In addition, complaints were filed by company directors who found that corporate fraud was committed by individuals changing the company's registered office address without formal consent or changing the names of the directors themselves (C19). This problem stemmed from the fact that CH does not have "statutory powers to validate or verify the contents of documents sent, and it does not have any investigative powers" (C19, p.10). CH regularly conducts basic checks on the forms delivered for registration to ensure that they are properly completed and signed. Any complaints about fraud have to be reported to BIS's Company's Investigation Branch, which liaises with CH and feeds information to them. However, CH took various security measures to prevent fraudulent filing behaviour.

In 2004, CH introduced a "Monitor Service" to be part of Companies House Direct and WebCHeck services (C20) that are used for searching for company information by Internet users. The Monitor helps CH to prevent fraud by alerting companies to any authorised and unauthorised changes with their records (CH, 2005).

4.2.3.6 Establishment of the Business Link and XBRL Awareness: 2004

In late 2004, CH participated in joint meetings with HMRC's technical experts to examine potential routes to achieving "joined-up government" for companies' business and financial data. These meetings were facilitated by XBRL managers at HMRC and CH. During the e-filing scoping workshop held on October 2003 by HMRC's e-Service team members, HMRC and CH's officials discussed the benefits of enabling a single filing facility by companies (H3). In May 2004, the former Department of Trade and Industry launched the Business Link website, dedicated to facilitate the electronic filing process by small businesses. As indicated previously, several central government departments co-funded and supported the offered services including HMRC and CH. CH explored the possibility of simplifying the accounts filing for small companies' unaudited accounts, so the same information could be submitted once through the Business Link to HMRC and CH, rather than separately to CH, HMRC, and other government agencies (CH1).

During the course of planning the implementation of the Business Link, CH became aware of HMRC's keen interest in developing its CT600 accounts and computations. CH's key IT personnel (CH1 and CH2) attended HMRC's workshop where HMRC's "ambitious" three-stage implementation plan of implementing XBRL for the accounts and computations. It was during that workshop and other events, members of the electronic service programmes at HMRC and CH agreed to work on initiating a single filing through the Business Link (H3, H4, and H5). CH became also aware of the benefits that XBRL could deliver to the processing of the accounts and to the presenters.

4.2.3.7 Introducing PROOF Service and Enabling the Electronic Filing of Unaudited Company Accounts: 2005-2006

To encourage the take-up of its web filing facility, CH introduced "PROOF (PROtected Online Filing) service in January 2005 to provide added security to web filers" (C21, p.15). "Companies signing up for this service choose to deliver electronically key forms such as appoint/termination/change of directors and change of registered office. CH will then reject paper versions of those forms, unless specifically authorised to accept them by the company" (C21, p.15). The added security measures and web functionalities contributed to the increase in the take-up rates of Web filing of the incorporations and annual returns. Table 4.4 illustrates this increase:

Table 4.4: The Usage of CH's Web Filing Services for Filing Company Incorporations and Annual Returns (2002-2006):

Year	Percentage Rate of Electronic Incorporation (out of the total number of incorporations)	Percentage Rate of Electronically Filed Annual Returns (out of the total number of filed annual returns)
2002-2003	19%	1%
2003-2004	67%	6%
2004-2005	73.5%	20%
2005-2006	83%	48%

Source: CH Annual Reports.

CH was encouraged by the positive outcome of the web and electronic filing and planned to enable unaudited company accounts to be electronically filed. Until June 2005, unaudited accounts (including dormant company accounts) comprised 75% of the total paper-filed annual accounts received by CH (C21). The remaining 25% constitute the paper-filed

audited accounts. Submitted unaudited accounts were processed by CH's Internal Processing System (CHIPS), which ran validation checks and captured them as images. CH had a problem with presenters who tried to deliver company accounts as a PDF or Word Document attached to an email. CH did not accept such forms as they did not comply with the formal direction of the Companies Act 1985, which specifies how authenticated accounts should be sent to the Registrar.

CH started looking for developing its existing electronic filing system. CH wanted to include the "email acknowledgement" feature in the criteria of adopting a new electronic method for accepting company's accounts. It also wanted to utilise the benefits of its existing web filing facility, which included low rejection rates of filed documents and minimal query handling. The "email acknowledgment" feature was particularly important due to the fact that until October 2005, 5% of the paper-based company's account presenters (125,000 sets of accounts) failed to deliver their accounts on time (C22). This resulted in incurring a late filing penalty fee[97] and delays with the processing of filed documents (C22 and CH1).

In addition to the low rejection and efficient query handling features of the CH's Web Filing facility, CH also wanted to maintain offering the free of charge PROtected Online Filing (PROOF) service so it can be used by accounts' web filers. In October 2003, CH officially announced its intention to develop a paper-free submission medium to file unaudited accounts, using XBRL (C16).

[97] Up to £5,000 (C23), which increased by 50% from February 2009 under Companies Act 2006 (C2).

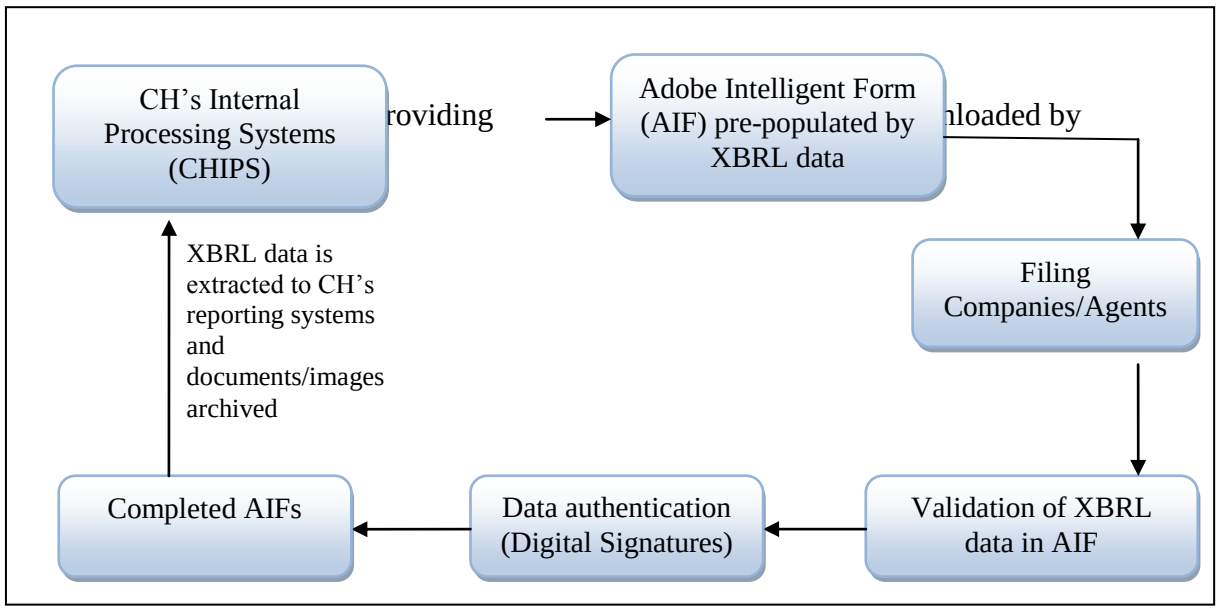
CH held meetings with HMRC technical experts and representatives of Adobe company (HMRC and CH's major IT supplier) (HMRC1, CH1 and CH2). During these meetings, the idea of using an "Adobe Intelligent Form" or AIF was introduced to CH's XBRL team[98] (CH2). XBRL data enable the pre-population of previous year's data through the usage of AIF, which reduces the time spent by presenters in filing their current accounts (C1). AIF also provides better 'screen clarity' and contains built-in checks and help-text for presenters who used to have difficulty following the online instructions during the registration process, resulting in some of the input data being lost or omitted by the system (C21). Once AIF is downloaded from CH's website, presenters enter the data into the "boxes" provided in the AIF. Agents filing on behalf of their clients can "complete them offline over a period of time, saving them as drafts that can be emailed to their clients before submitting the final version to CH" (C21, p.17). XBRL-based data can be automatically checked and validated before submission, which helps to reduce calculation errors and rejection rates. Completed AIFs are submitted to CH using the company's web filing authentication code, which is equivalent of a company officer's signature.

After validating the data and accepting the accounts, an XBRL style sheet is created and made available to CH's presenters. Then, in order to make the accounts publicly available and readable by presenters and Internet users[99], CH has to perform rendering task to the image of the data. This is done by converting XBRL data to TIFF[100] -based documents that will be stored in CH's image system and corporate database (CH1). The main feature of the TIFF images is that it preserves the image of the stored document without the loss of the original

[98] CH's XBRL team consisted of technical staff members who were in charge of the technical aspects of the Electronic Services Delivery Programme, which was established in 2003.
[99] By law, CH has to make the information available for public inspection and use. For more information, please visit: http://www.companieshouse.gov.uk/about/corporateDocuments/frameworkDocument.pdf
[100] Tagged Image File Format (TIFF) is an image file format. For more information, please visit: http://www.ntchosting.com/multimedia/tiff-tagged-image-file-format.html

data, and data could be subject to multiple editing without losing its quality.[101] For rejected accounts, presenters are asked to re-submit their accounts and make all the required corrections. Figure 4.3 illustrates the process of filing XBRL-based accounts data based on the accounts provided by CH1 and CH2.

Figure 4.3: CH's Electronic Filing Process using XBRL:



Various changes with web filing undertaken by CH, after several meetings with HMRC's XBRL project manager and IT specialists from major software vendors, took place during the period (2004-2005) (CH1). CH relied on outsourcing IT assistance to develop XBRL taxonomy for the unaudited accounts, which required 450 data elements to be tagged (CH1). In June 2005, CH announced that many software packages were approved and enabled to facilitate XBRL filings, so presenters would not need to develop their own packages (C21). The testing of the software filing was scheduled to start in November 2005. Pilot seminars were also conducted during March-May 2006 in several cities to showcase XBRL filing using

[101] http://www.ntchosting.com/multimedia/tiff-tagged-image-file-format.html

CH's web filing facility (C24). As part of XBRL showcasing campaign, CH announced in February 2006 that it has received its first XBRL-based filing from Forbes Computer Systems.[102] According to CH's former Chief Executive, Ms. Claire Clancy, accounts filed by Forbes "represented a major landmark" in the delivery of electronic services for customers.[103] After receiving positive feedback during the campaigns, CH ran several testing sessions in preparation for launch of the web filing, which took place in July 2006 (C1). Table 4.5 shows statistics on the number of XBRL-based filings over the period of July 2006 – December 2009:

Table 4.5: Statistics on the Number of XBRL-based Unaudited Company Accounts:

Year	Number of XBRL-based unaudited accounts	Percentage of the number of XBRL-based accounts out of total number of filed accounts
July-December 2006	11,063	3.2%
2007	78,799	22%
2008	176,833	47%
2009	250,000	64%

Sources: CH2; C25; C28; CH Annual Report (2008-2009)

4.2.3.8 Development of Inline XBRL: 2007-2008

One of the issues that faced CH in preparation for the joint filing facility was that a company filing abbreviated accounts has to provide full financial information to HMRC (CH1). The existing XBRL structure was not capable of supporting the data structure of such accounts. This technical difficulty was one of the reasons behind developing XBRL into Inline XBRL. A series of HTML documents could be generated in a single iXBRL report. According to

[102] http://www.xbrl.org/Announcements/CompaniesHouse-1Feb2006.htm
[103] http://myicwai.com/manacc/April_Final.pdf (page 295).

CH1 and CH2, iXBRL document is capable to absorb large amount of information filed by presenters. For example, in the same iXBRL document, a profit and loss account and balance sheet could be generated, and this complete set of statements is required by HMRC, while the balance sheet on its own would represent the abbreviated accounts required by CH.

4.2.3.9 Finalising the Implementation of the Business Link Facility and iXBRL testing: 2009-2010

In 2009, CH, BIS and HMRC finalised the implementation process of the Business Link, which started after the release of Lord Carter Report in 2006. CH worked with the BIS on to converge CH's website services to launch the dual-branded Web Filing and WebCHeck services, which facilitate filing information and searching for company records through the Business Link website. An estimate of 80% of the documents filed by companies will be received through the Business Link (CH, 2008). In November 2009, CH reiterated its commitment towards the joint filing facility by announcing that this facility will reduce the complexities and expenses associated with filing the same set of information to both HMRC and CH.[104] Inline XBRL capability will be introduced by CH by the summer of 2010.[105] CH will continue to develop iXBRL to extend its usage for full audited account filings by summer 2011.

4.2.4 Summary of CH's Electronic Filing History

The development of the CH's internal reporting systems emphasised CH's long-term plan to allow for the electronic submission of paper filings. Before 1996, CH's legacy information system did not support a web-based filing platform. Since that year, CH made the decision to

[104] http://www.companieshouse.gov.uk/about/pdf/hmrcCommonFiling2.pdf
[105] http://www.companieshouse.gov.uk/about/pdf/hmrcCommonFiling2.pdf, and http://www.hmrc.gov.uk/ct/returns/ct0021.pdf

develop its electronic filing facilities to improve the efficiency of the data processing. The initial development took almost 3-4 years including piloting, implementing and testing the web filing facility. This was developed from basic concepts of an email-based IT-supported filing system to a web filing portal that has additional sophisticated functionalities.

CH's electronic filing targets focused on improving the efficiency of data processing and providing better information dissemination service to its individual and business presenters. CH's plan to enable and expand the electronic submission of filings was carried out through seeking the support of private sector IT consultants and software vendors. By examining CH's filing process history, it was identified that CH established significant relationship, not only with its IT business partners, but also with other regulatory agencies such as HMRC and the BIS. This relationship was characterised by CH's continued interest in identifying and adopting the latest technologies that would contribute to its internal reporting processes and information dissemination sources. HMRC's long-term technical experience with XML-based filing platform was utilised by CH's technical team to raise its awareness about XBRL capabilities. CH also collaborated with HMRC's IT suppliers to develop XBRL capability built in its web filing facility. Technical and non-technical support was also extended by members of BIS and HMRC during the implementation of the joint filing facility.

CH was persuaded by the positive outcome and experience of enabling the electronic filing of company incorporation and annual returns. Hence, CH decided to retain some of the web filing facility's features to support the filing of XBRL-based unaudited accounts. For example, CH ensured that added security measures and web filing functionalities would

remain to facilitate XBRL filing process. With the noticeable increase in the volume of XBRL-based unaudited accounts submitted since 2005, CH hopes that it would develop the technical capability of XBRL to allow for the electronic filing of the full audited accounts, which comprise 20% of the non-digitised total accounts submitted to CH by summer 2010.

In the next section of this chapter, some comparative remarks will be identified and discussed regarding XBRL adoption experience in HMRC and CH, based on the history of each agency's electronic reporting process. This comparative overview identifies the main features that characterised and distinguished the organisational setting of XBRL adoption process at both agencies.

4.3 Comparative Remarks on HMRC and CH's Electronic Filing History:

In an e-government and XBRL adoption contexts, this chapter addresses three important issues: differences between HMRC and CH's perceptions of XBRL data usage and structure; strong top government support attained by HMRC and CH to develop their e-filing capabilities and HMRC and CH's dedication to seek technical and non-technical support to enhance their in-house organisational resources. The next sections will identify remarks based on the observation of HMRC and CH's electronic filing history and vision towards portal environment.

4.3.1 Remarks on HMRC's Electronic Filing History

HMRC's plan to adopt XBRL as a medium for submitting CT600 accounts and computations underlined the data structure of such filings. HMRC was largely driven by its goal to receive "better quality access to data" rather than everything filed by companies on paper (H1).

XBRL was seen as one of the ways of not only receiving high quality data, but also as means of moving data from one system to another (HMRC2). This allowed for overcoming the key issue of limited internal access and ability to use CT600 filings made on paper to facilitate the risk assessment process. According to HMRC1, this has been always HMRC's goal in adopting XBRL as a potential "filing solution" for CT600 accounts and computations. This goal was also supported by NAO's report on HMRC's e-Revenue project initiated in 1999 (NAO, 2002). HMRC's XBRL project managers were also diligent to "promote" XBRL potential as not just a mandated government-driven electronic filing medium, but also as an "e-filing solution" that would facilitate the flow of data during the tax preparation and filing processes.

For HMRC, the data structure of CT600 accounts and computations required receiving data in standardised form. HMRC realised that XBRL's capability would accommodate the complexity of the data structure of the accounts and computations, which are filed in non-standardised formats by tax agents and companies. XML, which is rather a form-based reporting language, has been effectively used for filing CT600 tax returns over the last few years. However, it was difficult to use XML for CT600 accounts and tax computation due to its non-standardised format. HMRC 3, as a tax inspector, believed that XBRL has more potential than XML as it [XBRL] will allow tax inspectors to have tagged data in the computations that could be submitted electronically, so such data can be easily linked to the figures in the tax return. XBRL has been perceived as a reporting medium that would enhance the readability and processing of the data by the computer systems of tax inspectors and agents, to assist the risk assessment process. Mr. Peter Calvert, the consultant of XBRL UK, supported this fact by stating that regulators receiving information "will be able to automate

processes and introduce far more wide ranging and effective analysis than they can achieve now" (Tilbury, 2009, p.2).

4.3.2 Remarks on CH's Electronic Filing History

Similar to HMRC's experience with enabling the electronic submission of the accounts and computations, CH identified a similar need to enable the electronic filing of unaudited accounts. Until mid 2005, CH did not have an electronic filing platform for receiving 2.5 million sets of unaudited accounts filed annually, which comprise 80% of the total number of paper filings at CH. Accounts' data filed with CH were documented and scanned, so images of the accounts were available for public use. The data structure of the unaudited accounts was not as complex as the data structure of the accounts and computations. CH needed to build a taxonomy that was composed of 450 data elements, compared to 12,000 data elements in HMRC case. Despite the differences in the complexity of the data structure in their filings, CH and HMRC shared the goal of adopting XBRL to achieve efficiency by using automated data processing mechanism with minimum human intervention. This was a great advantage of XBRL to CH which suffered from a shortage of IT and operations staff, particularly during peak filing periods.

The need to achieve efficiency was not the only reason for CH to adopt XBRL. The need for dissemination and disclosure of "better quality information" was another reason behind adopting XBRL. While HMRC mainly aimed to receive XBRL-based standardised data that would contribute to the efficiency of its internal reporting system, CH was concerned about the process of information dissemination. As required by the law, data submitted by presenters should be processed in order to be available for public use and inspection. To

comply with the information disclosure law, CH provides free of charge basic company information. In addition, CH sells the processed data –as one of its revenue sources- individually or in bulk to Internet users and data aggregators. According to XBRL project managers, adopting XBRL would allow for the effective manipulation of the data, which is not currently possible, as CH receives abbreviated accounts which contain small volume of accounts information. However, CH anticipates that usage of XBRL to file full accounts would be more beneficial (CH1). Full accounts data, rather than images of the data, will be made available to potential Internet users, so they have an easy way of capturing and buying the data. Therefore, CH's idea of adopting XBRL has been not only driven by achieving efficiency but also by realising financial outcome out of selling XBRL data. This fact was supported by CH1, who did not rule out the option of selling such data in the future.

Table 4.6 illustrates CH's turnover sources and the surplus (deficit) realised based on conducting registration and dissemination activities for the period (2007-2009):

Table 4.6: Financial Results of CH's Administrative and Dissemination Activities:

Activities	**Turnover (£ million)**			**Cost of Service (£ million)**			**Surplus (Deficit) (£ million)**		
	2007	**2008**	**2009**	**2007**	**2008**	**2009**	**2007**	**2008**	**2009**
Registration Activities – include incorporation, annual registration, dissolutions as well as other activities.*	57.8	53.5	50.6	57.7	51.5	51.5	**0.1**	**2.0**	**(0.9)**
Dissemination Activities – include searches delivered on paper,	12.7	14.1	14.4	11.8	12.5	12.8	**0.9**	**1.6**	**1.6**

electronically and to bulk users.									

*Late filing penalties are not included in this category as the proceeds are surrendered directly to HM Treasury.
Source: CH Annual Reports.

4.3.3 HMRC and CH's Vision Towards Portal Environment

HMRC had the intention to develop its e-filing systems to build a 'portal' environment that could offer secure personalised service for business taxpayers. To support this goal, HMRC was committed to seek top government support. Regulatory and financial support was extended by members of the Treasury Department and Cabinet Office. HMRC's XBRL adoption was also backed by Lord Carter's recommendation to mandate the usage of XBRL and establish a joint filing facility. CH did share HMRC's vision of creating portal environment to its presenters by enabling the electronic submission of the unaudited accounts which comprise almost 80% of paper filings received by CH as noted previously. CH also sought technical support from HMRC's IT team members and non-technical, particularly legal, support from members of the BIS and Cabinet Office. XBRL was viewed by both HMRC and CH as an electronic reporting technology tool that would contribute not only to their internal reporting systems but to the wider UK's "joined-up e-government" strategy, introduced by the Former Prime Minister Tony Blair, which aims to reduce the regulatory and administrative burden.

Since the inception of and throughout the XBRL adoption process, HMRC and CH collaborated extensively with their XBRL stakeholders through numerous consultations. This network included groups of software vendors, accounting professional bodies and representatives of big accounting firms as well as members of HMRC's electronic services

development experts. The long-standing history of HMRC's filing process did not show any lack of organisational resources in terms of technical or non-technical expertise. However, it was HMRC's decision to share its plan to adopt XBRL with interested stakeholders in order to enhance and consolidate HMRC's organisational resources and efforts to further support the adoption process. For example, consultations and workshops provided XBRL project managers with opportunity to interact with the stakeholders and discuss the potential implementation of XBRL. The joint meetings with representatives from XBRL UK and software industry played particularly an important role in helping HMRC and CH's XBRL teams to build and develop XBRL taxonomy structure. The technical aspects of the joint filing facility with representatives from CH and technical experts were also discussed during those consultations and meetings.

CH's history of electronic filing showed that it did not have HMRC's strong in-house IT expertise. Therefore, members of CH's XBRL project team (e-Services Delivery programme) collaborated with HMRC's XBRL project members. CH also had a strong contractual relationship with its IT suppliers, who were in charge of building XBRL technical infrastructure and implementing the joint filing facility through the establishment of the Business Link. It was also evident from CH's electronic filing history that it was keen to collaborate with software vendors to produce compliant software packages to enable agents to submit filings electronically. This collaboration was also identified in CH's XBRL adoption experience as CH introduced the idea of XBRL filing to its potential presenters through XBRL testing and demonstration events, which were co-organised by CH's IT business partners.

4.4 Chapter Summary

In this chapter, historical background of the electronic filing process at HMRC and CH as discussed by the research participants who have been involved in XBRL adoption has been introduced. Internal documents provided by the research participants have been used as one of the primary sources of collecting information about each agency's electronic filing process. External documentation such as books, public government and professional bodies' reports and opinion articles have been also used to identify and investigate information gaps that could be found in the research participants' accounts. The integration of various information sources has assisted in providing a contextual background of HMRC and CH's electronic filing processes. The chapter has also discussed the steps HMRC and CH that have taken to develop XBRL capabilities to support the implementation of the joint filing facility. The chapter is finalised by drawing comparative remarks to reflect on HMRC and CH's XBRL adoption experience. The findings of this chapter will inform the case study analysis and provide relevant implications of XBRL adoption process at both agencies. In the next chapter, a cross-case analysis of the HMRC and CH's XBRL adoption processes will be presented to revise the proposed conceptual framework illustrated in Figure 2.3 in Chapter 2.

CHAPTER 5

ANALYSIS OF CASE STUDIES

5.0 Introduction

In Chapter 2, the conceptual framework, based on Rogers' innovation adoption process, Tornatzky and Fleischer's (1990) TOE framework and e-government literature, was proposed and discussed. Chapter 4 presented the organisational settings which comprise the empirical data which were collected in HMRC and CH. The purpose of this research is to revise the proposed conceptual framework to provide a frame of reference that can be used as a decision-making tool for government agencies intending to adopt e-government initiatives. This frame of reference, represented by a combined conceptual framework, will be presented in Chapter 6. The empirical evidence, presented in Chapter 4, will be reviewed and analysed in this chapter to make the necessary modifications to the proposed conceptual framework.

This chapter analyses empirical data derived from the case studies conducted at HMRC and CH that can be used as evidence to revise the proposed conceptual framework. This chapter is structured according to the revision process of the components that build the proposed conceptual framework. In sections 5.1 and 5.2, a revised conceptual framework will be identified and explained for each organisation, based on the empirical evidence presented in Chapter 4. In these two sections, based on the e-government literature, the relevant e-government challenges will be identified and integrated into the revised conceptual frameworks to support the empirical evidence. In the light of these reviews, the suggested modifications will be presented and justified in both HMRC and CH organisational contexts.

5.1 Revised Conceptual Framework of E-Government Adoption

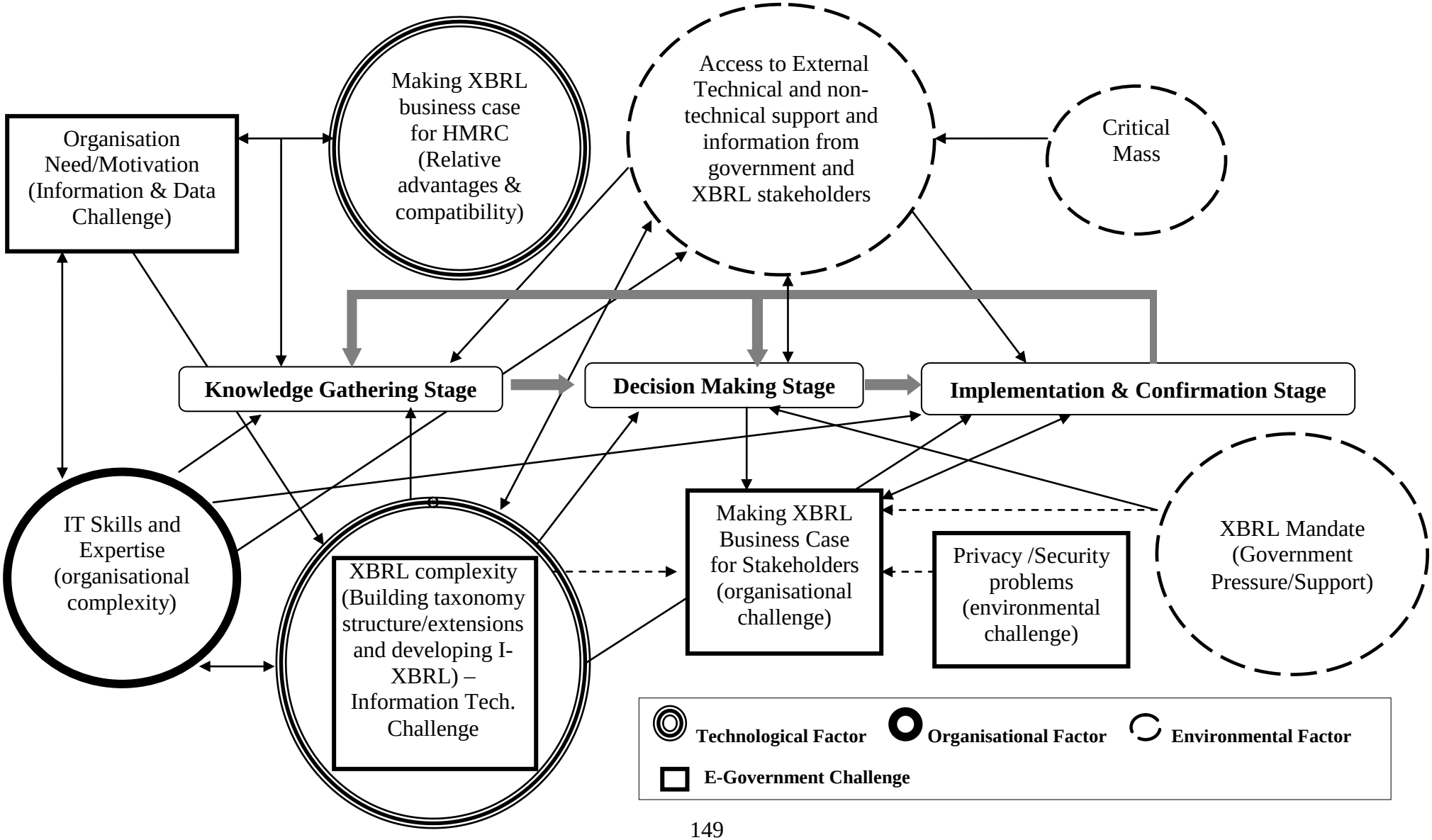
As discussed in Chapter 2, the proposed conceptual framework is consisted of two integrated models, namely Rogers' innovation adoption process, which represents the central part of the proposed framework and TOE model, which represents the factors that could influence the adoption process. The proposed conceptual framework in Chapter 2 has indicated basic relationships among Rogers' adoption process, TOE factors and e-government challenges. In this chapter, these relationships will be developed as depicted in two revised conceptual frameworks that are introduced exclusively to fit and be compatible with the contexts of HMRC and CH's XBRL adoption process. Therefore, the revised framework cannot be generalised to other country in the world that has different government organisational structure and setting. However, in some cases, this framework can be applied, with minor modifications, in a government body that has similar characteristics and organisational context to this research.

5.1.1 Revised Conceptual Framework: HMRC Context[106]

The proposed conceptual framework has been evaluated based on the empirical evidence derived from the case study conducted at HMRC. Figure 5.1 shows the synthesis of the revised conceptual framework components and the developed relationships using findings from the empirical data. This Figure shows some of the differences and similarities to the proposed conceptual framework, and also identifies relevant e-government challenges that influence XBRL adoption process.

[106] For detailed illustration and explanation of HMRC's XBRL adoption process, please see Appendix 6.

Figure 5.1: XBRL Adoption Process: HMRC Context (Revised Conceptual Framework)



5.1.1.1 Knowledge Gathering Stage:

During this stage, organisation's members start to gather information and raise their awareness about the potential technological innovation that will be adopted by the organisation. Developing knowledge and awareness is a function of the adopter's experience, education and exposure to the media as indicated by Rogers (1983, 1995). In TOE framework context, the availability of in-house technical expertise to support the adoption of technological innovations is identified as the organisational complexity. In HMRC, this factor is supported by the availability of technical experience and skill of the XBRL project team members, who work as part of the e-Service Development programme which was established in 2001 to support HMRC's online filing facilities. Those members have acquired strong experience in XML languages and have worked on developing HMRC's electronic filing projects since the introduction of ELS and FBI facilities. XBRL project manager (HMRC1) has also an influential role as the project "champion" due to his established experience with HMRC's electronic filing facilities. He also has strong working relationships with HMRC's business partners including software industry representatives. His awareness of the existing capabilities of HMRC's electronic reporting infrastructure has provided him with the opportunity to develop a vision of the possible improvement that could be applied to facilitate the adoption of XBRL at HMRC.

XBRL's project manager's vision of developing HMRC's online facilities has reflected HMRC's organisation's need to develop a technical "solution" that can support the filing of CT600 accounts and computations. While CT600 tax returns are filed using standardised XML-based form, the accompanying accounts and computations are filed in non-standardised PDF format. HMRC1 and the rest of XBRL project team members have

been faced by the sophistication of the data content of CT600 accounts and computations. The complexity and the lack of appropriate data structure are considered information and data challenges. During this stage, XBRL project manager has started to gather information about a technical "solution" that can facilitate the filing of the non-standardised accounts and computation, to support the risk assessment process conducted by HMRC's tax inspectors. Knowledge has been gathered about the potential of XBRL through the consultations conducted between HMRC1 and IT suppliers over the period 2001-2006. HMRC1 has also indicated that attending several conferences, where he has met with representatives of international regulatory bodies who shared their XBRL adoption experience, has enriched his own knowledge about XBRL's regulatory usage within HMRC.

The outcome of the knowledge gathering process by XBRL project manager has provided an opportunity to identify the main features and potential of XBRL to regulators in general, and to HMRC's electronic services in particular. XBRL business case for HMRC and top government bodies has been undertaken by HMRC1 and other top officials at HMRC to secure government's financial support of XBRL project. HMRC1 has presented and discussed the application of XBRL at HMRC with representatives from the Treasury Department and the Cabinet Office to seek their approval and financial support for the project. HMRC1 has presented and discussed XBRL's advantages to HMRC during initial meetings with members in the Cabinet Office.

XBRL perceived advantages to HMRC have been recognised by research participants and identified in XBRL adoption literature, which focus mainly on achieving process efficiency, cost savings and interoperability (ICAEW, 2004; Kull et al., 2007; Kull and

Abraham, 2008; Rogers, 2010). HMRC1 has emphasised that HMRC's main motivation behind XBRL adoption is to facilitate the risk assessment process, so better data quality could be produced. The digitisation of the accounts and computations will then reduce processing time and effort to conduct case enquiries, and allow corporate filers and tax agents to submit supporting documents in a convenient human-readable format. HMRC2 has supported XBRL's capability to achieve interoperability. HMRC2 has also recognised XBRL's interoperability feature was an indication of its compatibility with HMRC's existing electronic filing system (ICAEW, 2004). Given the fact that CT600 returns are already filed in XML format, HMRC has decided that adopting XBRL will not cause disruption to the filing process of CT600. This view has been also supported by HMRC3 who has mentioned that it was necessary during the initial phase of adopting XBRL to ensure that any undertaken development of XBRL taxonomy should work in harmony with the existing XML Schema.

The complexity of the data content of the accounts and computations has required developing an appropriate XBRL taxonomy structure that would accommodate the taxonomy extensions. HMRC1 and HMRC2 have looked for a mechanism to create style sheets that would support XBRL taxonomy. However, building XBRL technical infrastructure has been particularly difficult because 7,000 data elements[107] in the supporting documents needed to be tagged. According to HMRC1 and HMRC2, this has been one of the most difficult technical tasks that faced XBRL project team members during the information gathering stage of XBRL. The existence of expert knowledge of tax accounting and computer programming (organisational complexity) has been particularly needed to create taxonomy extensions tailored for specific industries and business segments. The knowledge of tax accounting has

[107] Total number tagged data elements is 12,000 (as of late 2009).

been also important to interpret the data elements in the accounts and computations to facilitate the creation of XBRL taxonomy. The complexity of the data content of the accounts and computations has contributed to XBRL's technological complexity (Rogers, 1995), which in turn has created an information technology challenge (Dawes and Nelson, 1995; Caffrey, 1998)

In addition, the technological complexity of XBRL has made HMRC1 also realise the building a proper taxonomy should comply with UK GAAP. HMRC1 and HMRC 2 have indicated that securing an access to external technical support from XBRL UK, particularly IT specialist members and top governmental bodies has been essential during the knowledge gathering stage. For example, on 30 January 2003, HMRC1 met with representatives from XBRL UK and members of the e-Envoy Office to discuss the e-Envoy's list of standards for enabling interoperability (XBRL Progress Report, 2003). XBRL UK has provided HMRC with initial technical guidance in creating instance documents and has discussed key accounting issues which are relevant to building the taxonomy according to UK GAAP.

Seeking non-technical external support has been another important step that has taken place during the knowledge gathering stage. HMRC's XBRL project manager has also sought sources of information from other international regulatory adopters through learning from their XBRL adoption experience within their organisations. HMRC1 and HMRC2 have indicated that HMRC membership of XBRL UK and international conference attendances have given them the opportunity to network with other adopters, exchange information on technical issues related to XBRL implementation. The critical mass of XBRL adopters, regulators and software developers has provided HMRC with insights into practical

application of XBRL in tax filing context. This has been consistent with (Chang and Jarvenpaa, 2005) and Gray and Miller (2009). HMRC1 and HMRC2 have been particularly motivated by the adoption of XBRL in the European Community, which has been driven by tax authorities (XBRL Progress Report, 2008).

Knowledge gathering and raising awareness are the main purposes of the first stage of adopting XBRL at HMRC. The knowledge acquisition process has not only been carried out within HMRC, but also through networking with stakeholders. This finding supports the e-government and IT adoption literature which emphasise the need to develop collaborative relationships between government agencies and their stakeholders (Fountain, 2001; Heeks, 2006). Different levels and types of knowledge which has been acquired from external sources contributed to HMRC's technical expertise with electronic filing projects. HMRC's XBRL project team members and top HMRC officials have also shared a strong motivation behind adopting XBRL, and this has affected their perceptions of the functionality and applicability of XBRL to their organisation. This motivation has been aligned with the top government's goal of utilising technologies in electronic government projects, which subsequently has facilitated the process of extending financial and informational support to HMRC's XBRL project (Cabinet Office, 2000a). In addition, in this stage, two important e-government challenges have been identified. Information and data and information technology challenges have been both found relevant to the data complexity of XBRL and technological complexity of XBRL taxonomy infrastructure.

In the proposed conceptual framework in Chapter 2, the three stages of Rogers' adoption process are affected by the access to external support and information, organisational

complexity, relative advantage and compatibility factors (TOE factors). However, in the revised version of the proposed conceptual framework, two of the e-government challenges reported in the literature, have found to be relevant to XBRL adoption process, as they have relationships with two TOE factors. The two factors are technological and organisational complexity. These challenges have been broadly discussed in the e-government literature as potential challenges affecting the adoption of e-government initiatives. However, in this research, information technology and information and data challenges have been specifically identified and found to be related to the knowledge gathering stage of the adoption process. The empirical evidence and the understanding of Rogers' definition of the knowledge gathering stage provide an opportunity to identify the relevant e-government challenges affecting this stage and other TOE factors.

5.1.1.2 Decision Making Stage:

In its most simplistic form, the decision making stage is where the organisation reaches a decision to adopt or reject a technological innovation. It has been demonstrated in this research that the decision to adopt XBRL at HMRC has been based on the collaboration of top government bodies, HMRC's top management and XBRL project manager. This type of decision, according to Rogers' classification of decisions, which has been made during the decision making stage is referred to as an authority decision (Rogers, 1995). An authority decision implies that the decision is made by few organisation members who possess power, authority and technical expertise (Rogers, 1995). This decision type has been confirmed by HMRC1's view of the mechanism of making the decision to adopt XBRL at HMRC. However, the documentation analysis indicates that this XBRL adoption decision has not been made entirely within HMRC premises. There are several top regulatory-based reports,

particularly NAO and House of Commons' Committee of Public Accounts, have been issued to assess the performance of HMRC's online services and examine ways to improve the take-up of such services by companies and agents. These reports have provided HMRC with strategic action plans and roadmaps to develop its filing facilities. For example, the idea of adopting XBRL has been initially raised in NAO report (2002) as part of NAO's strategy to help HMRC increasing the take up of its online facilities. Feedback from UK prominent professional bodies and representatives of the software industry and accountings firms has also served as catalysts in the decision making process. Over the period 2001-2006 and during the consultations undertaken by HMRC, XBRL project members have collaborated with a task force group gathering seven professional bodies to discuss proposals aimed to improve HMRC's online service, including the filing of CT600's accounts and computations. HMRC has also sought feedback from tax software vendors and representatives of accounting firms. During these meetings, HMRC has developed its three-phase XBRL implementation plan (2002-2005). The representation of several parties in the decision making of XBRL adoption highlights the sophistication of HMRC as a government agency that needs to collaborate with other parties, such as top government agencies and professional bodies, to adopt an e-government initiative, and help to formulate its plan to implement XBRL. This fact supports the importance of emphasising the role played by the stakeholders in the adoption process of e-government initiatives as indicated in the e-government literature (Fountain, 2001; Heeks, 2006).

XBRL adoption decision has been "formalised" by Lord Carter announcement in his Report (2006) on improving the performance of HMRC's online services that XBRL will be mandated in April 2011. This implies that even though the input of the decision making

process has been based on collective efforts of HMRC and its stakeholders; a final decision has to be made officially by a top government body. Lord Carter's recommendation has supported and culminated HMRC's efforts in securing the government's authoritative and financial support for XBRL project. The formality of the government decision to mandate XBRL also 'urged' the XBRL potential users (companies and tax agents) to start developing their corporate filing capabilities in the preparation for the mandate.

TOE literature indicates both the positive and negative aspects of government pressure factor that could facilitate or restrict the adoption of technological innovations (Tornatzky and Fleischer, 19900. Lord Carter's recommendation has represented top government support of adopting XBRL at HMRC. This finding supports Abdullah et al.'s (2009) claim that XBRL mandate represents an assurance of top government backing and financial support. This type of government pressure has been also needed to encourage the take-up of XBRL filing by users. HMRC's experience with FBI usage has indicated that only 28.5% of tax agents filing on behalf of taxpayers used FBI facility during the period 2000-2001 (NAO, 2002). This low take-up rate has provided HMRC with a reasonable "motive" to mandate the usage of XBRL to exert a pressure on the tax agents, who represent around 85% of HMRC's tax filers' population in order to file using XBRL tool.

Even though officials at HMRC have indicated that the mandate will force potential corporate users to take-up XBRL, skepticism among potential corporate users has been initially reported by HMRC1 who has noted that the low-take of XBRL is one of the constant difficulties facing HMRC. This skepticism has presented a potential e-government organisational challenge as reported as by Barret and Green (2001) and West and Berman

(2001). Despite the fact that XBRL business case has been made for HMRC and UK top regulatory authorities, this business case has not been shared among users and accounts production software vendors. Many professional bodies have expressed their concerns regarding the capabilities of corporate users and small businesses to quickly develop their filing facilities before April 2011. The ICAEW (ICAEW, 2005) and ICAS's members (Drysdale, 2007) have voiced their concerns towards HMRC's need to "educate" corporate users about XBRL's advantages to business reporting processes. In recognition, HMRC has organised many events to showcase the potential of XBRL to companies and tax agents. However, these events have not realised the main objective of making XBRL business case to users, as these events generally have provided means to HMRC to convey the message that XBRL is the government-mandated technical solution rather than a "useful" technology reporting tool. This organisational challenge has been supported by two research surveys that have identified an evident lack of awareness about XBRL and its functionalities among accounts preparers, tax accountants, finance professionals and auditors (Dunne et al., 2009) and corporate users from various business sectors (ICAS, 2010). These surveys have concluded that users' skepticism reflects the lack of awareness of the benefits of mandating XBRL usage to file accounts and computation, and emphasise users' concerns about the availability and difficulty in acquiring suitable XBRL-compatible software before the mandate deadline. From users' point of view, the technological complexity of XBRL represented by enabling tax software applications to be XBRL-based among corporate users is one of the most factors contributing to the lack of XBRL business case (Dunne et al., 2009; ICAS, 2010).

In addition to the difficulty of creating XBRL-compatible software, XBRL has been perceived as a costly reporting technology that will place additional administrative burden on users with no additional benefits reaped by businesses (ICAS, 2009). Corporate users have expressed their lack of awareness of XBRL's data tagging feature that can be utilised for financial analysis purpose. The benefit of data tagging has been perceived to be relevant to large financial institutions and banks, where high volume of data and transactions are processed on a daily basis, but it has not been clear how data tagging will be relevant to small businesses (ICAEW 2009b, ICAS 2009).

As indicated from the explanation of the decision making stage of XBRL adoption, the lack of XBRL awareness among users has been triggered by HMRC's decision to adopt XBRL. Even though the decision making process has been based on consensus among HMRC's organisational members, top government bodies and professional bodies, the idea of mandating XBRL has not been well received by corporate users, who have rather favoured to voluntarily file their accounts and computations in XBRL format (ICAS, 2010). The lack of XBRL business case for users and tax software vendors has not caused HMRC's officials to reject the adoption of XBRL. However, HMRC has opted for delaying the mandate deadline from April 2010 to April 2011 to allow tax software providers to prepare their products before the mandate. HMRC has continued to struggle to overcome the organisational challenge, represented by corporate users and IT vendors' potential resistance to use XBRL. HMRC has been also faced by other technical difficulties with the implementation of XBRL.

5.1.1.3 Implementation and Confirmation Stage:

During the implementation of XBRL at HMRC, XBRL project team members have worked on facilitating the process of providing alternative software filing options to companies and tax agents. This has been caused by the difficulties reported by accounts production software vendors who complained about the technical intricacies of XBRL and the changes that have to be made to modify the software applications to be XBRL-enabled (ICAS, 2007; ICAEW, 2009a). To facilitate the implementation of XBRL, HMRC has decided to issue minimum tagging requirements which are based on a combination of UK GAAP, UK-IFRS, UK Common Data and CT computational taxonomies as indicated in Table 4.3 (Chapter 4). To enable tax software vendors to modify their products in preparation for the mandate in April 2011, HMRC has decided that not all XBRL data tags will be used by the mandate deadline and the reduced minimum tagging will continue to be in use until 2013, when full tagging for the accounts will take place. HMRC1 and HMRC2 have agreed on the fact that large companies have also to cope with the issue of "multiplicity of software systems," by investing in simple conversion tax software that is able to tag data to create XBRL template when statutory accounts are prepared for the first time. However, this view has been opposed by companies, which have claimed that such tax software packages are still being developed by software vendors to be XBRL-compliant, and they will need additional time to test such packages (ICAEW, 2009a).

Technical complexities of XBRL have not been limited to users' concerns of implementing XBRL within their organisations. Upon the implementation of XBRL at HMRC, XBRL project team has discovered that XBRL-generated reports were not easily readable by agents and tax inspectors. XBRL project's technical architect (HMRC2) has

worked along with his team and HMRC's IT services provider to render XBRL to create reports that can be understood by tax inspectors and agents. The traditional method of rendering XBRL has been based on creating XSLT style sheets that takes XML input to produce output reports in HTML or PDF so tax inspectors can understand the data. Both XML and style sheet technologies have been designed to transform XML documents into different types of output reports. However, style sheet technology and XBRL did not work seamlessly together. XBRL's rich structure does not lend itself to the way style sheets work. Producing output reports from XBRL document that conforms to XBRL taxonomy has resulted in creating un-maintainable style sheets (HMRC2). In addition, the large sets of data in the accounts and computations normally submitted in non-standardised format have increased the complexity of rendering XBRL data.

Developing XBRL to solve the data rendering problem has caused the reiteration of XBRL adoption process as XBRL project's technical experts have started to gather more information about possible rendering solutions. External technical support has been sought from XBRL rendering solutions group, which is one of XBRL International's working groups, responsible for providing technical support with XBRL implementation. HMRC's XBRL project members have co-founded this group to share their technical expertise and utilise the technical support extended by other members including major software business partners. This shows HMRC's collaboration with its stakeholders to facilitate the implementation of XBRL. This collaboration has resulted in developing Inline XBRL, which allows the data producer to create and embed the data into the rendering. This enables HMRC's tax inspectors to view accounts and computations' data laid out in an HTML document. In addition, it helps to facilitate the processing of case enquiries as it will enable

data producer (filing company) to have the same type of rendering, which is similar to that produced by the company's tax software.

Developing Inline XBRL has meant that software vendors have to re-design their tax software packages to be iXBRL-enabled, which has caused an organisational challenge to HMRC. This is due to the fact that 80% of corporate users and their agents rely on tax software packages for filing their CT600 tax return. HMRC2 has elaborated on this problem, as he has indicated that some representatives of the software developing community do not support iXBRL because they have to incur additional costs, to develop their software packages, which may not be recouped. He has also mentioned that users are reluctant to pay additional money to develop their reporting systems to file in iXBRL, due to the complexity of producing XBRL report compared to paper filing (HMRC2).

The technical development of XBRL has caused the reiteration of XBRL adoption process, as HMRC needed to work with XBRL UK and IT business partners to support the implementation of iXBRL. HMRC has worked with software vendors to assist them with enabling their software packages. The joint work has resulted in developing several filing options, including iXBRL-enabled software version, which is still under development and will be available in spring 2010. In addition, HMRC's XBRL project manager has announced that using conversion software to tag data in Word and Excel applications is already available. However, representatives of major UK professional bodies have expressed their concerns towards the availability of these software products before the mandate, emphasising the importance of running tests to ensure their functionality (ICAEW, 2009; ICAS, 2009b).

In the implementation stage of XBRL adoption, HMRC has been faced by potential business users' concerns towards privacy issues, which has further undermined XBRL business case to users. The joint filing facility has required small companies to file their full statutory accounts to HMRC and their abbreviated accounts to CH. The requirement to file more detailed data to HMRC has concerned many small businesses as they fear that CH could have an access to corporate data that does not need to be reported and disclosed (CH1). This is considered one of the e-government environmental challenges as reported by Andersen and Dawes (1999) and Caffrey (1998) and has found to be relevant to HMRC case. This challenge has been rather recognised by CH's XBRL project manager, who has proposed the idea of using a software package that enables users to file individually full and abbreviated accounts, which provides the user with the flexibility to choose the documents that need to be filed with each agency. However, HMRC has not been be concerned about such privacy issues, because corporate tax data will not be shared with the public, or other external parties. Data as indicated by HMRC1 and HMRC2 are often aggregated and shared with top government bodies such as the Treasury or Cabinet as an input to government decision making process and for analytical purposes.

As mentioned in Chapter 4, HMRC has experienced security-related problems. By reviewing HMRC's history of electronic filing process, it has been found that HMRC has experienced problems with the loss of tax payers' data, which prompted HMRC to take security measures in its web filing facility. However, in this research, it has been found that XBRL project manager does not think that XBRL can improve the security of the data filed. He has rather indicated that it is the responsibility of companies and tax agents to secure the data that will be sent via XBRL-compliant tax software. HMRC's reluctance to provide

additional security measures, other than encrypting its messaging system, has caused many fears among large businesses due to HMRC system's past failure during peak filing periods (ICAEW, 2009a). Passing the responsibility of securing XBRL filing process to tax agents indicates that businesses will need to upgrade their firewalls and virus protection methods. This puts an extra burden on large and small businesses as it will add an additional cost to the total cost of changing underlying business reporting systems. These concerns have further undermined HMRC's ability to make a business case for XBRL among its corporate users and tax agents. However, these fears could be mitigated if small businesses use the web filing facility of the Business Link to file their full accounts, as the Business Link is run by top government bodies that use sophisticated security measures in this portal. However, tax agents using the software filing route remain to be the group that is mostly affected by the privacy and security concerns, and therefore have to collaborate with their software vendors to handle these concerns.

As part of confirming its decision to implement XBRL, HMRC decided to conduct "test runs" in November 2009, with a group of software vendors and representatives of small businesses. However, XBRL testing with corporate users or tax agents has not been conducted by HMRC,[108] and has not been considered by HMRC's XBRL project during the implementation stage of XBRL. HMRC has rather relied on simplifying the tagging requirements for filing the accounts and computations in addition to providing and updating a list of approved tax software packages to tax agents on its website.

[108] Testing did not take place until the writing of this research (May 2010).

The technical complexities associated with XBRL implementation at HMRC have "overshadowed" HMRC's ability to raise XBRL awareness among corporate users. This has contributed to undermining XBRL business case to users. It could be argued that HMRC has conducted several seminars and workshops to raise users' awareness about XBRL. However, such seminars have been mainly exploited to inform corporate users about XBRL mandate and usage and instruct them on the changes that need to be undertaken to their corporate filing systems before the mandate deadline.

The implementation and confirmation stage of XBRL adoption process at HMRC has been characterised by two main issues: the technical development of XBRL and the corporate users and tax software industry concerns' towards the feasibility of XBRL, and HMRC's ability to provide sufficient support before the mandate. This implies that if XBRL has not been mandated by the law, and has been rather offered as HMRC's *new* voluntary method of submitting a digitised version of the accounts and computations, HMRC could have invested additional efforts into convincing corporate users to adopt XBRL, so it can increase XBRL take-up rate. HMRC's motivation to adopt XBRL has focused primarily on generating data that could contribute to the risk assessment process, and lower the cost of case enquiries. This motivation has overshadowed HMRC's ability to provide reasonable causes to and convince potential users that accounts and computations have to be filed in XBRL rather than in traditional PDF format. HMRC1 has mentioned that many users are also sceptical towards using XBRL as they think that new system will require reporting and disclosing more corporate information than it is currently filed with HMRC (H4). However, HMRC has refuted this claim by emphasising the fact that it is HMRC's policy to demonstrate an "even-handed approach to compliance as e-filing must not act against the companies' interest by

increasing the likelihood of enquiring – *in fact XBRL enabled e-filing should reduce the chance of enquiry"* (H4, p.12).

In the context of e-government, HMRC is a regulator that relies on offering filing services to individual and business users. Therefore, as part of XBRL adoption process, offering XBRL as a potential "technical solution" that supports the filing of CT600 tax returns entails tailoring this "solution" to users' needs and capabilities. However, users have continued to lack XBRL awareness and struggled with the technical issues associated with changing their underlying reporting systems. In addition, the reluctance of the tax software vendors who are HMRC's business partners in the adoption process has also affected HMRC's ability to facilitate the usage of XBRL-enabled software by users. As a regulatory body, HMRC needs to engage with its users and business partners to facilitate the adoption process, which supports Heeks (2006) and Fountain (2001) claims about the importance of engaging with the government agencies' stakeholders during the adoption of new technologies. This engagement does not only entail seeking and sharing external support during the adoption process from business partners, but also taking users' needs and concerns on board as they constitute a key component in the e-government adoption process.

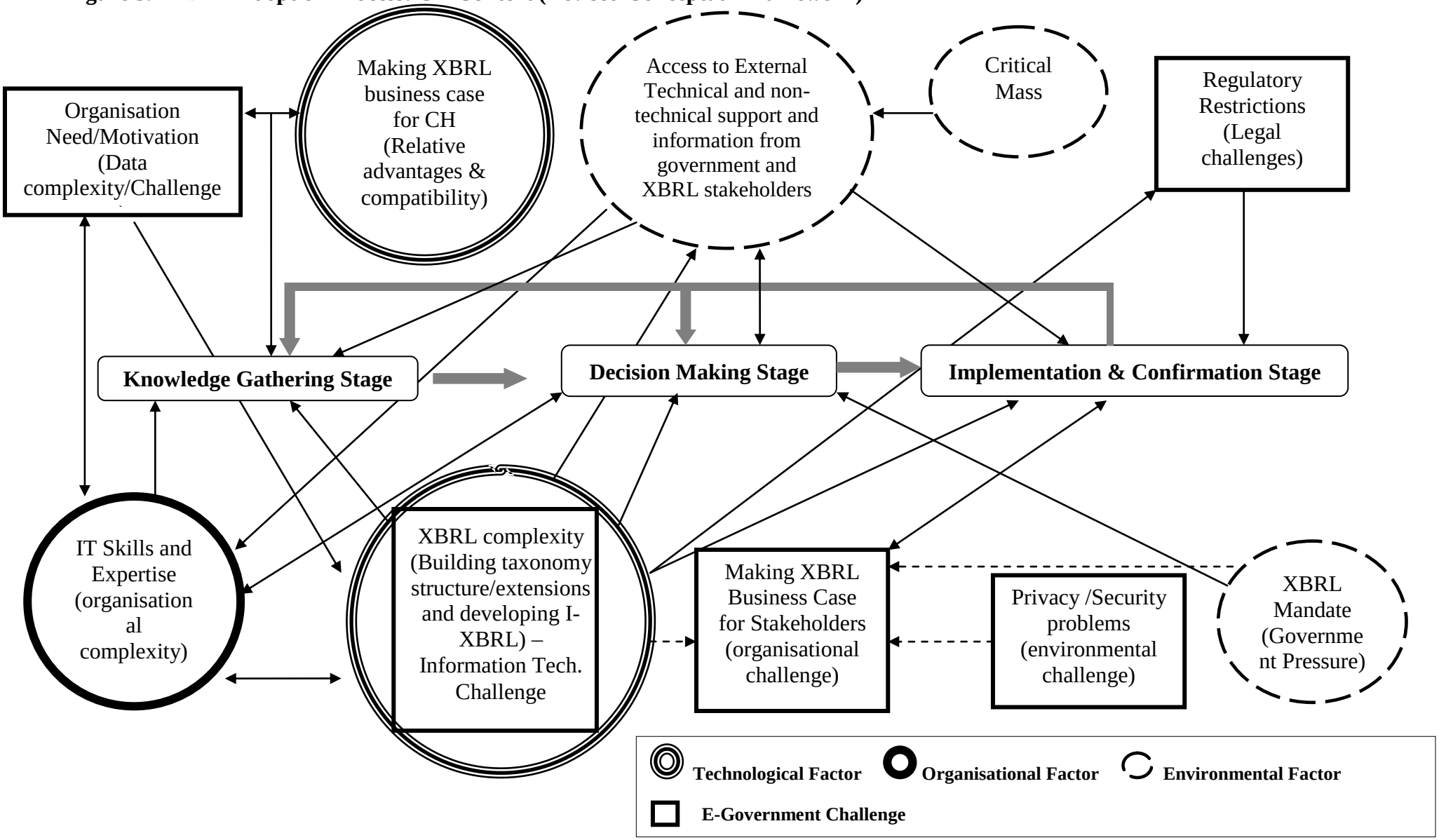
5.1.2 Revised Conceptual Framework: CH Context[109]

The proposed conceptual framework has been evaluated based on the empirical evidence derived from the case study conducted at CH. Figure 5.2 shows the synthesis of the revised conceptual framework components and the developed relationships using findings from

[109] For detailed illustration and explanation of CH's XBRL adoption process, please see Appendix 6.

empirical data. This Figure shows the developed relationships among each stage in the adoption process, TOE factors and e-government challenges.

Figure 5.2 XBRL Adoption Process: CH Context (Revised Conceptual Framework)



5.1.2.1 Knowledge Gathering Stage:

As indicated in the case study setting, pre-existing knowledge of XBRL has been passed to CH's XBRL project team members through their meetings with HMRC officials during the period 2002-2003. CH's main motivation behind their interest in XBRL is to find an electronic reporting method that could facilitate capturing and manipulating the data in the unaudited accounts, instead of capturing images of the data. In addition, CH1 has recognised the need for having an electronic filing platform to process the unaudited accounts. The manual accounts processing has been one of the obstacles that has faced CH in the past, especially during the peak filing periods. XBRL provides an opportunity to CH to facilitate the accounts processing, which results in reducing high rejection rate that has been caused by users' calculation errors in the paper filed accounts. XBRL's ability to improve the efficiency of the reporting process is one of the main advantages recognised by XBRL project manager (CH1). CH1 has also ensured that usage of the XBRL-based Adobe Intelligent Forms (AIFs) is compatible with CH's existing online filing systems, which are used to process companies' accounts by CH's operation staff members.

CH's XBRL project team members have gathered information about the applicability of XBRL to CH's audit-exempt accounts. Such accounts contain around 450 data elements that needed to be tagged in XBRL taxonomy, which was not a strenuous technical problem until CH has recognised that it does not have the technical capability to build an appropriate taxonomy structure for the unaudited accounts. This lack of technical expertise has made CH realise that it should seek external technical support from HMRC's XBRL project team members and collaborate with major software providers to explore outsourcing option. Through her meetings with HMRC's XBRL project team members, CH1 has been introduced

to HMRC's network of software developers and groups of accounting firms. As a member of the Steering Committee of XBRL UK, CH1 has utilised this communication network to seek assistance on the presentation and format of the XBRL-based Adobe forms. In addition, XBRL International conferences have provided another information venue for CH to meet European Registries to share their XBRL adoption experience. The diversity of these external knowledge sources has enabled CH to match HMRC's first-hand experience of XBRL. This knowledge has been also supported by CH1 and CH2's experience with electronic filing projects and web filing developments since early 2000s, which have all helped in putting XBRL into perspective.

CH1 and CH2's experience in XML languages and programming has not been supported by the existence of comparably skilled staff members in CH's IT department. CH1 has decided that if CH would consider the adoption of XBRL, the complexity of building the technical infrastructure of XBRL would be one of an information technology challenge (Caffrey, 1998, Dawes and Pardo, 2002). CH has been faced by the lack of organisational complexity, represented by IT expertise. CH1 has found difficulty to recruit and maintain XML skilled personnel due to the shortage in IT professionals who are provided with better employment packages offered by the private sector. Therefore, CH has needed to assess its in-house technical expertise that would support XBRL project, particularly to assist with building XBRL taxonomy. CH2 has indicated that the volume or the format of the data that needed to be XBRL-tagged is not a problem by itself. However, the lack of CH's IT expertise has caused a concern to CH1, who has feared that the lack of technical expertise could hamper the taxonomy building task. CH1 has decided to outsource the task of building XBRL taxonomy.

Reliance on external technical assistance by private-sector software vendors is one of the ways government agencies overcome potential information technology challenges (Graham and Scarborough, 1997). However, depending on IT outsourcing could encourage some government agencies to invest fewer resources into building and improving their own IT departments (Willcocks et al., 1995; Pavlichev, 2004). In addition, it hampers the agencies' ability to implement future large-scale IT projects. This has been found consistent with CH case, as XBRL project team has been consisted of four members, one of whom has received training on XBRL, while the rest have worked on the non-technical side of XBRL adoption. The shortage of technical expertise and reliance on IT outsourcing has put CH in a critical position as it needed to develop XBRL capabilities before the implementation of the joint filing facility with HMRC, as will be discussed in the implementation and confirmation stage.

5.1.2.2 Decision Making Stage:

According to Rogers, some organisations need to seek support from top government authorities. This takes places after assessing the organisational capabilities to adopt the technology, after all the knowledge about that technology has been gathered. In that respect, CH has acquired approval and advisory support from its overseeing top government agency, the Business, Innovation and Skills Department (BIS). The BIS's advisory assistance was an important catalyst in the decision making process. The BIS has provided CH with the accountancy expertise and assisted XBRL project manager with the selection of a proper data structure and format of XBRL-enabled unaudited accounts. The BIS has also assisted CH on how to advise companies on using XBRL-based Adobe Intelligent Forms, which has showed another dimension of top government support towards not only CH as an XBRL adopter but also small businesses, as potential users of XBRL. CH has utilised this support by delivering

creative marketing campaigns during XBRL showcase events where CH's officials have met with representatives of small businesses as part of CH's effort to make XBRL business case for them.

Lord Carter's recommendation to mandate XBRL has not affected CH's decision making regarding the adoption of XBRL to facilitate the filing of unaudited accounts. However, the mandate has played an important role in recognising the importance of reviewing the data structure of the full accounts of large companies. CH has collaborated with BIS and the Cabinet office to discuss the legal implications of enabling the filing of full accounts in XBRL before the implementation of the XBRL-based joint filing facility. This required CH to restart XBRL adoption process and gathering additional information about tagging full accounts in XBRL. Thus, CH has been faced by a potential information technology challenge represented by the complexity of the data structure of the full accounts. This has meant that CH needs to collaborate with HMRC's XBRL project members, XBRL UK, and IT suppliers to discuss the technical issues relevant to the joint filing facility. The lack of technical expertise at CH has not been viewed as a challenge to CH when it decided to adopt XBRL as the task of building the taxonomy to its IT business partners has been outsourced. However, the necessity of having experienced technical staff to support the implementation of the joint filing has contributed to the reiteration of XBRL adoption process, as XBRL project manager has needed to ensure that technical support is adequate to accommodate the changes with CH's electronic filing facilities. In addition, CH and HMRC's XBRL project managers have started to collaborate on utilising the Business Link to implement the joint filing facility.

The initial decision to adopt XBRL has been supported by CH's vision to achieve its long term objective of electronically enabling 100% of its filings. This vision has been steered by members in the BIS, and supported by the Treasury and the Cabinet Office, which has facilitated the process of securing non-technical and financial support. This indicates that the decision made by CH to adopt XBRL has been based on an authority basis. CH members who possess power and technical expertise represented by CH's top management, XBRL project manager and the BIS, are the ones who have led the decision making process. The BIS has been involved in the decision, since CH is an executive agency of the BIS, and has been the main authoritative figure that has facilitated the adoption process by providing technical and financial support.

As indicated previously, CH had to ensure that XBRL data filing complies with the reporting and information disclosure requirements under the Companies Act 2006. For example, the presentation and format of XBRL-based Adobe forms and accompanying notes provided by presenters have been checked by CH and BIS to determine their [forms] compliance with the Act. According to CH1 and CH2, securing legal approval from BIS and technical support from IT business partners has not been a difficult task. However, CH has started to face more technical and legal challenges with the implementation of XBRL-based joint filing facility with HMRC.

5.1.2.3 Implementation and Confirmation Stage:

Before the implementation of XBRL-based filing of the unaudited accounts, XBRL's project team members have conducted several testing sessions of CH's web and software filing facilities. These sessions have been publicised in CH's main magazine, the Register, where locations and times have been scheduled to take place in several major British cities. CH has

conducted these sessions in liaison with software vendors and groups of small businesses' representatives to address the technical issues that could be faced by them. CH1 has indicated that these sessions have assisted XBRL project team members in identifying potential problems with the usage of the Adobe forms as raised by small businesses. The success of the testing trials, which has been accompanied by the introduction of PROOF and Monitor security measures against fraud, provided CH with the opportunity to introduce XBRL in July 2006, and start receiving XBRL-based filings.

After the successful implementation of XBRL and the release of Lord Carter Report, CH and HMRC have collaborated to implement the joint filing facility with members of top government agencies such as the BIS and the Cabinet Office (e-Envoy Office). The implementation of the joint filing facility has been characterised by many challenges. During the course of the interviews, it has been found that small businesses have some concerns towards privacy issues associated with releasing their full accounts' data to HMRC and CH. As indicated previously, the joint filing facility requires small companies to file their full statutory accounts to HMRC and their abbreviated accounts to CH. The requirement to file more data to HMRC has concerned small businesses as they have feared that CH could have an access to corporate data that does not need to be disclosed. This has been considered one of the environmental challenges facing CH (Andersen and Dawes, 1991; Caffrey, 1998). Similar privacy concerns have been voiced by large companies filing under the joint filing facility. Many companies have expressed some "trust" issues towards CH's disclosure of corporate information through its web search facility or the possibility of selling such information to its subscribed customers (CH1 and CH2). This challenge has been recognised by CH1, who has discussed the idea of introducing a software application that enables users to file full and

abbreviated accounts to each agency individually. However, this idea has been met with resistance from software vendors, who have to re-design their software packages to be iXBRL-compliant before the testing of the joint filing facility in summer 2010 (ICAEW, 2009a). This has been one of the shared organisational challenges by HMRC and CH's XBRL project managers as they have identified its impact on the successful implementation of the joint filing facility. To safeguard the security of XBRL data reported using the joint filing facility, CH has indicated that it would rely on the security measures applied in the Business Link, but would need to cooperate with HMRC and the BIS to check those measures (CH1).

Data rendering has been one of the causes of legal challenges (Dawes and Nelson, 1995) and information technology challenges (Barki et al., 1993) that have faced CH during the implementation stage of XBRL adoption process. The legal challenge has been represented by the need to render XBRL data so the publicly disclosed accounts' information will exactly match the information submitted by small companies under the Companies Act. In addition, CH, which has lacked technical expertise, required to develop taxonomy structure for the accounts submitted by large companies, which has caused an information technology challenge. This has induced CH to seek HMRC and software providers' assistance to discuss the technical capabilities of iXBRL to assist the data rendering process. CH has reconsidered a technical solution for the data rendering problem. This has made XBRL project managers to restart XBRL adoption process for the purpose of seeking external support and gathering more information about iXBRL to accommodate the filing requirements of the full accounts in preparation for the joint filing facility.

The joint filing facility has also caused an organisational challenge to CH. CH1 has noted that many large companies question XBRL benefits to their business reporting systems. This is due to the fact that those companies have to file twice with HMRC and CH, while it is the government's goal is to reduce compliance costs for businesses (BIS, 2009) and minimise government inefficiencies (Hampton, 2005). Implementing the joint filing facility has been met by an apparent lack of XBRL benefits among large companies. Their lack of XBRL knowledge and benefits has reflected their skepticism about the feasibility of the double filing and their concerns about software providers' readiness for the joint filing facility (ICAEW, 2009b). CH did not experience this problem when it implemented XBRL filing in 2006, as it is based on voluntary basis. However, CH officials have believed that the voluntary filing approach is not a feasible option for large companies and agents, which have been most sceptical XBRL user group among CH's filing companies' population. CH1 has supported the application of XBRL mandate, and has considered it as an important step towards achieving CH's strategy of enabling the electronic filing of all companies' filings (full and unaudited accounts) by 2011. Both CH1 and CH2 have believed that the regulatory pressure is a reassuring and supportive factor, mostly to HMRC and CH, as it will be the only means to push reluctant corporate users towards changing their underlying filing systems.

Legalising the complex set of the full statutory accounts submitted by corporate users to CH has added a legal burden on CH. CH1 has sought legal assistance from the BIS. Similar to HMRC's minimum tagging requirements, CH has tried to reduce the burden on large companies to comply with the law (Company Act 2006). This has been done as CH has provided large companies with the opportunity to comply with the minimum reporting requirements stated in the Act to file their accounts with CH (CH1). This solution could be

considered as one of CH's legal manoeuvres to reduce the compliance burden on corporate users.[110] The issuance of minimum reporting requirements implies two important issues. First, CH will handle privacy concerns of information disclosure more effectively as companies will not need to report full corporate information that is not required by the law. Second, it also implies that CH will be less concerned about its ability to process the large volume of data filed by companies as CH has suffered from a shortage of its staff members especially during peak filing period

5.2 The Analysis of HMRC and CH's Revised Conceptual Frameworks

Based on the analysis of the revised conceptual frameworks of XBRL adoption process at HMRC and CH, this section will discuss and analyse the main features of both processes. A justification will be provided to explain the main differences between each framework.

The cases of HMRC and CH organisations presented in Chapter 4 and discussed in this chapter have shown XBRL adoption process, which has passed through a number of successive and identifiable stages during the process. The adoption process at both organisations has been reiterated based on the changes incurred because of the technical development of XBRL and the introduction of the joint filing facility. The process reiteration represented by the arrows linking the stages of XBRL adoption process with each other indicates that the process does not follow a one-way path as new information needed to be sought or additional support had to be secured from HMRC and CH's stakeholders. This supports Rogers' (1983) assumption that the adoption process is continuous, and

[110] For more information on the changes in the filing requirements of companies' accounts under Company Act 2006, please visit: http://www.opsi.gov.uk/acts/acts2006/ukpga_20060046_en_1 or http://www.berr.gov.uk/files/file46791.pdf

organisational members could re-think and change the way they make their decisions or implement technologies within their organisations as needed.

The speed of XBRL adoption process in the organisations varies. HMRC has faced many technical difficulties when XBRL project team members have built an in-house XBRL taxonomy infrastructure. The complexity of the data content and structure of CT600 accounts and computations has also added to this technical difficulty, which has caused a delay in testing and implementing XBRL. This is consistent with Ambite et al. (2002) and Dawes (1996) who identify the potential complexities associated with data structure that cannot be easily processed by government's processing systems. On the other hand, CH has relied on outsourcing XBRL taxonomy building task to its IT business partners (Adobe Systems), and has not faced a comparable data complexity with tagging the data in the abbreviated accounts. CH's perception of the information technology challenge represented by the complexity of building the taxonomy structure for the abbreviated accounts has been identified in the e-government literature. The existence of data and information challenge has been supported by Caffrey (1998) and Dawes and Pardo (2002) who emphasise the fact that certain adopted technologies require sophisticated level of IT expertise, which may not be readily available at government agencies.

The complexity of XBRL as a reporting technology tool and the complexity of building XBRL taxonomy are both interrelated and identified in the revised conceptual frameworks as a technological complexity (TOE factor) and as an information technology challenge (e-government challenge). E-government literature indicates that government agencies could deal with information technology challenges by providing demonstrations and

prototypes (Caffrey, 1998; Dawes and Pardo, 2002). This has been also supported by the ICAEW report (2009b) which indicates the need to test XBRL to determine its capability to cope with the volume of transactions. After making the decision to outsource the taxonomy building task, CH was able to quickly proceed with the implementation of XBRL and started to receive XBRL-based filings in July 2006, while HMRC has continued to struggle with the technical intricacies of XBRL implementation. This has its implication on each agency's ability to test XBRL. For example, before the implementation of XBRL in CH, several testing sessions have been conducted, where representatives of software vendors and small businesses have been invited to use XBRL. However, XBRL testing in HMRC took place only in November 2009, after building iXBRL taxonomy structure and issuing the minimum tagging requirements. HMRC's XBRL testing has involved representatives of small companies and software vendors, and has not included representatives of tax agents or corporate companies, who comprise 80% of taxpayers' population. The pace at which XBRL has been implemented in the final stages of XBRL adoption process has therefore affected the HMRC and CH's abilities to provide XBRL demonstrations before introducing XBRL to users.

Findings of the cases analysis also indicate that the engagement with stakeholders through building a critical mass with those stakeholders to acquire information and support has been associated with all the stages of XBRL adoption at both agencies. As noted throughout the process, HMRC and CH have collaborated with top government bodies such as the BIS, members of the Cabinet Office as well as major software companies. They have both attempted to work with major IT business partners from the private sector such as Adobe Systems and Core Filing. This finding supports the fact indicated in the e-government

literature that the adoption process of e-government initiatives requires collaboration with private-sector IT suppliers to support the existing technical expertise and resources at adopting organisations (Heeks, 1999; Allen et al., 2001; Bishop 2001). Data collected from case organisations has revealed that IT vendors' support has positively contributed to XBRL adoption process by providing consultations, product demonstrations, outsourcing of parts of the taxonomy building and skilled IT staff. The technical support has been particularly acquired by HMRC and CH during the development of Inline XBRL. HMRC2, CH1 and CH2 have emphasised that taxonomies needed to be reviewed to reflect the underlying changes in the tax computations and full accounts, and this has been accomplished to great extent through the support of large software vendors. Software vendors have provided valuable feedback on how the XBRL-compliant software could work and how accounting rules could be codified into computing terms. HMRC2 has indicated that software suppliers are one of HMRC's primary business partners who possess high levels of technical expertise that could be utilised to support HMRC's electronic reporting systems. CH has shared similar opinion on the importance of software vendors throughout the process of adopting XBRL.

The differences in the existence of the organisational technical expertise at HMRC and CH have their impact on the decision made by both agencies to outsource technical support. For example, CH has lacked sophisticated technical expertise to support the adoption of XBRL. However, this has not been viewed as a potential challenge as CH has entirely relied on its IT business partners to build the technical infrastructure of XBRL. On the other hand, HMRC's long-standing experience and history with electronic filing reporting which dated back to 1998 have provided XBRL project team members with the required technical expertise to develop XBRL taxonomy. TOE and e-government literature indicates that the

adoption process of e-government projects is not only a function of the complexity of the technology adopted or the data that will be transacted and processed, but also a function of the availability of the technical expertise that is needed to support the adoption of such technology (Tornatzky and Fleischer, 1990; Caffrey, 1998; Dawes and Pardo, 2002). This technical expertise can be developed within the government agencies which can often secure more financial support from top government bodies to develop its organisational resources including human expertise and training than what private organisations can do (Heeks, 2006). However, this is not consistent with CH's case as they have preferred to use external IT support during the three stages of XBRL adoption process, and this decision has revealed that in-house technical expertise can be strengthened by outsourcing certain technology implementation tasks to adopt large-scale e-government initiatives.

Both organisations have struggled with privacy/security concerns throughout XBRL adoption process. These concerns represent the environmental challenges discussed in e-government adoption literature (Andersen and Dawes, 1991; Caffrey, 1998; Moon, 2002; Holden et al., 2003) CH has struggled with the issue of personal information abuse as some Internet users have misused basic corporate information that has been downloaded for free through CH's search engine (HoC, 2008). The problem has also become imminent for CH's presenters as the information supplied as part of the incorporation of new companies or the submission of accounts have been misused to commit fraud by using directors' personal details to apply for lines of credit (HoC, 2008;

CH, 2006). As noted in Chapter 4, CH has tried to overcome these problems by the introduction of security measures (PROOF and Monitor service), which have raised

presenters' confidence in CH's online facilities as indicated by the increasing number of CH's online services take-up rate.

HMRC has relied on software vendors to take responsibility of securing the data transmitted using accounts production software. Since the majority of HMRC's corporate users depend on third party tax software applications to file on behalf of their clients (around 80% as indicated previously), privacy and security issues will continue to challenge HMRC's ability to encourage those users to file in XBRL. In addition, the other 20% of HMRC's taxpayers' population using HMRC's portal for filing their tax returns are also sceptical about security issues. According to Lord Carter report (2006), in 2003, only 6.4% of corporate tax filers and agents have used HMRC's online service facilities to file CT600 tax returns. This low rate is due to the fact that there is reluctance on the side of companies to use HMRC's online services because of the "high profile problems [security issues and data loss] with HMRC online service," (Lord Carter Report, 2006, p.19). During the course of interviews, HMRC1 has indicated that web filing's security is offered through the authentication and user authorisation processes. However, this claim has been refuted as the authentication process has been perceived as tedious job that is time consuming especially for agents handling large client lists (Lord Carter Report, 2006; Hall et al., 2008). Corporate users and tax agents' skepticism towards using HMRC's portal has influenced its efforts to make XBRL business case for the business users' community. This has been evidenced by the surveys' findings that have highlighted the lack of XBRL awareness among members of the business community (Dunne et al., 2009; ICAS, 2010). This research establishes a connection between the environmental challenges represented by privacy/security concerns and the organisational challenge represented by the lack of awareness among users towards e-government initiatives.

Including these e-government challenges in the revised conceptual frameworks has assisted in establishing this relationship. By refraining from engaging with stakeholders and making business case for newly adopted technology for them, those agencies could face a difficulty in implementing the technology due to the users' resistance. Therefore, the government may not realise the benefit of the technology that aims to reduce regulatory burden and achieve efficiency.

Both HMRC and CH's cases have been characterised by the absence of formalisation. Formalisation as defined in Chapter 2 refers to the process through which offering technical user manuals to potential users to facilitate the implementation of the newly adopted technologies or information systems (Chau and Tam, 1997; Raus et al., 2009). During the implementation of XBRL, HMRC's XBRL project members have developed the Technical Pack (Tech Pack) to help potential software vendors to know how to design their accounts production software to be XBRL-compatible and how to use such software so they know how to write their software for their clients (corporate users and tax agents) (HMRC2). The Tech Pack also has all the information needed to know about implementation of Inline XBRL and the authentication procedures for web filing. At CH, Technical Interface Specification (TIS) has been published to specify the type and format of the data that should be presented to CH. It also has information to software vendors on how to develop and test their software applications. Both organisations have been asked whether the introduction of this technical documentation has played any role in XBRL adoption process, and they have reported that it has been part of XBRL implementation. At HMRC and CH, documenting the implementation procedures to assist software vendors is often conducted on a routine basis with any newly developed technology to assist users who prefer to use the software filing route rather than the

web filing facility. Publishing user manuals is just part of the process of implementing the technology, and has not played any significant role in XBRL adoption process. Therefore, the formalisation factor has been disregarded in the revised conceptual frameworks of HMRC and CH.

The government pressure/support factor has been perceived as a supportive factor for HMRC and CH. Both agencies have used the authoritative power of XBRL mandate to push for the implementation of XBRL-based accounts and computations (HMRC) and joint filing facility (HMRC and CH). Government pressure is considered a regulatory challenge in e-government literature (Dawes and Nelson, 1995; Landsbergen and Wolken, 1998; Harris, 2000). However, Tornatzky and Fleischer (1990) suggest that supportive regulatory procedures could facilitate the adoption of technological innovations. Tornatzky and Fleischer's (1990) claims have been consistent with the findings of the case studies. XBRL mandate has provided the needed legal power which has been used to 'urge' companies and software vendors to start modifying their accounting systems and software applications to be XBRL-enabled (Abdullah et al, 2009). The mandate has served the interests of HMRC officials as they have struggled with the risk assessment process of the non-standardised PDF-based accounts and computations. HMRC has already thought of using XML to facilitate the filing of these documents, but the technical capabilities of XML does not provide the advantage of XBRL which enables the standardisation of the accounts and computations' filings. Corporate users and tax agents could not perceive XBRL's advantage to them as they have been concerned with the changes that needed to take place to electronically file the accounts and computations. XML, as a technical solution, would have been more convenient reporting medium to corporate users and tax agents than XBRL, as users already file CT600 tax returns

in XML format. If XBRL has been introduced to those users on a voluntary basis, most of these users would have resisted to change their systems and preferred to send their accounts and computations as PDF-based online attachment, as they are used to do. This assumption is supported by the apparent lack of XBRL business case for users, which has evident in HMRC case as noted previously. Therefore, XBRL mandate is needed to 'urge' corporate users and tax agents to comply with the law and change their accounting systems to file the accounts and computations.

At CH, XBRL has not been mandated for the filing of the unaudited accounts. Before the mandate of XBRL, CH has encouraged small businesses to use its web filing facilities to file their accounts at a reduced fee of £15 (paper filing fee is £30). At the same time, late filing penalties have been raised to £5000 under the new changes of Companies Act 2006. These two procedures have assisted CH in persuading presenters to electronically file their documents in XBRL, which has started to take place in July 2006. Lord Carter's recommendation has specified that XBRL should be used in the future to file large companies' full accounts. This has been part of the joint filing facility initiated by top government's decision makers to eliminate redundancies and inefficiencies in government administrative operations (Hampton, 2005). Implementing the joint filing facility has required the utilisation of a single reporting medium for filing companies' CT600 supporting documents (HMRC) and full accounts (CH). This facility aims to accomplish the objective of reducing redundancies in reporting requirements. As the law mandated the usage of XBRL to file the accounts and computations, the need to use the same reporting medium for filing the full accounts has been necessary to facilitate the joint filing. CH1 and CH2 have indicated that the law is the only way to implement such change; otherwise, it would have been

uneconomical to require companies to send two different sets of accounts, a set of abbreviated accounts through CH's web filing facility and another set of full accounts to HMRC using HMRC's filing facility, which defied the purpose of reducing government reporting inefficiencies.

5.3 Summary

This chapter has focused on the revision of and modifications to develop the proposed conceptual framework for an e-government initiative, represented by XBRL adoption process. Validation and testing of the proposed framework (Rogers' adoption process, TOE framework, and e-government challenges) have been discussed in this chapter, based on the empirical evidence presented in Chapter 4.

Empirical evidence derived from the analysis of the case studies confirms the applicability of the revised framework in two different contexts among case organisations. The discussion shows that HMRC and CH have followed similar routes towards adopting XBRL. In addition, they have faced data, organisational, information technology, legal (CH only) and environmental challenges throughout the process of adopting XBRL. XBRL project team members at both agencies have faced inherent technological complexities associated with the taxonomy building task. However, the underlying data structure of the regulatory filings has determined HMRC and CH's decision to outsource taxonomy building task. In addition, the differences in the data content have indicated that CH has faced legal restrictions as it has needed to seek legislative approval for using XBRL to receive full accounts.

XBRL business case has been made for HMRC and CH, as it has been perceived to contribute to their regulatory filing systems and government practices and improve data quality as well. However, XBRL business case has not been made successfully for potential corporate users and small businesses. Several security and privacy concerns have been reported. While CH has implemented some security measures within its web filing facilities, HMRC has continued to rely on its existing data authentication process and software vendors to secure their software packages, which both have not contributed positively to ensuring the security of the data filed.

The findings also suggest that strategic partnerships with software vendors have played an important role in XBRL adoption process. HMRC and CH have collaborated with major software companies to outsource some of the IT tasks and to provide consultations and XBRL live demonstrations. CH's lack of technical expertise has been particularly strengthened by this type of business partnership, while HMRC has relied on in-house technical expertise.

XBRL mandate has perceived as supportive factor in XBRL adoption process. Both agencies have exercised and benefited from the authoritative power. This has been found contrary to e-government literature but consistent with TOE framework. The existence of the mandate has created many problems with potential resistance of corporate users, tax agents and small businesses to change their reporting systems to be XBRL-compatible. This has contributed to the lack of XBRL business case for companies.

The revised conceptual frameworks at both agencies have also illustrated the developed relationships among each stage of Rogers' adoption process, TOE factors and e-government challenges. These relationships show that identified information technology challenge (e-government challenge) and the technological complexity of XBRL (TOE factor) have played a role in XBRL adoption process, causing the reiteration of the process, particularly during the development of Inline XBRL and the preparation for the joint filing facility.

In Chapter 6, the finalised combined conceptual framework will be introduced to explain the common features and characteristics of XBRL adoption process at both organisations and the underlying relevant implications. The combined framework will be discussed to determine its usage as a guiding tool for government agencies to support their decisions towards adopting similar e-government initiatives.

CHAPTER 6

FINALISED COMBINED CONCEPTUAL FRAMEWORK

&

CONCLUSIONS

6.0 Introduction

Chapter 5 has discussed the analysis of the case studies and has introduced the revised conceptual frameworks of the XBRL adoption process at HMRC and CH. Based on the discussion of Chapter 5, this chapter introduces the proposition of an empirical framework for XBRL adoption process that can be used as a frame of reference and a guiding tool for decision-making when government agencies intend to adopt an e-government initiative. This chapter presents the main findings, outcomes and conclusions derived from the literature analysis and the empirical research carried out. It provides the research limitations and the recommendations for future research.

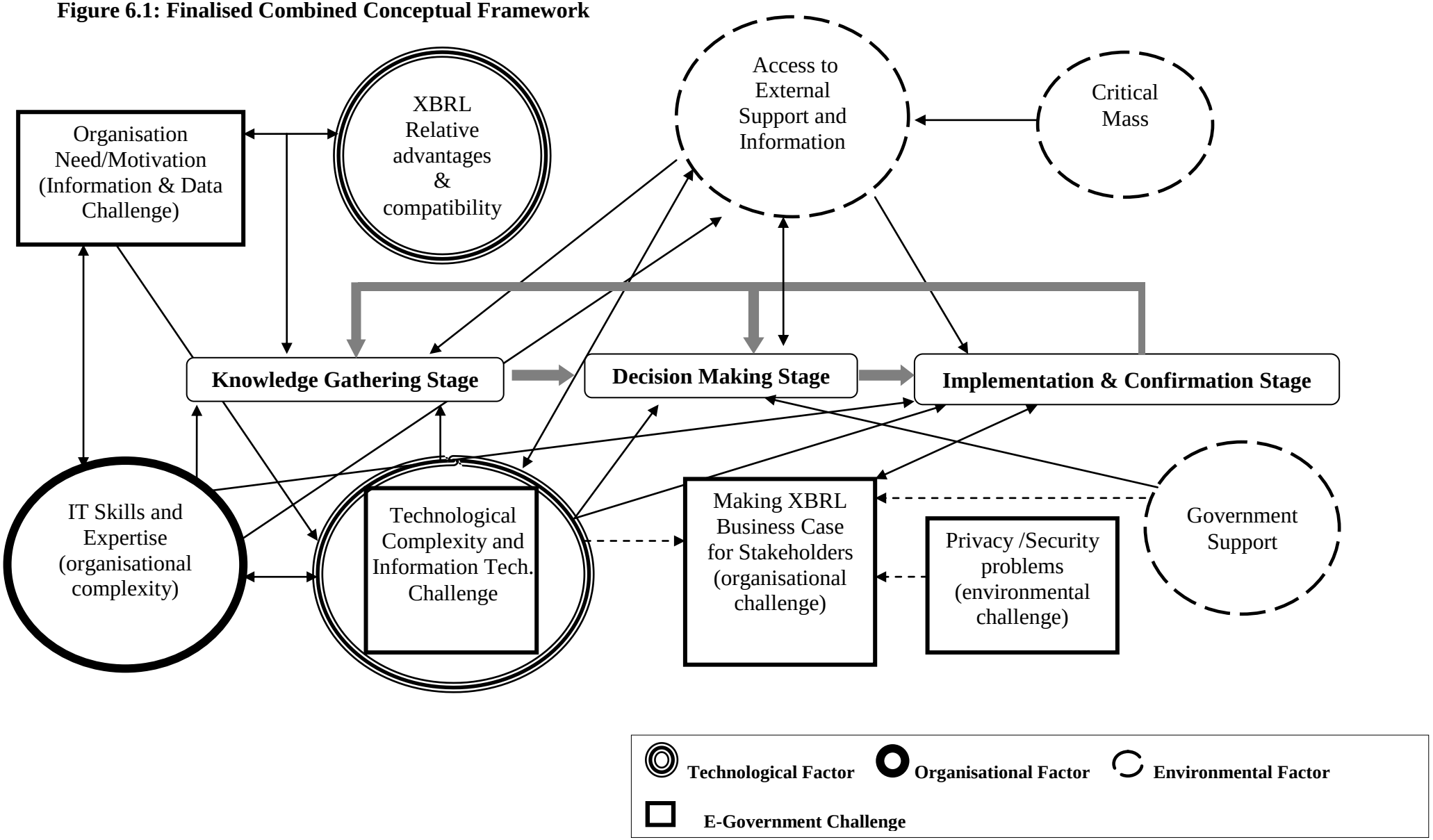
6.1 The Finalised Combined Conceptual Framework and its Implications[111]

As discussed in Chapter 2, the proposed conceptual framework is consisted of three main components, namely Rogers' innovation adoption process, which represents the central part of the proposed framework, Technology-Organisation-Environment framework, referred to TOE, and e-government challenges. In Chapter 5, the proposed conceptual framework has been revised to fit the two different organisational contexts of the case studies. In Chapter 5,

[111] For detailed illustration and explanation of HMRC and CH's XBRL adoption process, please see Appendix 6.

an analysis has been presented of the two revised frameworks of the XBRL adoption process to show the differences and similarities of frameworks across HMRC and CH organisations. In this Section 6.1, a finalised combined conceptual framework will be presented based on the similarities between HMRC and CH's frameworks to develop an integrated framework that can be used as a frame of reference for the adoption of e-government initiatives. Figure 6.1 illustrates the finalised combined conceptual framework.

Figure 6.1: Finalised Combined Conceptual Framework



6.1.1 Implications of the Finalised Combined Conceptual Framework

The critical review of the literature in conjunction with the analysis of HMRC and CH's case studies and the revised conceptual frameworks have revealed many issues that can be addressed in government organisations. This section presents the implications derived from the finalised conceptual framework illustrated in Figure 6.1:

- From the revised frameworks of HMRC and CH, it has been noticed that prior to commencing the XBRL adoption process and starting to gather knowledge about XBRL, each organisation has recognised the need to adopt this technology. XBRL has been adopted to produce "better quality data" that would contribute to achieving efficiency in processing statutory and non-statutory data filed by taxpayers and presenters and improving the quality of data dissemination and disclosure. The initial step of recognising the need for the technology has preceded the stage of gathering knowledge about its relative advantages. Recognising this need is primarily an organisational process, which does not require the participation of external stakeholders. Therefore, the need or motivation to adopt a technology should be added to Rogers' adoption process to precede the stage of knowledge gathering.
- As indicated in Chapter 4, the structure and type of data in the regulatory filings is one of the main issues that determined the applicability of XBRL as an appropriate reporting technology tool. XBRL has been selected by HMRC to provide standardised reporting medium for the varied formats of the detailed CT600 accounts and computations that would facilitate the risk assessment process of these documents. In CH, XBRL has been perceived as a reporting tool that would facilitate the manipulation and usage of the data captured in the small companies' accounts.

- The process of making XBRL business case for HMRC and CH has taken place during the knowledge gathering after recognising the need to adopt XBRL. XBRL as noted previously has been perceived as contributing to improving the efficiency and quality of the data filed by taxpayers and presenters. However, XBRL business case has not been made until XBRL has actually been implemented in both organisations. This implies that there is a gap between the government bodies' perception of XBRL usage and users' perception of XBRL benefits. While both agencies are making the decision to adopt XBRL, and preparing for the implementation stage, less effort has been exerted to raise public awareness of XBRL. Both organisations have been preoccupied with the technical tasks associated with the implementation, whilst relying on the power of XBRL mandate to 'urge' the users to seek information about XBRL and help from technical experts. The revised combined framework indicates that HMRC and CH should have realised the importance of making XBRL business case for potential stakeholders. Since the e-government adoption process is built on the idea of adopting a reporting technology tool aiming to facilitate the filing of data by stakeholders to government agencies, this means that the full participation of those stakeholders is needed to facilitate this process. Without recognising the needs and capabilities of the stakeholders by government agencies and without acknowledging the benefits of XBRL usage by those stakeholders, the potential of the e-government adoption process will not be fully realised as the output of this process is contingent on the users' participation through filing their information.
- By analysing HMRC and CH's electronic filing history, it has found that both agencies have already adopted XML-based electronic filing tools. XBRL has not been perceived as a "novel" reporting technology tool. However, it has been rather

perceived as a "technical solution" that can be easily integrated into the existing electronic filing systems at both agencies, and can also contribute to the data processing task. The importance and benefit of adopting XBRL has paralleled the need to adopt a reporting medium being compatible with the main filing system. This has its implication for the staff's perception in both agencies, as there is no evidence in the case studies indicating any resistance towards the new technology recognised by staff members within the organisations. This type of resistance is one of the common organisational challenges cited in e-government adoption literature (Jiang and Klein, 2000; Edmiston, 2003).

- XBRL project members' participation with other stakeholders including top government agencies, XBRL UK, software vendors, accounting firms and professional bodies has been noted as one of the main factors that characterised the adoption of XBRL at both agencies. Stakeholders' participation is widely cited as one of the main "success" factors in any e-government project. For example, Hirschheim et al. (1995) argue that adoption of e-government initiatives is contingent on the ability of government agencies to collaborate and meet the needs and expectations of different stakeholders. Therefore, three roles have been found to be present in the strategic plan and adoption process of XBRL for collaborator participation across organisational boundaries. The three roles indicated are:
    1. Top government officials and managers with the power to allocate resources and have decisions to adopt and implement the technology.
    2. IT staff at government agencies who can provide the necessary internal technical input and determine the requirements for e-government projects.

3. Technical specialists who provide technical support and consultations to government agencies through strategic partnerships and contractual agreements.

- The availability of technical expertise and resources at both agencies is an important catalyst for adopting XBRL at HMRC and CH. However, there is a noted discrepancy in the required level of technical expertise needed to adopt XBRL. At CH, there is a lack of technical expertise as there is a shortage in IT and operations staff who are responsible for data processing tasks. CH has compensated for this shortage by outsourcing the task of building XBRL taxonomy, and has also sought technical support and information from HMRC's XBRL project members. There is no evidence of lack of technical experience at HMRC, which has encouraged its XBRL project members to build XBRL taxonomy within their organisation. HMRC has sought relatively less help from software vendors compared to CH particularly during the implementation stage. This implies that the lack of in-house technical expertise has not been perceived as a factor that would prevent CH from adopting XBRL, as it has sought to outsource the majority of IT tasks associated with XBRL implementation. However, reliance on external technical support is found in the literature as one of the factors that would contribute to undermining the technical capabilities of IT departments at government agencies, and would affect the agency's decision to expand or develop potential e-government projects.
- XBRL mandate has played a dual role in the adoption process. The mandate has given HMRC and CH the regulatory power to "legitimise" and "urge" the usage of XBRL by individual, corporate users and agents. On the other hand, the mandate has been perceived by users as a demotivating factor to realise the benefits of XBRL as users

have shown scepticism about government's intention to mandate XBRL usage. They have also been concerned about its potential and the changes that should take place to modify their accounting and reporting systems.

- The technological complexity associated with building XBRL taxonomy structure has been a common factor and an information technology challenge in XBRL adoption process. This complexity has required the collaboration with stakeholders, particularly through building strategic partnerships with private sector software vendors. The complexity of XBRL as a reporting tool has undermined HMRC and CH's ability to make XBRL business case for potential users.
- The development of Inline XBRL has caused the reiteration of XBRL adoption process. This implies that the information technology challenge encountered by HMRC and CH has affected the process of making the decision of implementing XBRL at different times during the adoption process, which has caused an unavoidable disruption. It is unavoidable because the implementation of the initial version of XBRL has not facilitated the human and machine readability and understanding of XBRL documents. The decision to develop iXBRL has not been entirely an organisational decision. The technical consultations that have taken place between XBRL project managers at both agencies with major software developers have been a catalyst to the decision making process of developing iXBRL.
- The idea of introducing a joint filing facility has not taken into consideration the benefits that XBRL could particularly deliver to this facility. The implementation of the joint filing facility has been entirely contingent on the development of iXBRL. The objectives of adopting XBRL to meet the needs of HMRC and CH have been aligned with the government's policy to implement the joint filing facility. The introduction of

the joint filing facility has based on the recommendations of the Hampton's report (Hampton, 2005) whilst the decision to adopt of XBRL at HMRC and CH has been formalised by the recommendations of Lord Carter. Both regulators have emphasised the importance of reducing government regulatory burden and improving the efficiency of government administrative operations. The "execution" of these two strategies has been represented by the adoption of XBRL at HMRC and CH and the implementation of the XBRL-based joint filing facility.

- The existence of legal e-government challenges is contingent on the organisational context. For this reason, this challenge has been excluded from the finalised conceptual framework. Legalising the usage of XBRL by both agencies has been carried out differently. Despite the complexity of the content of the accounts and computations, HMRC has not faced any complex legal requirements to acquire legislative approval for using XBRL as a medium for online tax filing. This is due to the fact that this legal approval has only been needed to legitimise the usage of XBRL-based online filing version of the supporting documents by HMRC. The law does not stipulate any legal requirements to file certain information that has to be included in the supporting documents. HMRC as a regulator holds the authority to require companies to send supporting information –as needed- to support risk assessment procedures. On the other hand, CH has struggled with the legal aspects of approving the usage of XBRL-based Adobe forms. This is due to the fact that the order and presentation of the information submitted by presenters sometimes have legal interpretive ramifications for the users of such information. The legislation has also to ensure that the filing of XBRL data will comply with the information disclosure regulations under the Companies Act 2006.

- The privacy and security concerns have been characterised as a common environmental challenge. This challenge has been addressed by e-government literature and has been found to be important in HMRC and CH's XBRL adoption context. The impact of this challenge has been determined to contribute to undermining XBRL business case for potential users. While there is no direct connection between the introduction of security measures and XBRL as a reporting technology, the potential lack of "sufficient" security could generally concern users who submit XBRL-based data. Whilst CH has implemented some security measures to ensure the data security and integrity to encourage presenters to use its web filing facility, HMRC has maintained offering the conventional security measures of its portal, and has relied on users to acquire tax software packages which are built with their own data security features. Therefore, the privacy/security challenge has an implication for HMRC, as it could generally undermine XBRL business case for corporate stakeholders as identified by the reports issued by major professional bodies.
- Documenting the process of implementing XBRL by software vendors is referred to as the formalisation factor in TOE literature. This factor has not played an important role in the adoption process. Both HMRC and CH have documented the implementation procedures and provided implementation guidelines in the Technical Pack (HMRC) and Technical Interface Specification (CH). Providing such technical documentation has been found to be a routine procedure, often followed by organisations adopting new electronic filing methods. It can be argued that such documentation has facilitated the technical job of implementing XBRL by software developers, but there is no evidence found indicating its impact on XBRL adoption process within HMRC and CH.

- It can be concluded that the complexity level of the data submitted to each agency is one of the most important factors that has played a role in the adoption process of XBRL. Both case studies have determined the applicability of XBRL within their organisations. They have needed to gather information primarily to determine whether XBRL would "fit" and support the electronic filing of CT600 supporting documents and unaudited accounts. Realising the relative advantages and compatibility of XBRL has been found to be relatively less important than determining XBRL's functionality. This is due to the fact that both agencies have already seen the perceived benefits of adopting XML-based technologies in their electronic filing systems. Therefore, adopting an advanced version of an XML language, XBRL, did not require re-examining XBRL's benefits. The data has also influenced the pace and progress of each agency to move from one stage to another during the adoption process. It has caused a reiteration of the process when data-related problems have been encountered with the implementation of XBRL. The complexity of the data has also emphasised the importance of acquiring certain level of technical expertise for XBRL project, which has not been readily available at CH. The complexity of XBRL data structure has also played a role in pushing both agencies to secure sufficient technical and non-technical support to assist in building XBRL taxonomy and sorting out data rendering issues. This has been achieved by securing access to the "critical mass" of XBRL stakeholders in the UK and internationally.

Empirical evidence derived from the analysis of the case organisations, HMRC and CH, has supported the applicability and validity of the revised conceptual framework in both organisations, and possibly in other similar organisations. This is due to the fact that the

revised conceptual framework has been placed in two different contexts among case organisations. Both organisations have different data type and structure of the government filings, level of technical expertise for e-government adoption and purposes of e-government adoption process. However, the central part of the revised conceptual framework, which is based on Rogers' innovation adoption process, has reflected the reiterations that has taken place during the process as supported by Rogers (1995). The findings have also suggested that apart from TOE factors illustrated in the proposed conceptual framework, three factors have played an influential role in XBRL adoption process, namely the technological and organisational complexity and access to external support and information. Formalisation has been excluded from the finalised version of the conceptual framework as it does not play an important role in the process.

In addition, the empirical results have also indicated the relationships among e-Rogers' adoption process, TOE factors and e-government challenges. The relationship has shown that identified e-government challenges have affected XBRL adoption process. The TOE factors and challenges facing HMRC and CH include data complexity of the filings, complexity of building XBRL taxonomy and privacy and security concerns raised by users and software developers.

Therefore, the empirical data has validated the integrity of the conceptual framework and then has supported the aim of this research that the revised conceptual framework can be adopted as a guiding "tool" for government organisations to support their decisions about adopting e-government projects. The empirical data has revealed that strategic partners and

alliances from the private sector have filled the gap of IT infrastructure and competencies that existed during XBRL adoption process.

The review of the conceptual framework held in this Chapter and Chapter 5 suggest that the empirical framework for an e-government initiative, represented by XBRL adoption process, is comprehensive and suitable if it incorporates the following revised models:

- Rogers' innovation adoption process which illustrates reiterations throughout the process. In addition, based on the analysis of the case organisations, recognising a need for adopting the technology should precede the knowledge gathering stage of Roger' adoption process.
- Technology-Organisation-Environment model, which includes XBRL complexity and building XBRL taxonomy (technological complexity), making XBRL business case to government bodies (XBRL relative advantages and compatibility), IT skills and expertise (organisational complexity), access to external technical and non-technical support and information, critical mass and government support.
- E-government challenges which consist of data complexity (information and data technology challenge), XBRL complexity and building XBRL taxonomy (information technology challenge), making XBRL business case for stakeholders (organisational challenge) and privacy and security concerns (environmental challenge).

6.2 Research Overview

E-government research has developed in the IT adoption literature over the last few years. Literature has predominantly focused on fundamental issues such as benefits, motivations and applications of e-government initiatives. As a result, the adoption process aspect of electronic

government has not been given adequate attention in the research literature which has led to a number of research voids to exist. To date, the adoption of electronic government has become an important strategic action plan for government agencies since it becomes fundamental in improving regulatory performance. Research indicates that e-government adoption will increase efficiency, save money through increased centralisation of resources and economies of scale and standardise government information system applications (Heeks, 2001; Garson, 2004). However, many government officials have an incorrect stereotype that e-government is mostly providing and transacting with citizens through offering online information and services (Gupta et al., 2004). The reason for this is that there is a lack of awareness of influential challenges and factors affecting the adoption process of e-government among government organisations (Gilbert et al., 2004; Gil-Garcia and Pardo, 2005).

Chapter 1 states the aim of the research to develop an integrated framework that combines Rogers' adoption process, TOE factors and e-government challenges affecting the adoption process in an e-government context. In working to realise the aim of this research, Chapter 2 has discussed the literature review of IT and e-government adoption. Definitions of e-government from different perspectives and definitions of technological innovations have been discussed in e-government context.

To select the research methods and process to be followed to achieve the aim of this research, Chapter 3 has been used to identify the research strategy, research design and research approach. In Chapter 3, the research methodology has been identified and its usage has been justified. It has supported the selection of a qualitative research approach to collect data from the public sector. A multiple case study has been identified to investigate the e-

government adoption process in depth through a series of semi-structured interviews and documentation analysis.

Chapter 4 has provided a background of the organisational contexts of the case studies conducted at HMRC and CH. This chapter has introduced HMRC and CH's electronic filing history. It has illustrated and explained the developments that have taken place in both organisations, which have led to the adoption of XBRL. The chapter has emphasised the differences in HMRC and CH's organisational contexts and the implications for these differences on the decision to adopt XBRL.

Chapter 5 has provided the analysis of the case studies based on the proposed conceptual framework developed in Chapter 2. According to the empirical data derived from the case studies, the proposed conceptual framework which consists of Rogers' adoption process, TOE framework and e-government challenges, is appropriate for the research context. The revised conceptual framework has been developed to explain the adoption process of XBRL and has identified the factors and challenges affecting this process in the research context of this thesis. It has emphasised the relationships among each stage of Rogers' adoption process, TOE factors and e-government challenges. The major research outcomes are presented in the next section.

6.3 Research Outcomes

In this research, a set of technological, organisational and environmental factors and e-government challenges have been investigated to determine their impact on XBRL adoption

process. These factors and challenges have reflected each agency's organisational structure, complexities and experiences with XBRL.

Understanding the challenges encountered in adopting electronic government projects is a high priority for policy makers. It enlists policy makers' attention to the risks involved in adopting such projects, and it assists in planning and managing their organisational resources efficiently. Many developed countries initiate national electronic government projects. There is a need for a comprehensive framework to guide the deployment and usage of organisational and environmental resources that could affect the adoption process (Heeks, 2006). The finalised combined conceptual framework provides an important guideline for planning e-government adoption process, which explains the rationale behind integrating TOE factors and e-government challenges in Rogers' adoption process.

It can be also concluded that examining the process of adopting XBRL at HMRC and CH has required understanding of and relating this process to each agency's purpose of adopting XBRL. For example, the finalised framework has provided insights into each agency's motivation behind adopting XBRL, which has focused on generating "better quality data." An important underlying thread throughout this research is the dominant impact of the data complexity on XBRL adoption process. The complexity of the data in a large-scale e-government project such as XBRL project has affected the implementation of each stage in the adoption process. It has also emphasised the dynamic relationships among the adopting government agency, top government bodies, professional bodies and private-sector business partners (IT services providers). The data complexity has also determined the required level of technical expertise within the adopting organisation. In addition, the complexity of the data

has affected each organisation's decision to build the technical infrastructure of the XBRL taxonomy. Therefore, it can be concluded that XBRL adoption process at HMRC and CH is data-driven. The data is the main factor behind determining each agency's approach and decision of how to utilise the technology, mobilise organisational resources and seek external support throughout the adoption process.

6.4 Research Contribution

In addressing the gap in the literature regarding e-government adoption, and developing a finalised framework that outlines the e-government adoption process, a contribution is proposed and empirically supported. The finalised combined conceptual framework in this research is based on empirical work that provides a comprehensive structure for understanding the adoption process in e-government context. It has included technological, organisational and environmental factors and e-government challenges, drawn from the literature and tested empirically. This framework has sought to improve the understanding of the adoption process of e-government by identifying the process which can be followed by organisations seeking to adopt e-government initiatives.

The finalised framework provides a comprehensive structure for e-government adoption process in government agencies. This framework seeks to reduce the ambiguity surrounding the e-government adoption process in the public sector by understanding the adoption process and identifying the requirements of initiating an e-government project, highlighting the importance of the organisational readiness and the impact of the environment. The framework can also help decision makers in government agencies to set a vision and a

strategic action plan for the future of e-government by identifying key factors and stages needed to implement such an action plan.

The empirical evidence collected during the course of this research has verified the application of the combined framework because it has supported the understanding of the e-government adoption process in government organisations. This framework, as presented in Figure 6.1, was based on a critical analysis of literature, extended by the researcher to become an integrated framework for e-government that represents the alignment of IT infrastructure, organisational readiness and environmental impact with e-government adoption process in public sector organisations. The reason for including the technological, organisational and environmental factors is that they already plan a significant role in enhancing the e-government process in complex organisational settings such as government agencies. This framework can help IT practitioners in the public sector to learn how to use and manage information technologies to revitalise e-government adoption process, improve business decision making, and achieve efficiency from the adoption of e-government.

Although the literature has indicated broadly the challenges of e-government of its adoption, the contribution of this research has been to validate those challenges through the analysis of empirical data derived from HMRC and CH cases and then to propose a combined conceptual framework. The findings have confirmed some of these challenges proposed in Chapter 2. The researcher has added a contribution to the e-government literature by identifying those challenges based on the context of this research, and developing various relationships among those challenges and different stages of Rogers' adoption process. Those challenges could help organisational decision makers who consider adopting e-government projects, and allow IT managers and researchers to better analyse and explore several aspects of the e-government adoption.

Finally, the finalised conceptual framework has also proposed the inclusion of organisation need/adoption motivation as a stage that should precede knowledge gathering stage. This finding will contribute to the literature on IT adoption that utilises the usage of Rogers' adoption process, which could be applied in different organisational contexts.

6.5 Research Limitations

The finalised conceptual framework discussed earlier in this Chapter represents the start of research in the e-government adoption area in the UK context. It can be used as background theoretical framework for researchers. However, the proposed research is confined to the limited geographical area where it has been conducted and the small number of government organisations investigated in the case study. It might be therefore difficult to generalise the study findings to other regions of the world. The research does however give an image of what the context is in the UK and highlights some issues that could be used by decision makers and IT specialists in government agencies intending to adopt e-government initiatives.

As presented in Chapter 3, the research approach for this study is qualitative. Since e-government adoption, particularly XBRL adoption, is an under-researched phenomenon (Troshani and Rao, 2007), the qualitative research approach has allowed for understanding and examining in depth the adoption processes, determining existing adoption stages, TOE factors and e-government challenges through detailed interviewing and documentation analysis. In addition, qualitative research methods facilitate the generation of rich contextual data, which is associated with organisational issues. However, these methods have inherent limitations, such as being time consuming. A great deal of time is involved in the process of

data collection and analysis. The data collected through the two cases is greatly contextual in nature. This has made the presentation and analysis of the case studies difficult in Chapter 5 without some degree of bias. To overcome this bias, empirical evidence has been sought through interviews, documentation analysis and collection of archival records. This has contributed to improving the internal validity of the evidence collected. Finally, there is a concern about the degree to which qualitative research can be generalised outside the confines of the investigation, especially when the sample of case organisations is relatively small.

6.6 Recommendations for Further Research

The following recommendations are made for further research:

- The development of a conceptual framework for XBRL adoption process in this research has been based on two government agencies in the United Kingdom. It is recommended that this conceptual framework could be applied in different contexts to validate the adoption of XBRL by government agencies in other countries to extend the generalisability and contribution of this framework.
- It would be informative to propose a framework for evaluating XBRL adoption process to complement the understanding of the adoption process. This will allow government agencies to know how to evaluate the progress of the adoption process. It will also identify a potential feasibility study of XBRL adoption process in the public sector.
- A further recommendation is to develop a model that can address the process from the point of view of stakeholders including corporate, individual users and/or agents. This type of study could identify the outcome of XBRL adoption process by analysing the

users' acceptance and usage of XBRL within their organisations. Such study could be conducted to reflect the post-mandate impact on stakeholders' XBRL usage.

- A final recommendation is to research the implementation and development of the joint filing facility and its impact on XBRL adoption process.

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APPENDICES

- **Appendix 1: Fundamentals of XBRL**
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APPENDIX 1

Fundamentals of XBRL

Taxonomy:

XBRL taxonomies are used to define and map "lists of elements and relationships for specific reporting purposes, such as reporting financial information under the [UK] GAAP."[112] Taxonomy is considered a dictionary of all financial terminology that could be used in financial statements. It could also contain information that could be included in business reports.[113] Public taxonomies such as International Financial Reporting Standards-General Purpose (IFRS-GP), "define elements and relationships between them according to particular legislation or standards, for example "International Financial Reporting Standards" (IFRS) or "International Accounting Standards" (IAS)."[114] However organisations are required to include in their reports to add additional concepts to define a specific reporting procedures which may not be covered by general taxonomies. XBRL allows for adding additional extensions without jeopardising data consistency, and these are called taxonomy extension[115] (IASC, 2006).

Schema:

An XBRL schema is used to define and keep information about taxonomy elements[116]. This provides the computer with information on what it represents. As computers are not developed to have specific accounting knowledge, they have to be programmed to process particular concepts, their meanings and characteristics.

XBRL element:

[112] http://www.skipwhite.com/Chapter1FourthEdDec2009.html
[113] http://www.xbrleducation.com/edu/instance.htm
[114] http://www.iasb.org/XBRL/Resources/Fundamentals.htm
[115] http://www.iasb.org/XBRL/Resources/Fundamentals.htm
[116] http://www.xbrleducation.com/edu/instance.htm

In the Schema document, tagged data elements defined contextual data that will be included in the tag. For example, tags are designed to facilitate the specification of the following information (White, 2006):

- Data type whether it is monetary or date formatted.
- Balance whether it is debit or credit.
- Period, whether it is an instant in time or covering a period of time.
- Currency type.

XBRL linkbases:

Databases of extended links define accounting and financial reporting concepts and relationships, such as how to calculate current assets (White, 2006). Linkbases define data elements in specified languages in order to make taxonomy human-readable. They also "reference elements to the external resources that justify their existence and that contain an explanation, definition or example of the use of the particular financial concept, and they do define relations between elements according to different criteria. There are five general linkbases:" [117]

- Presentation – for example, cash could be represented ad an element under current assets. Current assets are presented as also an element of assets on the statement of financial position.
- Calculation: For example, it defines arithmetic calculations, assets = liabilities + equity.
- Definition: It is rather a narrative explanation that assists the user or account preparer to distinguish an element from other elements in company's financial statements.
- Label such as current receivables.
- Reference which is a citation from particular literature or supporting information.

[117] http://www.iasb.org/XBRL/Resources/Fundamentals.htm

XBRL Specification:

The main structure and rules of XBRL language is defined by XBRL specification. All XBRL documents should follow such rules to build XBRL taxonomy. XBRL Specification is regularly "updated to implement new XML standards if they are appropriate for use within XBRL" (Richards and Smith, 2004, p.7). However, the XBRL International Steering Committee agreed in November 2004 that "the core XBRL Specification will remain stable, at version 2.1 for a period of at least three years from its date of original recommendation, 31 December 2003." (ISC Minutes, 19 November 2004 quoted in Richards et al., 2006, p.9). "For this release (Specification 2.1), the name of the taxonomy file was changed from International Financial Reporting Standards-Commerce and Industry (IFRS-CI) to International Financial Reporting Standards-General Purpose (IFRS-GP)" (Richards et al., 2006, p, 10).

Creating Instance Documents and Reports:

XBRL documents are referred to "instance document." These documents could be generated by XBRL-compatible software or application, as defined by XBRL specification (Deshmukh, 2004). Instance documents usually have a standard format including tagged data elements as they are defined in XBRL taxonomy.[118] Each element is identified as financial or business information reported by certain business entity to cover a specific period of time, with all figures denominated in particular currency (Hoffman and Strand, 2001). Once instance documents are produced, they can be validated and processed by software application. The most important feature of instance document is the standardised data that represent financial and non-financial information that can utilised for different purposes by different user groups,

[118] http://www.xbrleducation.com/edu/instance.htm

minimising the inconsistency of the data. Once such data are tagged in XBRL format, users do not have to re-enter the data again, and data can be easily communicated in its original form across different software applications.[119]

[119] http://www.accaglobal.com/uk/members/technical/practice/guidance/xbrl

APPENDIX 2A

Information Sheet for Project Initiation

PURPOSE – The purpose of this research is to examine the adoption process of the Extensible Business Reporting Language (XBRL) by governmental bodies in the UK. We are interested in identifying and analysing the scope, drivers and inhibitors of XBRL adoption within these organisations. Relevant implications that are potentially useful for XBRL regulatory adopters and inputs to national public policy setting in relation to developing digital reporting process will be derived.

RESEARCHERS – This research is part of the doctoral dissertation of Rania Mousa, a postgraduate student under the supervision of Mr. Andy Lymer and Dr. Joanne Locke at Birmingham Business School, University of Birmingham.

INFORMATION GATHERING PROCESS – Documentation and interviews with organisation staff associated with XBRL projects will be used as means of collecting relevant information. We will seek management's guidance to identify appropriate people to interview and, with permission, add other employees associated with XBRL implementation. The timing of the interviews will be scheduled at the convenience of the research participants.

CONFIDENTIALITY – It will not be possible to keep the identity of the organisations in this research confidential because they are currently the only XBRL regulatory adopters in the UK. Individual participants' names will not be disclosed but their job titles will be used to allow readers to understand the participant's perspective in the XBRL adoption process.

Details of the rights of individual participants are provided in the consent form. Documents collected from the organisations will be kept in locked data storage devices until the end of the research study (July 2010), after which they will be disposed.

RESEARCH OUTCOMES – Information collected from research participants will be utilised as the main body of evidence of Rania's doctoral dissertation and may be disseminated in professional and academic journals.

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E-mail:	[redacted]	[redacted]	[redacted]
Telephone no:	[redacted]	[redacted]	

APPENDIX 2B

Consent Form

If you agree to become a participant, you will be asked to take part in a series of interviews in which participants' views and experience with using XBRL are investigated.

The Following details outline the procedures involved in participating in this research:

- All data collected in interviews is confidential to the researchers and will not be provided to the organisation.
- Individual interviews will be conducted on-site and recorded using a digital voice-recording device.
- The name of the organisation where you work will be identified in this research.
- You maybe be identifiable by position title. Where more than one participant shares the same job title, numbering will be used.
- If the researcher wishes to use a direct quote or refer to the view of an identifiable participant in the research output, their permission to do so will be sought prior to publication.
- You have the right to refuse to answer any question.
- You have the right to ask any question about the study before or during your participation.
- Your participation in this research is voluntary. You will be under no obligation to complete the interview if you choose to start it.
- You have the right to withdraw for any reason and without prejudice up until 1 February 2009. No record of information given by the withdrawing participant will be kept or used in the research. There will be no negative consequences and your withdrawal will not be mentioned in the research.
- Data and information gathered will be kept in locked data storage devices and cabinet.

If you choose to participate, please sign below and give this document to the researcher.

Thank you for your time and contribution to our research.

I have read the above and consent to take part in the research study described.

Name: ----------

Signature: ---------- **Date: ----------**

APPENDIX 3

Interview Questions

The purpose of this document is to give the research participants a factual overview of the issues that the researcher intends to explore during the interviews conducted with key figures involved in "XBRL project" in HMRC/CH:

Initial questions aim to introduce the researcher to the participant's role in the organisation and the project:

1. Please, describe your role in HMRC/CH and how you come to be in that position?
2. How did you come to have a part in the "XBRL project" and how would you describe that role?
3. How does this project fit in the organisational structure of HMRC/CH?

Questions shedding the light on XBRL implementation process within HMRC/CH:

1. As an organisation, what was/were the motivation(s) behind taking up XBRL?
2. What are the key stages of this project since inception?
3. Whom do you see as the key stakeholders in the project, and how did they affect the project's initiation and development?
4. What are the difficulties you faced in the course of implementing XBRL?

Questions highlighting the organisational efforts to push the XBRL implementation forward:

1. To invest in such technology, what are the internal organisational resources that you needed to kick off XBRL implementation project and how did you mobilise such resources?
2. HMRC/CH's efforts to assess XBRL implementation process and what could be done to further facilitate this process.
3. What could be the next account type to be filed using XBRL?
4. To what degree HMRC and CH are coordinating with each other to establish the joint filing facility?

APPENDIX 4A

HM Revenue and Customs' Archived Documentation

H1: Corporation Tax e-Service Programme. Information Technology Solutions Breakout Group Workshop, Inland Revenue, 2001.

H2: Corporation Tax e-Service Programme. Customers and Intermediaries Breakout Group Workshop, Inland Revenue, 2001.

H3: CT e-Filing Proposal Review Workshop – Outcome, Inland Revenue, 19 February 2002.

H4: Corporation Tax e-Service Programme. Business Process Change, Breakout Group Workshop, Inland Revenue, 2003.

H5: Corporation Tax e-Filing Scoping Workshop, Inland Revenue, April 2003.

H6: e-Services Programme, XBRL and Company Tax e-filing. Presentation delivered at XBRL International Conference, Amsterdam, May 2003.

H7: E-Filing of Company Tax Return. Presentation delivered at XBRL International Conference, London, 2006.

H8: XBRL Consultation document for Birmingham Business School, University of Birmingham, 2008.

H9: Corporation Tax Compulsory Online Filing: The HMRC Perspective. Presentation delivered by Jen Little, HMRC Carter Programme, 2009.

H10: HMRC Online Services. Presentation delivered by Julian Hatt and Anne Marie McNab, HMRC Carter Programme. 26 March 2009.

H11: Online Filing for Corporation Tax. Presentation delivered at the 2nd Annual Conference on XBRL and Online Reporting: Developing the Interface. Birmingham Business School, University of Birmingham. 13 November 2009.

APPENDIX 4B

Companies House's Archived Documentation

C1: Status of XBRL at Companies House. Presentation delivered at XBRL International Conference, London, 2006.

C2: Companies House: Change the Record. Presentation delivered by Arthur West, Companies House, 2009.

C3: Registrar Magazine, issue 33, Spring 1997.

C4: Registrar Magazine, issue 38, Winter 1998.

C5: Registrar Magazine, issue 40, Summer 1999.

C6: Registrar Magazine, issue 42, Winter 2000.

C7: Registrar Magazine, issue 43, Spring 2000.

C8: Registrar Magazine, issue 44, Summer 2000.

C9: Registrar Magazine, issue 45, Winter 2000.

C10: Registrar Magazine, issue 46, Spring 2001.

C11: Registrar Magazine, issue 47, Summer 2001.

C12: Registrar Magazine, issue 48, Winter 2001

C13: Registrar Magazine, issue 49, Spring 2002.

C14: Registrar Magazine, issue 50, February 2002.

C15: Registrar Magazine, issue 55, July 2003.

Cl6: Registrar Magazine, issue 56, October 2003.

C17: Registrar Magazine, issue 57, March 2004.

C18: Registrar Magazine, issue 59, June 2004.

C19: Registrar Magazine, issue 60, September 2004.

C20: Registrar Magazine, issue 61, November 2004.

C21: Registrar Magazine, issue 62, June 2005.

C22: Registrar Magazine, issue 63, October 2005.

C23: Registrar Magazine, issue 64, March 2006.

C24: Registrar Magazine, issue 65, July 2006.

C25: Registrar Magazine, issue 66, October-December 2006.

C26: Registrar Magazine, issue 67, February 2007.

C27: Registrar Magazine, issue 68, August 2007.

C28: Registrar Magazine, issue 69, April 2008.

C29: Registrar Magazine, issue 70, December 2008.

C30: Registrar Magazine, issue 71, October 2009.

APPENDIX 5

Index to Companies House Online Forms

Form or Document Filed	Company Act 1985	Company Act 2006
Change of Registered Office Address	If the form is signed on or before 30 September 2009, **Form 287** should be used.	If the form is signed on or after 1 October 2009, Form **AD01** should be used.
Director and Secretary	If the date of the appointment, termination of appointment or change of details is on or before 30 September 2009, **Forms 288a, 288b or 288c** should be used.	If the date of the appointment, termination of appointment or change of details is on or after 1 October 2009, **Forms AP01, AP02, AP03, AP04, TM01, TM02, CH01, CH02, CH03 or CH04** should be used.
Annual Return	If the made up date is on or before 30 September 2009, **Form 363a** should be used.	If made up date is on or after 1 October 2009, **Form AR01** should be used. Annual returns with a made date on or after 1 October 2009 which are received without a fee will be rejected.

Source: Companies House website.

APPENDIX 6

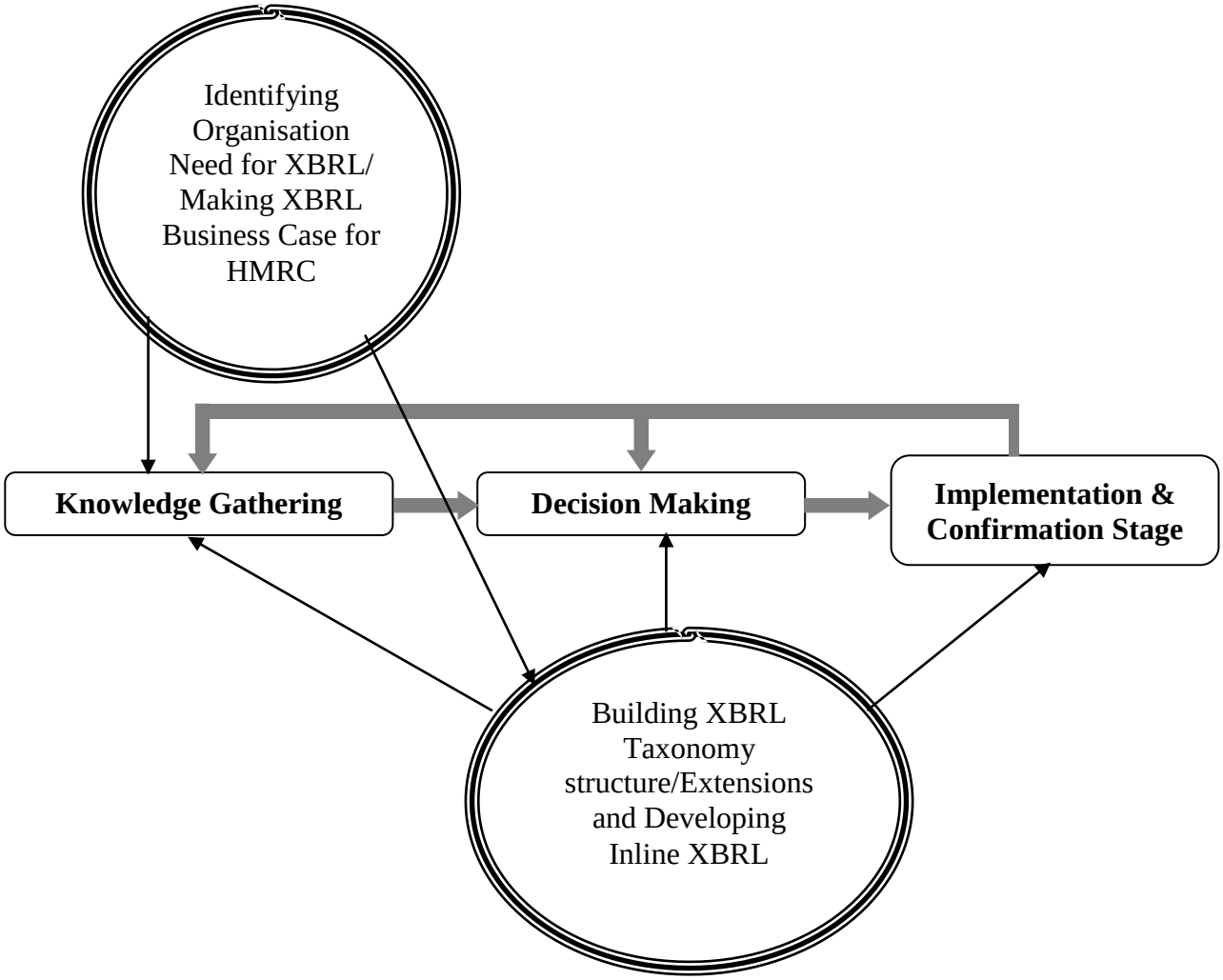
Detailed Explanation and Illustration of HMRC and CH's XBRL Adoption Process

In this appendix, a detailed illustration and explanation of XBRL adoption process at HMRC and Companies House is provided by identifying the technological, organisational and environmental (TOE) contexts at both government agencies. To provide a clear and concise view of XBRL adoption process, each context will be explained to identify and illustrate the factors that have played a role in XBRL adoption process in each agency. In addition, the e-government challenges which have been previously identified as data, information technology, organisational, environmental and legal challenges will be synthesised and embedded into TOE contexts according to their relevance to each context. Based on the empirical evidence found in this research, as identified in Chapter 4, the commonalities between the e-government challenges and different factors within TOE contexts provides a potential opportunity to examine XBRL adoption process more consistently and precisely. The integration of TOE factors and e-government challenges also enables the researcher to better pinpoint the similarities and differences between HMRC and CH in terms of gathering XBRL knowledge and deciding on adopting and implementing XBRL at both agencies.

The first section of this appendix starts with identifying and explaining the technological, organizational and environmental contexts of XBRL adoption process at HMRC. The discussion of each context will be preceded by an illustration of the impact of contextual factors on XBRL adoption process. The second section will provide a discussion and illustration of XBRL adoption process at Companies House. The last section provides an analysis of the potential similarities across the three contexts at HMRC and CH. An explanation of the potential differences is provided in the third section.

2.0 XBRL Adoption Process: HM Revenue and Customs (HMRC)

Figure 2.1: The Technological Context of XBRL Adoption Process: HMRC



The Technological Context of XBRL Adoption Process: HMRC

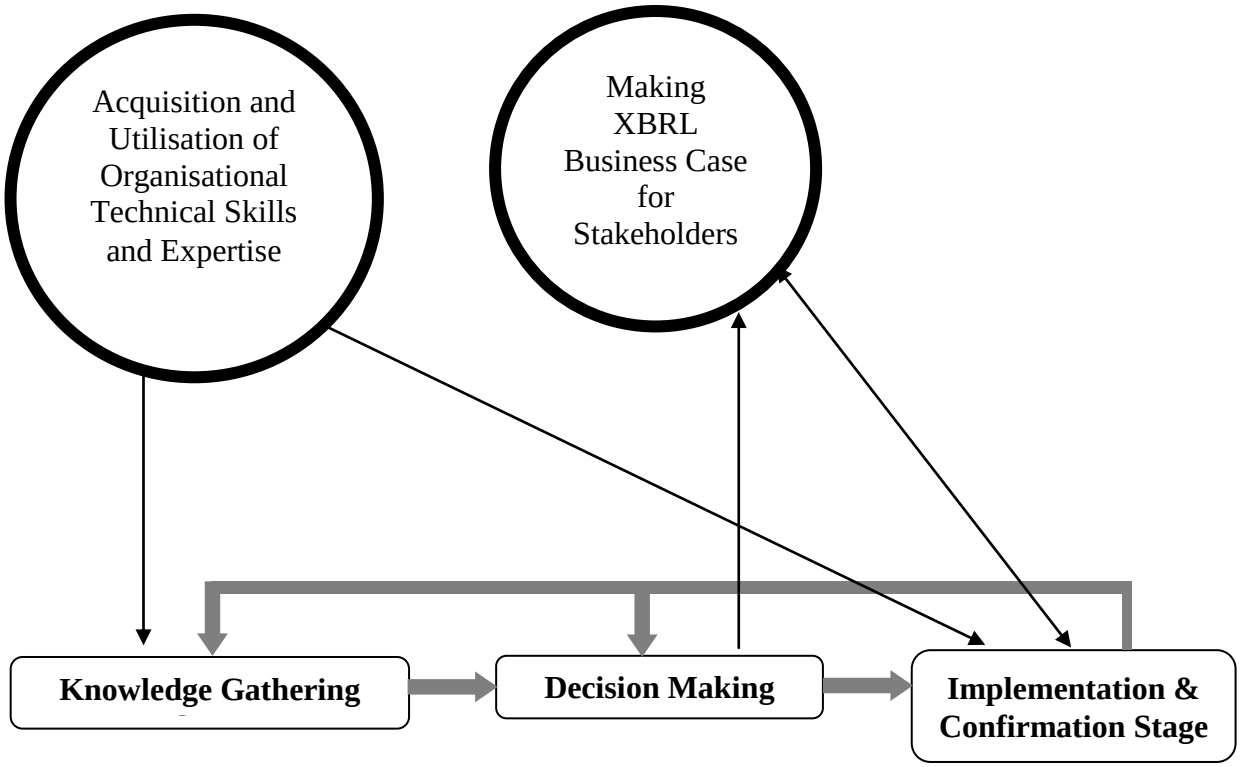
At HMRC, XBRL adoption process was affected by two technological factors: recognizing the need for XBRL and its advantages, as a potential technology "solution" as well as the technical difficulties caused by the adoption of XBRL. In the knowledge gathering stage, HMRC's XBRL team members recognized that non-standardized format of submitting CT600 accounts and computations was one of the reasons behind developing the technical capabilities of the XML-based reporting technologies and facilities at HMRC. XBRL was perceived as a technical "solution" that will streamline the regulatory filing process to support the risk assessment process conducted by HMRC's tax inspectors. XBRL was also perceived as a compatible technology that would cause any significant disruption to the existing reporting systems. This is due to the fact that XBRL is an XML-based reporting language, which suit HMRC's XBRL-based reporting facilities. The ultimate goal of adopting and implementing XBRL at HMRC was to generate "better data quality." Gathering sufficient information about XBRL advantages to HMRC contributed to building the business case for HMRC, which was an important step towards initiating XBRL adoption process.

As HMRC's XBRL team developed the appropriate taxonomy structure of XBRL, they were faced by the complexity of the data content of the accounts and computations. The developed structure had to accommodate also the taxonomy extensions. The sophistication of the data included in the accounts and computations was a major technological issue that faced HMRC during the process of XBRL adoption. Each stage in Rogers' adoption process as depicted in Figure 2.1 was impacted by the technical complexities found in building XBRL taxonomy and developing Inline XBRL. As of late 2009, 12000 data elements in the filings needed to be XBRL-tagged. In addition, XBRL project's team members worked on building a proper taxonomy that would comply with UK GAAP. Building the taxonomy was undertaken

as part of the three-phase XBRL implementation plan devised by HMRC during the period 2003-2005. Realizing the technical complexities faced by accounts production software vendors, XBRL project's members needed to facilitate the implementation of XBRL. HMRC decided to issue minimum tagging requirements, which are based on a combination of UK GAAP, UK-IFRS, UK Common Data and CT computational taxonomies as indicated in Table 4.3 (Chapter 4). HMRC decided that not all XBRL data tags will be used by the mandate deadline and reduced minimum tagging will continue to be in use until 2013, when full tagging for the accounts will take place.

Technical complexities have not been limited only to the software vendors' concerns of implementing XBRL within their organisations. Upon the implementation of XBRL at HMRC, XBRL project team discovered that XBRL-generated reports were not easily readable by agents and tax inspectors. XBRL project's technical architect (HMRC 2) has worked along with his team and HMRC's IT service provider to render XBRL to create reports that can be understood by tax inspectors and agents. XBRL project team members collaborated with their service provider and other stakeholders to find a suitable technical solution to XBRL rendering problem. This collaboration resulted in developing Inline XBRL, which allows the data producer to create and embed the data into the rendering. This enables HMRC's tax inspectors to view accounts and computations' data laid out in HTML document. In addition, it helps to facilitate the processing of case enquiries as it will enable the data producer (filing company) to have the same type of rendering, which is similar to that produced by the company's tax software.

Figure 2.2: The Organisational Context of XBRL Adoption Process: HMRC



The Organisational Context of XBRL Adoption Process: HMRC

The organisational context of XBRL adoption process at HMRC has been largely affected by the availability of technical expertise of HMRC's XBRL project's team members, and their effects to make XBRL business case for stakeholders. Developing knowledge and awareness is a function of the adopter's experience, education and exposure to the media as indicated by Rogers (1983, 1995). In TOE framework, the availability of in-house technical expertise to support the adoption of technological innovations is identified as an organisational factor that facilitates the adoption process.

`In HMRC, XBRL project members worked together as part of the e-Service Development programme, which was established in 2001 to support HMRC's online filing facilities. Those members have acquired strong experience in XML languages and have worked on developing on electronic filing projects since the introduction of ELS and FBI facilities. XBRL project manager (HMRC 1) has also an influential role as the project "champion" due to his established experience with HMRC's electronic filing facilities. He also has significant working relationships with HMRC's business partners including software industry representatives. His awareness of the existing capabilities of HMRC's electronic reporting infrastructure has provided him with the opportunity to develop a vision of the possible improvement that could be applied to facilitate the adoption of XBRL at HMRC.

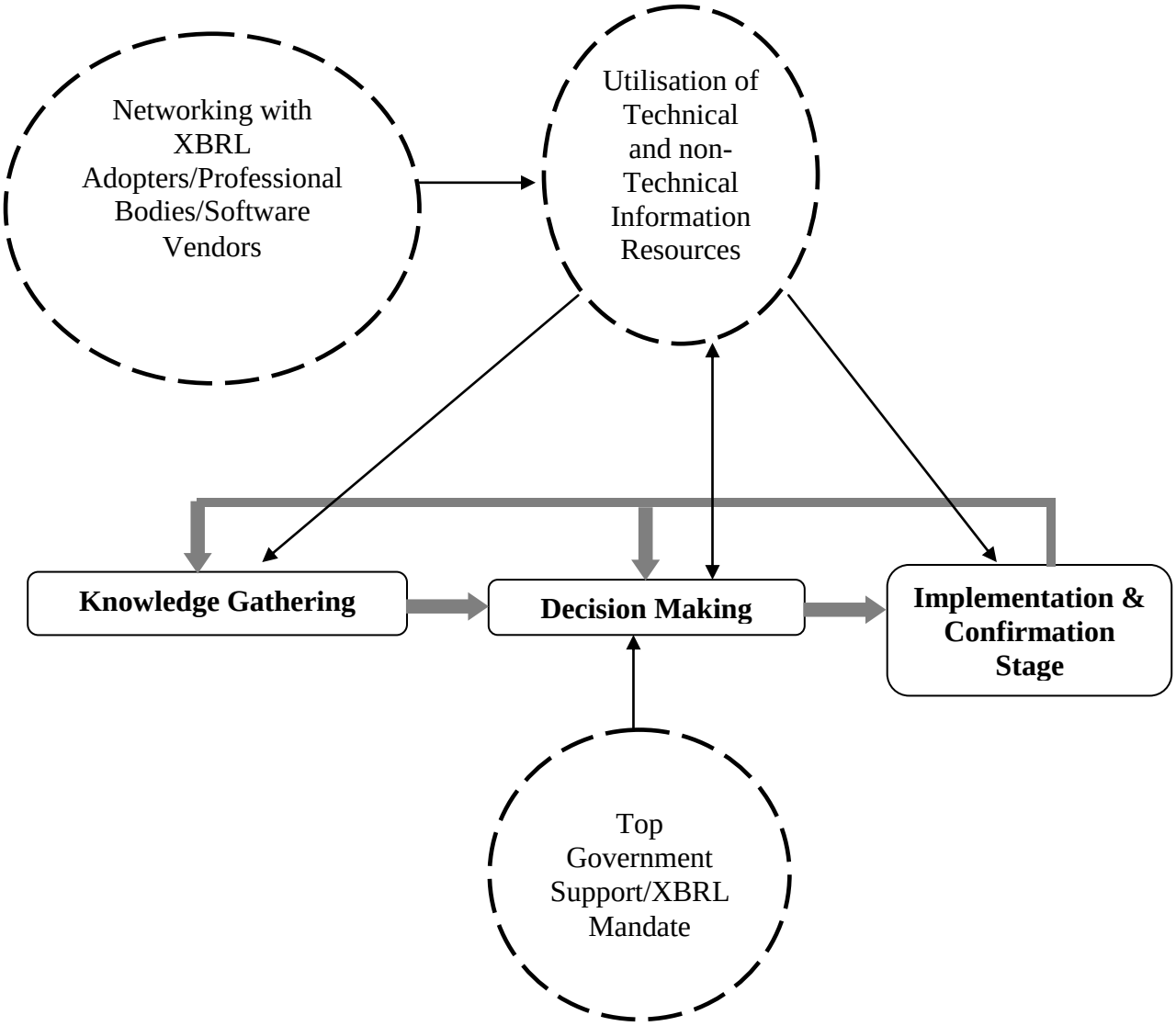
Even though official at HMRC indicated that XBRL mandate will force potential corporate users to take-up XBRL, scepticism among potential members of HMRC's stakeholders, including corporate users, has been initially reported by HMRC 1. HMRC 1 noted that the low-take of XBRL is one of the constant challenges that faced HMRC as a government agency. This challenge has been supported the e-government literature as one of the organizational issues that face government agencies intending to adopt technological

innovations (Barret and Green, 2001; West and Berman, 2001). Despite the fact that XBRL business case was made for HMRC and top government agencies, this business case has not been shared among users and accounts production software vendors.

Many professional bodies expressed their concerns regarding the capabilities of corporate users and small businesses to quickly develop their filing facilities before April 2011. The ICAEW (ICAEW, 2005) and ICAS's members (Drysdale, 2007) voiced their concerns towards HMRC's need to "educate" corporate users about XBRL's advantages to business reporting processes. In recognition, HMRC organized many events to showcase the potential of XBRL to companies and tax agents. However, these events did not realize the main objective of making XBRL business case to users, as these events generally provided means to HMRC to convey the message that XBRL is the government-mandated technical solution rather than a "useful" technology reporting tool. This organizational challenge has been supported by two research surveys that have identified an evident lack of XBRL awareness and its functionalities among account preparers, tax accountants, finance professionals and auditors (Dunne et al., 2009) and corporate users from various business sectors (ICAS, 2010). From users' point of view, the technological complexity of XBRL represented by enabling tax software applications to be XBRL-based among corporate users is one of the most factors contributing to the lack of XBRL business case.

2.3 The Environmental Context of XBRL Adoption Process: HMRC

Figure 2-3: The Environmental Context of XBRL Adoption Process: HMRC



The Environmental Context of XBRL Adoption Process: HMRC

The environmental context of XBRL adoption process at HMRC was largely affected HMRC's ability to network with its stakeholders and utilise the technical and non-technical resources that could be sought from the stakeholders. Top government support through the formalisation and mandation of XBRL was another important environmental factor that was a catalyst to XBRL adoption process.

HMRC 1 utilised several networking channels to gather information about XBRL applicability to HMRC. He indicated that attending several conferences, where he met with representatives of international regulatory bodies who shared their XBRL adoption experience. This contributed to enriching HMRC 1's own knowledge about XBRL's regulatory usage within HMRC.

HMRC's XBRL project members (HMRC 1 and HMRC 2) invested significant efforts in meeting with several representatives from XBRL UK and the e-Envoy Office in early 2003 to discuss the e-Envoy's list of standards for enabling interoperability (XBRL Progress Report, 2003). XBRL UK provided HMRC with initial technical guidance in creating instance documents and discussed key accounting issues which were relevant to building XBRL taxonomy according to UK GAAP.

Seeking non-technical support was another important step taken by members of XBRL project. HMRC 1 and HMRC 2 indicated that HMRC membership of XBRL UK and international conference attendances provided the opportunity to network with other international adopters and exchange information on technical relevant issues. The positive

impact of HMRC's networking with its stakeholders has been consistent with Chang and Jarvenpaa (2005) and Gray and Miller (2009). HMRC 1 and HMRC 2 were particularly motivated by the adoption of XBRL in the European Community, which was driven by tax authorities (XBRL Progress Report, 2008).

During the decision making stage of XBRL adoption process, feedback from UK prominent professional bodies and representatives of the software industry and accounting firms served also as catalysts in the decision making process. Over the period 2001-2006 and during the consultations undertaken by HMRC, XBRL project members collaborated with a task force group, which gathered seven professional bodies to discuss proposals aimed to improve HMRC's online service, including the filing of CT600's accounts and computations. The representation of several parties in the decision making of XBRL adoption highlights the sophistication of HMRC as a government agency that needed to collaborate with other parties, such as top government agencies and professional bodies, to adopt an e-government initiative. This collaboration contributed to HMRC's ability to formulate its three-phase XBRL implementation plan. This fact has been supported by e-government literature (Fountain, 2001; Heeks, 2006).

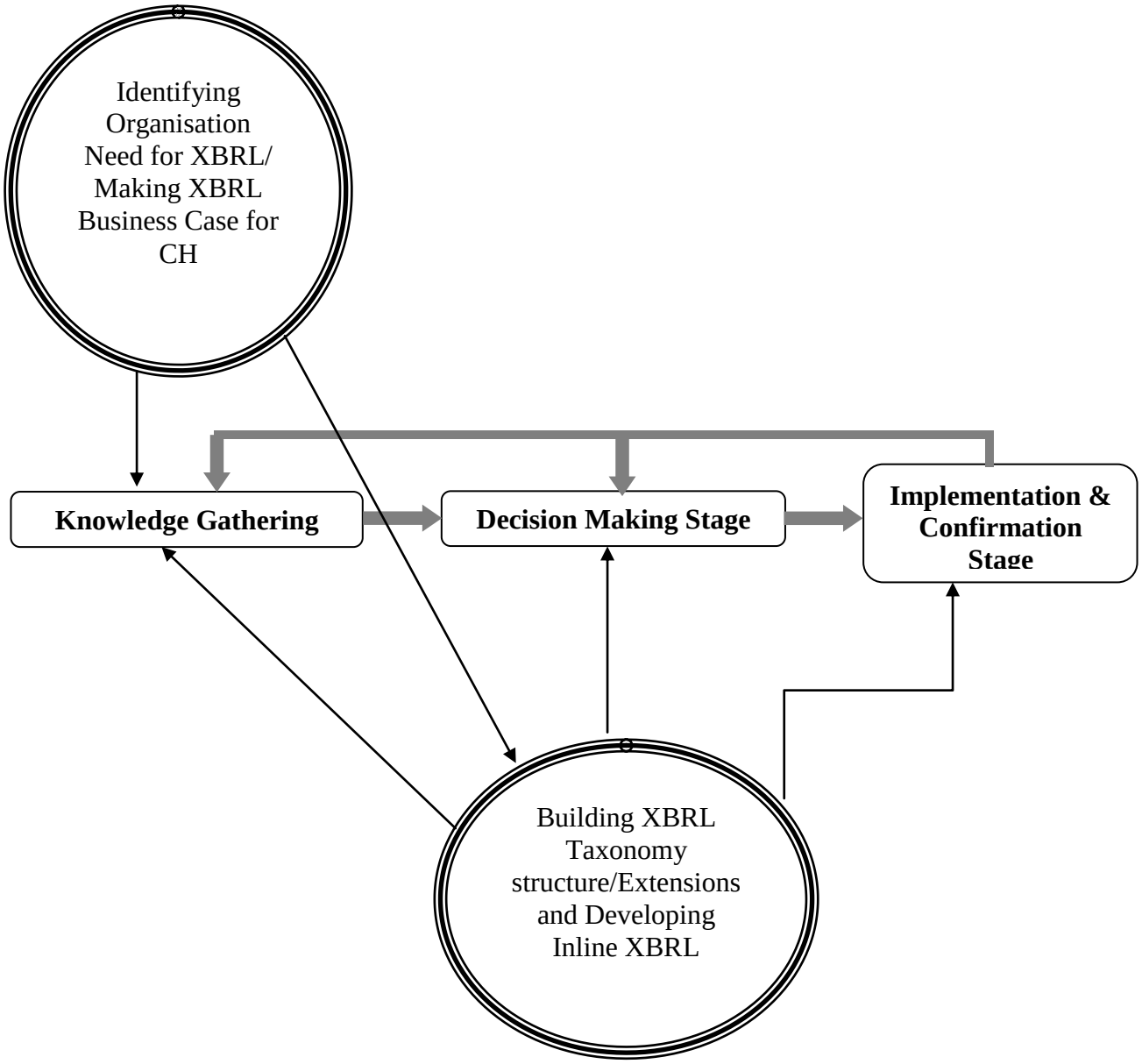
XBRL adoption decision was formalised by Lord Carter announcement in his report on improving the performance of HMRC's online services that XBRL will be mandated in April 2011 (Lord Carter Report, 2006). This implies that even though that XBRL adoption process was based on collaborative efforts of HMRC and its stakeholders, a final decision had to be made officially by a top government. Lord Carter's recommendation supported and

culminated HMRC's efforts in securing the government authoritative and financial support for XBRL project.

Developing Inline XBRL caused the reiteration of XBRL adoption process as XBRL's project's technical experts started to gather additional information about possible rendering solutions. Seeking technical support from HMRC's stakeholders was recognised by the establishment XBRL rendering solutions group, which is one of XBRL International's working groups, responsible for providing technical support with XBRL implementation. HMRC's XBRL project members co-founded this group to share their technical expertise and utilise the technical support extended by other members of the group including major software business partners. This shows HMRC's collaboration with its stakeholders to facilitate implementation of XBRL.

3.0 XBRL Adoption Process: Companies House (CH)

Figure 3.1: The Technological Context of XBRL Adoption Process: CH



The Technological Context of XBRL Adoption Process: CH

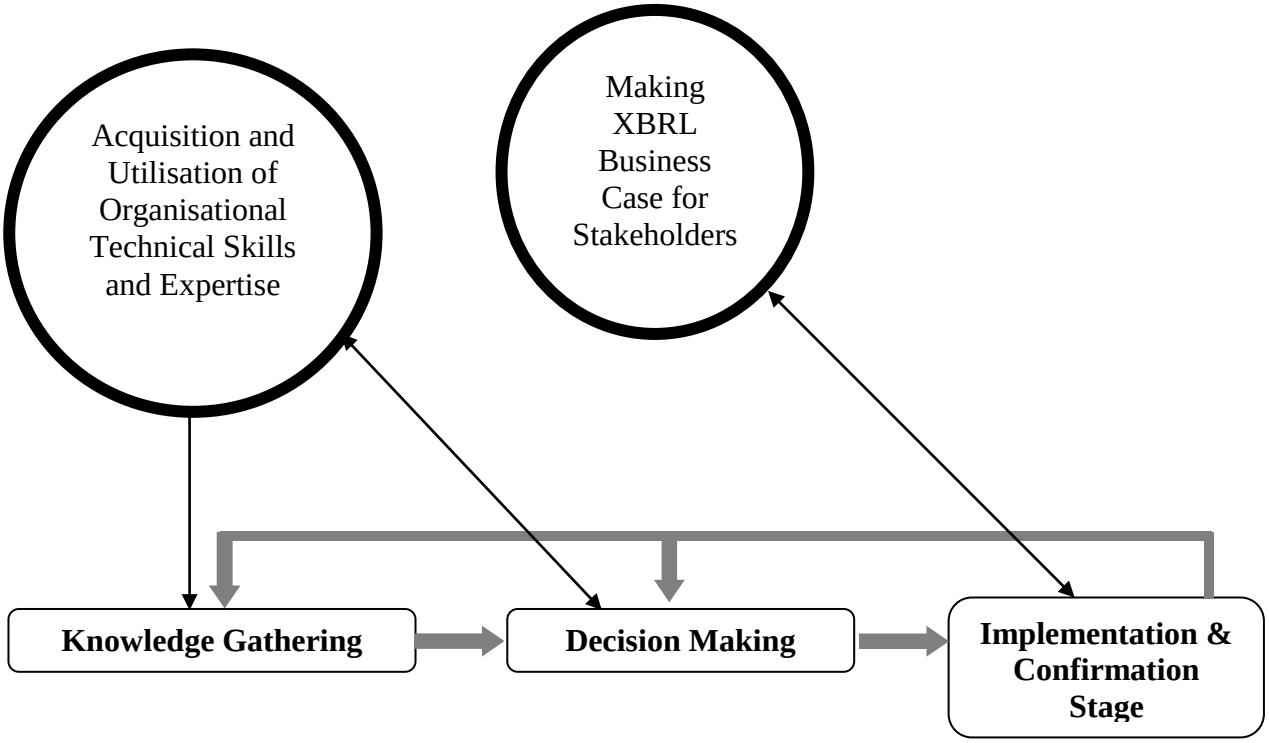
Companies House's main motivation in adopting XBRL was to find an electronic filing medium that could facilitate capturing and manipulating the data in the audit-exempt accounts. XBRL was perceived as a better reporting option than the old method of capturing images of filed, which did not facilitate processing such data. CH 1 acknowledged that that during peak filing periods, CH's staff members struggled with processing manual accounts. This has resulted in having high rejection rates that were caused by users' calculation errors in the paper-filed accounts. XBRL business case was sought to reduce those rejection errors. This was done by the utilisation of XBRL-based Adobe Intelligent Forms (AIFs). AIF has been perceived as compatible with CH's existing filing systems, which are used to process companies' accounts by CH's operation staff members. The decision to adopt XBRL was also supported by CH's vision to achieve its long-term objective of electronically enabling 100% of its filings.

As part of the knowledge gathering stage in XBRL adoption process at CH, CH officials gathered information about the applicability of XBRL to CH's audit-exempt accounts. CH was faced by a significant challenge, as it discovered that 450 data elements in the accounts were required to be XBRL-tagged. CH did not have sufficient technical expertise to build XBRL taxonomy structure that would support the filing of the unaudited accounts. CH's XBRL project team leader sought external support from CH's IT service providers, which will be explained in the next two sections.

That technological challenge was evident throughout XBRL adoption process, as CH moved further towards making the decision to adopt XBRL to facilitate the filing of full

accounts of large companies. CH's XBRL project manager realised that full accounts would add and additional burden in terms of the technical complexity associated with tagging more data elements than those in the unaudited accounts. The data structure of the full accounts was more detailed and sophisticated, and required additional IT expertise that could facilitate the process of tagging the data in the accounts. This was also emphasized by the need to develop XBRL capabilities to accommodate the data structure of the full accounts. This resulted in the development of Inline XBRL, which CH worked on in cooperation with its software vendors and members of HMRC's XBRL project. The lack of IT expertise and the complexity of the data structure of the full accounts have both caused XBRL adoption process to reiterate, as XBRL project manager needed to ensure that technical support is adequate implement the joint filing facility along with HMRC by summer 2010.

Figure 3.2: The Organisational Context of XBRL Adoption Process: CH



The Organisational Context of XBRL Adoption Process: CH

As indicated in the previous section, the lack of CH's technical expertise was one of the organisational factors and challenges that faced CH. As part of gathering knowledge about XBRL applicability to CH's filing systems, CH's XBRL project manager realised that the evidence lack of IT expertise would hamper XBRL adoption process. CH as an organisation does not have a full-fledged IT department. As XBRL team was established, two members have possessed sufficient IT knowledge, specifically in computer programming and XML languages. CH was unsuccessful in recruiting and retaining IT personnel, as there is a shortage of IT professionals in the job market. Most IT-skilled professional prefer to work for a private-sector organisation, which provides lucrative employment opportunities, which are not readily available in public-sector organisations like CH.

The complexity of building the technical infrastructure of XBRL contributed to CH's decision to assess its in-house technical expertise that would support XBRL project, particularly to assist with building XBRL taxonomy. CH 2 indicated that the volume or the format of the data that needed to be XBRL-tagged was not an imminent a problem, until CH discovered that it lacks the technical expertise to deal with it. This resulted in CH's decision to outsource the task of building XBRL taxonomy.

CH relied on acquiring technical expertise from its private-sector software vendors, such as Adobe. Adobe helped in creating Adobe Intelligent Forms that supported the filing of audit-exempt accounts. Outsourcing was perceived as a better alternative to hiring IT-skilled personnel, who would eventually need special training in XBRL. However, depending on IT outsourcing has been perceived as an inhabitant to government agencies' ability to develop

their own IT departments (Willcocks et al., 1995; Pavlichev, 2004). In addition, outsourcing hampers these agencies' capability to implement future large-scale IT projects. This has been found consistent with CH case. XBRL project team has been consisted of four members, one of whom has received special training on XBRL, while the rest have worked on non-technical side of XBRL project. The shortage of technical expertise and reliance on IT outsourcing put CH in a critical position as it needed to develop XBRL capabilities before the implementation of the joint filing facility with HMRC.

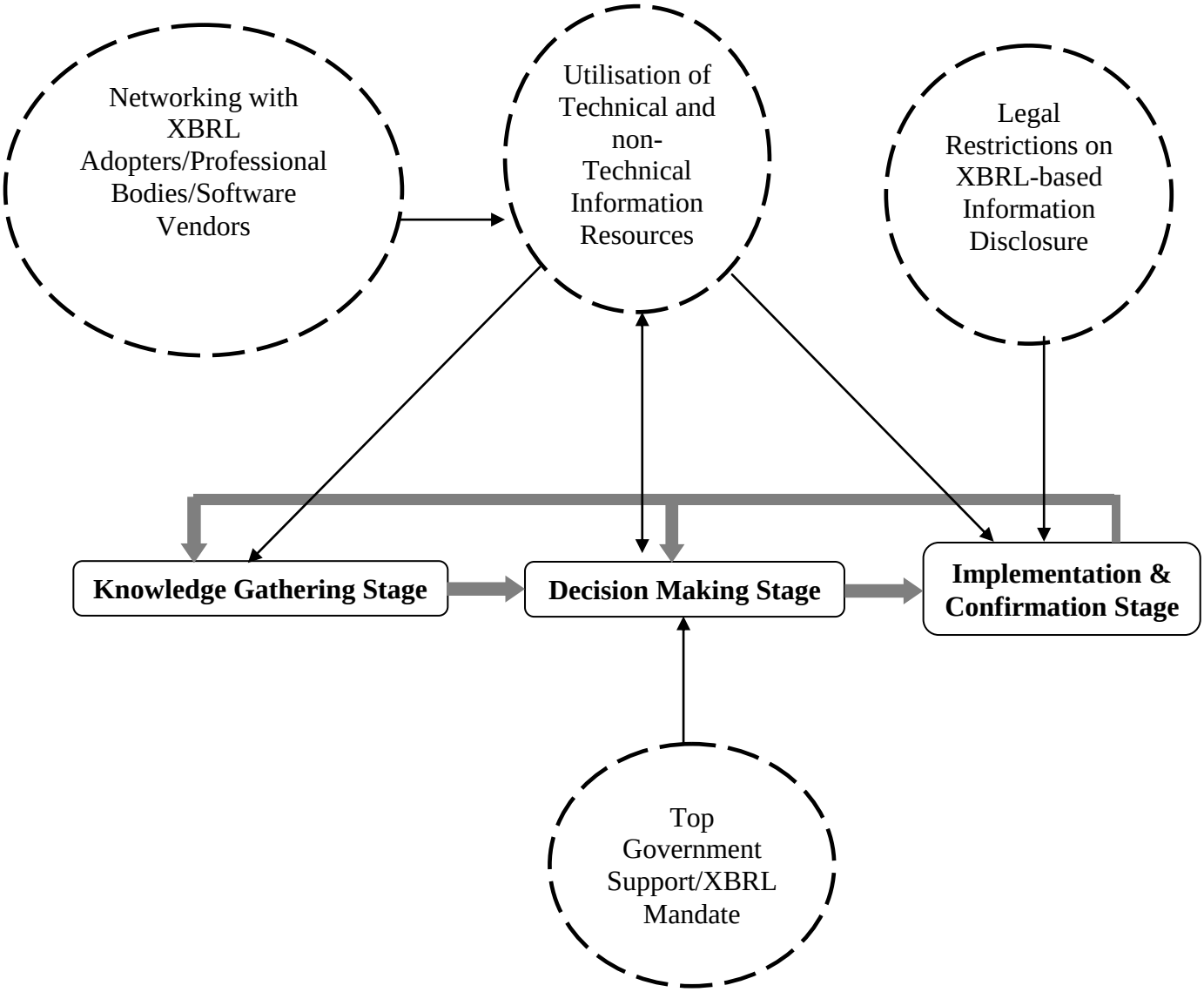
CH's XBRL project managed to make XBRL business case for its stakeholders, including small businesses and software vendors. Before the implementation of XBRL-based filing of the unaudited accounts, XBRL's project team members conducted several testing sessions of CH's web and software filing facilities. The testing sessions were publicised in CH's main magazine, the Register, where locations and times have been scheduled to take place in several major British cities. CH conducted these sessions in liaison with software vendors and groups of small businesses' representatives to address the technical issues that could be faced by them. CH 1 indicated that these sessions assisted in addressing potential problems with the usage of Adobe forms, as raised by small business owners.

The joint filing facility caused an organisational challenge, as many large companies questioned XBRL benefits to their business reporting systems. This is due to the fact that those companies have to file twice with HMRC and CH, while it is the government's goal to reduce compliance cost for businesses (BIS, 2009) and minimise regulatory inefficiencies (Hampton, 2005). Implementing the joint filing facility was met by an apparent lack of XBRL knowledge and benefits, which reflected their skepticism about the feasibility of the double

filing and their concerns about software vendors' readiness for the joint filing facility (ICAEW, 2009b). CH did not experience this problem when it implemented XBRL filing in 2006, as it was based on voluntary basis. However, CH officials believed that the voluntary filing approach is not a feasible option for large companies and agents, who have been the most sceptical XBRL user group among CH's filing companies' population. CH's XBRL project manager perceived XBRL mandate as the only option to urge corporate companies to file in XBRL, despite the fact that this mandate would not necessarily contribute to building XBRL business case for stakeholders in general.

3.3: The Environmental Context of XBRL Adoption Process: CH

Figure 3.3: The Environmental Context of XBRL Adoption Process: Companies House



The Environmental Context of XBRL Adoption Process: Companies House

Building a network of stakeholders, composed of software vendors, professional bodies and other XBRL adopters was one of the main features of the environmental features of XBRL adoption process at CH. The evidence lack of CH's in-house technical expertise forced XBRL project manager to seek external IT support through its main IT service providers and utilise HMRC's strong IT experience with electronic reporting systems. This was part of CH's solution to overcome the lack of technical expertise by resorting to outsourcing the task of building XBRL taxonomy.

CH utilised its network with other potential stakeholders to facilitate the process of adopting XBRL. As a member of the Steering Committee of XBRL UK, CH 1 sought technical assistance on the presentation and format of XBRL-based Adobe forms. In addition, XBRL International provided another information venue for CH to meet European Registries to share their XBRL adoption experience. The diversity of these external knowledge sources was also supported by CH 1 and CH 2's experience in electronic filing projects since early 2000s, which all helped in putting XBRL into perspective.

Upon making the decision to adopt XBRL, CH acquired approval and advisory support from its overseeing top government agency, the Business, Innovation and Skills Department (BIS). The BIS's advisory assistance was an important catalyst in the decision making process. The BIS provided CH with the accountancy expertise and assisted XBRL project manager with the selection of a proper data structure and format of XBRL-enabled unaudited accounts. The BIS also assisted CH on how to advise companies on using XBRL-based Adobe Intelligent Forms, which showed another dimension of top government support

not only to CH, as an XBRL adopter, but also to small businesses, as potential users of XBRL. CH used this top government support in launching creative marketing campaigns during XBRL showcase events where CH's officials met with representatives of small businesses.

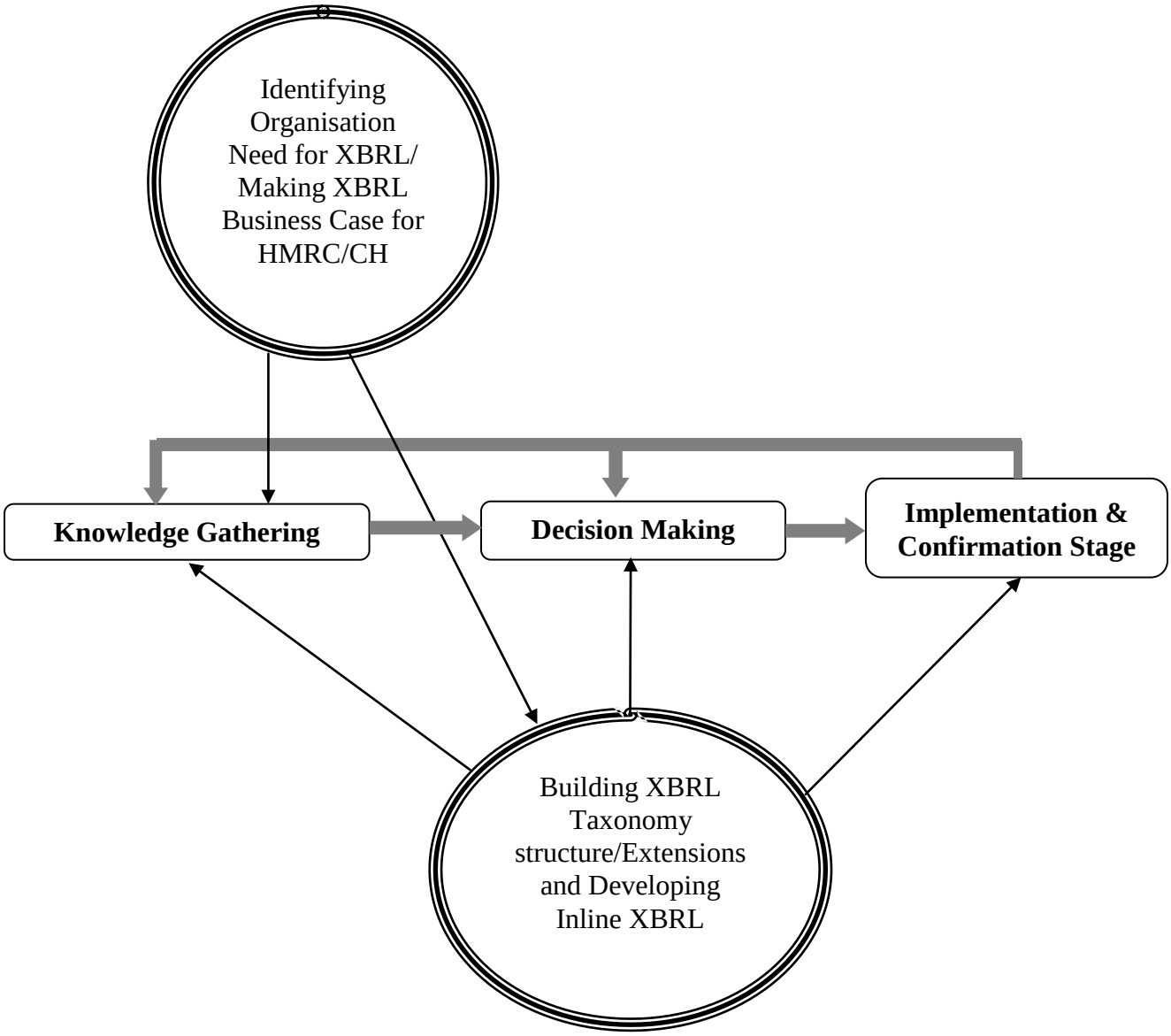
Lord Carter's recommendation to mandate XBRL did not affect CH's decision making when it decided to adopt XBRL for filing unaudited accounts. However, the mandate played an important role in recognising the importance of reviewing the data structure of the full accounts of large companies. CH collaborated with the BIS and the Cabinet Office to discuss the legal implications of enabling the filing of full accounts in XBRL before the implementation of the joint filing facility. This required the reiteration of XBRL adoption process. CH needed to seek the support of its IT service providers and work with HMRC's project managers to initiate the Business Link to implement the joint filing facility.

Rendering XBRL data in the unaudited accounts caused another environmental challenge to CH from the legal point of view. The legal challenge was represented by the need to render XBRL data so the publicly disclosed accounts' information would exactly match the information submitted by small companies under the Companies Act. In addition, legalising the complex set of the full accounts submitted by corporate users added an additional legal burden on CH. CH 1 sought legal assistance from the BIS. CH tried to reduce the compliance burden on large companies to follow the law (Companies Act 2006). This was done as CH provided large companies with the opportunity to comply with the minimum reporting requirements stated in the Act to file their accounts with CH (CH 1). This solution was one of CH's legal manoeuvres to reduce the compliance burden on corporate users. The issuance of

the minimum reporting requirements implied two important issues. First, CH would handle users' concerns of information disclosure more effectively as companies would not need to report full corporate information that is not required by the law. Second, CH would be less concerned with its ability to process large volumes of data filed by companies as CH suffered from a shortage of its staff members especially during peak filing periods.

4.0 XBRL Adoption Process: HMRC and CH

Figure 4.1: The Technological Context of XBRL Adoption Process: HMRC and CH



The Technological Context of XBRL Adoption Process: HMRC and CH

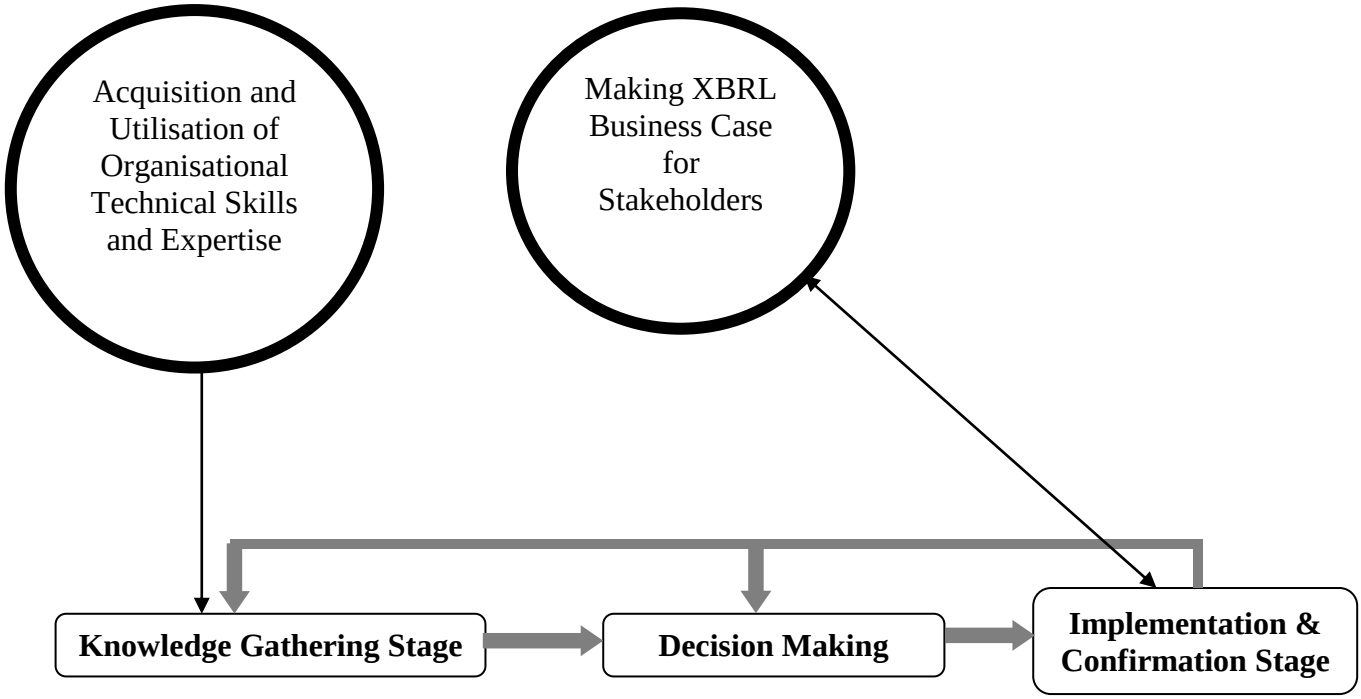
HMRC and CH have both followed similar path towards adopting XBRL, based on the impact of the technological context on such process. The adoption process at both organisations passed through a number of successive and identifiable stages. The first stage of XBRL adoption process at HMRC and CH was characterised by the agencies' identification of the need to adopt and implement XBRL to support their existing electronic reporting facilities. At HMRC, XBRL was sought to support the tax inspectors and agents to process data in CT600, which facilitates the risk assessment process. At CH, XBRL was sought as part of CH's vision to realise its goal of electronically enabling 100% of the filings, and XBRL contributed to this vision as it facilitated the data processing and manipulation of the unaudited accounts of small companies. This supports the finding that XBRL business case was made successfully at HMRC and CH.

It is evident that the complexity of the data structure and content of CT600 accounts and computations and unaudited accounts affected the speed of XBRL adoption process. HMRC faced many difficulties when XBRL project team members decided on utilising their in-house technical expertise to build XBRL taxonomy infrastructure. The complexity of the data at HMRC added to this technical difficulty, which ultimately caused a delay in testing and implementing XBRL. This is consistent with Ambite et al. (2002) and Dawes (1996) who identify the potential complexities associated with data structure that cannot be easily processed by regulatory legacy processing systems. On the other hand, CH relied on outsourcing XBRL taxonomy building task to its IT business partners (Adobe Systems and Core Filing), and did not face a comparable data complexity with tagging the data in the

abbreviated accounts. CH's perception of the technical complexity of the data is identified in the e-government literature (Caffrey, 1998; Dawes and Pardo, 2002).

The complexity of XBRL as a reporting technology tool and the difficulty of building XBRL taxonomy are both interrelated and were identified as a technological factor and challenge that affected XBRL adoption process at both agencies. E-government literature indicated that government agencies could deal with information technology challenges by providing demonstrations and prototypes (Caffrey, 1998; Dawes and Pardo, 2002). This has been also supported by the ICAEW report (2009b), which indicates the need to test XBRL to determine its capability to cope with the volume of transactions. After making the decision to outsource the taxonomy building task, CH was able to quickly proceed with the implementation of XBRL and started to receive XBRL-based filings in July 2006, while HMRC continued to struggle with the technical intricacies of XBRL implementation. This had its impact on both agencies' ability to test XBRL. CH managed to conduct several testing sessions, where representatives of software vendors and small businesses were invited to use XBRL. However, XBRL testing in HMRC took place only in November 2009, after developing Inline XBRL and issuing the minimum tagging requirements. This supports the finding that the complexity of the data structure in the regulatory filings did affect significantly both agencies to build XBRL taxonomy, develop XBRL capabilities and conduct sufficient testing sessions in preparation for the launch of the joint filing facility.

Figure 4.2: The Organisational Context of XBRL Adoption Process: HMRC and CH



The Organisational Context of XBRL Adoption Process: HMRC and CH

Both HMRC and CH realised the importance of utilising and acquiring sufficient technical expertise to adopt XBRL. This was evident in the first stage of XBRL adoption process at both agencies. XBRL project managers at HMRC and CH indicated that they both utilised the technical expertise of their IT service providers (Adobe Systems and Core Filing). HMRC 1, CH 1 and CH 2 emphasised that XBRL taxonomies needed to be reviewed to reflect the underlying changes in the tax computations and full accounts, and this was accomplished to great extent through the support of the software vendors.

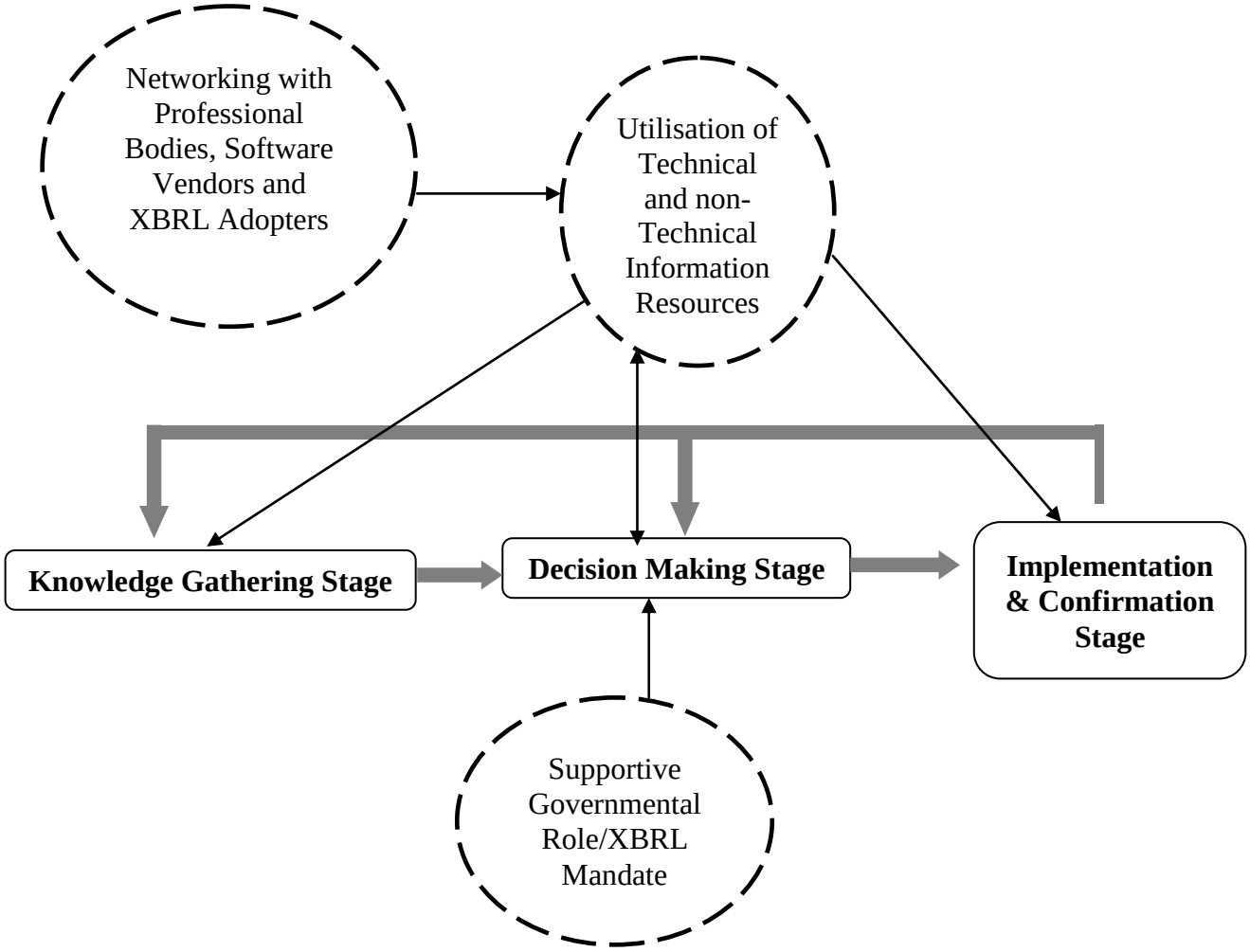
However, differences were noted in the existence of the organizational technical expertise at HMRC and CH. These differences had its impact on adopting and implementing XBRL. For example, CH lacked sophisticated technical expertise to support the adoption of XBRL. However, this was not viewed as a potential organisational challenge as CH entirely relied on its IT business partners to build the technical infrastructure of XBRL. On the other hand, HMRC's long-standing experience and history with electronic filing systems which dated back to 1998 provided a better chance to HMRC to utilize its in-house technical skills to develop XBRL taxonomy. TOE and e-government literature indicates that the adoption process of e-government projects is not only a function of the complexity of the technology adopted or the data processed, but also a function of the availability of the technical expertise, needed to support such technology (Tornatzky and Fleischer, 1990; Caffrey, 1998; Dawes and Pardo, 2002). This technical expertise can be developed within the government agencies which can often secure more financial support from top government bodies than private organisations can do (Heeks, 2006). However, this is not consisten with CH case as CH officials decided to depend primarily on its IT service providers when it gathered knowledge

about XBRL applicability to the filing of the unaudited accounts. This was also evident when CH made the decision to adopt XBRL. However, at HMRC, the need to utilise technical expertise impacted the knowledge gathering and implementation stages. This is due to the fact that HMRC needed to reinforce its technical expertise by putting additional effort into working with its IT service providers, upon the development of Inline XBRL and before the implementation of the joint filing facility.

Both agencies struggled to make XBRL business case for stakeholders during the implementation and confirmation stage. Both HMRC and CH were faced by the corporate users' community's scepticism towards using XBRL file regulatory information and its benefit to the business reporting system. This was evidenced by two surveys' findings that highlighted the lack of XBRL awareness among members of the business community (Dunne at al., 2009; ICAS, 2010). Both agencies did not realise this challenge until XBRL was about to be implemented, especially during the preparation for the launch of the joint filing facility, which comes as the last stage in XBRL adoption process. This indicates that both agencies relied on the power of XBRL mandate to urge users to comply with the law, and use XBRL in filing their corporate tax returns and accounts. Making XBRL business case for stakeholders, particularly corporate users, was not part of either HMRC or CH's decision making process to adopt XBRL. This clearly shows the difference between the willingness of each agency to interact with their stakeholders to make XBRL business case for them, and the agencies' keen efforts to make XBRL business case within their respective organisations. Making XBRL business case for HMRC and CH took place during the knowledge gathering stage, and this reflects each agency's initial emphasis on primarily realising XBRL benefits to the agencies for the sake of securing top government support representing by financial and legal support.

The issue that arises here is that by refraining from engaging with XBRL stakeholders and making business case in the early stages of XBRL adoption process poses a difficulty in successfully implementing the technology due to the users' resistance. HMRC and CH may not realise the full potential of XBRL, if the main stakeholder group's concerns, corporate users, are not addressed properly, as both agencies intend to launch the joint filing facility.

Figure 4.3: The Environmental Context of XBRL Adoption Process: HMRC and CH



The Environmental Context of XBRL Adoption Process: HMRC and CH

The supportive role of the top government is perceived as a facilitating factor for HMRC and CH. Both agencies used the legislative power of XBRL mandate to push for the implementation of XBRL-based accounts and implementation and computations (HMRC) and joint filing facility (HMRC and CH). Government pressure is considered a regulatory challenge in e-government literature (Dawes and Nelson, 1995; Landsbergen and Wolken, 1998; Harris, 2000). However, Tornatzky and Fleischer (1990) suggest that supportive regulatory laws facilitate the adoption of technological innovations. This has been consistent with the findings of the case studies. XBRL mandate provided the required legal power which was used to urge companies and software vendors to start modifying their accounting systems and software applications to be XBRL-enabled (Abdullah et al., 2009).

The mandate served the interests of HMRC officials as they struggled with the risk assessment process of the non-standardised PDF-based accounts and computations. HMRC considered using XML to facilitate the filing of these documents, but the technical capabilities of XML did not provide the advantage of XBRL which enables the standardisation of the accounts and computations. Corporate users and tax agents did not perceive XBRL advantages, as indicated in the previous section. For such users, XML, as a technical solution, would have been more convenient reporting medium to corporate users and tax agents than XBRL, as users already file CT600 tax returns in XML format. If XBRL was introduced to those users on a voluntary basis, most of these users would have resisted to change their systems and preferred to send their accounts and computations as PDF-based online attachment, as they are used to do. This assumption is supported by the apparent lack of XBRL business case for users. Therefore, top government support and XBRL mandate were

required to urge corporate users and tax agents to comply with the law and change their accounting systems to file the accounts and computations.

At CH, XBRL was not mandated for the filing of the unaudited accounts. Before the mandate of XBRL, CH encouraged small businesses to use its web filing facilities to file their accounts at a reduced fee of £15 (paper filing fee is £30). At the same time, late filing penalties have been raised to £5000 under the new changes of Companies Act 2006. These two procedures assisted CH in persuading presenters to electronically file their documents in XBRL, which took place in July 2006. Lord Carter's report specified that XBRL should be used in the future to file large companies' full accounts. This was part of the joint filing facility initiated by top government's decision makers to eliminate redundancies and inefficiencies in administrative operations (Hampton, 2005). Implementing the joint filing facility required the utilization of a single reporting medium. As the law mandated the usage of XBRL to file the accounts and computations, the need to use the same reporting medium for filing the full accounts was necessary to facilitate the joint filing. CH 1 and CH 2 indicated that top government support was the only way to implement such change; otherwise, it would have been uneconomical to require companies to send two different sets of accounts to HMRC and CH, which defied the purpose of reducing government administrative burden.

Both government agencies utilised all possible technical and non-technical information sources throughout the process of adopting XBRL at their organisations. XBRL project managers at HMRC and CH emphasised the importance of sharing XBRL adoption experience with other international regulatory adopters. They also benefited from the collaboration with other members in XBRL UK, who provided technical and advisory support

during XBRL adoption process. HMRC and CH's networking efforts with their stakeholders facilitated the process to great extent as both agencies sought technical assistance from their IT service providers. This was evident when both agencies examined XBRL applicability to support the electronic filing process and facilitate the data processing and manipulation to achieve the espoused benefits of XBRL.

HMRC and CH differed with regard to the impact of the legal challenges affecting XBRL adoption process. HMRC did not face any legal obstacles towards legislating the usage of XBRL to support the filing of CT600 accounts and computations. CH, on the other hand, struggled with the issue of personal information disclosure and security as some Internet users misused basic corporate information that is downloaded for free through CH's search engine (HoC, 2008). The security issue became imminent for CH's presenters as the information supplied as part of the incorporation of new companies or the submission of accounts have been misused to commit fraud by using directors' personal details to apply for lines of credit (HoC, 2008; CH, 2006). As noted in Chapter 4, CH tried to overcome these problems by the introduction of security measure (PROOF and Monitor service), which raised presenters' confidence in CH's online reporting facilities as indicated by the increasing numbers of CH's online services take-up rates.