ABC and ABM Adoption in Medium/Large Irish Firms – Information Technology and Economic Conditions as Contingent Variables

By

Otman Elafi

Research Supervisors: Dr. Martin Quinn

Dr. Mark Mulgrew Prof. Dermot Brabazon Prof. Saleem Hashmi

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I

Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text.

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List of Abbreviations

IT	Information Technology
ABC	Activity-Based Costing
ABM	Activity-Based Management
ABB	Activity-Based Budgeting
TD-ABC	Time Driven Activity-Based Costing
JIT	Just in Time
LCC	Lifecycle Cost
SIZE _t	Organisation size
IND _t	Organisation's Industry
MULTIt	Multinational Organisations
COMPt	Organisation's Levels of Competition
КМО	Kaiser-Meyer-Olkin
CPA	Customer Profitability Analysis
MCS	Management Control Systems
DCU	Dublin City University
MA	Management Accounting
ICMS	Integrated Cost Management Systems
EVA	Economic Value Added
AAA	American Accounting Association
TCM	Target Cost Management
GAAP	Generally Accepted Accounting Principles
CAM-I	Consortium of Advanced Management International
ERPs	Enterprise Resource Planning Systems
AICPA	American Institute of Certified Public Accountants

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Dedication

This thesis is dedicated to my father Mohamed Elafi, my wife Amal Elfituri, my two little daughters, Tasneem and Salma, to the memory of my beloved mother Salma, and my two sons Mohamed.

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Abstract

ABC and ABM Adoption in Medium/Large Irish Firms – Information Technology and Economic Conditions as Contingent Variables

Otman Elafi

Activity-based costing (ABC) and activity-based management (ABM) emerged in the 1980s as management tools with potential to increase competitiveness and enhance profitability. To date adoption rates for both range from 20-25%. Some studies suggest that economic conditions and technological capability improve adoption rates. However, extant literature has not assessed the role of more recent technological developments, such as online activity and in-house software adoption, or assessed effects of the recent global economic crisis. This study explores the impact of such technology and economic conditions on ABC and ABM implementation at top companies in the Republic of Ireland.

The research adopts a contingency approach and a positivist ontology, using an online survey instrument as its primary method. A questionnaire was sent to 824 Irish companies. The data gathered was analysed using factor analysis and regression analysis. Factor analysis supported consideration of the independent variables associated with Information Technology (IT) and economic conditions and identification of additional variables. The findings reveal the rate of implementation and adoption of ABC and ABM is 18.7%; similar to that reported previously. The data reveals a statistically significant relationship between information technology resources and ABC and ABM implementation.

This study provides an original contribution, in that it explores the relationship between more recent major changes in technology and changes in economic conditions to ABC and ABM implementation. It also contributes methodologically by using a factor analysis approach, and to the Irish context by studying only large organisations.

CHAPTER ONE

Introduction

1.1. Introduction

Activity-based costing (ABC) systems and activity-based management (ABM) systems were initially proposed as management tools in 1980 (Cooper and Kaplan 1992). Cooper and Kaplan (1992) argued that these tools could result in heightened competitiveness and enhanced profitability, while simultaneously increasing organisations' overall performance. Contemporary organisations face many problems, especially those offering multiple products or services, and/or with a multinational status. These problems include the high costs associated with the implementation of ABC and ABM. Business managers and shareholders are therefore very interested in determining whether ABC and ABM can produce positive financial results, as has been suggested. Cost factors include employees' time commitments and management, process interruptions, and direct investments in technology (Cooper and Kaplan 1992).

Many authors claim that, in order to overcome such difficulties, management accounting (MA) systems must be accurate, fast, and up to date. In recent times, there has been significant progress in the form of the development of ABC, and its role in MA cannot be understated. ABC has been used for multiple purposes, such as product range decisions (Johnson and Kaplan 1991), cost reduction (Brimson 1991), budgeting (Kaplan 1994), cost modelling (Cooper 1994), customer profitability analyses (Bellis-Jones 1989), inventory valuation, and performance measurement (Cotton, Jackman and Brown 2003). However, the MA literature recognises that successful implementation of ABC remains problematic for many organisations in different sectors and countries.

A key theme in the contemporary MA literature is the problems companies encounter when seeking to assign production overheads to products or services in an accurate and efficient way. These problems include keeping pace with rapid developments in products and services, the complexity of production and service methods, increasingly competitive conditions, evolutions in information technology (IT), and the consequences of the global economic crisis. Arguably, ABC and ABM can result in increased competitiveness and enhanced profitability, while also improving overall organisational performance. However, implementing ABC without ABM in order to improve organisational performance can damage shareholder value, because of the effort and expenses required to implement it. A common mistake made by organisations when first implementing ABC and ABM is that they over-emphasise ABC and under-emphasise ABM.

The development of IT and IT systems for use by organisations since the 1970s has been significant. Contemporary firms can readily access the internet and benefit from cloud computing, self-service, and affordable personal computers, and this has brought about a dramatic change in the nature of IT outputs and tasks (Scapens et al. 2003). MA literature has emphasised IT as the key information driver in MA (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003). Moreover, the use of software within business practices has dramatically increased (Iltuzer, Tas and Gozlu 2007), facilitating changes in the domain of MA and organisational structure; for example, with the use of SAP and Sage (Markus et al. 2000, Parr and Shanks 2000). IT functions, online activities, IT training, and software are now no longer restricted to any single department within an organisation, especially in the case of finance and accounting departments (Burns, Ezzamel and Scapens 1999, Scapens et al. 2003). Utilisation of appropriate technology assists management accountants by providing them with readily accessible and comprehensive information about their organisations. Consequently, developments in IT are impacting positively on businesses generally, and on MA in particular. Thus, they could be a key factor influencing the level of ABC and ABM implementation now and in the future.

In addition, recent global economic conditions have resulted in some countries and organisations being negatively affected, and the economic difficulties they have experienced have altered organisational structures and functions. Libby and Waterhouse (1996) argue that economic, social, and political change are the key drivers of organisational change, but that the mechanisms of such change are not well understood (Libby and Waterhouse 1996, p. 137). Thus, economic change would be expected to influence organisations, MA, and organisational costing systems. Moreover, Giannone et al. (2011) observed that the recent recession has had an impact on international organisations, whether they were formerly in a strong or weak macroeconomic state.

1.2. Research Objectives

ABC is recognised by many practitioners and researchers as one of the most significant innovations in MA in the 20th century (Johnson 1990, Shields 1995, Clarke et al. 1997, Booth and Giacobbe 1999, Askarany 2006, Kaplan and Anderson 2007, Gosselin 2007, Askarany and Yazdifar 2007, Smith et al. 2008). MA literature has reported that in most organisations worldwide, there are inherent problems with the implementation of ABC. Despite the cited advantages of ABC and ABM, adoption has not been widespread and reported adoption rates are typically in the 20-25% range (Clarke et al. 1997, Smith et al. 2008). Many researchers in the fields of economics, management, and accounting have made suggestions about why organisations behave as they do; growth, IT changes within the organisation, shifts in the level of the competition, alterations to the size and structure of the organisation, and the organisation's economic conditions are among the most complex phenomena to be described (Van de Ven and Poole 1995). As such, the research objectives in this study are as follows:

- Research Objective 1: to determine the level of adoption and implementation of ABC and ABM in the top 1,000 Irish companies. This will be answered by posting the following research question (RQ1): of the top 1,000 Irish organisations in the sample, how many (percentage) have adopted and implemented ABC and ABM?
- Research Objective 2: to determine if there is a relationship between the level of IT resources within the firm and the adoption and implementation of ABC and ABM in the top 1,000 Irish organisations. This objective will be met by posing the following research question (RQ2): is there an association between the level of IT and the adoption and implementation ABC and ABM in the sample firms?
- Research Objective 3: to determine if there is a relationship between the economic conditions faced and the adoption and implementation of ABC and ABM adoption in the top 1,000 Irish organisations. This objective will be addressed through the following research question (RQ3): is there an association between the economic conditions faced by the organisation and the adoption and implementation ABC and ABM in the sample firms?

While not a formal objective of this research, an examination will also be conducted into any potential relationships which may exist between identified control variables (see later) and the level of and the adoption and implementation of ABC and ABM by the sample firms. These questions will be formally tested through the formulation of a number of appropriate hypotheses (see Chapter 5 Research Design, Section 5.3). The main argument of this thesis is that ABC and ABM adoption is dependent on a number of variables, as per RQ2 and RQ3 above. Both RQ2 and RQ3 will be extensively examined using a factor analysis approach.

1.3. Research Model

Proceeding from the research objectives, Figure 1-1 depicts the research model and the relationships between the dependent, independent, and control variables used in this research study. The model is divided into three groups of variables: 1) ABC and ABM (dependent variables); 2) IT resources and economic conditions (independent variables); and, 3) size, industry, competition, and multi-nationality (control variables) - all will be discussed in depth in Chapters 2 and 5. Figure 1.1 also identifies the interconnectivity between each variable.



Figure 1-1: Model of ABC and ABM Implementation Variables

1.4. Research Methodology Chosen

This study is designed to review the level of implementation and adoption of ABC and ABM in the top 1,000 Irish organisations, as listed in *The Irish Times*. Research methods applied in the literature suggest that this area of research is suited to both a positivist approach, and a contingency approach. Contingency theory is an approach to the study of organisational behaviour in which explanations expressed as contingent factors influence the design and function of organisations. Therefore, contingency theory is a suitable approach for this study – see Chapter 4 for more detail. Two independent variables - IT and the company's current

economic conditions - and four control variables - company size, industry type, level of competition, and multinational status – are tested in this study. These six variables are contingent factors by nature, reflecting the behaviour of the organisation and its associated costing system.

This research will carry out a cross-sectional study to answer the questions set out above. Postal and online questionnaires were sent to 824 Irish companies selected from the top 1,000 Irish companies; of these, 176 firms were ruled out due to their sector, geography and being non-profit organisations (see Section 5.8.5). Much existing research concerning the level of implementation and adoption of ABC and ABM has also used questionnaires (see for example, Innes and Mitchell 1995, Bjørnenak 1997, Gosselin 1997, Krumwiede 1998, Clarke, Hill and Stevens 1999, Malmi 1999, Hoque 2000, Innes, Mitchell and Sinclair 2000, Cagwin and Bouwman 2002, Al-Omiri and Drury 2007, Bhimani et al. 2007, Schoute 2009, Askarany, Yazdifar and Askary 2010, Schoute 2011, Bt-Fadzil and Rababah 2012). A total of 171 respondents completed the survey, representing a response rate of 20.75%.

1.5. Summary of Findings

In summary, the descriptive statistics reveal that 32 companies have adopted and continue to utilise ABC. This is an uptake rate of 18.7%, similar to that reported in previous studies. Of these, 17 also use ABM. The results of the study further demonstrate that an additional five companies were (at the time of response) in the process of considering ABM adoption. The main drivers for adoption appear to be online activity and in-house software. Many companies have strengthened their online links with customers and suppliers (ordering and selling online, and providing online customer support), and have also raised their level of spending on employee training to ensure the effective utilisation of the newly available IT resources. In addition, the findings provide evidence that certain factors contribute to some companies' non-use of ABC and ABM. The three most prominent of these are companies' satisfaction with current costing methods, the belief that change is not necessary, and the time-consuming nature of ABC and ABM adoption.

Regression analysis revealed a statistically significant positive relationship between the level of IT resources available and the level of ABC and ABM implementation. In addition, the findings indicate that there is no statistically significant relationship between an organisation's economic condition and its levels of ABC and ABM implementation. The significant findings in relation to the control variables include the identification of a negative and significant association between the size of an organisation and the scale of ABC and ABM implementation. However, no statistically significant associations were found between the dependent variable and the level of competition. The same was true of implementation of ABC and ABM based on industry type, and multinational status.

1.6. Research Contributions

A summary of the contributions of this study are now presented. More detail can be found later in Chapter 7.

To date, only a small number of Irish studies have described ABC and ABM implementation; thus, this study contributes to existing literature by outlining some contingent factors - the IT resources available and the economic conditions of the organisation. In addition, previous studies in an Irish context have not controlled for the nationality of the organisation, and have not focussed solely on organisations more likely to adopt ABC and ABM (i.e. large and medium-sized organisations). Expanding beyond studies in an Irish context, no previous literature on ABC implementation has examined online activity or in-house software when assessing the level of ABC implementation. Moreover, no research has yet been conducted to evaluate the impact of the global economic crisis (i.e. economic conditions) on levels of ABC implementation.

In the Irish context, it has been a long time (circa 11 years) since research was last conducted on ABC and ABM adoption. This is a sufficiently long period to allow for organisational change, and in this particular time much has happened. On the technology front, mobile and cloud technologies have emerged and become dominant. On the economic front, Irish organisations have faced one of the toughest economic recessions of our time, which naturally affects business conditions. Addressing these two issues, this study contributes to extant research by delivering a revised and up to date assessment of the level of ABC and ABM adoption in the Republic of Ireland.

In particular, the study contributes a more detailed appreciation of the relationship between various components of IT and ABC and ABM adoption than previously offered, and also incorporates major technological change over the past decade or so. The relationship between IT levels and ABC adoption as reported here also offers some food for thought to educators and practitioners. The former may draw on the findings here to provide support for more technology based teaching and syllabi in management accounting; meanwhile, the latter could draw on the on the findings to help promote the type of IT needed by firms to adopt ABC and/or ABM.

On the contrary, this study does not find a link between economic conditions and the level of ABC and ABM adoption. This is somewhat surprising, as it would be easy to conceive of firms using more accurate costing techniques in tougher economic times, as accurate costing information could assist in such conditions. This is a contribution, in that is presents an initial relationship for further exploration in future research. The economic conditions variable used here has been specifically designed for this study, and offers a foundation for future researchers to build on, or challenge.

In terms of the methodology used in this study, factor analysis has not been previously used as a method in studies examining levels of ABC/ABM implementation. This robust method allows consideration of the independent variables associated with IT (e.g. IT function, online activity, IT training, in-house software, and management need) and economic conditions, making it possible to identify additional variables (e.g. business growth, product activity and liquidity), which might affect the level of ABC and ABM implementation. The use of factor analysis, combined with regression analysis, implies this study is thus based on two robust methodologies. Thus, the data, findings, and contributions presented are well-grounded in an effort to address the research questions.

1.7. Thesis Structure

This study comprises six chapters following this one. Chapter 2 will introduce and define MA and will review and discuss the relevant literature on ABC, including the benefits and limitations of ABC, when an ABC system is required, and the design of an ABC system. It will also provide some commentary on Time-Driven Activity-Based Costing TD-ABC and ABM. Also, it will introduce and discuss in more depth relevant literature on ABC and ABM implementation, analysing ABC and ABM in relation to different times and locations, identifying gaps in the literature, and finally, discussing the impact of the changing business environment on MA.

The research methodology and theory employed in this study will be discussed in Chapters 3 and 4. In Chapter 3, relevant theoretical approahces are discussed, as well as the process of formulating a research design, appropriate ontology, and epistemology in business research, research paradigms, and the philosophical foundations of this research. The main theoretical perspectives examined in this study are discussed in Chapter 4, detailing contingency theory, contingency fit, and problems affecting contingency theory.

The following three chapters will discuss the process of data collection, and introduce and analyse the findings. In Chapter 5, the research design will be discussed in depth. Chapter 6 will discuss the analysis of the raw data and will present the factor analysis and model estimation. Finally, Chapter 7 will provide a brief and general discussion of the findings, the limitations of the study, and future research directions.

CHAPTER TWO

Literature Review

2.1. Introduction

This chapter provides a brief overview of MA in general, as a precursor to reviewing ABC and ABM literature. It will then detail literature specifically on ABC, TD-ABC, ABM, and the relationships between ABC and ABM. It will also consider the benefits and limitations of these new cost system approaches.

This chapter also analyses and discusses the relevant literature on the implementation of ABC and ABM by exploring factors that affect implementation. Reviewing the existing literature will provide an understanding of the nature of problems reported related to these factors. In addition, it will identify recent literature on ABC and ABM in general, and then, more specifically, ABC and ABM implementation research. It will also identify and discuss the gaps in the literature, and key factors in these gaps that influence implementation.

This literature review informed the research objectives and questions stated in Chapter 1. In the first instance, this was achieved through an initial brief study of previous literature on MA in general, and then focus was placed on relevant ABC and ABM topics, highlighting key issues from previous research in an effort to identify gaps in the literature (see Section 2.8 later). This chapter will also explore literature on the key independent variables used in the current study, namely the impact of IT resources and the impact of an organisation's economic conditions on the level of ABC and ABM implementation. It will also discuss the control variables in the study as outlined in prior literature - company size, level of competition, nationality, and industry type on the level of ABC and ABM implementation.

2.2. Management Accounting

One of the early writers in the discipline of MA, Clark (1923), described MA as involving different costs for different purposes (Clark 1923). More recently, Johnson and Kaplan (1987) have described how the need for this kind of information could improve organisational profits:

...a management accounting system must provide timely and accurate information to facilitate efforts to control costs, to measure and improve productivity, and to devise improved production processes. The management accounting system must also report accurate product costs so that pricing decisions, the introduction of new products, abandonment of obsolete products, and response to rival products can be made (Johnson and Kaplan 1987, p. 4).

Clearly, MA plays a significant role in providing the necessary information for different levels of management to perform the functions of controlling, planning, decision-making and organising, and should also serve as a decision support system for all levels of management. It is thus critical that this information is accurate, reliable, and timely, factors that could be affected by the cost system the organisation is using. The mid-1980s were a point of change, according to the MA literature. For example, Johnson and Kaplan (1987) stated that most elements or characteristics of typical MA systems used by companies in the 1980s were the same as cost systems that existed twenty or thirty years before (Johnson and Kaplan 1987, Drury 2008). Traditional MA techniques have a long history, while ABC, one of the newer techniques, was promoted in the business world by Jonson and Kaplan (1987) and Cooper and Kaplan (1988a 1988b), although the underlying ideas initially emerged in the 1970s (Burns et al. 2013). ABC was developed to overcome some of the limitations of traditional cost accounting systems and to improve the effectiveness of strategic decision-making (Gupta and Galloway 2003). The limitations of traditional MA costing systems included assigned production overheads using volume-based cost drivers (Arora 2009). In recent years, there have been lower direct labour costs in some manufacturing companies; indeed, in some cases, the content of direct labour may be as little as 10% of the total product cost (Clarke 2010). Additionally, direct labour cost has little relevance within certain industries, for instance in pharmaceutical, IT, and electronics companies, which tend to have highly automated manufacturing environments. The impact from such scenarios is an increase in overhead costs with reduced automation and direct labour costs (Clarke 2010). Production processes in modern manufacturing organisations also have far greater complexity and are more complicated than they were previously. Moreover, with the intensity of competition between firms increasing, information managers require needs met to be relevant, accurate, and immediately available. This information is essential in order to formulate and operationalise

functional strategies, and to inform decisions on product mix and production costs (Sohal and Chung 1998). However, in many organisations, information systems and internal MA systems have remained unchanged (Sohal and Chung 1998). Accountants and managers have thus become frustrated with conventional costing systems, and have expressed doubt about their suitability in the current manufacturing organisational environment (Sohal and Chung 1998). However, MA as a discipline can address the limitations of traditional cost systems by suggesting organisations implement ABC (Clarke 2010). However, for many manufacturing and service organisations, ABC is still considered a complex and relatively costly system to implement, as is explored in the next section.

2.3. Activity-Based Costing

In the mid-1970s, and as a result of automation, companies' witnessed reduced direct materials and direct labour costs, while simultaneously overhead costs dramatically increased. Over time, companies started to recognise that the information provided by their MA systems was not meeting their requirements, especially in the context of the continually changing information needed at management levels. Those needs prompted many companies to seek out alternative MA systems that could provide the information required for different levels of management (Bahnub 2010). Sohal and Chung (1998) claim that ABC is an appropriate method for handling manufacturing intricacies and diversity. ABC is a process of independently listing and measuring the cost of any component activity contributing to the overall production and delivery of a particular product or service (Sohal and Chung 1998). The original concept of ABC first appeared in companies such as Siemens AG (implementation began in 1975) and Schlafhorst (in the early 1980s) (Antić and Georgijevski 2010). Abdul-Majid and Sulaiman (2008) argued that ABC is related to a greater degree of accuracy and that ABC has gained increasing attention in recent years.

As a cost accounting technique, ABC ascertains what activities organisations are undertaking in both the long and short-term, and then allocates related indirect costs to products or services. Thus, Blocher defines ABC as, "a costing approach that assigns resource costs to cost objects such as products, services, or customers, based on activities performed for the cost objects" (Blocher 2005, p. 136). Similarly, Bahnub (2010) defines ABC as "an accurate method of assigning costs to work activities, processes, products/services, customers, and lines of business" (Bahnub 2010, p 23). Similarly, Integrated Cost Management Systems (ICMS) defines ABC as, "a systematic, cause and effect method of assigning the cost of activities to products, services, customers or any cost object" (ICMS 2012). Finally, Antić and Georgijevski (2010, p. 34) define ABC as a "costs, activities performance, and cost drivers measuring method" that ascribes cost allocations to activities based on their resource usage, and which is used to assign activity costs to cost objects. They further state that ABC distinguishes between cost drivers and activities.

Cooper and Kaplan (1992) suggest that the balanced scorecard created awareness of these concepts in many published articles in 1988. They understood ABC to be a methodology that could solve the limitations of traditional costing systems. Traditional costing systems were considered unable to precisely determine the actual costs of production and services. Consequently, managers were therefore making decisions based on imprecise data, especially where numerous products were being produced (Cooper and Kaplan 1992). Furthermore, Clarke (2002) explains that ABC can help to detect and abolish non-value adding activities, explaining that non-value adding costs are an expense that can be avoided without decreasing product quality, value, or performance (Clarke 2002).

In summary, from this brief description, ABC can be characterised as a more detailed way of allocating the cost of organisational activities to a product or service. We now turn to the reported benefits and limitations of ABC as outlined in the literature.

2.4. ABC Benefits and Limitations

While this study does not explore the benefits or limitations of ABC, it is nevertheless useful to review them briefly, to help understand why organisations might or might not adopt it. Blocher (2005) observed that, since the early 1980s, an increasing number of organisations have successfully implemented ABC. These organisations adopted ABC out of an interest in the benefits it offered them in terms of overcoming the limitations of TCM. However, Blocher (2005) also states that ABC improved decision-making processes, control, profitability measures, and the information available to manage capacity costs (Blocher 2005). In addition, Sohal and Chung (1998) argue that ABC provides organisations with the following benefits: more accurate product line costing; the ability to analyse costs based on cost objectives; reliable indication of long-run variable product costs, financial, and non-financial period costs; identification and understanding of cost behaviour (Sohal and Chung 1998). Weygandt Kimmel and Kieso (2009) argue that the main benefit of ABC is that it provides an organisation with more accurate product or service costings. They further state that the reasons why ABC is authoritative are because it uses more cost pools to allocate overhead costs to products, while also maximising control over overhead costs, leading to better management decisions. They acknowledge that ABC does not alter total overhead costs, but rather allocates

those overhead costs more precisely. Furthermore, if the costs of products or services are realistic and accurate, managers' understandings of cost behaviour and overall profitability will most likely be improved (Weygandt, Kimmel and Kieso 2009).

Like any other system, ABC has certain limitations, and managers must be aware of these. Blocher (2005) states that the limitations of ABC include, for example, cost allocations, where some costs require allocation to departments and products based on arbitrary volume measures, because finding the activity that informs cost is almost impossible. A further limitation is the imperfection of costs, where, in an ABC system, some costs will not include product or service costs. In addition, it is expensive and time-consuming to develop and implement ABC (Blocher 2005). Weygandt, Kimmel and Kieso (2009) also state that ABC systems are costly to use. Many companies have discovered that ABC increases the costs of identifying multiple activities and applying these activities to cost drivers. Companies must thus review the benefits they derive from implementing ABC systems, as they are more complex than traditional costing systems, resulting in greater implementation expenses. Some of the arbitrary divisions endure, even though overhead costs can be allocated directly to products using ABC's various activity cost pools; in particular, overhead costs continue to be assigned by utilising an arbitrary volume-based cost driver, such as machine hours or labour hours (Weygandt, Kimmel and Kieso 2009).

Clarke (2002) argues that another limitation of ABC is that it does not eliminate the arbitrary apportionment problem in cost accounting. The number of actions that organisations perform is typically quite large. The real complexity when producing products or services lies in the fact that there are many activities aggregated within each umbrella activity; as more actions accumulate to produce products or services, the capability of a cost driver to precisely track the combined costs generated is reduced. A second limitation Clarke (2002) observed is the potential behavioural and organisational consequences of ABC. For example, reducing the number of set-ups results in organisations producing more units per batch, which increases stock levels and has an associated cost. In addition, the information derived from ABC regarding new products sometimes encounters resistance within the organisation. For instance, employees might view the implementation of ABC as part of a long-term process towards redundancies. In such circumstances, employees may be reluctant to cooperate and provide the initial information on which the operation of the ABC system depends. Implementation of ABC in such cases becomes difficult due to employee behaviour (Clarke 2002). A third limitation Clarke (2002) highlights, in the context of financial reporting, is that some accountants are reluctant to change accounting systems with which they are familiar. For financial reporting purposes, inventory is valued at cost in the traditional cost system way,

whereas ABC requires the allocation of some non-production overhead costs to the product, such as market research, payroll administration, and accounts payable, as these all contribute to product costs. It is unlikely that ABC product costs would be acceptable for inventory valuation purposes in external reporting and tax liability calculations (Clarke 2002). Finally, the introduction of any new system within any type of organisation must be carefully and clearly evaluated in the context of a cost-benefit analysis. ABC does not provide net benefits for all organisations. This can then hinder the implementation of new systems, thereby increasing the cost of implementation, and the work and time required to establish an ABC system (Clarke 2002).

Burns et al. (2013) suggest that there are many possible criticisms of ABC, including the cost of implementation, problems appearing in the design stage, and maintenance issues. They cite Kaplan and Anderson's (2004) analysis of the use of ABC to overcome some of these issues by developing TD-ABC. TD-ABC is a system that simplifies the ABC process, making the process more suitable for complex organisations. Kaplan and Anderson (2004) found that one of the principal inconveniences of ABC relates to the completion of daily employee surveys, which are both costly and time-consuming. They stated that TD-ABC system does not require individual employees to carry out detailed and complicated surveys to track the use of resources, as in the case of ABC. TD-ABC overcomes this problem and does not rely on managerial estimates; in other words, it bypasses the stage of allocating resources to activities (Burns et al. 2013). Burns et al. (2013) state that there are two key components of TD-ABC, which manager estimates can identify: the cost time unit for delivering each resource, and the unit time of consumption for each resource by cost object. In the case of original ABC, employees use a survey method, which results in a time-consuming documentation process; using this method, resources are not used to full capacity. On the other hand, in TD-ABC, managers estimate how much time each resource has in theory, and then how much time is actually available in practice. Once the cost time unit of each resource has been calculated, the manager estimates how much time it takes to complete each activity. At this stage, the cost time unit of resources multiplied by the time taken to complete one activity is used to calculate the cost driver (Burns et al. 2013).

2.5. Activity-Based Management

As this study is also exploring the level of ABM implementation, it is useful to review the relevant literature to help understand organisations decisions regarding implementation. Clarke (2002) notes that if management want a firm's products or services to be competitive,

they are obligated to discern the following information about the products or services they are producing: (a) what activities the organisation is focused on (e.g. providing goods or services to the market); and (b) the cost of those activities. To decrease a product or service cost, managers must modify the activities involved in producing that product or service. This is because managers can manage and control activities, but they cannot easily manage or control the related costs. However, ABM focuses on managing activities and their related costs (Clarke 2002), balancing value to the customer, process orientation, and cost control (predominantly based on ABC). Bahnub (2010, p. 43) has defined ABM as "active process management undertaken to improve performance", and Miller states that ABM is:

...a method which helps leaders at all levels in a company to focus on the management of activities to improve the value received by the customer and the profit achieved by providing this value (Miller 1996, p. 75).

Blocher (2005) explains that ABM manages activities in order to enhance the value of services or products to consumers, and improve an organisation's performance. ABM draws on ABC as its primary source of information and focuses on the effectiveness and performance of primary business processes and activities (Blocher 2005). In addition, Burns et al. (2013, p. 480) state that, "ABM supplements ABC; combining ABC insights on costs with value considerations, to better orient managerial action", and that customers' observations are the key factors considered when assessing value in approaches governed by ABM. They view ABM in two ways: operational or strategic. In its operational form, ABM aims to 'do things right', is based on measuring activity costs, and what drives those costs. On the other hand, strategic ABM aims to 'do the right things', for example, selling the right products, to the right clients, in the right mix, with the right process, at the right time. Often, this strategic analysis leads to operational adjustments (Burns et al. 2013).

There are four stages of ABM; the first three stages are required for operational ABM, and the fourth for strategic ABM. The first three stages identify principal cost activities, which become cost pools; assign costs for each activity to respective cost pools, and then select a cost driver for each activity and calculate the cost rate of each cost driver (Burns et al. 2013). Operational ABM requires the attribution of a customer's perception of value to various activities, ranging from 'no value added' to 'high value added', with the aim of reducing costs and improving processes in both internal and external forms. Activity costs are then assigned to products or cost objects, according to the usage of those activities by each product (or cost object), as required under strategic ABM (Burns et al. 2013). By using ABC information, ABM emphasises how to improve and redirect the use of resources to increase the value generated for customers and other stakeholders (Cardos and Pete 2011).

ABC helps companies to comprehend costs and link these costs to the products and customers driving them. It can also support management processes, and improve profitability. According to the Chartered Institute of Management Accountants (CIMA), ABC becomes ABM if the following apply:

- 1. If management gains an exhaustive understanding of its commercial processes and cost behaviours during the ABC investigation process.
- If management applies the acumen acquired through the ABC data-collection and data-analysis to enhance decision-making at both operational and strategic levels (CIMA 2001).

In the 1990s, CAM-I described the relationship between ABC and ABM as representing a cross, known as the 'CAM-I Cross', as displayed in Figure 2-1. In the centre of the cross is the allocation of resources to activities and activities to cost objects. Activity Based Costing/Management (ABC/M) ascertains the full scope of both ABC and ABM, while ABM refines and breaks down the business process model into activities and subsequently performance measures (Bahnub 2010). In Figure 2-1, the vertical flow is cost flow, which represents ABC. It comprises of three phases, beginning with resources, followed by activities, and then cost objects. ABC is based on the concept of cause-and-effect. On the other hand, the horizontal flow represents ABM, and comprises of three phases, beginning with the cost driver, which is the cause of the cost, followed by the activities - a shared dimension with ABC in the cross - and then performance measures.



Figure 2-1: Schematic of the CAM-I Cross

CAM-I combines both ABC and ABM, leading to what is known as ABC/M. ABC and ABM together focus on the improvement of activities; if activities are improved, then by default the organisation improves. ABC information, running from top to bottom, groups overheads into cost pools, and then moves to the middle stage of the cross where ABC deals with cost drivers

and cost driver rates, and the final stage, using cost driver rates to assign overheads to units employing activities that seek to provide more accurate information for product costing. On the other hand, ABM running from left to right begins with an analysis of activities and cost drivers, then moves to the overlapping point with ABC, which is concerned with cost drivers and cost driver rates. It then moves to the final stage, which is associated with performance information for ABC/M, which concerns managing costs rather than simply counting them (Clarke 2002, p. 190).

The emphasis of ABM is on allocating activities to achieve objectives, rather than the more traditional method of directing resources. The intention of ABM is to delineate the non-value adding absorption of resources and convert this into value-adding costs. It is important for an organisation to know which of their customers are profitable, and which are not. Miller (1996) states that ABM enables managers to understand product and consumer profitability, which provides organisational management with details clarifying which costs customers impose most often on the business. When using ABM, overhead costs become measurable; this can prove difficult when using traditional accounting systems (Miller 1996). The only way to measure the benefits and value of ABM is to observe whether the employees within an organisation assimilate decisions, actions, and enhancements, or if they are enthusiastic about securing its future, grounded in the information and knowledge delivered by the system (Miller 1996). Organisations adopting ABM view the method from varying perspectives. Some organisations view ABM as a method for bringing about improvements, while others consider it a tool to support development initiatives and decision-making (Miller 1996).

Implementing ABC without implementing ABM is arguably of less value to an organisation. Bahnub (2010) stated that the information gathered has no value unless it is used to drive results, and implementing ABC without ABM to expand organisational performance can damage shareholder value due to the effort and expenses required to implement ABC. In addition, organisations focus more on the start of the implementation of ABC, and much less on the end of the process of implementation of ABM (Bahnub 2010).

2.6. Use of ABC and ABM

Having now set out what ABC and ABM are, along with some reported benefits and limitations of ABC, we now turn to literature regarding the use of ABC/ABM. In terms of the research objectives of this study, this portion of the literature review helps reveal how ABC and ABM has been used in some countries, and how it has developed (or not) over time, both of which can be related to the Irish context of this study later. Many studies on the use of ABC

have been undertaken, with fewer studies on ABM, over an extended period of time and in multiple contexts. The following provides a chronological summary of some key studies from 1995 to the present day.

Malik and Sullivan (1995) utilised a mixed integer-programming model that uses ABC data to draw conclusions about optimum product mix and product cost within a multi-product manufacturing environment. They also carried out an assessment of the marginal costs of products and the marginal worth of resources for decision-making, encompassing product mix and capacity. The authors evaluated the influence of utilising comprehensive ABC data on various important engineering and management judgments, such as product costing, product mix, and capacity operations. They concluded that the proposed mixed integer-programming methodology integrating meticulous evidence on indirect resource depletion produces diversified numerical results, in comparison with the model using traditional costing information. Furthermore, with ABC data, the cost of idle capacity accredited to different products can be determined, such that the model delivers far higher precision in product costing (Malik and Sullivan 1995).

Nakcharoen and Rogers (1998) studied the application of an ABC methodology to an equipment selection problem related to flexible manufacturing systems. They developed a procedure that helps decision-makers choose a suitable set of machines or equipment to be utilised, with the aim of reducing total operating costs, subject to the accessibility of machines or equipment (Nakcharoen and Rogers 1998). They used two mathematical methods; the first involved equipment selection without expansion into new products, which is appropriate for the design of an adaptable production system. The second included equipment selection with expansion into new products and the range of new equipment from vendors (Nakcharoen and Rogers 1998). This method necessitated economic appraisal of new equipment. The researchers concluded that the integration of ABC concepts into the manufacturing process enables planners to calculate a projected cost that is closer in value to the actual cost. For each method, the researchers developed computer programmes for the planning of larger systems (Nakcharoen and Rogers 1998). Additional studies of note have also been conducted. For instance, Roztocki and Needy (1998) presented a cost and performance measurement system that combines the ABC technique with the Economic Value Added (EVA) system as an engineering management tool for manufacturers. This system aids the effective management of cost and capital, and permits enterprise leaders to generate shareholder value as a result of cost-structure improvements. The researchers concluded that the combined ABC and EVA system, when applied as an engineering management tool, can protect an organisation's

leadership from making short-term decisions based solely on profit considerations, which may damage the company's economic value in the long-term (Roztocki and Needy 1998).

Ben-Arieh and Qian (2003) presented a method for using ABC to estimate the cost of the development and design activities for machined parts. They demonstrated the method using a sample part produced in a controlled manufacturing facility, and based on a comprehensive analysis of the activities that contributed to the design and development stage. They modelled the activities using the Integrated Computer Aided Manufacturing Definition (ICAM) (Ben-Arieh and Qian 2003). The ICAM convention is a technique designed to model the actions, decisions, and activities of an organisation or system. The ABC method traces the costs of activities executed on cost objectives, yielding exact and traceable cost information. The use of ABC may lead to the categorisation of activities as value-added or non-value-added, and enables the eradication of non-value-added activities (Ben-Arieh and Qian 2003). The authors concluded that this technique appears to have a higher degree of accuracy than traditional cost estimations provided by an in-house accountant. A further advantage of this technique is its ability to focus on costly activities and provide a more detailed examination of the causes of costs. This provides valuable insight into the factors that result in a particular cost, and thus enables better management of these activities (Ben-Arieh and Qian 2003). In another study, Gupta and Galloway (2003) examined how ABC and ABM systems function as beneficial information systems supporting effective operations-based decision-making processes. They discussed ABC and ABM systems and their managerial implications for several operational management decisions associated with product planning and design, with the aim of improving operations and the quality of decisions made. The authors concluded that activitybased accounting creates a genuine representation, including details about how the activities undertaken within a product or service creation process actually influence costs (Gupta and Galloway 2003).

Zbayraka, Akgunb and Turkerc (2004) also studied estimations of manufacturing and product costs using the ABC technique in an advanced manufacturing system run, using either Material Requirements Planning (MRP) or a Just in Time (JIT) system. They reported on and discussed the implementation of ABC together with a mathematical and simulated model in order to estimate manufacturing and product costs in an automated manufacturing system. To achieve this, the authors carried out extensive analyses to determine product costings under these two strategies. The two strategies were compared in terms of what effects, if any, they had on manufacturing and product costs, in order to highlight the variance between these two strategies. This model calculates the effects of manufacturing, planning, and control strategies (Zbayraka, Akgunb and Turkerc 2004). The authors also described the cell hardware structure

and the basic control system applied. They described the mathematical model together with manufacturing activities, and using ABC analysis they computed the unit cost of manufactured products. This provided rudimentary information for the simulation model, and demonstrated that ABC is a valuable information tool, able to uncover precise cost information for strategic decision-making processes, and provide management with an unequalled level of detail regarding the workings within the manufacturing system. It is thus clear that ABC offers more than a product pricing system; it improves the prominence of costs and illustrates the method by which activities allocate costs to products (Zbayraka, Akgunb and Turkerc 2004).

Liu et al. (2007) applied a methodology that automatically creates configuration awareness. They presented a hybrid method, utilising ABC with machine learning techniques in order to estimate the lifecycle cost (LCC) of derived product alternatives from a restriction-based configuration at the design stage, and to improve product development capabilities within a smaller lifecycle. By using existing product lifecycle data, they applied the rules that automatically generate configuration knowledge, which thus facilitates a product configuration to enhance effectiveness. The authors claimed that this enables enterprises to accumulate product design and development capabilities by adopting a product lifecycle knowledge-centric approach to a modern mass-customisation environment (Liu et al. 2007). Also, Yi-ran et al. (2007) studied a manufacturing cost estimation method based on ABC, with the bill for materials, correctly with adaptability, grounded in the current cost framework of aeronautic products. The researchers concluded that differentiating between direct and indirect activity costs assists the calculation of the direct activity cost, and allows for the bill for materials to be calculated accurately and quickly (Yi-ran et al. 2007).

Later, Hassan et al. (2008) proposed a framework for estimating the costs of manufacturing a product without evaluating risk and quality control costs. This methodology is based on Failure Mode and Effect Analysis (FMEA), which concerns the financial aspects of risk, and with the determination of economic evaluations using ABC of the procedure plan. This methodology allows designers to enhance the manufacturing procedure plan. It can also act as a beneficial information system to assist decision-making in product development. The researchers suggest how FMEA and ABC could be adapted to examine the quality associated with costs, and give prominence to quality-improvement efforts (i.e. quality goals and limited budgets) (Hassan et al. 2008). They concluded that manufacturing procedure risk costs and manufacturing costs can be estimated using ABC techniques to calculate manufacturing costs from the process plan. They further concluded that manufacturing process risk costs could be estimated using FMEA. This enables decision-makers to adjust the procedure plan in terms of

allocating substitute resources, altering procedure plan activities, and assigning alternative actions, thereby reducing costs and refining product quality (Hassan et al. 2008).

Sun, Li and Piao (2008) applied Data Envelopment Analysis (DEA) to enhance ABC and establish a low-cost activity control system. Their proposed system helps automobile manufacturing enterprises to control cost in their automobile assembly line supply logistics, through controlling activities (Sun, Li and Piao 2008). They claim that the system enhances the advantages of both ABC and DEA, and achieves the aim of combining high efficiency with low cost. Furthermore, it helps enterprises improve activities and re-engineer their activity flow to good effect (Sun, Li and Piao 2008).

Later, Afonso and Paisana (2009) presented a robust algorithm for ABC, utilising matrix multiplication based on a previous study by Livingstone (1969) and Kaplan (1973). This algorithm uses matrixes and linear algebra, and draws upon prior research carried out between the 1960s and 1970s, which studied cost allocation linking matrices and linear algebra using Leontief's input-output model. An algorithm such as this expresses ABC in conceptual terms, linking activities, resources, and products through a well-defined procedure. This algorithm is considered an effective approach to computing product costs, and offers a simple, flexible procedure, making it a useful tool for designing product costing software for large companies (Afonso and Paisana 2009). In addition, Schoute (2009) examined data relating to 133 Dutch, medium-sized manufacturing organisations in order to identify associations between cost system complexity, intention of use, and cost system success, and identified two joint effects of the cost system. The first effect refers to the variety of intentions for using a cost system, from two common duties: the use of cost systems for product planning, and for cost management. The second effect relates to cost system complexity and its use for product planning and cost management purposes, specifically its impact on cost system effectiveness (Schoute 2009). The author concluded that:

...at higher (lower) levels of usage for product planning purposes, cost system complexity negatively (positively) affects the cost system intensity of use, while at higher (lower) levels of usage for cost management purposes, cost system complexity positively (negatively) affects the cost system intensity of use and satisfaction (Schoute 2009, p. 45).

Roudaki and Doroodchi (2009) proposed that integrating ABC with a unified modelling procedure aids in identifying mandatory activities, and further cost calculations. The authors concluded that this integrated system could help to compute diverse business activity costs and trace costs for every product and service by using a cost factor, ABC specifically can

assist the improvement of practices and render procedures more economical by minimising costs (Roudaki and Doroodchi 2009).

Furthermore, Yongqian et al. (2010) designed a technique grounded in ABC to estimate manufacturing costs and provide comprehensive procedures that assist estimators by avoiding ad hoc and chronic errors. This method addresses the inefficiencies and inconsistencies in cost estimation procedures and helps designers to select the least costly design from the available alternatives. The authors classified manufacturing costs into two groups: direct activity costs, and indirect activity costs. They then calculated direct activity costs with assistance from the board and utilised data attained by direct cost estimation to forecast indirect activity costs using a neural network. A neural network is a method that compensates for the defects of current cost estimations when they cannot effectively identify the origin of a cost (Yongqian et al. 2010). By constructing a neural network, information acquired from ABC accounting procedures in related organisations, when used in full, can ensure the effectiveness of the network (Yongqian et al. 2010).

Filomena et al. (2011) explored the concept of manufacturing feature cost management systems (CMSs) beyond the use of ABC. The researchers proposed a CMS founded on the characteristics and communal components of costing objects instead of products. In this model, direct manufacturing costs were organised using the unit of production effort methodology; indirect costs were evaluated using the ABC method, and customary procedures were used to compute raw materials costs. The authors used a Brazilian manufacturing organisation's process of bus seat production to illustrate the method. This method helps provide a better understanding of the components and procedures that serve as the prerequisites for each product model, as it allows for consistent comparisons between such products. Furthermore, the researchers estimated indirect costs by means of ABC (Filomena et al. 2011).

This section discussed some examples presented in prior literature to explain the relevance and accuracy of ABC as a cost system for managers and organisations at different times and in various locations. To meet the research objectives and answer the research questions posed in the current study, literature on the level of ABC and ABM implementation is detailed next. Focus will be given to studies which show the effect of IT resources, economic conditions, company size, industry type, the level of competition and multinational organisations.

2.7. The Implementation of ABC and ABM

This section of the literature review reveals the impact of the level of IT resources available, organisations' economic conditions, size, level of competition, industry type, and multinationality on ABC and ABM implementation in an international and Irish context. As the examples presented in the previous section have shown, numerous studies have examined the uses of ABC. Some of this research has identified organisations that have successfully implemented ABC and are continuing to use this system (Clarke, Hill and Stevens 1999, Drury and Tayles 2005, Liu and Pan 2007, Fei and Isa 2010, Schoute 2011, Askarany and Yazdifar 2012). Other researchers have identified companies trying to implement ABC, some that have completed the implementation, and companies who have tried to use the technique but have not been successful. Table 2-1 lists a number of studies analysing ABC implementation in different geographical locations, and using different research methods, some of which will be presented in detail in this section. This table was compiled from the following previous studies - Clarke, Hill and Stevens (1999), Drury and Tayles (2005), Liu and Pan (2007), Fei and Isa (2010), Schoute (2011), Askarany and Yazdifar (2012).

Author and year	Method*	Title of the publication
Innes and Mitchell (1991)	S	A survey of activity-based costing in the U.K.'s largest companies
Nicholls (1992)	S	ABC in the UK: A Status Report
Bhimani and Pigott (1993)	CS	Implementing ABC: a case study of organisational and behavioural consequences
Armitage and Nicholson (1993)	S	Activity-Based Costing: A Survey of Canadian Practice
Cobb et al. (1993)	S	Activity-based costing problems: the British experience
Shim (1993)	S	A Survey of Current Managerial Accounting Practices: Where Do We Stand?
Drury and Tayles (1994)	S	Product Costing in UK Manufacturing Organisations
Anderson (1995)	CS	A framework for assessing cost management system changes: the case of activity-based costing implementation at General Motors 1986-1993
APQC/CAM (1995)	S	Activity Based Management Consortium Study
Clarke and Mia (1995)	S	Activity-Based Costing Systems—Use and Application in Australia
Innes and Mitchell (1995)	S	A survey of activity-based costing in the U.K.'s largest companies
Shield (1995)	S	An empirical analysis of firms' implementation experiences with activity-based costing
Yakhou and Dorweiler (1995)	S	Advanced cost management systems: an empirical comparison of England, France, and the United States
Corrigan (1996)	S	ABC is not easy in Australia: survey
Malmi (1997)	CS	Towards explaining activity-based costing: failure accounting and control in a decentralised organisation
Norris (1997)	CS	The formation of managers' views of ABC and their impact on the outcome of its use: a grounded theory case study
Anderson and Young (1997)	S	Evaluation of activity-based costing systems: the impact of contextual and procedural factors
Björnenak (1997)	S	Diffusion and accounting: the case of ABC in Norway
Booth and Giacobbe (1997)	S	Activity-Based Costing in Australian Manufacturing Firms: Key Survey Findings
Foster and Swenson (1997)	S	Measuring the success of activity-based cost management and its determinants
Gosselin (1997)	S	The effect of strategy and organisational structure on the adoption and implementation of activity-based costing
Hosseini et al. (1997)	S	A survey of cost management practices among the United States and Canadian companies
McGowan and Klammer (1997)	S	Perceived benefits of ABCM implementation
Nguyen and Brooks (1997)	S	An empirical investigation of adoption issues relating to activity-based costing

Table 2-1: Previous Research on ABC and ABM Via Varying Means and Methods
Author and year	Method*	Title of the publication
Warwick and Reeve (1997)	S	Accounting and organisational influences on the usefulness of cost information: an empirical study
Brewer (1998)	CS	National culture and activity-based costing system: a note
Sohal and Chung (1998)	CS	Activity-based costing in manufacturing: two case studies on implementation
Chenhall and Langfield-Smith (1998)	S	Adoption and benefits of MA practices: an Australian study
Krumwiede (1998)	S	The implementation stages of activity-based costing and the impact of contextual and organisational factors
Anderson and Young (1999)	SI	The impact of contextual and process factors on the evaluation of activity-based costing systems
Friedman and Lyne (1999)	CS	Success and Failure of Activity-based Techniques: a Long-term Perspective
Cinquini et al. (1999)	S	A survey on cost accounting practices in Italian large and medium sized manufacturing firms
Clarke et al. (1999)	S	Activity-based costing in Ireland: barriers to, and opportunities, for change
Groot (1999)	S	Activity-based costing in US and Dutch food companies
Malmi (1999)	S	Activity-based costing diffusion across organisations: an exploratory empirical analysis of Finnish firms
Gunasekaran et al. (2000)	CS	Activity-based management in a small company: a case study
Drury and Tayles (2000)	S	Cost systems and profitability analysis in UK companies: discussing survey findings
Innes et al. (2000)	S	Activity-based costing in the U.K.'s largest companies: a comparison of 1994 and 1999 survey results
Sartorius et al. (2000)	S	Organisational problems in respect of the implementation of activity-based costing in South Africa
Hoque (2000a)	S	Just-in-time production, automation, cost allocation practices, and the importance of cost information: an empirical investigation in New Zealand-based manufacturing
Hoque (2000b)	S	Linking balanced scorecard measures to size and market factors: impact on organisational performance
Supitcha et al. (2001)	CS	Cultural influences on ABC implementation in Thailand
Chen et al. (2001)	S	The implementation of benefits of activity-based costing: a Hong Kong study
Joshi (2001)	S	The international diffusion of new MA practices: the case of India
Chongruksut (2002)	S	The Adoption of Activity-Based Costing in Thailand
Duffy and McCahey (2002)	S	An Empirical Study of Adoption/Non-adoption of Activity-based Costing in Hospitals in Ireland
Ittner et al. (2002)	S	The association between activity-based costing and manufacturing performance
Cotton et al. (2003a)	S	Note on a New Zealand replication of the Innes et al. UK activity-based costing survey
Cotton et al. (2003b)	S	Note on a New Zealand replication of the Innes et al. UK activity-based costing survey
Khalid (2003)	S	Activity-based costing in Saudi Arabia's largest 100 firms in 2003
Askarany and Smith (2004)	S	Contextual factors and administrative changes
Baird et al. (2004)	S	Adoption of activity management practices: a note on the extent of adoption and the influence of organisational and cultural factors
Pierce and Brown (2004)	S	An empirical study of activity-based systems in Ireland

Author and year	Method*	Title of the publication	
Cohen et al. (2005)	S	ABC: Adopters	
Drury and Tayles (2005)	S	Explicating the design of overhead absorption procedures in UK organisations	
Ruhanita et al. (2006)	SC	Activity-based costing (ABC) adoption among manufacturing organisations-the case of Malaysia	
Lana and Fei (2007)	CS	The implementation of activity-based costing in China: an innovation action research approach	
Al-Omiri and Drury (2007)	S	A survey of factors influencing the choice of product costing systems in UK organisations	
Askarany et al. (2007a)	S	Attributes of innovation and the implementation of managerial tools: an activity-based management technique	
Askarany et al. (2007b)	S	Technological innovations, activity based costing and satisfaction	
Baird et al. (2007)	S	Success of activity management practices: the influence of organisational and cultural factors	
Bhimani et al. (2007)	S	Activity-based costing: how far have we come internationally?	
Kip and Augustin (2007)	S	Comparing U.S. and German cost accounting methods	
Maelah and Ibrahim (2007)	S	Factors influencing activity-based costing (ABC) adoption in manufacturing industry	
Sartorius et al. (2007)	S	The design and implementation of activity-based costing (ABC): a South African survey research	
Majid et al. (2008)	CS	Implementation of activity-based costing in Malaysia: A case study of two companies	
Fawzi (2008)	S	Barriers to Adopting Activity-Based Costing Systems (ABC): An Empirical Investigation Using Cluster Analysis	
Askarany and Yazdifar (2009a)	S	Relationship between business size, organisational industry, and the adoption of ABC in Australia, New Zealand and the UK	
Askarany and Yazdifar (2009b)	S	Supply Chain Management and Cost Accounting	
Pavlatos and Paggios (2009)	S	MA practices in the Greek hospitality industry	
Schoute (2009)	S	The relationship between cost system complexity, purposes of use, and cost system effectiveness	
Fei and Isa (2010)	TRF	Factors Influencing Activity-Based Costing Success: A Research Framework	
Liu and Pan (2011)	CS	Activity-based costing in China: a case study of Xu Ji Electric Co. Ltd	
Schoute (2011)	S	The relationship between product diversity, usage of advanced manufacturing technologies and activity-based costing adoption	
Bt Fadzil and Rababah (2012)	SI	MA Change: ABC Adoption and Implementation	
* S = Survey; CS = Case Study; SI = Survey and Interviews; TRF = Theoretical Research Framework.			

ABC is recognised by many practitioners and researchers as one of the most significant innovations in MA in the 20th century (Askarany 2006; Kaplan and Anderson 2007; Bhimani et al. 2007; Askarany, Smith and Yazdifar 2007; Smith, Abdullah and Abdul-Razak 2008). Undoubtedly, ABC is one of the most significant innovations in MA since 1985 (Johnson 1990, Shields 1995, Booth and Giacobbe 1998, Clarke and Manton 1997). Many researchers in economics, management and accounting have provided suggestions to explain why institutions behave as they do in regard to MA. The growth and change in institutions have been among the most complex phenomena described (Van de Ven and Poole 1995). Malmi (1999) has theorised about what drives innovation in MA during its various phases, and identified four perspectives – efficient choices, forced selection, fads, and fashion perspectives - to explain the diffusion of accounting innovations. The distribution of ABC in Finland provided an experimental context in which to study how these four perspectives relate to MA innovation. An instrument involving four surveys was used to collect the data, as well as a set of interviews. The study findings suggest the driving forces behind innovation diffusion in MA change over the course of their diffusion. Specifically, the drivers behind accounting change may remain external to the adopting institutions (Malmi 1999). Thus, technology, and improvements in the level of IT, as an external factor, may be one of the drivers explaining the changes reported in the accounting literature, assuming that the trigger for change comes from within the organisation. Furthermore, the level of competition, according to economic theory, increases incentives to improve performance. Evidence of the positive role of market competition was provided by Nickell (1996) and Hayri and Dutz (1999). However, La Porta and Lopenz-de-Silanes (1999) failed to find performance improvement with more intense competition. Additionally, company size is likely to impact manufacturing performance, since smaller plants are likely to be more agile in their responsiveness to customer needs compared to larger plants, when all other factors are equal (Hendricks and Singhal 1997, La Porta and Lopez-de-Silanes 1999, Banker, Bardhan and Chen. 2008). Plant size was measured in terms of the number of plant employees (Banker, Bardhan and Chen. 2008). A more detailed examination of contingent factors is given in Chapter 4, but now literature on ABC implementation is reviewed – again chronologically for convenience.

Shields (1995) examined the relationship between the success of ABC implementation and certain technical factors, including behavioural and organisational, and found that unsuccessful ABC implementations could be due to the architectural and software design of the ABC system; this is one of the factors examined in the current study. He confirms the complexity involved in defining ABC success, highlighting the confusion and frustration in the literature regarding an agreed definition, even after consulting ABC specialists. He also

states that success is connected to the following six organisational and behavioural factors: competitive strategies; top management support; performance evaluation and compensation; training; implementing and using ABC; sufficient resources; and non-accounting ownership. Therefore, competitive strategies and training could impact the level of ABC and ABM implementation, as will be scrutinised in the current study. Also, he discovered no relationship between ABC success, and technical factors such as the employment of external consultants, whether a standalone system or purchased software was used, design training, or the implementation and use of ABC. In addition, it was found that users noticed an enhancement in organisational performance and increasing ABC cost benefits for the three types of systems (cost management, integrated and accounting systems) (Shields 1995). He further stated that standalone systems have the highest cost in comparison with other systems and that there is a distinction between the three types of systems; this finding was later supported by McGowan and Klammer (1997).

Sohal and Chung (1998) also examined the implementation of ABC in case studies of two companies and identified factors that have a significant impact on the implementation of ABC. They observed that implementation was the most problematic stage when adopting new management philosophies and methods (Sohal and Chung 1998, p. 137). The methodology they used was a case study of two companies; the first an engineering company specialising in software developments based in Melbourne, Australia, and the second, Ciba Additive, a manufacturing company specialising in chemicals based in Hong Kong (Sohal and Chung 1998, p. 137). They concluded that the benefits of ABC were considerable in comparison to conventional accounting systems, but that it had a moderately low up-take throughout organisations. They discovered that difficulties with the introduction of ABC were correlated with managerial traits rather than technical features of the ABC system (Sohal and Chung 1998). In addition, the concept of ABC, based on the requirements of new technology, significantly changed the way that costs could be measured within companies, and also introduced Advanced Manufacturing Technology (AMT) aimed at improving cost management systems (Currie 1999). In addition, Currie (1999) studied the relationship between information systems and management innovation and change programmes, to improve company performance and competitive advantage. By comparing TQM, JIT, ABC, BPR and process innovation as a new MA innovation, Currie (1999) found a significant overlap in their style, content, scope, aims, and purposes, and argued that, rather than reinventing these techniques using a new management innovation, perspective should be used to understand the wider ideological, historical, and empirical perspectives that underpin these ideas. Furthermore, Currie (1999) states that the reason behind the advancement of ABC is

the awareness that traditional MA systems fail to provide sufficient cost management information in modern businesses employing a variety of new technologies. These include Computer Aided Manufacture (CAM), Robotics and Computer Aided Design (CAD), as well as new MA techniques and methods, such as MRP, TQM, and JIT. As such, Currie asserts that "new technologies were altering much of the cost management landscape" (Currie 1999, p. 651). Also, Bromwich and Hongf (1999) presented the requirements and satisfactory evaluations of technology when planning cost functions for ABC and costs proportional with output volume (CVO), with output volume to estimate incremental costs. An alternative to a form of additional cost added, known as 'accounting separability', tests for these characteristics, making both standalone and incremental costs necessary. The authors state that incremental costs are obtained from the required conditions in economic theory to define the cost-minimising joint cost function of product volumes and inputs under separable technology and non-jointness. Furthermore, they observe that the full power of duality between technology and costs is focused on the need for a particular type of technology, and a continuous input mix for all products in each cost pool. In addition, the researchers found that technology requires that the system cover non-jointness, that inputs are locally separable and that they manifest a particular set of technologies in each cost pool (Bromwich and Hong 1999). In summary, as these studies suggest, there is a strong link between access to technology and ABC implementation.

An Irish study undertaken by Clarke, Hill and Stevens (1999) noted that comparatively little has been published on current MA systems in manufacturing organisations in Ireland, and even less on the adoption of ABC. They focused on the percentage of ABC implementation in Irish organisations, compared to the ABC adoption rates with Anglo-American countries, and analysed the capacity of MA by examining the adoption of ABC in Ireland. The researchers compared the use of ABC by local companies to those of multinational subsidiary companies, and concluded that the use of ABC in Ireland lagged behind (Clarke, Hill and Stevens 1999). They further observed some of the influences that underpinned the decision to implement ABC or not, and discussed the barriers to change in accounting systems, which help to contextualise understanding of MA (Clarke, Hill and Stevens 1999). The study concluded that management accountants have a poor understanding of ABC, and it is comparatively under-utilised compared with other systems. The results showed that Ireland overall is weak in its use of ABC compared to other common-language countries (Clarke, Hill and Stevens 1999). In addition, it was found that Ireland also lags behind in its acceptance of pioneering MA techniques, which could be contributed to a form of interaction between academia and the business community (Clarke, Hill and Stevens 1999). The authors argued

that, managerial accounting has been marginalised because of supply and demand obstacles, and the close relationship between them controlled by changes in MA. The lack of advancement of managerial accountants in Ireland is the result of an absence of compulsory continuing professional education, as well as a lack of MBA programmes at that time. Additionally, both the Irish academic and business communities needed wide ranging changes to their accounting syllabuses. Finally, the authors also reported that the degree of implementation is lesser in Ireland compared with Anglo-American countries (Clarke, Hill and Stevens 1999). In terms of the business landscape, numerous changes have occurred in Ireland in the last twenty years. It has become a target of interest for many international companies, which is reflected in the reported companies' sizes. Therefore, the current study will re-visit ABC implementation to explore the contemporary Irish context.

Gunasekaran, McNeil and Singh (2000) studied ABM in a small company that produced machines for the photo-framing industry. They developed an ABM system for the organisation, leading to enhancement of actions derived from 'a make or buy' decision about various parts of the machine. They stated that ABC and ABM offered operating and cost data that reflected a horizontal view for management. ABC systems produce large amounts of accurate cost information, which are then utilised by ABM to initiate improvements; a costing at part level or sub assembly level assists management in 'make or buy' decisions (Gunasekaran, McNeil and Singh 2000). The authors concluded that the benefits of ABC and ABM could only be accomplished if these systems were applied throughout the entire company. Consequently, they stated that the case company should use an activity-based examination to identify non-value-adding activities, and then try to remove these activities using one of the numerous available management methods and techniques. Furthermore, in order to measure the performance of activities, organisations should utilise cost drivers for each activity (Gunasekaran, McNeil and Singh 2000). Also, Hoque (2000) conducted an empirical study into the relationship between JIT production, automation, cost allocation practices, and the relative use of cost information for making and evaluating managerial decisions. A questionnaire was used to collect data from a random sample of manufacturing companies in New Zealand. It was found that ABC was negatively correlated with the intensity of the JIT approach used within the companies. However, it was positively correlated with enhanced automation in the factory. Moreover, the study concluded that the increase in use of JIT causes a decrease in the use of detailed costing information, while an increase in automation is correlated with increased use of costing information for managerial decisions (Hoque 2000). Therefore, ABC and ABM are crucial systems for organisational performance; thus, companies should implement both systems.

In the UK, Innes, Mitchell and Sinclair (2000) reviewed the results of two surveys of ABC in the UK's largest companies. They studied changes that occurred with the adoption of ABC, and the status of users in companies over a five-year period. They concluded that there were important changes between 1994 and 1999 in the adoption and use of ABC (Innes, Mitchell and Sinclair 2000). Moreover, the adoption lasted significantly longer within larger organisations, and in those in the finance sector in particular. Nonetheless, the numbers of ABC users and those presently using it dropped; while the rate of rejection rose marginally, and a statistically noteworthy increase was detected in those not presently considering ABC. The authors concluded that the results suggested non-advancement in the acceptance of ABC, and were consistent with both a levelling off in interest and in the implementation of ABC during the five-year period (Innes, Mitchell and Sinclair 2000). Bowhill and Lee (2002) studied the incompatibility of standard costing systems and modern manufacturing, and observed that standard cost systems provide a general means of measuring actual costs, planning costs, and the information needed to control costs. This system is unable to meet the needs of management for these multiple objectives, because of the lack of focus, relevance, and accuracy, and unintended motivational consequences. Furthermore, the authors state that, when consumers require several features, such as a wide variety of products, or faster delivery and better quality, it is necessary to understand the source of a particular company's competitive advantage by sharing knowledge of one's competitors, before deciding on accounting measurements. The authors concluded that changes in the manufacturing environment and traditional, standard costing still continues to support some management tasks, for example, standard costs, financial reporting, and internal transfer pricing, and provides a variety of beneficial data to support operational management. In addition, the authors argue that the potential problems inherent in standard costing could be overcome with a range of improvements to current accounting and other reporting systems, with the observed accounting system contributing only some of the information needs of operational management. Moreover, the changes in the manufacturing environment have altered the accounting system by either requiring or justifying a cost/benefit analysis. For example, modification of the infrastructure necessary for the recording of information relating to standard cost variances is also needed for other purposes, specifically in relation to production control (Bowhill and Lee 2002). These two studies confirm changes have occurred in manufacturing companies that might explain changes in the level of ABC use. This makes it more interesting to re-examine the level of ABC adoption, as per this study.

Brown, Booth and Giacobbe (2004) investigated what factors influence the adoption of ABC in Australian service and manufacturing companies. The researchers tested seven specific

factors: top management support; internal champion support; organisation size; the use of consultants; the level of overheads; product complexity and diversity; and factors affecting relative advantage. The researchers anticipated a positive association between these factors and the general adoption of ABC. They used a cross-sectional mailed survey of senior management accountants in Australian service and manufacturing companies (Brown, Booth and Giacobbe 2004) - the current study will also use a cross-sectional mailed and online survey focusing on organisation size as a factor influencing ABC and ABM implementation. Furthermore, Drury and Tayles (2005) examined the complexity of product costing system design choices in UK organisations, and the extent to which potential explanatory factors influence the level of complexity of the product costing system design choices made by UK companies. They suggested that preceding studies have classified costing systems into two separate categories, as either a traditional costing systems or an ABC system, but have not effectively captured the full variety of procedures that exist (Drury and Tayles 2005). The researchers adopted a wider viewpoint that examined cost system design choice variations along a continuum extending from highly simplistic to complex costing systems. They concluded that the relationship between indirect costs and cost structure are influenced by level of competition and the importance of cost information to decision-making, but that they are not significant variables in influencing the choice of cost systems (Drury and Tayles 2005). In addition, Hughes (2005) examined ABC and ABM as a profitability model for SMEs manufacturing clothing and textiles in the UK, with the aim of improving their competitive performance, as such companies have had little exposure to ABC and ABM in the UK. Hughes (2005) reviewed the ABC and ABM literature relating specifically to the clothing and textile SME manufacturing sector, and also conducted a case study to examine theories proposed in relation to SMEs operating in these industries. Hughes (2005) citing Hussein and Gunasekaran (2001), noted that they stated that global competition and the considerable improvements in IT have made current MA systems redundant. Furthermore, the study reported that, "traditional management accounting systems (TMAS) were mainly developed to serve the accountancy function, not the needs of the decision-makers in the firm" (Hussain and Gunasekaran 2001, Hughes 2005, p. 8), and that ABC and ABM supports companies in focusing on their products and activities. This will also allow them to trace cost-to-cost drivers; furthermore, it will help companies to understand the cost of process failure by considering business processes in detail, in addition to profitability and the relationship with customers, and spending on preferred customer groups. ABC Information alone, does not invoke actions and decisions leading to improved profits and operating performance. Management must institute a conscious process of organisational change and implementation if the organisation is to receive benefits from the improved insights resulting from an ABC analysis (Cooper

1996, Hughes 2005). The current study will further examine level of competition as a factor influencing ABC and ABM implementation.

Bardhan et al. (2006) stated that manufacturing companies have been suffering from increasing global competition and simultaneous pressures on both the quality and cost of their products. This has led to increased investment in information technologies to streamline and automate operations. Furthermore, companies began to outsource non-core support processes and core production processes in order to focus on their core competencies. Bardhan, Whitaker and Mithas (2006) investigated the role of IT and organisational strategies as a precursor of production outsourcing, and evaluated the impact of production outsourcing and IT investments on quality and decreasing production costs. They developed a conceptual framework for increasing companies' performance in regard to production outsourcing at the company level. In order to validate this conceptual framework, they distributed a crosssectional questionnaire to American manufacturing companies (Bardhan, Whitaker and Mithas 2006). An electronic survey was emailed to 20,000 controllers and managers of manufacturing organisations, eliciting 608 responses. The researchers reported that the IT literature suggests that IT digital platforms and infrastructure are significant enablers of organisational competencies and companies' performance. Furthermore, improvements in IT have aided organisations by offering high-speed communication and connectivity to develop the flexibility of supply chains.

Furthermore, Bardhan, Whitaker and Mithas (2006) go on to state that IT investments and ITenabled capabilities are correlated with improved productivity, organisational capacities, customer satisfaction, and the enhancement of organisational performance. For example, innovative supply chain technologies provide the foundation needed for partner integration and supply chain visibility, and also enable organisations to improve their effectiveness, performance, product quality, time to market, and productivity. It was found that IT investments were correlated with companies' production outsourcing, where production outsourcing was associated with higher plant quality and lower manufacturing costs, by highlighting the role of IT investments in facilitating production outsourcing and positively impacting on companies' performance (Bardhan, Whitaker and Mithas 2006). Also, Efendi, Mulig and Smith (2006) meanwhile, observed that IT is highly successful in the current business environment, particularly regarding the accounting function. Consequently, it should be expected that IT and accounting systems will be an important element of accounting research. Efendi, Mulig and Smith (2006) studied the extent of technology and systems research comprehensively addressed in accounting literature. They examined technology and systems articles in four academic and three highly ranked professional accounting journals,

and found that very few technology and systems articles have been published in academic journals, in comparison to the dramatic increase in articles published in professional journals. This could be due to the lack of appropriate consideration of this area by academic accounting journals (Efendi, Mulig and Smith 2006). As argued in the literature, there is a strong relationship between IT and ABC and ABM implementation. This study focuses on the level of IT resources available to each organisation when identifying level of ABC and ABM implementation.

Al-Omiri and Drury (2007) examined the degree of possible contextual factors influencing the idiosyncrasies of product costing systems, via a postal questionnaire. They stated that previous research frequently utilised the implementation or non-implementation of ABC systems in order to track the idiosyncrasies of product costing systems (Al-Omiri and Drury 2007). They referenced other surveys involving UK companies (Drury and Tayles 2000, Innes, Mitchell and Sinclair 2000), highlighting that the number of companies adopting ABC was at a low rate (approximately 15% of the companies surveyed had adopted ABC) (Al-Omiri and Drury 2007). This low rate of adoption of ABC has prompted several writers in the last decade to discuss the design, implementation, operation, and effectiveness of ABC in producing a more precise product cost (Noreen 1991, Cobb, Innes and Mitchell 1992, Datar and Gupta 1994, Maher and Marais 1998, Yahya-Zadeh 2011). These studies have focused on the dynamics that influence the implementation or/and non-implementation of ABC systems in an organisation, and have provided interesting explanations for their findings. Despite being of interest, the reported findings might be considered spurious as they are not reproducible, and the studies have used poor measures subject to measurement error (Al-Omiri and Drury 2007). The authors stated that all three of these samples of research into the adoption and nonadoption of ABC in general failed to identify a clear relationship between implementation and the influences acknowledged in the literature as advantageous to the implementation of ABC systems (Al-Omiri and Drury 2007). They used a postal questionnaire survey to randomly sample 1,000 large UK manufacturing/service companies whose annual sales exceeded £50 million, and who were expected to have instituted MA processes (Al-Omiri and Drury 2007). The study sample was selected from the Financial Analysis Made Easy (FAME) database and the membership database of CIMA (Al-Omiri and Drury 2007). In total, 384 questionnaires were returned, of which, 176 were completed in full, yielding a response rate of 19.6%. The study specified that 22 responding organisations had an ABC system in place. However, based on the number of replies from adopters of ABC, the purposes of the study could not be accomplished. The second group of data from UK organisations was obtained as ABC consultants arranged to post surveys to their clients; this ensured the receipt of an additional

29 responses from ABC adopters. The authors found no noteworthy inconsistencies in the responses between both sets of ABC adopters (Al-Omiri and Drury 2007). They concluded that the importance of cost information, the extent of use of other innovative MA techniques, the scope of use of JIT/lean production techniques, company size, the intensity of the competitive environment, and the type of business sector are positively associated with higher levels of cost system sophistication. They also stated there is no association between cost structure, product diversity and quality of information technology and the level of cost system sophistication (Al-Omiri and Drury 2007). The current study will also examine the relationship between costing systems and company size, IT, and the level of competition as a contingent factor, and will use a survey instrument to collect the data.

Bhimani et al. (2007) investigated a number of organisations in seven countries - Japan, the USA, Canada, the UK, France, Italy, and Germany. They tested the extent of ABC adoption in organisations in these countries in relation to perceptions regarding the following key points: the usefulness, speed, and success of ABC implementation (Bhimani et al. 2007). They used quantitative research methods to collect the data by sending questionnaires to a number of organisations. The questionnaire was written in English and translated by professional academics into different languages for each country, including French, German, Italian, and Japanese. The questionnaire was addressed to the chief accountant or controller of selected companies in each country, and the questionnaire was also mailed to a sample of the general population in each of the seven countries (Bhimani et al. 2007). The data was used to analyse the extent of the implementation of ABC in organisations in each of the seven countries, wherein the researchers examined the usefulness of ABC implementation, and how it compared across countries. Moreover, they examined how perceptions of the extent, speed, and success of implementation differed (Bhimani et al. 2007). In total, 500 surveys were distributed to organisations in Japan, the USA, Canada, the UK, France, and Germany, and 450 in Italy. The organisations were selected from databases in each country. In total, 416 questionnaires were returned, as follows: Canada 35, France 39, Germany 73, Japan 95, the UK 85, Italy 32, and the USA 57 (Bhimani et al. 2007). The authors noted that there were substantial variations in the percentage of organisations that deemed ABC to be beneficial; on this point, the results for each country were as follows: Canada 65.7%, France 94.9%, Germany 43.9%, Japan 86.3%, Italy 59.4%, UK 61.2%, and USA 80.7%. Nevertheless, significant differences were revealed in the analysis of the stages of implementation of ABC in each country. In Italy and Japan, the number of respondent organisations that had abandoned ABC was high. In terms of implementation, Japanese organisations were second highest after France (Bhimani et al. 2007). The study observed that there were substantial

dissimilarities in the adoption speed, rates, and extent of the implementation of ABC in organisations across the seven countries. Observations of ABC success also demonstrated wide variations between organisations in the seven countries (Bhimani et al. 2007). The authors explained that the study was limited in its reporting on the implementation of ABC across large firms in the countries investigated. In addition, it was difficult to identify some factors relating to the speed, extent, stages, and perceived success of such adoptions, as well as precise organisational data. Nevertheless, the study confirms that, according to a number of different studies, the organisational accounting systems in the firms of the case study countries were affected by different forms of ABC implementation (Bhimani et al. 2007). Like their study shows differences in the level of ABC implementation in the countries studied, the current study will identify the differences between Irish companies and international companies with regard to the level of ABC implementation. It will also identify the level of ABC implementation in Ireland.

Pavlatos and Paggios (2008) studied the level of adoption and the benefits derived from both traditional and more recently developed MA practices in the Greek hotel industry, by conducting a survey of 85 leading hotels. The analysis of the survey data revealed that traditional MA techniques were more widely adopted than new techniques (Pavlatos and Paggios 2008). In addition, it was found that traditional absorption costing systems were the most used in the Greek hotels. Financial statements according to Greek legislation must be prepared using absorption costing while variable costing is used in short-term decision-making. Furthermore, the study reported that there had been a recent increase in the implementation rates of ABC with the use of Customer Profitability Analysis (CPA). It was found that hotels that adopted ABC, ABB, ABM, or BSC, had a higher level of competition, higher cost structures, and were larger in size than non-adopting hotels (Pavlatos and Paggios 2008). This confirms Bjørnenak's (1997) study. The current study will also further examine the relationship between adoption of a costing system and the level of competition, and company size as factors influencing ABC implementation.

In a different context, Abdul-Majid and Sulaiman (2008) studied the benefits of and problems with implementing ABC in two Malaysian multinational companies (a telecommunications company that is a subsidiary of an American company, and a multinational Malaysian manufacturing company) that had adopted ABC. They used a case study approach to examine the process of ABC implementation (Abdul-Majid and Sulaiman 2008). The study focused on three issues related to ABC implementation: (1) the factors that drive companies to adopt ABC; (2) the problems faced; and, (3) the benefits gained (Abdul-Majid and Sulaiman 2008). The study concluded that these companies focused less on technical aspects than on

behavioural and organisational factors when implementing ABC. The authors stated that, as most difficulties relate to managerial factors and the use of appropriate software, the success of ABC implementation which like any system or tool, must have top management support. In addition, if companies can simplify the ABC implementation process, and workers can be actively involved in the implementation and have an understanding of ABC, this helps implementation (Abdul-Majid and Sulaiman 2008). In summary, the implementation of any system relies on management decisions, as Abul-Majid and Sulaiman (2008) explained. Therefore, this study will examine the locus of responsibility for changing the MA system within an organisation, seeking to identify the relationship between how decisions are made and changes applied. Also, Chapman and Kihn (2009) studied information system integration, which enables control and performance, focusing on one aspect of information system integration, namely data structure, which is usually referred to as the single database concept. The argument put forth is that, while the particular issue of integration is related to a system's success, the diversity of ways in which information is used practically suggests it provides no reliable basis for predicting a companies' performance. The researchers state that the level of information system integration encourages the four design features that enable management control, having collected survey responses from 169 managers. They also identified a direct relationship between perceived system success and information system integration. The findings also showed that there is no relationship between information system integration and other aspects of performance, but that there are positive and statistically significant links between the design principles and information system integration (Chapman and Kihn 2009).

Fei and Isa (2010) also studied key factors influencing ABC success, after reviewing research on ABC published during the period 1995-2008, and identifying some research gaps. They examined a collection of characteristics that influence successful ABC adoption, including variables used in past research, as well as different definitions and operational variables (Fei and Isa 2010). They concluded that previous research focused on behavioural, organisational, and technical variables as the central components of ABC success, but that little research had been undertaken to examine the roles of organisational structure and culture (Fei and Isa 2010). Recently, ABC has declined in popularity, as compared to the early 1990s, due to the complexities associated with collecting data and generating the entries needed to track that data (Kaplan and Anderson 2007). The difficulty of ABC implementation aids the implementation of other, simpler MA techniques; for example, economic value added, and the balanced scorecard (Hicks 1999). In addition, Pike, Tayles and Mansor (2011) investigated users' understanding of ABC performance in a different system involving a communication provider and major information in Southeast Asia. The researchers collected data from 181 users and 54 developers of 16 different ABC systems in order to examine five types of performance: cost-benefit trade-off; cost accuracy; information use; ABC impact; and, decision action. They found that the user performance and development inputs differed with the type of system (embedded, stand-alone, ad-hoc) (Pike, Tayles and Mansor 2011).

Nassar, Al-Khadash and Sangster (2011) examined the diffusion of ABC in Jordanian industrial companies. The researchers investigated why companies chose to implement ABC, adopting general diffusion theory to describe the diffusion method within the target companies in order to reveal motivations for the implementation or non-implementation of ABC. They conducted semi-structured face-to-face and telephone interviews with the heads of costing departments and the financial managers at the companies. The authors concluded that the introduction and popularity of ABC is mainly due to the fact that the information offered by ABC is more detailed and accurate than that offered by traditional costing systems. In addition, they assert that, among the manufacturing companies in Jordan, the intention to adopt ABC arose due to the original company's policies in the USA and the UK. The authors concluded that the main reasons for the non-implementation of ABC within Jordanian organisations were a lack of accounting bodies; the high cost of ABC implementation, the shortage of local consultants, the high cost of consultants, and the shortage of conferences, journals, and workshops concerning ABC in Jordan. They noted that supply-side factors have been apparent, but that ABC implementation has not yet happened. This is because the companies were not convinced that the ABC system would add value, and therefore the implementation of such innovation was considered irrational (Nassar, Al-Khadash and Sangster 2011). In China, Liu and Pan (2011) examined the implementation of ABC in a large Chinese manufacturing company, a state-owned enterprise (Liu and Pan 2011). The researchers stated in a previous study in 2007 that ABC concepts existed at a theoretical level in China (Liu and Pan 2007). The authors cited the accessibility of plentiful labour at comparatively competitive prices as the main reason for the boom in the Chinese economy, specifically in the manufacturing sector, in the last three decades. It was also found that Chinese companies were not as advanced in terms of office and accounting computerisation and IT-enabled business solutions as Western companies. Under these circumstances, the company found itself undergoing a series of flotations. At the same time, China introduced free-market competition, which represented a further barrier for companies, and demanded better costing systems at the management level of the company, making it necessary for them to adopt ABC. In late 2002 and early 2003, they implemented the ABC system successfully, albeit with some problems, including the affinity of information systems and IT programmers misunderstanding ABC concepts. The Chinese market quickly became highly competitive and saturated, as companies

faced threats to survival and sought to avoid closure or financial difficulty. The authors concluded that ABC systems are clearly more successful in a moderately consistent environment, and that they might not work as well in a fluctuating or unbalanced environment. In addition, they stated that ABC provides noticeable improvements that allow companies to acquire exact product cost information, helping high-level management to clarify sales activities (Liu and Pan 2011). In summary, these two studies stated that companies fail to implement such costing systems, because of a lack of accounting bodies and accounting regulations; the various costs of implementation, the information systems themselves, and IT programmers, and the weaknesses in the education systems in these countries. The current study will also use different methods to examine ABC implementation in Ireland, where it is expected to be more advanced than in either Jordan or China, to determine if there is any measurable difference.

Schoute (2011) re-examined the relationship between product variety and ABC implementation in survey response data collected from 191 Dutch medium-sized manufacturing organisations. The study distinguished between the adoption and use of ABC, and enhancements in the measurement of product variety. The author also observed that the relationship was curvilinear and/or moderated by the use of advanced manufacturing technologies (AMTs). The sample and data used were taken from a large-scale, multi-purpose study conducted in 2002 concerning the use of cost systems in medium-sized Dutch manufacturing organisations. Schoute (2011) used a database that contained financial and economic information on 5,000 Dutch organisations over a ten-year period, including medium-sized firms that employed 50 to 500 people and whose main activity was in the manufacturing industry (Schoute 2011). The paper concluded that product variety was, on average, positively connected to the utilisation and adoption of ABC, that the relationships formed an inverted U-shape, and that organisations were more likely to adopt and use ABC at moderate levels of product variance than at high levels of product variance. The current study also controls for the size of the organisation, but using a different approach to Schoute's (2011) study. He controlled for size by including small size organisations, whereas this study addresses a different area of interest, excluding small size firms, but including medium to large size organisations.

Askarany, Brierley and Yazdifar (2012) studied the factors influencing the adoption of ABC by evaluating the contribution of the characteristics of change on adoption. They mailed a questionnaire to 2,041 CIMA members, in three different countries (Australia: 1,175; the UK: 500; and New Zealand: 366), who worked in MA departments. A total of 584 questionnaires were completed and returned, representing a response rate of 28.6%. Of the returned surveys,

310 came from Australia (a response rate of 26.4%) 132 from the UK (a response rate of 26.4%), and 142 questionnaires were returned from New Zealand (a response rate of 38.8%). The researchers used innovation diffusion theory to investigate the impact of company size, innovation, location, and industry type on the decision to adopt ABC. They used logistic regression analysis to compare organisations that had adopted ABC and those that had rejected it. They reported that it was not possible to distinguish the companies that had adopted ABC from those that had not within the model. When the researchers compared the two groups of companies, the model could be operationalised, since adopted and rejected companies shared details of whether they had considered ABC. Furthermore, the researchers stated that managers did not perceive it as important to address companies' support in order to identify the benefits of ABC regarding comprehensive training programmes and the requirement for information concerning ABC. Furthermore, ABC users do not need to be provided with complete information, indicating that ABC offers advantages over other systems. The study also suggests that location, in terms of country, is a significant factor influencing the adoption of ABC (Askarany, Brierley and Yazdifar 2012). The respondents reported on the level of ABC adoption, revealing inconsistent and mixed results. The authors stated that this could cause uncertainty for many potential adopters of ABC, potentially influencing their adoption of ABC in the future. The differences between ABC adoption rates, as detailed in the study findings, were as follows: more than 19% of the difference in the ABC adoption rates in Australia; more than 15% of the difference in the ABC adoption in New Zealand; and finally, more than 21% of the difference in the ABC adoption rates in the UK. These differences are most likely due to the different stages and levels of adoption used to study the diffusion of ABC use. In addition, the researchers explained that the stages model and the levels of the study suggest a significant correlation between the ABC adoption rates and the countries in which the diffusion of ABC was investigated. There was also a significant correlation between the ABC adoption rates and the diffusion models implemented. Furthermore, the authors observed that the reason behind organisations not replacing their traditional accounting techniques with ABC is that they classify themselves as adopters of traditional systems when dealing with the allocation of 'facility costs', which is one of the principal ABC costing systems (Askarany and Yazdifar 2012). The current study will use contingency theory to investigate any impact from company size, multinational Irish organisation, and industry type on the decision to implement ABC. In addition, it will employ logistic regression analysis to compare organisations that have implemented ABC, and those that have not, similar to Askarany, Brierley and Yazdifar's (2012) study.

Bt-Fadzil and Rababah (2012) studied the contribution of effective design and application of ABC within the context of Jordanian manufacturing companies, utilising both quantitative and qualitative research methodologies. A survey questionnaire was developed and used to establish the contemporary situation regarding ABC implementation and adoption. They also used semi-structured interviews to identify the factors that affected the implementation and adoption of ABC in Jordan. They collected data from representatives of 13 Jordanian companies in three different groups. The first group was made up of four companies that had not yet adopted ABC, in order to ascertain the intent behind the non-implementation of ABC. This was followed by interviews with a second group of three organisations that had implemented ABC, in order to identify the motives for beginning the implementation procedure of ABC. Lastly, interviews were carried out with companies in the third group, involving six organisations that had adopted ABC and were applying ABC information for an alternate use (Bt-Fadzil and Rababah 2012). Both within-company and cross-organisational analysis was carried out on the data gathered. The researchers used three procedures to investigate the level of ABC achievement, as follows:

- 1. Sector evaluation of the degree of ABC success.
- 2. Users perceived ABC information with a characteristic rating.
- 3. ABC users had a high level of satisfaction with the provided information (Bt-Fadzil and Rababah 2012).

It was concluded that 19.5% of Jordanian manufacturing companies fell into the third category of implementers or users of ABC. In addition, it was emerged that the main influencing factors included fashion, forced decisions, and proficiency, which were all directly connected to the ABC implementation decisions in the target companies. Furthermore, the study found that the barriers to implementation of ABC were linked to behavioural and technical complications. The researchers further stated that the study results show that behavioural and organisational dynamics, rather than technical factors, influence ABC implementation and application (Bt-Fadzil and Rababah 2012).

Maiga, Nilsson and Jacobs (2014) state that the interface between IT and management control is still weak in terms of research, with a specific awareness gap regarding its implications for financial performance. Thus, they assessed the influence of cost control systems and IT integration on the financial performance of manufacturing plants. They surveyed 518 managers of US manufacturing companies, with an equal number using ABC and volume-based costing systems. The survey questionnaires were sent to the chief operating officers, managers, and directors of 2,506 US manufacturing companies. Specific criteria were set for

the inclusion of the responses in the data analysis: the company should be an investment organisation; the manager should have at least two years' experience within the organisation; and two complete responses should be collected from each company. The researchers received 272 responses from companies using ABC, and 246 from non-ABC users, providing 518 usable responses, representing a 20.67% response rate. Three independent variables were tested - IT integration, cost control system, and financial performance - by controlling for the size, age of the company, competition, earnings-based bonuses, production environment, and product diversity. It was found that the main influences of IT integration and cost control systems on companies' financial performance were not significant; however, the effect of their interaction indicated a significant positive influence on companies' financial performance. The authors cited Ashby's (1958) law of necessary quality: higher-quality cost information emerging from cost control system practices may require a comparable level of variation in information flows, enabled by a high level of IT integration (Maiga, Nilsson and Jacobs 2014). Also, more recently, Orwig et al. (2015) had stated that information systems technology is becoming an increasingly important aspect of change management, and that managers within organisations need to understand IT changes. The authors also claimed that the potential of IT has caused organisations to automate. Furthermore, they observed that directors perceive the need for change and the integration of technology negatively, and have placed their confidence in information technologies to allow a decline in staff and increased control of managers. The authors also claimed that ABC is a valuable instrument for managing costs through new IT implementation, and is a useful management tool to use when a change in business activities is expected or required (Orwig et al. 2015). Company size, IT resources, and economic condition are all important factors influencing the adoption of more complex managerial systems, therefore the current study will focus on examining these factors as they influence level of ABC and ABM implementation in Irish companies.

Al-Sayed and Dugdale (2016) also studied Activity-Based Innovations (ABI), such as MA change. Their study investigated the extent of ABI adoption in UK manufacturing organisations, specifically in relation to the adoption process and adoption experiments, the influence of nine specific factors of ABI adoption, and five other factors that affect the extent of ABI adoption. Data was collected via a survey of UK manufacturing companies. Several previous studies concerning ABC adoption have also been conducted (Gosselin 1997; Booth and Giacobbe 1998; Krumwiede 1998; Malmi 1999; Clarke, Hill and Stevens 1999; Baird, Harrison and Reeve 2004; Askarany, Smith and Yazdifar 2007; Bjørnenak 1997; Brierley 2009; Schoute 2011). These studies highlight the very limited research on the nature of ABC as a MA technique (Al-Sayed and Dugdale 2016). Also, in India Dwivedi and Chakraborty

(2016) studied the development of a strategic management tool in a thermal power plant in India using ABC and balanced scorecard (BSC) models. They stated that ABC and BSC are the MA techniques currently recognised as the most reliable tools for strategy formulation in an organisation. A department of a thermal power plant in India (The Merry-Go-Round, MGR) permitted the implementation of ABC and BSC models in order to provide its customers with accurate information and other critical business information about the essential elements of the organisation in terms of resources, customers, people, activities, services, and products. They proposed an ABC-BSC model for MGR, based on the assumption that it would help managers to manage long-term competitive advantage in the modern, changing business environment (Dwivedi and Chakraborty 2016). Furthermore, the authors stated that ABC yields reliable knowledge of costs at various activity levels of the organisation, but it cannot assign strategic importance to different activities carried out within the organisation. Nonetheless, companies use BSC with traditional costing methods for unclear and imprecise cost data in order to monitor the performance of the organisation. In this way, companies combine the two methods to overcome the limitations associated with each of them. The findings suggest that the implementation of ABC and ABC-BSC models in the MGR department of the power plant assisted in terms of making strategic decisions based on more reliable information, which can improve the quality of decisions and help achieve a competitive advantage. The authors also asserted that the integration of the ABC and BSC model could enable more reliable cost information for monitoring strategy implementation, and provide a strategic view on operational decisions (Dwivedi and Chakraborty 2016).

In summary, the above literature identified problems and issues influencing the level of ABC implementation. The authors reviewed also acknowledged a number of gaps in the literature, as discussed in detail in the following section. Some of these gaps inform the specific focus of the research objectives of this study.

2.8. Gaps in the Literature

From the literature summarised in Section 2.7 above, the following gaps in the literature have been identified:

• Only four studies on the implementation of ABC have been undertaken in Ireland, which is relatively few compared to the number of studies conducted in the UK and USA. These studies on ABC took place within Ireland in the last two decades. These include Clarke, Hill and Stevens (1999), who identified an adoption rate of 11.80%,

and Duffy and McCahey (2002), who found that ABC had an adoption rate of 55%, in a study limited to hospitals only. Pierce and Brown (2004) identified an adoption rate of 27.90% and, finally, a study by Abusalama (2008) indicated a rate of 26.30% (Clarke, Hill and Stevens 1999, Doyle et al. 2002, Pierce and Brown 2004, Abusalama 2008). Therefore, it would appear the implementation rate in Ireland is variable. Additionally, these studies fail to adequately address company size, as they cover only smaller companies, which are unlikely to have the resources to implement ABC. As such, there is greater value in focusing on medium to large organisations.

- In the existing literature, there is a dearth of studies examining the use of ABM within product/service companies following the successful implementation of ABC.
- The consequences of rapid contemporary change in IT and the availability of IT to organisations have not been covered in previous Irish studies, and have only been mentioned in a few studies carried out in other countries. This provides an opportunity to reassess previous thoughts on implementing ABC, in light of changes within IT.
- A number of organisations can be classified as having partial ABC adoption. For example, the evolution within the financial sector to online self-banking activities, and customer self-service in-branch lodgements, has become a prevalent trend. This has led to a reduction in the number of employees and branches. This indicates that there is management activity at play, as observed in changes to the structure of certain organisations. This can be seen in the case of Allied Irish Banks (AIB) (Kinsella 2012), which closed a number of branches, affecting the organisation's structure and behaviour. Examples such as these could result in a managerial review of whether the organisation should initiate implementation of ABC.
- The consequences of the current financial climate have led to changes across business structures overall, which in turn might have resulted in a reassessment of previous cost systems, by addressing the potential value of implementing ABC. This has not been examined in detail.
- The assumption that a vast number of organisations are multinational means a single organisation can extend across a multitude of different cultures. The consequent diversity influence companies in terms of personal practices, managerial involvement, and all aspects of the accounting system, as well as affecting the costing systems utilised by the parent organisation. Therefore, the effect that ABC implementation has in terms of the culture in each country, and within the culture inherent in and displayed by the organisation, should be examined in detail.
- The most common form of research examining factors influencing the success of ABC adoption has focused on the behavioural and organisational variables specified by

Shields (1995). In contrast, there is a distinct deficiency of research covering the impact of organisational structure on ABC success.

- Only a small proportion of research has analysed the effects of corporate culture on ABC success. Therefore, there is a need to investigate the relationship between ABC success and organisational culture, and the importance of cultural factors as they relate to organisations and within an organisation in relation to non-cultural factors (Baird 2007).
- A dearth in studies examining the effects of national cultural on ABC is also clear. Due to variations in national culture, accounting practices require modification from country to country, and differences in the perception of ABC success could be attributable to national culture.
- A wide selection of research has focused on whether an organisation has undertaken the implementation of ABC; due to the knowledge that ABC implementation involves many stages, a study of the early stages of implementation needs to be carried out on organisations informing the process of a full implementation of ABC (Fei and Isa 2010).

In addition to the gaps in the literature listed above, there have also been changes to the business environment in recent years. These changes have the potential to impact MA in general, and in particular on the costing systems utilised within organisations worldwide.

This study will focus on three areas from the above-mentioned gaps. The first examines the level of ABC and ABM implementation in medium to large Irish companies (RQ1), which is introduced as the dependent variable. The second area relates to the impact of the independent variables on the level of ABC and ABM implementation (RQ2 and 3). The third area refers to the impact of control variables on the level of ABC and ABM implementation (see Section 1.3). These areas are identified as the gaps above, and are now grouped together and summarised in terms of the objectives of this study:

A. As discussed there have been a limited number of studies undertaken in Ireland regarding the implementation of ABC, when compared to other English speaking countries. The works of Clarke, Hill and Stevens (1999), Duffy and McCahey (2002), Pierce and Brown (2004), and Abusalama (2008), are the only studies on ABC to have emerged from within Ireland in the last two decades (Clarke, Hill and Stevens 1999, Doyle et al. 2002, Pierce and Brown 2004, Abusalama 2008). These have indicated an ABC and ABM adoption rate of as little as 11.80%. Also, there has been a dearth of studies examining the use of ABM following the successful

implementation of ABC. This study will revisit the issue of level of implementation of ABC and ABM in the Irish context (i.e. address RQ1), adding to the limited literature presently available.

- B. The availability and type of IT resources has changed in the past decade or so, and this has not been covered in any previous Irish study (RQ2); indeed, it has only been mentioned in a few studies in other countries in relation to IT in general. Certainly, no previous researcher has studied the impact of IT availability to an organisation on the level of ABC and ABM implementation in terms of change in IT function within the organisation, or in relation to how in-house software has suited the specific needs of organisations, or how the accounting software available has aligned with the needs of management and financial accounting teams within organisations.
- C. The consequences of the recent financial climate and its impact on economic conditions have led to changes being inflicted on overall business structure. This might have resulted in a reassessment of previous accounting perspectives and is potentially a consideration when implementing ABC (RQ3).
- D. In the Irish context, research has focused on whether differences exist between manufacturing and non-manufacturing organisations when referring to undertaking the implementation of ABC. In addition, a vast number of organisations are multinational in nature and this has not been addressed in previous studies. Also, previous studies have failed to adequately address company size when differentiating types of organisation, often covering smaller companies that are unlikely to have the resources required to implement ABC. As such, when designing this study, it was determined that there is greater value in focusing on medium to large organisations. Moreover, the increase in the size of companies in recent years is considered relative to the role of the competitive environment. There are thus clear gaps in the literature in terms of the focus on the control variables of size, level of competition, industry type, and multinational organisations (Moores and Booth 1994, Innes and Mitchell 1995, Bjørnenak 1997, Van Nguyen and Brooks 1997, Krumwiede 1998, Clarke, Hill and Stevens 1999, Innes, Mitchell and Sinclair 2000, Brown, Booth and Giacobbe 2004, Baird, Harrison and Reeve 2004, Al-Omiri and Drury 2007).

2.9. Impact of Changing Business Environment on MA

As already outlined, this study explores the impact of IT and economic conditions on the adoption/implementation of ABC and ABM. Both these factors have been subject to major

change in the past decade or so. This section thus outlines literature concerning the general nature of MA change and also literature focused on how IT and economic conditions might bring about further change.

The verb 'change' is defined as "to make or become different"; as a noun, change means, "the action of changing; an instance of becoming different"¹. On an initial reading of these definitions, the term seems simple and logical. However, what environmental change is, and/or the scale of such change in MA within an organisation, is more difficult to define. For example, changes in the levels of IT could be part of product change, such as changes in the processes of products, while the function of the product could also change. These changes affect managers and decision-makers; at the same time, this is reflected in the MA information used by management within organisations. Furthermore, to describe and define change, various adjectives can be used to express and clarify the requisite meaning any specific change must use. Change is commonplace throughout society and the natural world. It can be inferred for example, from the chemical mutations and organic responses of individuals, elements, groups, institutes, and countries.

Change typically centres on an outcome, whereby a process of change of any magnitude precedes any new stable state. However, according to Dawson (2003), such understanding is insufficient when deducing change, because when and how change begins and ends is infrequently perceptible (Dawson 2003). Lewin (1951) offered a framework of change in a planned social structure, and defined it as the presence of restraining or driving forces aligned with a background of possible change. Lewin (1951) understood change as a three-stage sequential procedure. The first stage identifies the forces that restrain and drive change, for example, rules, institutional terms, habits, customs, and routines. The second stage involves loosening existing conditions to allow change to take effect. The final stage is reset when aspirations are met. The framework was principally intended to assist individual decision-makers in forecasting and managing change (Lewin 1951).

Scapens et al. (2003) state that external and internal organisation factors could force or drive change in MA. However, external forces might play a more dominant and more pervasive role, as drivers of change (Scapens et al. 2003). In addition, Burns et al. (2013) state that changes in the business environment, and the industry moving from being controlled by local manufacturing companies to large international organisations, have resulted in TCM

¹ Online Compact Oxford English Dictionary

becoming obsolete. The business environment has not only changed in terms of the location and size of organisations, but also service-centred organisations have become a more significant part of the employment pool. TCM is known to provide inaccurate costing information because the system is based on inappropriate assumptions (Burns et al. 2013). According to Burns and Scapens (2000), at this time, MA alterations had become a topic of much discussion; they stated that whether:

...management accounting has changed, not changed, or should change, have all been discussed. Furthermore, the environment in which management accounting is practised certainly appears to have evolved, with advances in information technology, more competitive markets, different organisational structures, and new management practices (Burns and Scapens 2000, p. 3).

All of this could drive MA to change or evolve, as changes in the environment will not necessarily lead to changes in MA. Burns and Scapens cited Drury et al. (1993) when arguing that there are indications that the use of accounting within the management process has changed (Burns and Scapens 2000).

The following sections will discuss the specific changes that have occurred in terms of IT, competition, the market, organisation size, and multi-nationality in the latter part of the 20th century, and the impact of these changes on the business environment, and on MA. They will also relate back to the research objectives and research questions, presenting a number of independent and control variables to identify the possible impacts from these variables on levels of ABC and ABM implementation.

2.9.1. Changes in IT

Many publications on the topic of MA discuss how IT has been a key influence upon it (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003). Business practices encompassing both organisational structure and MA change have evolved alongside the evolution in IT software; for example, SAP and Sage (Markus et al. 2000, Parr and Shanks 2000). The progression of IT has been rapid since the 1980s. Marked change came about with the arrival of affordable personal computers, the internet, unified networks, and the dramatic change in the nature of IT outputs and tasks compared to the previous four decades (Scapens et al. 2003). IT and systems have now taken over all functions, operations, and levels within an organisation, and are no longer restricted to finance and accounting departments (Burns, Ezzamel and Scapens 1999, Scapens et al. 2003). It is apparent that enterprise resource planning systems (ERPs) have developed

into a commonplace feature of globally-connected organisations (Davenport 2000). According to Davenport:

...the most important part of the term ERP is enterprise. Any definition or understanding of these systems must recognise the possibility of one single information system enveloping all resources, processes, and functions of an organisation (Davenport 2000, p. 2).

Additionally, Davenport identifies ERPs as, "essentially off-the-shelf software packages that do not readily lend themselves to customisation, but at the same time, they do tend to span an entire organisation" (Davenport 2000, p. 3). MA in organisations required appropriate technology to assemble more comprehensive management information. Due to ERP's wide-ranging coverage of organisational functions and real-time data endowment, it permits accounting information to be more freely obtainable for the organisational user (Dechow, Granlund and Mouritsen 2007, p. 60).

Drury (2008) argues that, in the past decade, the use of IT to aid business activities has been amplified dramatically with the development of electronic business communication. Consequently, these developments and IT support are having an impact on businesses in general, and on MA in particular. Consumers have become more discerning when purchasing products or services, as they are able to access more information on the comparative virtues of different products, via the internet. The opportunities provided by e-commerce have led to the development of new methods to accomplish things that generate considerable cost savings. This is achieved by simplifying business processes and generating additional revenues from the efficient use of online sales facilities (e.g. ticketless airline bookings, and internet banking). In addition, Drury also stated that the ability to use e-commerce more proficiently than competitors provides the potential for companies to establish a competitive advantage (Drury 2008).

2.9.2. Changes in Economic Conditions

The economic conditions within organisations have changed in recent years, due to a global recession that started in or around 2008. As this is quite recent, there is still relatively little literature on the effects of the changes to economic conditions on MA practice and in the implementation of ABC and ABM. Libby and Waterhouse (1996. p, 137) stated that economic change prompted the recent development of new MA systems. Similarly, Giannone, Lenza and Reichlin (2011) confirmed that the recent recession has affected economies across the world. These views provide further impetus for this study to examine the impact of economic

conditions on the level of ABC and ABM implementation (Giannone, Lenza and Reichlin 2011. p, 111).

2.9.3. Changes in Competitive Environment

Porter (1979) provided an extensively used framework to scrutinise the competitive nature of an industry or sector, listing five forces that "govern competition in an industry" (Porter 1979, p. 141), namely:

- 1) Threat of new entrants.
- 2) Bargaining power of suppliers.
- 3) Bargaining power of customers.
- 4) The risk of substitutes.
- 5) Competitiveness in the sector (Porter 1979).

Spedding and Sun (1999) stated that in the last two decades:

...competition in the global manufacturing environment has greatly intensified. For companies to survive and maintain profit margins, cost management techniques must constantly be improved. Traditional cost accounting practices have been unable to respond to the changing information needs of manufacturing management (Spedding and Sun 1999, p. 289).

In addition, Lewis (1995) stated that, ABC systems are designed to be complementary, with the technological changes in factories due to enhanced global competition (Lewis 1995). Competition between new products and services, low-cost substitutes, and the ever-increasing demands of customers has consistently opened up global markets (Scapens et al. 2003). The expansion of growth economies, as seen in the Far East with the economic rise of China and India, are having large-scale effects on the global stage. As such, product, quality, cost, and services are playing a vital role for organisations in the current competitive environment (Scapens et al. 2003). New delivery channels, as well as new products, materialise more rapidly than in the past; due to the economic uncertainties this creates, organisations are in a continual flux of redevelopment.

2.9.4. Changes in Organisation Size

Intra-organisational dynamics can be drivers of MA change, for example, new management styles and organisational structures (Scapens et al. 2003). Organisations in the 1970s and 1980s tended towards a more centralised base than in previous decades. Then, during the 1990s, an inversion of this trend occurred, as organisations focused on key business activities,

outsourcing support activities. This resulted in a reduction in management layers, a change in procedures, and had an effect on the skill base of employees, with either a decline or an improvement (Ezzamel, Lilley and Willmott 1993).

Libby and Waterhouse (1996) surveyed 24 Canadian organisations with the aim of identifying predictions of change in MA systems. The findings identified forces of an external and comparable nature to those described, namely: competition, decentralisation, size, and capacity for change. Technological change was not present in these factors, as the authors lacked a reliable method to measure effect. Adequate support for competition in driving change in MA systems, as well as a greater relationship between size and the organisation's capacity for change, were noted. Libby and Waterhouse acknowledged that changes were not paradigm-shifting in nature, instead representing additions, substitutions, and deletions to current MA systems (Libby and Waterhouse 1996, p. 147).

2.9.5. Changes in Multinationality of Organisations

Atkinson et al. (1997) argued that successful organisations continually adjust to changes in the environment, and proactively alter their environment. Organisations grow, merge, acquire other organisations, and adapt management styles. These adjustments affect MA in two ways. The first relates to how MA information can assist organisations in making these changes. MA helps organisations identify the requirements for instigating change, and the appropriate responses to an environmental change (Atkinson et al. 1997). Equally important is that MA not inhibit change. Considerable anecdotal evidence suggests that MA systems can impede change by concentrating on performance measures that preserve the status quo and hinder experimental change. For example, the academic and popular press frequently notes changes in the structure of the work environment, such as employee expectations imply that information for decision-making and motivation must change concurrently (Atkinson et al. 1997).

2.10. Conclusion

This chapter provided an examination of the literature relating to ABC and ABM. It examined studies on ABC over various time periods and contexts. A summary overview of the literature regarding factors influencing the implementation of ABC and ABM was also provided and gaps in the literature identified. Finally, changes to the business environment that were

relevant to the variables examined in this study were discussed. Together, these aspects of the literature supported the research objectives of the study and will feed into the research methods and design in later chapters.

CHAPTER THREE

Research Methodology

3.1. Introduction

This chapter begins by reviewing the research philosophies behind MA research and then, outlines various theories, including deductive and inductive theory, and continues by detailing the formulation of the research design. It also offers discussion of ontology and epistemology in accounting research, research paradigms, and types of research. This is followed by a review of the research strategy, quantitative and qualitative elements and the enquiry mode. All of these elements are then brought together to outline the philosophical foundations of the current research.

3.2. What Type of Theory?

Theory is defined by Bryman (2004) as:

...an explanation of observed regularities in the higher level of abstraction such structural functionalism, symbolic interactionism, critical theory, post-structuralism, and structuration theory (Bryman 2004, p. 20).

Earlier work by Merton (1967) divides theory into two types: medial theories and grand theories. These theories operate at differing levels of abstraction and generality, providing suggestions to researchers, assisting in monitoring or influencing the collection of empirical evidence, despite being unlikely to forge essential links with the real world. Arguably, the utility of theory is limited in the domain of social research. Merton (1968) observed that middle-range theories are:

...intermediate to general theories of social systems which are too remote from particular classes of social behaviour, organisation and change to account for what is observed and to detailed, orderly descriptions of particulars that are not generalised at all (Merton 1968, p. 39).

Thus, no grand theory exists that is characteristic of and applicable to guiding all social research. Consequently, middle-range theories are applied in the majority of empirical enquiries. Merton (1967) expressed this idea, to bridge the growing gulf between theory and empirical findings. Bryman (2004) compared Merton's (1967) theories with explanations in Cloward and Ohlin's (1960) study of differential association theory, specifically in connection with juvenile delinquency. They contended that middle range theories fall somewhere between grand theories and empirical findings, thereby representing attempts to understand and explain narrower aspects of social life (Bryman 2004).

Tomkins and Groves (1983) stated that researchers in the field of accounting are predisposed to applying theories and methods adopted from the natural sciences. They also state that considerable time and attention must be paid to the possibility of using fundamentally different naturalistic or interpretive-humanistic research styles, applying methods meticulously focused on practitioners' desire to provide a greater understanding of the effects of accounting and the practices of accountants themselves. Research by accounting academics has previously been analysed from a narrow-minded viewpoint, as researchers frequently adopt a single stereotyped research style, namely quantitative techniques, possibly resulting from conditioning and training they themselves have previously received (Tomkins and Groves 1983). Tomkins and Groves (1983) encouraged researchers in the field of accounting to consider applying a breadth of research methods to assess their relevance to accounting, as well as issues unique to accounting. Moreover, they also discussed conventional scientific approaches to research in accounting practices and the manner in which accounting information is used within the research domain (Tomkins and Groves 1983).

3.3. Deductive and Inductive Theory

Deductive theory is characterised as the commonest aspect of the natural relationship between research and theory, as used in a piece of research (Bryman and Bell 2007). When a researcher conducts research into a specific phenomenon, the theoretical considerations of that phenomenon are used to deduce a research hypothesis, which must then be subjected to empirical examination. The research hypothesis includes concepts requiring translation into discoverable entities (Bryman and Bell 2007) and the researcher must devise a hypothesis that translates the research phenomena into terms that can be investigated. This means the researcher should clarify his or her ability to collect data in relation to the research hypothesis. This particular description of the role of theory is evocative of Merton's notion of middle-

range theory, as cited by Bryman and Bell. Merton (1968) argued that, theory "is principally used in sociology to guide empirical inquiry" (Merton 1968, p. 39). Bryman and Bell (2007) listed the steps involved in the process of creating a hypothesis, proceeding from theory. Data is then collected to examine the hypothesis, and tests run to produce findings. Finally, the hypotheses are either confirmed or rejected and the theory revised accordingly (Bryman and Bell 2007). Inductive research, on the other hand, is where the researcher concludes by suggesting how their findings relate to a particular theory that initially prompted the research. These findings contribute to the stock of theory and research literature associated with the specific area investigated (Bryman and Bell 2007).

The approach used in this study is primarily deductive. The research objectives and questions developed are designed to test the body of literature that exists on a topic. However, prior literature on ABC and ABM in Ireland, which provided the foundation for the current research topic and the survey tool.

3.4. Ontology and Epistemology

Ontology and epistemology are among the two main behavioural areas to be considered when choosing a research philosophy. Each involves significant differences that will affect how the researcher thinks about research procedures (Saunders, Lewis and Thornhill 2011). Grix (2002) stated that each research tool utilised by a researcher has a different purpose, and if a research tool is incorrectly used, or if the correct tool is used in the wrong order, the results generated will be inaccurate. In order to utilise research tools correctly, the researcher must understand their purpose, when and how to use them, and what action to take prior to employing them. Grix also stated that the most crucial aspect of doing research is that the researcher must be able to clearly understand their ontological and epistemological assumptions. This is necessary to support the research and to avoid any misunderstandings regarding findings when discussing the theoretical impact of any social phenomenon examined, as well as when understanding the interconnectedness of key aspects of the research and when defending the shortfalls and positions taken (Grix 2002).

Ontology focuses on what exists in the world around us; i.e. the philosophy of reality (Eby, Hurst and Butts 2009, Creswell 2013). The following question exemplifies the purpose of ontology: "What is the nature of reality and therefore what is there that can be known about it?" (Guba and Lincoln 1994, Creswell 2013). Grix (2002) states that researchers should be aware of the need to understand admit and support their own ontological positions. He also

cites Hay (2002), stating that an individual's ontological position is the researcher's "answer to the question: what is the nature of the social and political reality to be investigated?" (Hay, 2002, p. 63). By answering this question, the researcher can discuss what can be known about social and political reality, before moving on to a consideration of epistemology. Grix (2002, p. 29) stated, "an ontological position that asserts that social phenomena and their meanings have an existence that is independent of social actors" (Grix 2002). Ontological positions emphasise that social actors are constantly enhancing social phenomena. He also stated that: "if ontology is about what we may know, then epistemology is about how we come to know what we know" (Grix 2002, p. 29).

Ontology is not separate from the realm of business research. Ardalan (2010) argued that ontology refers "to what extent the phenomenon is objective and external to the individual or it is subjective and the product of the individual's mind" (Ardalan 2010, p. 3). In addition, Bryman and Bell (2015) define ontology as, "ontological assumptions and commitments that feed into the formulation of research questions and the way research is carried out" (Bryman and Bell 2015, p. 35). Hitzler et al. (2005) state that "an ontology can be viewed as something which conveys a certain specification (e.g. of some data) based on a given classification system" (Hitzler et al. 2005, p. 36). Bryman and Bell (2015) argued that if a research problem is developed within an approach, which suggests that cultures and companies are objective social bodies that influence individuals, researchers are then likely to indicate that the formal ownership of companies, or the values and beliefs they possess, are representative of the culture they exist within. In addition, if researchers develop research questions such that the connection between culture and companies as objective categories is questionable, attention will then focus on the active association between individuals involved in the development of the phenomenon. In both cases, distinctive forms of the research questions and appropriate types of data collection will be required (Bryman and Bell 2015). Saunders, Lewis and Thornhill (2011) state that ontology focuses on the nature of reality, the manner in which the world operates and an associated commitment to particular views. Ontology has two approaches as follows: the first attitude of ontology is objectivism; how social entities exist independently of social actors. This represents the reality of the existence of social entities that exist externally, relative to social actors. The second attitude is subjectivism, which states that social actors create the social phenomena concerned with their existence; i.e. understanding the meanings that individuals attach to social phenomena (Saunders, Lewis and Thornhill 2011).

Epistemology focuses on the possible ways knowledge is accrued, in particular focusing on the theory of knowledge. Validation and methods are also treated as from among the foundational branches of philosophy. Hofer and Pintrich (1997) argued that epistemology "is an area of philosophy concerned with the nature and justification of human knowledge" (Hofer and Pintrich 1997, p. 88). Furthermore, Saunders, Lewis and Thornhill (2011) state that epistemology is "concerned with what constitutes acceptable knowledge in a field of study" (Saunders, Lewis and Thornhill 2011, p. 112). Epistemology concerns modes of questioning the nature of the world (Easterby-Smith, Thorpe and Jackson 2012), and is a branch of philosophy that focuses on and is concerned with sources of human knowledge, and how humans come to know the world around them (Eby, Hurst and Butts 2009, Creswell 2013). The following question is posed in reference to epistemology; i.e. what is the relationship between the would-be knower and the object of research? (Guba and Lincoln 1994, Creswell 2013). Blaikie (2009) stated that epistemological assumptions are "concerned with what kinds of knowledge are possible – how we can know these things – and with criteria for deciding when knowledge is both adequate and legitimate" (Blaikie 2009, p. 92). Epistemology focuses on the development of knowledge, as well gathering and developing new theories or models' superior to those already in existence. Grix (2002) stated that "knowledge, and the ways of discovering it, is not static, but forever changing" (Grix 2002, p. 6). He also stated that there are two different epistemological situations, corresponding with 'positivism' and 'interpretivisim'. Grix (2002) stated that the former "is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond" (Grix 2002, p. 5). Bryman and Bell (2007) stated that the epistemological position "is predicated upon the view that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action" (Bryman and Bell 2007, p. 30). From the previous discussion of epistemological positions, it is apparent that when employing different research methodologies, the researcher does so from particular ontological perspectives that produce different views concerning the same social phenomena, and that utilise different epistemological positions (Grix 2002). Blaikie (2009) stated that there are six types of epistemological assumption, namely empiricism, rationalism, falsification, neorealism, constructionism, and conventionalism (Blaikie 2009, pp. 94-95).

With clear support from the ontological and epistemological framing of the research question or research phenomena, the researcher should begin by thinking and framing the research question relative to the methodology, answering the question, 'how can we go about acquiring that knowledge?', by defining the best way to gather information about their topic. After clarifying the methodology, the researcher should then establish the research methods planned for use in order to answer the question, 'which precise procedures can we use to acquire it?' As a final step, the researcher should seek out sources of data to answer the question, 'what data can we collect?'. All of these are addressed later in the chapter relative to the present study.

3.5. Research Paradigms

A research paradigm is a "philosophical framework that guides how scientific research should be conducted" (Collis and Hussey 2009, p. 55). A key tool for understanding the ontological and epistemological foundations of social science research is Burrell and Morgan's (1979) four paradigms. These four paradigms reflect the nature of organisations. Burrell and Morgan's (1979) paradigms, as shown in Figure 3-1, are ontology, epistemology, human nature, and methodology. These paradigms typically include either objectivist or subjectivist approaches. Saunders, Lewis and Thornhill (2011) contend:

...pragmatism argues that the most important determinant of the epistemology, ontology and axiology you adopt is the research question – one may be more appropriate than the other for answering particular questions. Moreover, if the research question does not suggest unambiguously that either a positivist or interpretivist philosophy is adopted, this confirms the pragmatist's view that it is perfectly possible to work with variations in your epistemology, ontology and axiology (Saunders, Lewis and Thornhill 2011, p. 109).

Each paradigm makes assumptions about the function and purpose of research when investigating the world of business, either subjectively or objectively (Burrell and Morgan 1979):



Figure 3-1: The Subjective-Objective Dimension

Burrell and Morgan (1979) stated that, "all theories of organisation are based upon a philosophy of science and a theory of society" (Burrell and Morgan 1979, p. 12). The initial set of paradigmatic assumptions regarding ontological nature of the research phenomena. Ontological research questions raised in the social sciences concern the 'reality' to be investigated, where 'reality' has an 'objective' nature, and 'reality' is seen as 'out there' to be discovered (Burrell and Morgan 1979). The second set of assumptions of an epistemological nature relate to the basis of knowledge. Burrell and Morgan (1979) stated that an epistemological nature relates to "how one might begin to understand the world and communicate this as knowledge to fellow human beings" (Burrell and Morgan 1979, p. 12). These assumptions encompass ideas that knowledge or experience can be understood and categorised as either 'true' or 'false'. The third set of paradigm assumptions discusses human nature, and, in particular, the connection between human existence and the surrounding environment. Subsequently, human life is the fundamental object and subject of investigation. Thus, one can identify which view of human reality responds in a mechanistic or even deterministic fashion to the situations one encounters in the external world.

Burrell and Morgan (1979) stated that these three sets of assumptions (ontology, epistemology, and human nature) have direct methodological implications. Each paradigm provides different meaningful ways to obtain and investigate 'knowledge', and each lead to an alternative methodology for investigating the social world. They also stated that the possible range of choices between methodologies is large, although the natural sciences adopt only a small range of options. Bryman and Bell (2015) claimed that each paradigm also makes unique assumptions, and highlights research questions and notions about how the proposed

research will examine the world in either of two ways: 1) regulatory, by describing how organisations exist relative to the possibility of providing recommendations to improve an organisation without making judgements; and 2) radical, to make judgements about the way organisations ought to be, and make suggestions about how this could be achieved.

Figure 3-2 shows Burrell and Morgan's two-dimensional, four paradigm models intersecting with the subjective-objective debate (Burrell and Morgan 1979). The four paradigms produced are functionalist, interpretive, radical humanist, and radical structuralist, and divide the social sciences into ontology and epistemology (Hassard 1991).



Figure 3-2: Four Paradigms for the Analysis of Social Theory

Bryman and Bell (2015) stated that regulation and radical research assumptions provide the groundwork for the four paradigmatic positions applicable to the study of organisations as follows. The first assumption of the research paradigm model is that of the functionalist researcher. This type of assumption is grounded in organisational studies, and is built on a problem-solving orientation within the organisation. The second assumption of the research paradigm model is that of the interpretative researcher. This type of assumption is based on the experience of social actors within an organisation. Based on this supposition, the researcher studies the social behaviour that results in problems within an organisation, and includes recommendations about how to solve the problem. The third assumption of the research paradigm model is the radical humanist perspective. This postulation is made when an organisation's need for change. A researcher or group of researchers examines the social activities within an organisation that requires change, in order to provide recommendations to help facilitate the required change (Bryman and Bell 2015). The final assumption views the
organisation as the output of structural power relationships. It focuses on the development of an employment relationship, citing conflicts that occur over time (Bryman and Bell 2015). In addition, Hassard (1991) observes radical structuralism as present when "measures have been taken which at once enhance management's control over the work process whilst yielding greater productivity from the working period" (Hassard 1991, p. 294).

Each of the above paradigms involves different types of organisations, addressing different organisational problems in a variety of ways. Burrell and Morgan (1979) were relatively specific that "a synthesis between paradigms cannot be achieved" (Jackson and Carter 1991, p. 110), largely because paradigms not suitable for cross-comparison. Each paradigm must be developed independently. Jackson and Carter (1991) stated that paradigms are established separately, and must remain disconnected if they are to benefit research. This separation between paradigms informs the establishment of expectations regarding the nature of the conventions of particular paradigms (Jackson and Carter 1991). Such separation generates two well know dimensions: the objective and the subjective. The nature of the research dimension and administrative/radical change assumptions relates to the ontological, epistemological, human nature, and the methodological (Jackson and Carter 1991). Furthermore, they state that:

...each pair of adjacent paradigms shares a common dimension, but the differences in understanding of the other dimension are sufficient to make them as incommensurable as those pairs which do not share any common dimension (Jackson and Carter 1991, p. 111).

Each paradigm relies on its own language, often also sharing a common language, but the regulations involved are fundamentally different (Jackson and Carter 1991). Reed (1985) proposed that the barriers between these four paradigms are unclear, and Burrell and Morgan (1979) suggested that the differences between these paradigms have been overstated, leading to independence and reducing their interrelatedness, despite the potential for creative theoretical development (Reed 1985, p. 205). Willmott (1993) suggests that the four paradigms challenge the logical hegemony of functionalism, and moreover, that the differences between objectivist and subjectivist structures of analysis produce a polarisation of methodological approaches (Willmott 1993). Shepherd and Challenger (2013) argue that the discussion of paradigms continues to be influential within business research, including in subfields such as accounting, marketing, and operations research, as well as in organisational studies; the domain within which it was originally applied (Shepherd and Challenger 2013). Bryman and Bell (2015) argue that the Burrell and Morgan (1979) model has significantly influenced business researchers, by encouraging exploration of the assumptions made about the nature of the social world and how it is studied. Furthermore, they state that all four

paradigms clarify the relationship between ontology and epistemology, resulting in implications for the design of the research and the data collection approach (Bryman and Bell 2015).

3.6. Types of Research

Kumar (2011) explored multiple types of research and noted that they all three core principles, namely, research goals/objectives, the application of the research in the form of conclusions, and a mode and methodology of enquiry and investigation that is applied when conducting a study. Bryman and Bell (2015) stated that many authors have identified core differences between qualitative and quantitative research based on their epistemological foundations. Table 3-1 below outlines these fundamental differences and each is now described.

Table 3-1: Differences Between Quantitative and Qualitative Research Strategies

	Quantitative	Qualitative
Principal orientation to the role of theory in relation to research	Deductive; testing of theory	Inductive; generation of theory
Epistemological orientation	Natural science model, in particular positivism	Interpretivism
Ontological orientation	Objectivism	Constructionism

3.6.1. Quantitative Research

Researchers are expected to consider a number of practical issues when conducting business research, such as research design, the choice of research strategy, and the research methods they intend to use to investigate the research question (Bryman and Bell 2015). In addition, Bryman and Bell (2015) observed that if a researcher is interested in investigating social phenomena involving a large number of causes or relatively new topics, it is highly likely that quantitative research methods will be the most suitable. Bryman and Bell (2015) define quantitative research as, "a research strategy that emphasises quantification in the collection and analysis of data" (Bryman and Bell 2015, p. 38). This suggests a rational methodology, which relates the research conducted to theory, explaining how the research draws attention to the testing of theories. Quantitative research also combines rules and logic within the scientific approach of positivism, incorporating the view that objective reality is external.

3.6.2. Qualitative Research

If a researcher is interested in investigating the worldviews of a social group, or if they need to engage with individuals collecting data, there is a high probability that they will employ a qualitative research strategy (Bryman and Bell 2015). Qualitative research is defined by Bryman and Bell (2015) as "a research strategy that usually emphasises words rather than quantification in the collection and analysis of data" (Bryman and Bell 2015, p. 392). The aim of this is to confirm that the research approach has a relationship with theory. In this case, qualitative research rejects the rules of logical science and positivism. Rather, it examines how entities exist in the social world, viewing social reality as a constantly changing and developing process of equity created by individuals. Bryman and Bell (2015) stated that qualitative research methods observe particular research approaches, and that each conveys differences as regards the role of theory, ontological concerns, and epistemological issues (Bryman and Bell 2015).

The use of qualitative research has steadily increased. Lee, Mitchell and Sablynski (1999) reviewed the body of qualitative research designed since Maanen's (1979) study, defining the characteristics and practices of qualitative research. Bartunek, Rynes and Ireland (2011) reviewed research by Lee et al. (1999) reporting on how formerly 'quiet reconstruction' has become louder through the publication of more qualitative work in top American management journals over the past ten years, demonstrating an extensive interest in the topic.

3.6.3. Enquiry Mode

The enquiry mode of a study is typically one of two types, namely structured or unstructured. The structured approach is typically classified as quantitative research, and affects the research process in areas such as design, objectives, sample, and questions that are predetermined and planned from the outset of the research. Kumar (2011) specified the structured research study approach as more suitable for determining the degree of a problem, issue, or phenomenon. If research describes a perceived situation, a historical enumeration of events, or an account of the varying opinions of individuals or groups regarding a specific issue, then it is characteristically classified as structured or quantitative (Kumar 2011). Quantitative researchers typically apply the use of statistics to test and confirm or contradict the hypotheses at the heart of their research. They analyse data and assign a value to validate or disprove a hypothesis. Statistical techniques are not an essential, or an integral part of a quantitative study; rather they contribute by quantifying the magnitude of an association or relationship,

providing an indication of the confidence the researcher can place on their findings and assisting them in isolating the consequences of different variables (Kumar 2011).

The unstructured approach is typically classified as qualitative research, which by contrast, allows flexibility in all aspects of the research process; and can be used to explore its nature. If the purpose of a study is principally to define a situation, phenomenon, problem, or event, or if information is collected using variables measured in nominal or ordinal scales, or if it is classified as an unstructured approach or qualitative research, then the assumption is that an analysis is necessary to establish variations in a situation, phenomenon, or problem without quantifying it. A research study is usually classified as unstructured or qualitative, according to the assumption that the researcher wishes to assess the extent of variation in a phenomenon, situation, problem, or issue. Typically, qualitative researchers evaluate information that is gathered resulting from descriptive analysis codes. Such collected data allows for use in statistical analyses, which may confirm or contradict conclusions drawn by researchers based on their comprehension of a subject. However, statistical analyses are not the norm in qualitative researcher, and it tends to more commonly produce rich descriptive outputs.

3.7. Philosophical Foundations of this Research

Having discussed philosophy in general, the philosophical foundations of this study are now discussed in detail. As already revealed, the impact of IT, the recent economic environment (the economic recession), organisations' level of competitiveness, organisations' industry type, organisations' multinational status, and the size of organisations engaged in the implementation and adoption of ABC and ABM are the main phenomena being studied.

Positivism adopts a realist ontology that perceives of reality as objectively 'out there' (Creswell 1994). Positivism claims that when applying determinism, it is highly probable that the research will reveal the effects of the outcomes (Guba and Lincoln 1994, Creswell 2003). In this study, the aim of investigating growth in advanced IT resources and the implications of economic recession demands the application of a realist ontology. The outcomes of these factors could result in a change to the way organisations think about the cost systems they utilise. Creswell (2003, p. 53) contends that "the problems, therefore, investigated by the positivists reflect a need to identify the causes that affect particular outcomes".

As noted in Chapter 1, the implementation of ABC and ABM in the top 1,000 Irish organisations is the principal phenomena reviewed in this research. The literature review

(Chapter 2) discussed literature relating to the adoption of ABC and ABM, and found a positivist approach to be embedded in this literature, which is also the approach applied here (see the outline of the literature in Table 2.1 for more detail). Positivist researchers claim to be deterministic, suggesting that facts govern effects or outcomes (Creswell 2003). Positivist research aligns with realist ontology suggesting that reality is objective, existing, and 'out there', disconnected from the language researcher's striving to discover reality (Creswell 2003).

Positivists adopt a stance similar to that of the natural scientist, collecting data about observable reality and seeking out regularities and causal relationships in data sets to form law-like generalisations (Saunders, Lewis and Thornhill 2011). Positivists believe that one should employ quantitative methods when aiming to identify and measure social structures (Ibrahim, 2014). An important component of positivism is that it involves researching in a value-free way. This can be achieved through a survey approach, although one could argue that this act would suggest an underlying value laden position (Saunders, Lewis and Thornhill 2011).

Research phenomena examined using positivistic methods requires evaluation of the causes that affect those phenomena and particular outcomes (Creswell 2003). Positivism reflects a reductionist philosophy, thereby condensing research questions into specific hypotheses, which can then be examined empirically in the latter stages of the research (see Chapter 1 Section 1.2 for the study's research question and Chapter 5 Section 5.3 for the research hypotheses). It also assumes that the researched object and the researcher are separate and independent (Guba and Lincoln 1994, Creswell 2003). Furthermore, Guba and Lincoln (1994) recommended that when researching an object, the researcher should strive to avoid affecting or being affected by it. Creswell (2003) stated that researchers who implement a positivist approach should also adopt extra protection to control bias and ensure objectivity at all times whilst conducting their research (Creswell 2003).

Luft and Shields (2014) stated that the term "positivist" has been used in accounting research in a manner similar to that used in other modern social science research, which is, loosely put, designed to represent quantitative research methods and to test research hypotheses in social science. Luft and Shields (2014) claim that researchers who conduct research in the social sciences often do not admit that the methods of classic positivism are identical to research in the sciences, even though they support some of the earliest advocates of positivism; e.g. Comte Andreski (1974) and Friedman (1953). Luft and Shields (2014) argued that positivist research in accounting shares several relative instances, and that a unique confirmation of shared and non-shared elements could arise at any time (Luft and Shields 2014). Remenyi (1998) argued that the positivist researcher's standpoint is independent of and neither affects nor is affected by the subject of their research. Researchers can therefore deduce findings about these shared elements based on a narrow sample of observations (Remenyi 1998, p. 33). Consequently, the validity of any results, from the specific to the general, is a fundamental concern for researchers (Luft and Shields 2014).

While interpretivists do not necessarily reject notions of positivism, they do pursue a more humanist viewpoint. The aim of interpretivist approaches in research is to understand the subjective experiences of those being studied, by examining how they think and feel, and observing how they act in their native contexts (Ibrahim 2014). The interpretivist may use a qualitative approach to data collection, as it provides the researcher a way of entering their subject's social world to generate understanding from the subject's point of view. An interpretive approach is acutely appropriate to the field of organisational behaviour, as business situations are complex and frequently also unique (Saunders, Lewis and Thornhill 2011, p. 137).

3.8. Conclusion

This chapter provided an overview of the theoretical perspectives that inform the choice of research methodology. It discussed different theory types in detail, focusing on social systems theory in particular, in addition to deductive and inductive theory, ontology, epistemology, and research paradigms. Quantitative and qualitative research methods were also outlined.

The researcher has identified that a quantitative research method strategy is the optimal way to execute the research. This method supports the positivist stance of the study, which in turn underpins the more objective nature of the research questions, as outlined in Chapter 1. The research will be conducted using a questionnaire, which supports a quantitative approach and will address the research questions. Chapter 5 provides more detail on the questionnaire design.

CHAPTER FOUR

Contingency Theory

4.1. Introduction

The research questions addressed in this study aim to identify the level of ABC and ABM implementation in the top 1,000 Irish organisations based on a number of contingent variables. Two of these are independent variables, namely the level of IT within each respective company, and the company's current economic conditions. There are four control variables, namely company size, the type of industry in which the company operates, the company's level of competition and the multinational company variable. Due to the nature of these variables, a contingency theory approach is a suitable lens to inform the study.

A review of the implementation and adoption of ABC and ABM and associated research methods, as discussed in the previous chapters, suggests this area of research is suited to a positivist approach and also a contingency approach. This study examines the impact of contingent factors (level of IT resources, economic conditions in which the organisation operates, size, level of competition, type of industry, and multinational nature) on the level of ABC and ABM implementation. These six variables are contingent factors reflecting the behaviour of the organisation utilising ABC. The following sections focus on three different areas; firstly, outlining contingency theory and its relevance to this study, secondly, contingency theory in MA, and thirdly, contingency fit.

4.2. Contingency theory

Contingency theory examines contingent factors that influence changes within any organisation. In the current study, for example, this involves examining change caused by the use of IT within an organisation, or changes influenced by economic conditions within an organisation. Clarke, Hill and Stevens (1999) argued that:

...contingency theory research in accounting argues that factors such as the environment, technology, and organisational size and structure influence the choice of accounting and information systems (Clarke, Hill and Stevens 1999, p. 464).

Contingency theory stems from sociological functionalist theories of organisational structure, such as structural approaches to organisational studies (Reid and Smith 2000, Chenhall 2003, Woods 2009). Such an approach assumes that the organisational structure is contingent on related factors, such as the size of the organisation, the environment, and the level of technology in place (Reid and Smith 2000, Chenhall 2003, Woods 2009). Other writers, such as Fisher (1996) and Cadez and Guilding (2008), regard contingency theory as the on-going leading paradigm in MA research. These studies provide support for the use of a contingency theory approach to studying MA, IT, the size of the organisation and economic conditions to produce a "best fit" approach to understanding an organisation's behaviour and organisational structure (Fisher 1996, Cadez and Guilding 2008). For example, Cadez and Guilding (2008) studied how size, market orientation and organisational strategy affect an organisation's strategic MA. They concluded that the organisation's size and its strategic choices have important effects on the application of strategic MA. Furthermore, their results demonstrate that organisational performance depends on the fit between structure and context (Cadez and Guilding 2008). Aver, Aaver and Cadez (2009) argued that sociological changes are highly connected to the participation of accountants in the strategic decision-making process. Furthermore, Islam and Hu (2012) confirmed that MA research has approved the use of contingency theory as a research tool, including when addressing three types of MA research questions. The first type of MA research, as it relates to contingency theory concerns organisational control and structure; the second type concerns the impact of that fit on organisational performance; and the third includes an investigation into various contingencies within an organisation, along with their impact on organisational design (Islam and Hu 2012).

Chenhall (2007) states:

...the term contingency means that something is true only under specified conditions. As such there is no 'contingency theory', rather a variety of theories may be used to explain and predict the conditions under which particular MCSs will be found or whether they will be associated with enhanced performance (Chenhall 2007, p. 191).

The fundamental assumption of contingency theory is that no single category of organisational structure is equally applicable to all organisations. Moreover, organisational efficiency relates to the match or fit between types of technology, the information systems within the organisation, the size of the organisation, environmental changes, and the structure of the organisation. In this study, ABC implementation could be related to the level of IT available, company size or economic conditions.

Having provided a general overview of contingency theory, it is beneficial to focus in depth on how contingency theory relates to MA, and its specific connection to ABC and ABM implementation, which is relevant to the research objective and research questions posed in this study.

4.3. Contingency Theory in MA

Since the 1970s, researchers have used organisational theory to demonstrate the characteristics of MA within an organisation. Organisational theory provides different elements to MA research, through for example, systems theory, contingency theory, and organisational/behavioural decision theory.

Contingency theory is widely used in MA research to describe and observe variations in the characteristics of the MA systems used within organisations. Many contingent factors have been investigated, including the competitiveness strategies employed, organisational size, IT, the nature of the external environment/other business units and firm/industry variables. Fei and Isa (2010) stated that, "based on the contingency theory, researchers have argued that the reasons for different degrees of ABC success could be due to the different contextual factors faced by each firm" (Fei and Isa 2010, p. 144).

Hall (2016) examined the use of psychology theory in relation to contingency-based MA research. He classified five ways to use and improve psychology theory in contingency-based MA research. The first is achieved by developing relationships between individuals and adopting a more dynamic perspective. This is followed by the use of studies conducted at the organisational level. The third category involves comparing MA with other methods of accounting and organisation, while the fourth includes the use of field research. Finally, increasing the use of psychology theories represents the fifth classification (Hall 2016).

Zeithaml, Varadarajan and Zeithaml (1988) stated that in the 1960s, research on management theory began to move in a new direction that discusses a very simple idea and supports important improvements in research on organisations and management. This direction is now termed contingency theory. It ensures that importance is attached to specific effects and questions the existence of individuals and the management of organisations. In addition, the contingency approach influences almost all research into management and organisational literature and theory (Zeithaml, Varadarajan and Zeithaml 1988). In addition, Burkert et al. (2014) claimed that contingency theory developed as a critical organisational theory in the 1960s. Contingency theory attempts to understand and study factors of internal and external-perspective, such as the technology used in the organisation, its size, and the organisation's

competitive environment, which affect and control the organisation's structure and design (Burkert et al. 2014). In respect of this argument, level of IT and company size are the two internal organisational factors which may influence the level of ABC and ABM implementation – as to be observed in this study. Additionally, each organisation's economic conditions, the level of competition, industry type, and multinational status represent an additional four external factors that may influence the level of ABC and ABM implementation in this study. Therefore, for this study, contingency theory is a useful approach for identifying internal and external factors influencing the level of ABC and ABM implementation in medium to large Irish organisations. In addition, Burkert et al. (2014) and Schoonhoven (1981) argued that internal and external organisational factors, such as the company's level of technology, its size, and the level of competition in the environment, determine the optimal design of the organisational structure (Schoonhoven 1981, Burkert et al. 2014).

Rashidirad, Soltani and Syed (2013) argued that contingency theory is a demanding approach that has contributed significantly to different research fields, including MA research (Rashidirad, Soltani and Syed 2013). Also, Meyer (1978), cited by Schoonhoven (1981) emphasised that contingency theory had become extensively used, accepted and is no longer questioned or controversial (Meyer 1978, p. 18, Schoonhoven 1981). This view is supported by the fundamental position that contingency theory appears to be applied to management and other relevant literature (Kast and Rosenzweig 1974, Tosi and Carroll 1976, Galbraith 1977, Hellriegel and Slocum 1978, Schoonhoven 1981). Otley (2016), meanwhile, has argued that contingency theory in relation to MA had its origins in the 1970s, a period during which many people sought to define the differences between separate forms of MA practice (Otley 2016). In addition, Chenhall (2003) states that the various studies that have been conducted with regard to contingency theory research in MA and control are still, 14 years after their original publication, among the most downloaded papers in the journal of the Accounting, Organisations, and Society. It is noteworthy that Otley (1980) observed that "contingency theory must identify specific aspects of an accounting system which are associated with certain defined circumstances and demonstrate an appropriate matching" (Otley 1980, p. 413). In support of the argument that contingency theory is widely accepted in MA research, examples of its use in the MA literature include, for example, Otley (1980) Banker, Potter and Schroeder (1995), Kaplan and Cooper (1998) Pertusa-Ortega et al. (2010).

Chapman (1997) suggests that contingency studies can use postal questionnaires and crosssectional studies to explore the connections between a limited numbers of research variables. In addition, Chapman (1997) claimed there is a substantial degree of understanding concerning the use of contingency approaches to answer the types of question that a researcher may ask (Chapman 1997). The current research represents a cross-sectional study, and a questionnaire will be used as a research method to collect the data. Therefore, following on from Chapman (1997), contingency theory is a suitable approach when employing the research method used in this study.

Also, contingency theory has been perceived as "the most widely utilized contemporary theoretical approach to the study of organizations" (Scott 1998, p. 97). Donaldson (2001) explained that the core of the contingency success of an organisation results from the configuration or fitting of the characteristics of the organisation to the contingencies that change the situation for that organisation (Donaldson 2001). Ghofar and Islam (2014) stated that a contingency is any variable responsible for or controlling the organisation's characteristics and affecting organisational performance. Contingency variables could include the internal attributes of an organisation, such as their strategy for IT systems, or consist of external factors, such as the environment or the economy (Ghofar and Islam 2014). Contingency theory can be used to clarify the factors that affect the performance of an organisation (Ghofar and Islam 2014). However, the definition of the performance of an organisation is far-reaching, and includes, for example, effectiveness referring to performance (Donaldson 2001), profitability (Yeung and Ennew 2000), the use of a combination of nonfinancial and financial measures (Kaplan and Norton 1992), and customer satisfaction (Ittner and Larcker 1998). Thus, contingency theory also has a history of use in research into organisational performance. The cost system utilised within an organisation can influence performance, and thus a contingency approach is again supported as a suitable approach in the current study.

In addition, Research by Langfield-Smith (1997) into management control systems (MCS) extensively used a contingency approach. Donaldson (2001) found that the focus on contingency theory in management control systems aims to detect the effects of a correlation between contingent factors and organisational structure, and the consequences these have for the organisation's performance; this is called the structural contingency approach (Donaldson 2001). Donaldson (2001) clarifies that a structural contingency approach or model has three components: the first refers to whether there is a relationship between contingencies and the organisation's control; the second to whether contingencies control the structure of the organisation; and the last to whether the fit between contingency approach highlights an interconnection and relationship between contingent factors and structure affect the organisation between of fit between contingency variables and organisational structure variables, leading to improved performance (Ghofar and Islam 2014). The performance of an organisation depends on its ability to fit within its environment (Langfield-Smith 1997). Multinationality and organisational size are the control variables in the current study. These

variables can determine the nature of a company's structure, and are considered here when applying a contingency approach.

Companies typically offer an extensive number of choices regarding products or services to meet customers' increased demands and to intensively maintain competitiveness, even the empirical studies on this are not entirely consistent (Anderson 1995, p. 364). Furthermore, it is commonly believed that increased variety in the product mix has a negative effect on costs and operational performance (Miller and Vollmann 1985, Banker, Potter and Schroeder 1995, Kaplan and Cooper 1998). Pertusa-Ortega et al. (2010) have conducted research into competitive strategy, structure, and organisational performance by carrying out observations using the resource-based view (RBV) of contingency theory. They have stated that, in order to gain competitive advantage and to improve performance, companies should shift their focus towards the design of competitive strategies. Contingency theory has frequently been used to determine the relationship between competitive strategy, organisational structure, and organisational performance structure, and organisational performance structure, and organisational performance structure, and organisational performance, companies should shift their focus towards the design of competitive strategies. Contingency theory has frequently been used to determine the relationship between competitive strategy, organisational structure, and organisational performance. Pertusa-Ortega et al. (2010) state that contingency theory developed as a result of early research conducted on the relationship between organisational design and performance, specifically studies by Burns and Stalker (1961), Lawrence and Lorsch (1967), and Reimann (1974).

Furthermore, Mintzberg (1979) observed that, with regard to the design of an organisation's structure, contingent factors are instrumental in terms of determining the particular characteristics of organisational design (Pertusa-Ortega, Molina-Azorín and Claver-Cortés 2010). Ghofar and Islam (2014) state that organisations require a continuing strategy to be able to adapt and regulate continuous changes in the business environment. Organisations use such strategies to establish their own space in the business environment relative to their competitors (Ghofar and Islam 2014). The relationship between organisational strategy and the business environment is the core source of competitive advantage, and one that ensures an organisation's ability to gain position in the industry (Miles et al. 1978, Donaldson 2001). Level of competition is one of four control variables in this study. This variable examines the impact of level of competition on ABC and ABM implementation (see Chapter 1 for more detail). As contingency theory is commonly used to examine competitive advantage, this provides further support for the use of a contingency approach in this study.

Langfield-Smith (1997) argued that it took some time before strategy was labelled by the contingency literature as a variable (Langfield-Smith 1997). Chapman (1997, citing Chandler, 1962) argued that this approach is comparatively accurate and provides a simple explanation of a research phenomenon in a single organisation, but that it is very difficult to provide generally applicable results (Chandler 1962, Chapman 1997). An organisation's strategy

needs to ensure that its abilities and resources are used correctly and fully support the organisation's goals. To do so, structure and control systems are required (Ghofar and Islam 2014). Langfield-Smith (1997) argues that structure and control systems must be designed in a way that guarantees that the organisation's abilities and financial resources are used efficiently and effectively in accordance with organisational strategy (Langfield-Smith 1997). Also, Thyssen, Israelsen and Jørgensen (2006) studied the support of ABC analysis for decision-making regarding product modularity. In their study, ABC provides information to decision-makers about how the average variable cost for product-unique modules compared to substitutes in order to break even in terms of total cost. Their findings have indicated that three common rules apply to the cost-effectiveness of modularisation, identifying the highest level of profit that can be achieved in relation to product modularisation (Thyssen, Israelsen and Jørgensen 2006). Effective cost systems support organisational performance, as previously noted, and enhance company profitability by helping to control the costs of products or services. This study examines the cost system Irish companies use to calculate the sales value of a product or service. Again, this provides support for use of a contingency approach here.

Chenhall (2003) reported that "technology refers to how the organisation's work processes operate (the way tasks transform inputs into outputs) and include hardware (such as machines and tools), materials, people, software and knowledge" (Chenhall 2003, p. 135). There are three types of technology of relevance to MCS design. The first type is the complexity of the technology; this derives from the standardisation of the work (for example involving a small or large batch size or highly automated factories). The second type of technology is defined by the level of task uncertainty; this refers to variability in the tasks and the analysability of the methods for performing duties with a high level of variability. The third type of technology is the interdependence of technology within the organisation, the knowledge of the transformation process and the level of predictability in relation to measuring the outputs (Ouchi 1979, Perrow 1970, Woodward 1965, Chenhall 2003). In this study, IT is one of two independent variables considered when assessing factors contributing to the level of ABC and ABM implementation. This variable has been divided into five factors; namely, IT function, online activity, training activity, in-house software, and meeting management needs, as will be discussed in more detail in Chapter 5.

In addition, Chenhall (2003) stated that contingency-based research in MA has been used for a long time, specifically for MCS. He also observed that researchers operating in the MA field have attempted to explain the effectiveness of MCS by considering the environment. For example, they address aspects such as changes to the internal and external organisational culture, changes to technology, the modification of organisational structure and size, and the

shift in organisational strategy. Therefore, the current research, which examines several of these contingent factors, suggest a contingency approach is the best-fit approach to exploring the research questions. The classification of contingency variables related to the design of MCS can be traced to the original structural contingency frameworks formed in the organisational theory (Chenhall 2003). Researchers such as Burns and Stalker (1961), Lawrence and Lorsch (1967), Thompson (1967), Perrow (1970), and Galbraith (1973) have focused on the influence of technology and the environment on organisational structure (Burns and Stalker 1961, Lawrence and Lorsch 1967, Thompson 1967, Perrow 1970, Galbraith 1973). The current study, examines the impact of the IT resources on the level of ABC implementation as a contingent factor, and thus effectively explores IT variables when answering the research questions. Reviews of accounting research have been carried out by researchers such as Otley (1980), and Waterhouse and Tiessen (1978), who examined the importance of technology, company size, environment, and company structure in terms of the design of MCS. Waterhouse and Tiessen (1978) asserted that national cultures have been influenced by organisational cultures, and that this has affected the development of multinational operations in many companies (Chenhall 2003). Thus, current research, examining the impact of multinational status on the level of ABC implementation as a contingent factor, further supports the use of a contingency approach.

Research based on contingency theory in MA has also concentrated on different of aspects of MCS, including budget slack, post-completion audits, variance analysis, the sophistication of systems and the formality of communications, and links to reward systems (Bruns and Waterhouse 1975, Merchant 1981, Merchant 1985, Dunk 1993, Smith 1993, Chenhall and Morris 1993, Van der Stede 2000, Emsley 2000). Examples of contemporary innovations in MCS include ABC and ABM (Gosselin 1997, Anderson and Young 1999), non-financial performance measures (see Ittner and Larcker (1998) for a relevant review) and economic value analysis (Biddle, Bowen and Wallace 1998). Furthermore, contingency-based theory has focused on such modern innovations in MCS, including ABC and ABM, non-financial performance measures, and economic value analysis (Biddle, Bowen and Wallace 1997, Gosselin 1997, Ittner and Larcker 1998, Anderson and Young 1999). Thus, the use of contingency theory has proven beneficial in other studies on MCS innovations. This suggests the use of contingency theory is again a rationale choice for this study. However, there has been very little replication of measurable improvement with regard to research investigating MCS practices concerning issues such as non-financial performance measures, static-flexible budgets, activity-based accounting, competitor-focused accounting and product development information (Chenhall 2003). In addition, the control culture, whether necessary or mechanistic, influences the processes involved in the implementation of MCS, such as ABC,

which are closely linked to the organisation's control culture (Shields 1995, Gosselin 1997, Krumwiede 1998, Anderson and Young 1999, Chenhall 2003). The current study did not focus on organisational culture as a control variable, but did include the multinationality of an organisation as a control variable impacting the level of ABC and ABM implementation. By examining this variable, the organisational culture is included, therefore a contingency approach seems a useful approach in this study.

Summarising different perspectives of contingency theory, Schoonhoven (1981) views contingency theory as a meta-theory or as a conventional theory with a specific set of interrelated propositions. In addition, the available literature suggests no general optimal structure exists in the MA context. Researchers have demonstrated that there is no optimal design of MCS, by examining contingent factors such as the level of technology, the organisation's size, environmental uncertainty and strategy, which determine the nature of optimal design (Chenhall 2003). Also, contingency theory assumes that any organisation, operational system or management team cannot be equally efficient and/or relevant to all circumstances and environments (Van de Ven and Drazin 1984). Consequently, specific circumstances may be more beneficial in a particular specific system than a fact that alludes to the role of fit at the core of contingency theory (Van de Ven and Drazin 1984).

Independent and dependent variables in MCS have been examined using contingency-based theory. In order to examine the contingency fit occurring between MCS and context, the outcome-independent variables should represent some dimension of the required organisational or managerial performance, and should explain some of the characteristics of MCS in order to provide conclusions that support managers in their efforts to achieve their goals (Otley 1980, Otley and Wilkinson 1988). Also, Chenhall (2003) stated, "if disequilibrium conditions are assumed, then it may be useful for contingency-based studies to first establish adoption and use of MCS, then to examine how they are used to enhance decision quality and finally investigate links with organisational performance" (Chenhall 2003, p. 135). He also noted that caution is needed when interpreting research in which outcome variables are linked to the characteristics of MCS, including outcome variables such as the 'use and usefulness' of the system. Individual companies may be required to use MCS systems, such as ABC and ABM, or budgets in decision-making, although they note that these are of little use. Whilst an appropriate MCS may be observed as not beneficial, organisational performance may still be high, due to information derived from other sources. In addition, contingency theories have been used to assist researchers studying organisational behaviour, planning and management strategy, performance and design. These theories share the common hypothesis that the outcome is fit between two factors. There are three concepts of contingency theory fit - selection fit, interaction fit and the systems fit approach (Van de Ven and Drazin 1995). Contingency theory was developed in the 1960s as a major organisational theory that views companies as open systems for which no general optimal structure exists. The importance of contingency theory in MA relates to the concept of contingency fit, with three rarely discussed types of contingency fit occurring in MA (Fisher 1995, Chenhall 2003, Franco-Santos, Lucianetti and Bourne 2012). Burkert et al. (2014) adds matching fit as another type of contingency theory fit in relation to MA, with the moderation of form and the mediating form of fit. The issue of contingency fit is discussed in detail in the following section.

4.4. Contingency Fit

Contingency fit is one of a number of factors to be addressed in the use of contingency theory (Donaldson 2001). Ghofar and Islam (2014) argue that the concept of contingency fit requires a combination of strategies of controls and contingencies in order to produce better performance. Furthermore, better performance is an outcome of a suitable combination of contingent factors (Ghofar and Islam 2014). Chapman (1997) stated that accounting research using the contingency approach is most often operationalised as the routine use of official technology. Such a polarity seems at odds with more general considerations of accounting. Therefore, as accounting provides a high level of information to the management levels of an organisation, it does not readily accept the idea that the accounting function as a whole may be incorrect due to unclear contexts (Chapman 1997).

In addition, Hoque (2006) stated that the literature on any research phenomenon adopts a varied range of statistical and empirical approaches, and that the fundamental problem needed to inform an understanding of the contribution of the research relates to the concept of 'fit' (Hoque 2006). Donaldson (2001) defined the concept of fit as "the heart of contingency theory" (Donaldson 2001, p. 181). Also, Hoque (2006) states that research using a contingency approach in MCS has been employed to recognise how to best consider and implement this 'fit' to the contingencies within which those controls are engaged (Hoque 2006). In any research, fit is a question of alignment between a number of primary pieces of an organisational puzzle, and this is how one research study differs from another. In Hoque's (2006) study, fit is concerned with the alignment between three primary elements: (1) the characteristics of MCS, (2) organisational performance, and (3) contingent factors that may affect the relationship between the other two (Hoque 2006). In the current study, which focuses on MA techniques rather than management control, fit is a question of alignment

between three primary pieces of the organisational puzzle: (1) the characteristics of costing systems used within the organisation; (2) the level of implementation of ABC and ABM, and (3) the contingent factors that may affect the relationship between (1) and (2) (mainly, the level of IT and the economic conditions).

Hoque (2006) stated that contingency theory forms part of the body of literature on organisational research. For example, research on MCS has examined the effects of the technology used by an organisation, the environment in which an organisation works, and the size and structure of that organisation. The current study also focuses on the effect of technology, size, and the structure of the organisation (as a national or multinational corporation) and on the level of ABC and ABM implementation in the top 1000 Irish organisations. Furthermore, considerable attention should be paid to the usefulness of a contingency approach, as it characterises differences between internal and external variables that may affect the behaviour of an organisation (Hoque 2006). The current study also focuses on internal factors, for example, IT resources, and whether organisational size influences organisational behaviours. In addition, it focuses on external factors, that is, the economic conditions, and how level of competition in an organisation influences behaviours. These behaviours can affect decisions about the cost system utilised in Irish companies.

It is difficult to understand the fit between methodological and theoretical significance and its implications. In fact, there are substantial and confusing differences in the vocabulary used to define the different forms of fit used by key writers on the subject of contingency theory. Hoque (2006) compares (see Table 4-1) the different terms of fit employed by Drazin and Van de Ven (1985) and Donaldson (2001), who are key source writers on the subject (Hoque 2006).

Drazin and Van de Ven (1985)	Donaldson (2001)
 Selection fit Interaction fit System fit 	 Managerial choice Congruence fit matching and interaction Multi fit

Table 4-1: Abbreviated Summary of Fit Relationships

It can be seen from Table 4-1 that whilst the adoption of a common set of terms is helpful, Donaldson (2001) proposed a comprehensive departure from the terms suggested by Van de Ven and Drazin (1985). Hoque (2006) argued in support of his suggested re-naming of 'Selection fit' and 'Systems fit' and provides an excellent summary of the key arguments regarding the nature of relationships being theorised. In particular, he proposes that the renaming of 'Interaction fit' deserves more attention as it stresses an important argument, highlighting the separation between theoretical concepts of fit and their statistical operationalisation. In part, he wishes to avoid the confusion caused by the use of the multiplicative interaction terms commonly used in statistical analysis of interaction fit. His main concern is to elaborate on a matching fit (used very infrequently in MCS research) from approaches that are more general and use multiplicative interaction terms (the bulk of MCS literature). Donaldson proposed the term 'Matching fit' as the exemplar of contingency research, as it offers a far more precise theorisation of the relationship between MCS, contingencies and performance (Hoque 2006).

In summary, many research studies have considered the success and validity of ABC adoption, in addition to the different stages of its adoption and its use based on the contingency theory approach. Studies have examined the relationships between diffusion and individual contextual factors, such as business complexity or strategy, product variety, or organisational characteristics (see, for example, Anderson 1995, Krumwiede 1998, Chenhall and Langfield-Smith 1998, Anderson and Young 1999, Anderson 2002, Chenhall 2003). Gosselin (2007), reviewing the ABC literature, identified the fundamental unsolved problem of the ABC paradox as that, "despite favourable context for the adoption and implementation of ABC and even though ABC exists since almost 20 years, surveys have shown that the diffusion process of ABC has not been intense as may have been expected" (Gosselin 2007, p. 642). The next sections discuss the different concepts of contingency fit as shown in Table 4-1 - selection fit, matching/interaction fit and systems fit.

4.4.1. Selection Fit

Selection fit, as described by Drazin and Van de Ven (1985), tests how contextual variables are related to the characteristics of MCS by assessing whether this relationship is linked to performance (Drazin and Van de Ven 1985). The cost system utilised in the target organisations has an MCS characteristic, which also relates to the organisation's performance. This study does not focus on the MCS or the organisation's performance, but rather on a key factor of MCS, the cost system. Therefore, assessing selection fit could be appropriate in this study. Donaldson (2001) termed selection fit a 'managerial choice'. A dependence on accounting performance measures, for example, is useful only in circumstances that are stable and certain (Hoque 2006). Using this assumption, researchers can only detect whether organisations have utilised the best choice when confirming that MCS fits the context of the organisation, and cannot detect the context of organisations that have not. Drazin and Van de Ven (1985) stated that selection fit may apply more to some aspects than others.

In addition, Hoque (2006) stated that statistical analysis can be used to test selection fit by examining research phenomena regarding the level to which MCS are connected to components of context. This requires an examination of that correlation through, for example,

regression or correlation analysis. In addition, he states that a unique feature of selection fit research in MCS is recognising the novelty of MCS and showing how it is connected to different contingencies (Hoque 2006). On this argument, the current study uses a questionnaire as a research method to examine research phenomena. In addition, regression and correlation analyses are used to examine the relationships between the research variables. Therefore, selection fit applies to this study.

4.4.2. Interaction Fit

Hoque (2006) suggested that interaction fit approaches propose that whilst some organisations are possibly moving in the direction of best combinations, others have not accomplished this. Interaction fit helps the researcher to identify those organisations that perform poorly, and which are not suited to using MCS to report at any particular point in time (Hoque 2006). Hoque (2006) argues that MCS performance and contingencies are interrelated, whereas Donaldson (2001) contends there are other concepts of interaction fit, such as matching fit, theoretical and empirical Euclidean distance approaches, and multiplicative interaction fit. All of these interactional fit contingencies try to identify the relationships between MCS and organisational performance. When examining the relationship between MCS and performance in the current study, the focus is not directly on organisational performance but instead on the cost system, which is one aspect of the MCS. Therefore, the choice of which cost system is utilised could affect an organisations' performance, due to the impact of MCS. Thus, this argument again supports contingency theory as a suitable research approach.

4.4.3. Systems Fit

Van de Ven and Drazin (1984) stated that interaction fit approaches reflect how an organisation's performance measures are connected to only one or two related variables. There is some disagreement over whether MCS design should be studied in terms of many variables, and it is argued that the interaction fit approach is overly molecular (Van de Ven and Drazin 1984). Hoque (2006) stated that complete organisations, multiple contextual variables, and performance processes provide a form of systems fit. A contextual variable may perform negatively or positively with other variables, reducing or increasing the effects of context on a requisite aspect of MCS (Hoque 2006). Indeed, this study examines the relationships between several variables as regards the level of ABC and ABM implementation. However, the purpose of systems fit approaches is to remove the complete pattern of interdependencies between multiple variables. An interdependent relationship exists between these variables, so that their combined impact is greater than that of each variable when considered separately.

4.5. Problems with Contingency Theory

There is no complete theory and all theory has some unresolvable problems associated with it. Contingency theory has several problems that have been debated in the literature, and some of these are discussed here.

The first is lack of clarity. Schoonhoven (1981) found that contingency theory is not a theory in the conventional sense, as a theory is a powerful set of interconnected propositions. He argued that contingency theory is more of a meta-theory or a conforming strategy, suggesting ways in which an approach to a phenomenon should be explained or conceived. Schoonhoven (1981) argued that contingency theory is built on two assumptions, as cited by Galbraith (1973, p. 2). These assumptions are 1) there is no single best path for organising, and 2) any one way of organising is not equally effective under all conditions. These presumptions are explicitly stated and guide contingency research. While the overall strategy is mostly clear, this element of the theory is not (Schoonhoven 1981).

Second is contingency relations as interactions. The lack of clarity expressed by contingency theorists has caused a second problem, understood as the issue of empirical interaction. Namboodiri, Carter and Blalock (1975) argued that contingency theorists state that there is a relationship between two variables in their research (for example technology and economic crises). They state that this relationship should examine a third variable (the level of implementation of ABC and ABM within the organisation, for example, in the current research). They declare that an interaction typically exists between the first two variables (Namboodiri, Carter and Blalock 1975).

Third is a functional form of interaction. The lack of clarity affects associated theoretical statements, failing to deliver any evidence of the specific form of the interaction intended (Schoonhoven 1981). A mathematical equation of implied interaction between the two variables is seldom explicit. The argument explaining this absence is that the mathematical equation implied by the relationship between theories may be represented in practice by different functions or equations with quite different properties (Schoonhoven 1981).

Fourth is the analytic model used: The functioning and computational actions that researchers are using to enforce assumptions on an already indefinite conceptual framework have caused problems with contingency theory (Schoonhoven 1981). In addition, it relies on linear models and correlation procedures, assuming the relationships between variables using a contingency framework are typically linear (Schoonhoven 1981).

The current study tests independent and dependent variables, which are presented as contingent factors influencing the level of ABC and ABM implementation at the top 1000 Irish organisations. The issue of loss of clarity when applying contingency theory is of less importance in the current study, as the relationship between the contingency variables means there will be less scope for erroneous assumptions and overlap. Moreover, measuring the level of ABC adoption is not an issue, as it either is or is not adopted. Furthermore, the mathematical equation for the proposed interrelationship between the dependent variable on one side of the equation, and the independent and control variables on the other, are relatively transparent. Therefore, the problems and limitations that can obscure results when applying contingency theory have less effect on the current study.

4.6. Conclusion

Contingency theory acknowledges that contingent factors are interrelated and could lead to enhanced organisational performance. This chapter has examined the foundations of contingency theory, as drawn upon in this study, and, in conjunction with Chapter 5, argues that contingency theory and the positivist framework are the most appropriate methods to employ herein. Contingency theory can be used to study the aspects of an organisation's behaviour that are affected by different internal or external factors, and is thus suited to a positivist ontology. Furthermore, the chapter discussed types of contingency fit, including selection fit, interaction fit and systems fit. Challenges associated with contingency theory are discussed further in the Research Methods section in Chapter 5, which presents the research methods employed in this study. It also describes the research questions, the research hypotheses, the research model, and the variables used. In addition, it presents the research questionnaire, details of the response rate and the limitations of the method used.

CHAPTER FIVE

Research Design

5.1. Introduction

As detailed in Chapter 4, this research adopts a contingency approach and a positivist ontological position. This chapter first discusses the research questions, formulates research hypotheses, presents the research model and the research variables in detail. Second, it presents the questionnaire design, phases of the questionnaire, and the stages of the pilot questionnaire. Third, it examines the research sample and details of the sample. Fourth, it outlines the questionnaire package, and its distribution. Fifth, it discusses the response rate, making comparisons with similar studies. Sixth, it defines the research coding and statistical tests and tools used to analyse the data. Finally, it discusses the limitations of the method employed.

5.2. Research Questions

As discussed in Chapter 2, ABC is recognised as one of the most significant innovations to date in the field of MA. The literature reviewed reported that in the majority of organisations worldwide, ABC and ABM and implementation rates are low, usually between 20% and 25% (Johnson, 1990; Shields, 1995; Clarke et al., 1997; Booth and Giacobbe, 1999; Askarany, 2006; Kaplan and Anderson, 2007; Gosselin, 2007; Askarany and Yazdifar, 2007; Smith et al., 2008). To deliver additional data to better inform organisational stakeholders and researchers, this study examines the level of ABC and ABM implementation within the top 1000 Irish organisations, as listed in the *Irish Times*. Adoption of activity-based costing or activity based management (ABCM_t) is the primary dependent variable in the research model. The following research objectives guide the study, as already outlined in Chapter 1.

Research Objective 1: to determine the level of adoption and implementation of ABC and ABM in the top 1,000 Irish companies.

Research Objective 2: to determine if there is a relationship between the level of IT resources within the firm and the adoption and implementation of ABC and ABM in the top 1,000 Irish organisations.

Research Objective 3: to determine if there is a relationship between the economic conditions faced and the adoption and implementation of ABC and ABM adoption in the top 1,000 Irish organisations.

5.3. Formulation of Research Hypotheses

From the above research objectives (and the related questions outlined in Chapter 1), as well as the potential relationship to control variables, a set of research hypotheses will now be formulated.

Clarke, Hill and Stevens (1999) stated that the practice of MA in Ireland is less advanced than in any other English-speaking country. They also stated that the primary role of management accountants in Irish organisations is that of record-keeper, rather than decision-facilitator and innovator (Clarke, Hill and Stevens 1999). MA literature describes ABC as one of the most important MA theories of the twentieth century, particularly as it enables management accountants to become part of an organisation's value-added team, and to work with other organisations (Johnson 1990, Turney 1991, Kaplan et al. 1992, Kaplan 1995, Clarke, Hill and Stevens 1999, Al-Sayed and Dugdale 2016). Lin, Collins and Su (2001) stated: "No cost accounting system is perfect, including ABC, because of the near impossibility of tracking and attaching every resource cost to a particular activity" (Lin, Collins and Su 2001, p. 710). Clarke, Hill and Stevens (1999) moreover stated that adoption rates for ABC in Ireland are comparatively low, and influenced by changes to MA in general. This may be due to a focus of efforts instead on traditional costing systems, or that the cost of the implementation of ABC and ABM is prohibitive. Others may have adopted ABC and ABM, but failed to reap rewards from using it (Clarke, Hill and Stevens 1999). This research primarily hypotheses the exploration of the implementation of ABC and ABM in relation to: (1) the impact of economic conditions, and (2) the IT resources held by organisations.

5.3.1. The Level of IT and ABC and ABM adoption

As outlined previously, there has been a rapid growth in IT since the 1970s, which brought about considerable levels of change, including in telecommunications, transportation systems, computing, health system, social media, and scientific discoveries. These all affect the way human beings work and operate (McWatters, Morse and Zimmerman 2001). IT systems have now taken over multiple functions and operations within organisations, with the result that they are now no longer restricted to finance and accounting departments (Burns, Ezzamel and Scapens 1999, Scapens et al. 2003). A considerable volume of MA literature has addressed how technology influences MA (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003). Thus, new business practices have arisen, triggering both organisational and structural changes within MA; these are supported by software packages such as SAP and Sage (Markus et al. 2000, Parr and Shanks 2000). In addition, organisations are using ERPs, and these have now become a commonplace feature, responsible for forming global connections with other organisations (Davenport 2000). Drury (2008) explained that the use of IT to assist business activities has been improved dramatically by the development of electronic business communication technologies (Drury 2008), and IT has subsequently had a considerable impact on both businesses and MA.

With the arrival of affordable personal computers, the internet, unified networks, and selfservice utilities, have brought about a radical change in the potential of IT, influencing both MA and organisational structure in response to the evolution of IT software (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003, Markus et al. 2000, Parr and Shanks 2000, Scapens et al. 2003). In particular, management accountants have used IT to assemble more comprehensive management information for decision makers and the users of MA systems. They benefit from real-time data endowment, which makes accounting information about organisations more readily obtainable (Dechow, Granlund and Mouritsen 2007, p. 60). In addition, the use of IT and the development of electronic business communication changes MA systems, altering how organisations transfer information and communicate (Drury 2008).

IT can drive organisations to reassess the systems they employ to calculate overheads, making it an important independent variable in this research. The literature notes the potential for a strong relationship between the implementation of ABC and ABM and the level of IT facilities available within an organisation. Here, the focus is solely on the influence of technology on the adoption of ABC and ABM. The key research proposition here is that the adoption of ABC and ABM is positively related to a company's technological resources. Figure 5-1 depicts the impact of aspects of IT as an independent variable, and the implementation of ABC and ABM as dependent variables in this research study.



Figure 5-1: IT as an Independent Variable

The figure above illustrates that the IT variable has five associated factors that can be employed to test the impact on the adoption and implementation of ABC and ABM in Irish organisations. The IT function within each organisation is associated with the IT variable, which examines the function of IT within each organisation, by testing its size based on number of IT employees, as well as the amount of investment in: (1) IT training; (2) devices owned, or used, in the IT department; and (3) the IT training programmes provided by the company. The second factor relates to online IT, and examines an organisation's engagement in online activities, i.e. its use of the Internet to connect customers and suppliers, undertake business, order materials or services, and provide online customer support. The third factor consists of IT training, which examines an organisation's level of engagement in IT training; i.e. funding for outsourced employee training programmes in IT, and in-house IT training programmes. The fourth factor consists of IT in-house software, which examines internal level involvement in IT within an organisation, e.g. establishing whether an organisation has an independent IT department, along with customised software created in-house, and determining the level of use of accounting software and the development of a website in-house. The final factor associated with these variables concerns whether the IT resources within an organisation meet the needs of management.

Figure 5-2 illustrates the relationship between these five factors, along with the IT independent variable. To merge these five factors into one independent variable (i.e. IT), the mean value of each was computed. This procedure was then repeated for the remaining factors (i.e. IT)

function; online activity; training activity; in-house software; and meeting management needs) fulfilling management's requirement for information. Subsequently, the mean value of these five factors was computed to obtain the mean value of the IT independent variable, thus comprising the end value of the IT variable, which was then employed in the full model.



Figure 5-2: IT Independent Variable Factors

In the context of the current study, level of IT resources within a firm is referred to as ' IT_t ' (denoting a continuous measure of the average level of IT within the sample firms) in the estimation model. The above discussion of previous research provided compelling evidence suggesting a potentially positive association between Online Activity as a factor and the availability of in-house software (IHSoftware) for investigation in this study. This is a relevant and novel approach, not considered to date in the literature. The study thus tests the following hypothesis:

Hypothesis 1: There is a positive relationship between the implementation of $ABCM_{i}$, and the level of IT resources (IT_{i}).

5.3.2. Economic Conditions and ABC and ABM

Over the most recent decade, there has been a rapid transformation in global economic conditions. Some industries have experienced a negative impact as a consequence, with others less so. Economic challenges can trigger diverse changes, both within organisations and the environment; thereby, becoming a significant factor impacting an organisation's strategy and construction, e.g. causing a change in the cost of products or services provided; a change in organisational strategy; and alterations to the level of employment within an organisation. The recent global economic recession has impacted the majority of global, and Irish, organisations. In a general sense, Libby and Waterhouse (1996) have stated that impact of economic forces is not widely understood in terms of the effects on MA.

...economic, social and political forces drive organisational change in ways that are not well understood. That organisational change has influenced the recent development of new management accounting systems and techniques seems indisputable (Libby and Waterhouse 1996, p. 137).

However, the work of Libby and Waterhouse (1996) pre-dates the recent economic slowdown. On this specifically Giannone, Lenza and Reichlin (2011) stated that:

...the recent recession has affected all countries around the world in an almost synchronous way. Interestingly, not only has it hit countries with bad macroeconomic fundamentals, but also those with AAA rating (Giannone, Lenza and Reichlin 2011. p, 111).

The costing system utilised by an organisation forms a vital component of its structure, and is impacted by ongoing difficulties in the economy, driving many organisations to reassess the systems they employ to calculate product costs. This has enabled the researcher to establish current economic conditions as an important independent variable in this study. Furthermore, the researcher proposes there is a strong relationship between the implementation of ABC and ABM and the economic status of an organisation.

Figure 5-3 presents the second independent variable, which examines the impact of economic conditions within an organisation on its implementation of ABC and ABM. This variable is comprised of three factors: (1) business growth; (2) product activity; and (3) liquidity. Each of these factors examines the impact of an organisation's economic conditions on the implementation of ABC and ABM.



Figure 5-3: Organisation's Economic Condition Independent Variables

The business growth factor examines changes in the profits of an organisation in two forms: (1) gross profit, and (2) net profit. In addition, this factor includes changes in the number of employees within an organisation over the past five years, as an indicator of the organisation's economic conditions, and as an indicator of the impact of such conditions on the implementation of ABC and ABM systems. In addition, it examines the fluctuating levels of products/services sales as a further indicator of the organisation's economic conditions. Finally, this factor examines the organisation's relationship with its suppliers, and the subsequent impact on the implementation of the ABC and ABM system.

Product activity examines changes in level of productivity within each organisation, as an additional indicator of economic conditions. It examines changes in the number of services delivered within organisations over the past five years, to indicate the impact of economic conditions on the implementation of the ABC and ABM system. In addition, it measures any changes in number of customers, as an indicator of the impact of economic conditions on the implementation of ABC and ABM systems. Finally, it measures changes in the number of products produced over the previous five years, as an indicator of the economic conditions within the organisation, in conjunction with the impact of any change on the implementation of ABC and ABM system.

The liquidity factor examines changes in the liquidity of an organisation, as an indication of its economic conditions, and their impact on the implementation of the ABC and ABM system. This factor is determined through an assessment of changes to the amount owed by customers,

as well as examining changes in the amount owed to suppliers. The above factors are all included under the heading economic conditions, as a means of examining the impact of a specific variable on the level of implementation of an ABC and ABM system.

Figure 5-4 demonstrates that the relationship between these three factors and an organisation's economic condition is that of an independent variable. The mean value of each of these three factors was computed to merge them into one independent variable. The functions of transform, compute, and mean, were applied to estimate the mean value of business growth, e.g. the mean value of business growth factor = MEAN (gross profit, net profit, number of employees, products/services sales price, and number of supplier relationships). This process was repeated for the further two factors, i.e. product activity and the liquidity of the organisation. Subsequently, the mean value of these factors was calculated using identical procedures, to obtain the mean value of the organisation's economic condition as a variable.



Figure 5-4: Organisation Economic Condition Independent Variable Factors

As the recession occurred relatively recently, no studies have to date, tested the impact of an organisation's economic conditions on its implementation of ABC and ABM. Therefore, the following hypothesis tests the impact of economic conditions ' $ECON_t$ ' (as a continuous measure of the average organisation economic condition of the sample firms) on ABC/ABM implementation, as follows:

Hypothesis 2: There is a positive relationship between the implementation of activity-based costing and activity-based management ($ABCM_t$) and an organisation's economic condition ($ECON_t$).

5.4. Control Variables

This section discusses a number of control variables addressed within the current study; i.e. organisation size, industry, multinational organisations and level of competition. The study examines the impact of these control variables on the level of implementation of ABC and ABM, and is followed by an analysis of the results from the acquired survey data in relation to the relevant literature.

5.4.1. Organisation Size

Over recent decades, there has been a rapid global transformation of organisational structures. A number of organisations have amalgamated to increase their size and financial capacity, leaving small companies, which have failed to follow this route easily outcompeted. These developments result in many changes within an organisation, affecting the business environment, and therefore representing a significant factor in an organisation's strategy and construction. The costing system forms a vital component of the construction of an organisation, and can be influenced by changes in company size, thus persuading many companies to reassess the systems they employ to calculate overheads. This led the researcher to set company size as an important control variable in the current research.

The debate in the literature concerning the impact of organisational size on ABC implementation levels is divided between two groups. The first group acknowledges the existence of a statistically significant association between the size of an organisation and its implementation of ABC; i.e. larger organisations are more likely to adopt ABC than smaller organisations (see for example, Innes and Mitchell 1995, Bjørnenak 1997, Malmi 1999, Pierce and Brown 2004, Al-Omiri and Drury 2007, Schoute 2009). Innes, Mitchell and Sinclair (2000) argued that in the UK, there is a higher level of implementation in larger than smaller organisations. Al-Omiri and Drury (2007) also identified a relationship between the size of an organisation in the UK and the implementation of ABC. Brown et al. (2004) confirmed a relationship between the size of an Irish organisation and the implementation of ABC. The second group suggested a lack of any direct relationship between organisational size and the level of ABC implementation (see for example, Libby and Waterhouse 1996, Gosselin 1997,

Krumwiede 1998, Baird, Harrison and Reeve 2004, Pierce and Brown 2004). Libby and Waterhouse (1996) confirmed a lack of any significant statistical association between the implementation of ABC and the size of an organisation. In addition, Baird (2007), Cohen et al. (2005), and Gosselin (1997) also suggested a lack of any significant statistical association between ABC implementation and organisational size. In addition, Cotton, Jackman and Brown (2003) found that implementation levels of ABC in New Zealand organisations receive less consideration than those of UK organisations, because New Zealand organisations tend to be smaller in size than those in the UK (Cotton, Jackman and Brown 2003).

Studies in the literature focussing on the implementation of ABC have employed a number of different methods to measure the size of an organisation, with some using annual turnover, total sales, and number of employees (Gosselin 1997, Baird, Harrison and Reeve 2004, Baird 2007, Askarany, Yazdifar and Askary 2010). Furthermore, researchers have employed varying levels of sales revenue to measure the size of organisations (Krumwiede 1998, Al-Omiri and Drury 2007). Gosselin (1997) and Askarany et al. (2010) stated that the most popular method in the literature offers number of employees as a proxy for organisational size. Figure 5-5 depicts the two factors built into this variable to provide different measures of company size: (1) annual turnover, and (2) number of employees.



Figure 5-5: Company Size Control Variable

Annual turnover as a factor groups the size of companies in terms of annual turnover, followed by an examination of the level of implementation of ABC and ABM within each group. In addition, the factor number of employees groups the size of companies in terms of number of employees, followed by an examination of the level of implementation of ABC and ABM. In the current research model the researcher decided to use annual turnover as an indicator of company size, because it is a more accurate measurement of company size than number of employees. The questionnaire is structured to collect information about company size using both company turnover and number of employees. Additionally, as this study is based in the Republic of Ireland, and similar to that produced by Pierce and Brown (2004) (the last study to examine the level of ABC implementation in Ireland), it uses annual turnover as a measure of company size.

In the context of the current study, company size is entitled 'SIZE_t' (a continuous measure of company size based on revenue). Based on the above findings, a positive relationship is predicted between implementation of $ABCM_t$ and company size (SIZE_t).

5.4.2. Industry Sector

Organisational size influences the implementation levels of ABC within the ABC literature (see Section 5.4.1). A debate also exists concerning the relationship between the industry to which an organisation belongs, and the level of ABC implementation (see for example, Innes and Mitchell 1995, Innes, Mitchell and Sinclair 2000, Cotton, Jackman and Brown 2003, Pierce and Brown 2004, Al-Omiri and Drury 2007). For example, Innes and Mitchell (1995) and Innes, Mitchell and Sinclair (2000) established that the implementation rate for manufacturing in the UK is lower than that for non-manufacturing. Similarly, Al-Omiri and Drury (2007) identified a statistical association in the UK between the service and financial sectors and the implementation of ABC. In addition, Kaplan and Cooper (1998) recommended service organisations as more appropriate than manufacturing organisations when discussing the implementation of ABC. They stated that "while ABC had its origins in manufacturing companies; many service organisations today are obtaining great benefits from this approach as well" (Kaplan and Cooper 1998, p. 228). Meanwhile, a number of studies have concluded that the implementation of ABC is higher among manufacturing than non-manufacturing organisations (Cotton, Jackman and Brown 2003, Pierce and Brown 2004). A further study found no relationship between ABC implementation and industry type, i.e. non-manufacturing and manufacturing companies (Askarany, Yazdifar and Askary 2010).

This variable will ascertain whether industry sector has had an impact on the implementation of ABC and ABM. In recent decades, there has been a rapid change in organisational structure on a global basis, leading to a large number of companies specialising in this fast-changing environment with stronger competition, groups of companies, and wider online markets. Some focus has been directed towards industry sector specialisation, including major companies, such as Apple, Microsoft, Google, eBay, and Amazon. This can lead to many different changes

within an organisation, in addition to impacting the business environment. It will therefore prove a significant factor in establishing an organisation's strategy and construction. The costing system forms a vital component of an organisation's construction, and this can be affected by continuous change within the industry sector, leading many companies to reassess the costing system employed. Thus, the industry sector formed an important control variable in this current research study. As demonstrated by Figure 5-6, this research contains two factors that measure industry type: i.e. (1) manufacturing and (2) non-manufacturing.



Figure 5-6: Organisation Industry Type Control Variable

In the context of the current study, industry is entitled ' IND_t ' (a categorical variable that captures the various industry types), and as noted above, previous literature can lead to an assumption that there is a positive relationship between the implementation of (ABCM_t) and (IND_t).

In later tests, the variable 'INDGRPt' is employed. This is a categorical variable that equals '1' if the sample firm is a manufacturing company, '2' if the firm is a service company, and '3' if the firm is any other company type (see Section 5.9.1 for more details).

5.4.3. Level of Competition

A number of studies have focussed on the levels of competition between companies as factors influencing the implementation of ABC, which this study considers a control variable (Khandwalla 1972, Bruns and Kaplan 1987, Cooper 1988, Simons 1992, Libby and Waterhouse 1996, Bjørnenak 1997, Gosselin 1997, Krumwiede 1998, Guilding and McManus

2002, Baird, Harrison and Reeve 2004, Al-Omiri and Drury 2007, Baird 2007, Schoute 2009, Askarany, Yazdifar and Askary 2010). Additionally, Khandwalla (1972) stated that:

...the greater the competition, the greater the need to control costs, and to evaluate whether production, marketing, finance, etc. are operating according to expectations (Khandwalla 1972, p. 275).

There has been a rapid increase in competition within the international manufacturing sector in recent years, leading to a need for regular improvements in cost management systems. In addition, traditional cost practices have been unable to respond to these changes (Spedding and Sun 1999, Scapens et al. 2003). Due to the transformation in level of competition, organisations are in a continual flux of redevelopment, and this has helped to ascertain whether level of competition affects the implementation of ABC and ABM. Over the previous decade, the level of competition experienced increased rapidly, which had a considerable impact on many companies, because of the fast-changing competitive environment, which resulted in stronger competition, and broader online markets. Some organisations have begun to focus on their competitors. This has led to a number of changes within companies, which, as noted above, affected the business environment. This is, therefore, expected to form a significant factor in organisations' strategies and construction. The costing system utilised forms a vital component of organisational construction, and so could be affected by continuous change in terms of the level of competition. This has driven many companies to reassess the costing systems they employ to calculate overheads, and led this author to introduce level of competition as an important control variable in this research study.

The following Figure 5-7 depicts the impact of levels of competition within an organisation's sector as a control variable in the adoption and implementation of ABC and ABM.



Figure 5-7: The Level of Competition Control Variables

This control variable contains two in-built factors. Firstly, there is the alteration in the price of the product or service as a measure of: (1) the strength of competition within the sector; and (2) the strength of the competition in the product or service provided by the company. This factor measures marketing strategy, including: (1) planned advertising budget: (2) marketing issues; (3) product or service design; and (4) promotion and career progression. Secondly, there is a focus on the change made by organisations in terms of their product or service promotion. These measures the level of competition present in the organisational sector; e.g. the products/services provided by an organisation, and the selling price of products/services as influenced by pricing structure, pricing levels and the purchase price of key materials.

Figure 5-8 demonstrates the relationship between these two factors and level of competition as a control variable. An identical procedure was used for independent variables, in order to calculate the mean value of the control variable. The mean values of competition price and competition promotion were used to compute the mean value of competition as a control variable. To compute the factor of competition price, a calculation of the following was undertaken: (1) the mean value of the products/services provided; and (2) the selling price, as influenced by price structure, price levels, and the purchase price of key materials. Subsequently, there was a calculation of the mean value of these factors; these were employed in a similar manner to retrieve the mean value at the organisational level in reference to the competition control variable.



Figure 5-8: The Level of Competition Control Variable Factors

The level of competition between the dependent variable (ABC/M_t) and the control variable is denoted as COMP_t. Some prior literature observed the existence of such a relationship (Simons 1992, Shields 1995, Libby and Waterhouse 1996, Bjørnenak 1997, Anderson 2002, Al-Omiri and Drury 2007, Schoute 2009), and companies with highly competitive environments are more likely to use sophisticated MA systems (Simons 1992, Shields 1995, Libby and Waterhouse 1996, Bjørnenak 1997, Anderson 2002, Al-Omiri and Drury 2007, Schoute 2009). In addition, some literature has asserted that organisations should consider such implementation when levels of competition are high (Bruns and Kaplan 1987, Cooper 1988, Guilding and McManus 2002).

In addition, competition motivates managers to uncover alternative ways of differentiating their organisations from competitors. One such method involves considering costing systems (Bruns and Kaplan 1987, Guilding and McManus 2002). Cooper (1988) stated that organisations operating within highly competitive industries need to implement ABC (Cooper 1988), and Khandwalla (1972) confirmed the existence of a relationship between the intensity of competition and sophisticated management controls (Khandwalla 1972). Organisations have recently become more open to global competition (i.e. an organisation's competitors are no longer necessarily located in the same city, country or even on the same continent). Thus, there is an urgent need for organisations to focus on their competitors. This could be a potential motivation when increasing implementation rates within organisations. It is therefore expected that a positive relationship will develop between ABCM_t affecting competition levels within
the sample firms entitled 'COMPt' in the research model (a continuous variable which measures the average organisational level of competition).

5.4.4. Multinational Organisations

Recent years have also seen a dramatic change in the multi-nationality of companies, with many firms strongly impacted by the competitive environment, along with changes in IT and size, and the appearance of wider online markets. This has led to a tendency for organisations to become multinational, and is a significant factor informing their strategy and structure. The costing system utilised is a vital component of an organisation's construction, and can be impacted by continuous changes in multinational companies, or in the nationality of companies, which can in turn drive many to reassess the costing systems they employ to calculate overhead costs (Abdul-Majid and Sulaiman 2008). This led the researcher to include the multinational status of a company as an important control variable in this research, as shown in Figure 5-9. The variable is coded '1' if the sample firm is a multinational company, and '0' if not.



Figure 5-9: Company Multinational Control Variables

The organisation's multinational variable (MULTI_t) forms a further control variable, which also controls the relationship between the dependent variable (ABCM_t) and the independent variables (IT_t and ECON_t). A proportion of the literature has confirmed the existence of such relationships (Clarke, Hill and Stevens 1999). For the purposes of testing and analysis, this variable is entitled 'MULTI_t' (a dichotomous variable, where 1 = multinational, 0 if not). Based on the above assessment of previous literature, it is reasonable to predict a positive association between ABCM_t, whether or not the sample firm is MULTI_t.

5.5. Research Model

As demonstrated above, a number of factors inform each of the dependent and control, variables assessed in this study. The following procedures are employed to simplify and understand the many complex relationships within the data collected. First, factor analysis is applied to the data. Second, the current study has a binary component, seeking to identify whether a company has implemented ABC and ABM. Binary logistic regression is generally employed to examine binary dependent variables based on a number of other independent variables. The following LOGIT model is tested, following the key factors identified for each variable in the study:

 $ABCM_{t} = \alpha_{0} + \alpha_{1}IT_{t} + \alpha_{2}ECON_{t} + \alpha_{3}SIZE_{t} + \alpha_{4}INDGRP_{t} + \alpha_{5}COMP_{t} + \alpha_{6}MULTI_{t} + \varepsilon_{t}$

Where:

- ABCM_t = 1 if the organisation adopted ABC and ABM; 0 if the organisation did not adopt ABC and ABM but used another costing system to calculate the cost of products/services.
- IT_t = Average organisational level of IT in the sample, as defined by factor analysis test (see Section 5.3.1).
- $ECON_t$ = Average economic condition within the organisations in the sample, as defined by factor analysis (see Section 5.3.2).
- SIZE_t = Company size in the sample, as measured by annual company revenue (see Section 5.4.1).
- $INDGRP_t = Company industry type group in the sample (i.e. service companies, manufacturing companies and other companies); see Section 5.4.2 and Table 6-33.$
- $COMP_t$ = Average organisational level of competition in the sample, as defined by a factor analysis test (see Section 5.4.3).
- $MULTI_t = 1$ if the company is operating only in Ireland/the UK; and 0 if the company is operating worldwide (see Section 5.4.4).
- ϵ_t = Error term.

5.6. Factor Analysis

The fundamental supposition of factor analysis is that multiple observed variables will produce comparable patterns of answers to a research question, since they are all associated with a hidden (i.e. not directly estimated) variable. The respective factor carries a particular number of the overall questions, which have been loaded in the same group, and presentation of one factor will always be listed in order of how much variation is present. For example, in this study, participants might be expected to respond similarly to questions about IT function, online activity, IT training, in-house software, and IT meeting management needs, which are all associated with the latent variable, level of IT (see Section 5.3.1 for more details). In addition, participants respond similarly to questions about business growth, product activity, and liquidity, with the latent variable being the organisation's economic condition (see Section 5.3.2 for more details).

Factors classify correlations, and uncover causal order and interdependencies between variables. Rummel (1988) stated that:

...the factors discovered by a factor analysis can themselves be treated as formal concepts expressing mathematical relationships, as theoretical concepts or constructs bridging diverse phenomena, or as empirical concepts categorising concomitant relationships (Rummel 1988, p. 12).

The deduction, or defining of factors can be executed in two ways: (1) through theory, or (2) through the inductive application of analysis through the use of actual (or a sample of) data. The current study uses actual data to define factors, whereas factor analysis is additionally employed to test research hypotheses and prove research theories.

Factor analysis is a general scientific method employed when analysing data (Rummel 1988). Rummel (1988) specified that there is no limit to the possible content of a set of data, i.e. data can consist of anything and/or be of any type. Factor analysis focuses on inconsistencies within the data and the correlations present, and seeks to extract meaning from both. A single factor can be determined from data that is random, if an insignificant quantity is present. As with any tool, factor analysis has limitations and weaknesses. One limitation is that the data must have an underlying multinomial frequency distribution. There is also an assumption of additivity and linearity in the data. Also, it is possible for different investigators to arrive at different answers when using identical data and techniques (Rummel 1988).

5.6.1. Factors as Concepts

Rummel (1988) cited Carl Hempel (1952), who classified three categories of concepts which distinguish the conceptual nature of factors, as follows:

- 1. Analytic concepts: these represent the mathematical relationship between symbols.
- 2. Theoretical concepts: constructs that function as an analytic device for generating further concepts about a theory of an empirical nature, and for deriving theorems or hypotheses capable of being tested.
- 3. Empirical concepts: the definition of existential phenomena, which also have an operational meaning (Rummel 1988).

A number of the research questions in the questionnaire distributed for this current study were sourced from previous studies but a higher percentage were specifically tailored for this research. Due to the survey in the current study containing a large number of detailed questions, an exploratory factor analysis was conducted to simplify testing for the impact of IT, competition, and the economic position of the company in relation to the implementation and adoption of ABC and ABM.

Four steps were undertaken when runnning the factor analysis. The first step related to an examination of the correlation matrix; the second consisted of an extraction of initial factors; the third comprised of rotation and interpretation/validation using Cronbach's Alpha test on the factors; and the final step involved the construction of those factor scores to be utilised in further analyses. Regression analysis was undertaken once the results had been achieved following the employment of factor analysis of the data collected in the study.

The following section examines the current study's procedures for running the three aspects of factor analysis in detail. Before running the factor analysis, a Kaiser-Meyer-Olkin KMO and Bartlett's test was conducted, with factor analysis deployed following the conclusion of these tests. Firstly, factor analysis was run on the data collected regarding the impact of IT on the implementation of ABC and ABM. Secondly, factor analysis was run on the data gathered concerning the impact of the economic conditions of an organisation in the implementation of ABC and ABM. Finally, factor analysis was run on the data assembled relating to the level of competition, and its impact on the implementation of ABC and ABM. A Cronbach Alpha test was employed to validate each factor analysis test.

5.6.2. Cronbach Alpha

Cronbach (1951) stated that any study built on measurement should be concerned with the reliability of the measurement employed. A reliability test result reveals whether desired results are as expected when using a definitive group of items to produce interpretable reports concerning individual differences (Cronbach 1951). In order to test the reliability of any study, the researcher needs to run a test in SPSS, known as the Cronbach Alpha test. Cronbach (1951) published his paper on coefficient alpha and the internal structure of tests, stating that alpha is "an estimate of the correlation between two random samples of items from a universe of items like those in the test" (Cronbach 1951). This is established to form a suitable index of the similarity, and the concentration, of the first factor in the test. The index resulting from alpha demonstrates an index of inter-item homogeneity (Cronbach 1951). Cronbach stated that factor analysis cannot be understood without a suitable estimate of the size of the error of measurement (Cronbach 1951).

5.7. Logistic (LOGIT) Model

The current study is a binary study, containing "ONE" if the participating organisation has implemented ABC and ABM, and "ZERO" if not. Binary logistic regression is generally employed to examine binary dependent variables based on a number of independent variables (see for example, Scott 1997, Hosmer Jr, Lemeshow and Sturdivant 2000, Al-Sayed and Dugdale 2016). The following figure outlines the method of data collection applied in a binary study, in which there are Y-axes and X-axes and the data is binary (i.e. 1 and 0). The most effective means of testing used in binary studies is the Logit model (Cramer 2003, p. 10).



Figure 5-10: The Binary Model

The output of the equation employing the binary model Y, or, in this study model, ABC and ABM, is a scalar that can only adopt the values 1 or 0. Regardless of the nature of the test, the

output Y = 1 generally indicates success, and Y = 0 denotes failure (Cramer 2003). Thus, in the present study:

$$Y_i = 1$$
 if the organisation i implemented ABC and ABM.

$$Y_i = 0$$
 if the organisation i did not implement ABC and ABM.

When the dependent values were plotted against the independent and control variables X_i for the study sample, the Cramer (2003) scatter diagram was produced, see Figure 5-10. This was followed by a regression line and a function fitted to this data.

In statistics, LOGIT regression, logistic regression, or a LOGIT model, is a regression model in which the dependent variable is categorical. Gujarati (2012) stated that the logistic model has been widely used in the analysis of growth research phenomena; i.e. Gross National Product (GNP), population, and financial supply (Gujarati 2012). Figure 5-11 demonstrated the LOGIT regression curve, while Lokare et al. (2016) defined logistic regression as follows:

...logistic regression measures the relationship between the categorical dependent variable and one or more independent variables by estimating probabilities using a logistic function, which is the cumulative logistic distribution (Lokare et al. 2016, p. 117).



Figure 5-11: The Logistic Curve (Cramer 2003, p. 12)

5.8. Research Questionnaire

The term 'questionnaire' is used in a number of different fields and in different ways. Oppenheim (2000, p. 8) stated that: "some practitioners reserve the term exclusively for selfadministered and postal questionnaires, while others include interviewing schedules (i.e. administered face-to-face, or by telephone) under the general rubric of questionnaires". Questionnaires are used to discriminate between a set of closed and open-ended questions applying highly structured: tests, scales, attitude scales, checklists, rating scales, and projective techniques. According to Malhotra (2010, p. 335), a survey can be defined as "A technique for data collection that consists of a series of questions, written or verbal that must be answered by a respondent". Additionally, each respondent is asked the same set of questions in a predetermined order (Malhotra 2010).

This section discusses in detail the design of a questionnaire, including the phases, and the package used to address the research objectives. The design process for the survey was conducted in two parts. First, considerable time was spent reviewing the literature to identify the major issues associated with ABC and ABM implementation. This aided the identification of variables, which needed to be explored and afforded the bones of the survey to be distributed. In addition, ad lib questioning led to further issues, which needed to be addressed in the survey instrument. Second, the survey was piloted (see Section 5.8.4 for more details) to ensure the collected data would enable the researcher to answer the research questions and meet the research objectives (Saunders et al., 2012, p. 427). The survey consisted of six major sections (see Appendix G: Research Questionnaire).

5.8.1. Why a Questionnaire?

The literature review discussed in Chapter 2 established the existence of a high volume of research concerning the level of implementation and adoption of ABC and ABM based on questionnaire data (Innes and Mitchell 1995, Bjørnenak 1997, Gosselin 1997, Krumwiede 1998, Clarke, Hill and Stevens 1999, Malmi 1999, Hoque 2000, Innes, Mitchell and Sinclair 2000, Cagwin and Bouwman 2002, Al-Omiri and Drury 2007, Bhimani et al. 2007, Schoute 2009, Askarany, Yazdifar and Askary 2010, Schoute 2011, Bt-Fadzil and Rababah 2012). Fei and Isa (2010) stated that the majority of ABC implementation research is undertaken by employing quantitative research methods (e.g. a questionnaire survey), highlighting the lower volume of research studies undertaken using qualitative methods (i.e. interviews). It was necessary when undertaking the current research to collect data from a large number of organisations, due to its focus on the top 1,000 Irish organisations. It was therefore beneficial to utilise a questionnaire as the key research method. This resulted in the researcher developing a number of survey questions designed to answer the research questions, in conjunction with sub questions to answer general questions, i.e. those relating to demographics. As stated previously, not all the questions posed in the questionnaire were newly developed, with a number having been utilised by previous studies.

5.8.2. Questionnaire Design

This section outlines the design and construction of the questionnaire (see Appendix G: Research Questionnaire). It was divided into an entrance key section, which guided the participants into: (1) two further areas, independent of each other; and (2) a singular intersecting area comprising a number of sections. Furthermore, each section contained an intensive description and explanation of the questions, accompanied by a comprehensive explanation of the coding of each question used in the statistical analysis in SPSS 23 software, while the explanations followed the flow of the questionnaire sections described independently in each section. Each individual participant was requested to answer two independent areas of questions (i.e. Area 1, and Area 2), and an intersection area (i.e. Area 3). Figure 5-12 visualises the relationship between Areas 1, 2, and 3.



Figure 5-12: The Current Study Questionnaire Design

Thus, Area 1 was answered if the organisation was using a traditional costing system (i.e. a direct costing system, an absorption costing system, or other methods). It comprised fifty-three questions divided between two sections (i.e. 2 and 3). Section 2 identified the duration of the current usage of both the costing system and the level of satisfaction with the system. Section 3 identified the following: (1) business strategy; (2) the responsibility for changes in MA; (3) reasons for not changing to more modern techniques; and (4) the motivation behind rejecting changes to modern techniques. Following the completion of Area 1, the participants proceeded to questions in Area 3 (see below).

Area 2 established whether the organisation was employing ABC, TD-ABC, and ABM. It comprised of a single section, featuring twenty-seven questions, which examined: (1) the

duration of use; (2) prior systems; (3) alternative system used; (4) improvements; (5) percentage use; (6) current stage of ABM; and (7) periods. Following the completion of questions in Area 2, the participant proceeded to the questions encompassing Area 3 (see below).

Area 3 formed the core of the questionnaire, and was answered following the completion of either Area 1 or Area 2. It comprised seventy-three questions, divided between two sections (i.e. 5 and 6). Section 5 focussed on satisfaction with MA within the organisation and engagement in online activities. Section 6 classified levels of competition, economic conditions, level of IT resources, MA department resources, the size of the organisation, and demographic information.

Section 1: (See Appendix G: Research Questionnaire) formed the entrance key to the questionnaire, identifying the costing system utilised, and allowing participants to identify which sections they were required to complete in the hard copy version of the questionnaire. The online version of the questionnaire differed, as participants only had access to the relevant sections. The questionnaire entrance key consisted of four questions, each of which indicated a separate hierarchy, highlighting the different sections to answer. If participants gave positive answers to questions A, B or D, they were then requested to complete Area 1 and Area 3; however, if the participants answered question C, they were then requested to complete Area 2 and Area 3. This action was taken by the researcher to allow the participants to achieve greater efficiency, simplification, and relevance. This section was coded (see Appendix H: Coding List) for use in SPSS software in the statistical analysis phase of the research (see Chapter 6: Analysis of Data).

5.8.2.1. Sections 2 and 3

This area was answered by companies using traditional costing systems, or those that made no use of ABC and ABM systems. It contained two sections (i.e. Section 2 and Section 3), which established the traditional costing systems currently utilised within the organisation, i.e. 1) organisations employing direct costing systems; 2) organisations employing absorption costing systems; and 3) organisations employing costing systems that had not been included among those listed (i.e. the responses allowed the user to specify any of the alternative costing systems they were utilising). The participants answering this area were also required to complete Area 3. These sections are discussed in detail below. Section 2 was answered by organisations utilising traditional costing systems (i.e. direct, absorption and other traditional costing systems). It contains two subsections with six questions, and involved answering the question of approximate number of years an organisation had employed their current costing method, i.e. length of use. It also employed a 5-point scale to measure level of satisfaction with the costing method within the organisation, in terms of: information, timely information, necessary information, meeting management needs, and flexibility in relation to change.

Section 3 was completed by organisations utilising traditional costing systems (i.e. direct, absorption and other traditional costing systems). It contained four subsections, with forty-seven questions on a 5-point scale. The questions were divided into two groups, to answer two types of questions. The first referred to the effects of the business strategy of the organisation, and the ways in which it altered the practices of MA. The second consisted of why-type questions, i.e. why the organisation had failed to adopt more modern techniques, and reasons for rejecting changes to ABC and ABM.

5.8.2.2. Section 4

This area was intended for companies employing ABC and ABM as their main costing system. It comprised of one large section, i.e. Section 4. As shown in Figure 5-12 above, the participants completing this area did not complete Area 1, but had to complete Area 3.

Section 4 contained twenty-seven questions requesting two different types of information. The first focussed on ABC/TDABC and measured the approximate number of years for which the organisation had used the system. Furthermore, it indicated further costing methods employed, alongside, or in conjunction with, this system. Also, in relation to the 5-point scale, it indicated the extent of any improvements noted as a result of the implementation of ABC/TDABC, and was used to access information concerning the level, extent, and time of implementation within the organisation in all departments. In addition, it elicited information concerning ABC/TDABC integration with other information systems. Following intensive questions concerning ABC/TDABC, information was requested on ABM, including information relating to the stages of the implementation of this system within the organisation. It also established approximate duration of use, and information regarding the completion and scheduling of this system. This was followed by the organisation being given an opportunity to discuss the extent of management improvement since the implementation of ABM.

5.8.2.3. Sections 5 and 6

This area was a requirement for all study participants, regardless of which costing system was being employed. It consisted of two sections (i.e. Sections 5 and 6), and contained seventy-three questions.

Section 5 contains sixteen questions on a 5-point scale, designed to identify the general level of MA within the organisation, and the level of engagement in other activities aimed at reducing costs.

Section 6 contains fifty-seven sub-questions, arranged to collect four different types of information. The first type collected information concerning competition. The second type collected information concerning levels of IT within the organisation. The third type collected information concerning the available MA departments within the organisation. The fourth type collected information concerning the company's demographics.

All these areas worked in the background in the online version of the questionnaire; i.e. the participants were not shown questions in areas lacking relevance to their own circumstances. In addition, to avoid confusion, the on-line form was designed to omit any costing systems about which those surveyed had no information. One of the greatest issues facing the researchers concerned the response rate and this may have been influenced by the length of time the participants needed to complete the questionnaire. The researcher was able to minimise the time required to complete the online questionnaire, by ensuring the participants answered only those questions relevant to their circumstances (see Figure 5-12).

5.8.3. Questionnaire Phases

In order to address the research questions posed for this study, it was important to increase the response rate to achieve the highest possible number. To overcome the challenges and weaknesses inherent in both the hard copy, and the online version, of the questionnaire, the researcher chose to construct it in two phases (Mehta and Sivadas 1995, Smith 1997, Brennan, Rae and Parackal 1999, Medlin, Roy and Ham Chai 1999, Van Selm and Jankowski 2006). The following section outlines the two phases of the questionnaire: (1) the first phase containing the hard copy version; and (2) the second consisting of the online version.

5.8.3.1. First Phase: Hard Copy

A hard copy of the questionnaire was designed for the first phase of the current study (see Appendix G: Research Questionnaire). The subsequent online version of the questionnaire was created using Qualtrics Software, and was derived from the hard copy version, having been developed in an identical manner. This enabled the construction of two identical versions of the questionnaire. The software contained the ability to build the questionnaire in an area format, as described above. In addition, it enabled the researcher to enhance the questionnaire, and to manage his time and communicate with specific audiences. A number of prior studies (Mehta and Sivadas 1995, Smith 1997, Brennan, Rae and Parackal 1999, Medlin, Roy and Ham Chai 1999, Van Selm and Jankowski 2006) cite the advantages of an online survey in comparison to a postal survey, namely 1) the absence of interviewer bias, 2) the removal of a need for data entry, as respondents enter data directly into an electronic file, and 3) convenience for respondents.

5.8.3.2. Comparison of the Hard-Copy and Online Versions of the Questionnaire

Distributing a hard copy of a questionnaire to the population of a research study can incur a high cost, due to the need to send out questionnaire packages (including pre-paid return envelopes) to 1,000 Irish companies. There may also be further postage costs, due to the potential mailing of up to three reminders within a specific period. Furthermore, the researcher had a lower expectation of the response rate to hard copy postal questionnaires in comparison to online questionnaires. Further advantages presented by online questionnaires are that they represent: (1) highest degree of efficiency, (2) reliability, (3) less time required, and (4) affordability. To negate the costs incurred when distributing a hard copy of the questionnaire, it was decided to create an online version. Despite the clear advantages of online questionnaires, there are also a number of drawbacks, including issues of distribution; mainly difficulties obtaining email addresses for the CFOs of organisations (see Section 5.8.5). The prior mailing of an invitational letter to the CFO (including the hard copy of the questionnaire) minimised this concern, ensuring emails containing access to an online version of the questionnaire would be viewed by the recipient, rather than classified automatically as 'spam'. Thus, the decision was taken to utilise both the hard copy and an online version of the questionnaire.

5.8.4. Piloting the Questionnaire

Both the hard copy and online versions of the questionnaire were intensively piloted with four separate groups. The first group comprised accounting academics at Irish universities. The second group consisted of MA professionals, qualified with CIMA and working within the MA area. The third group was an MBA class at an Irish University, consisting of a mixed group of professional students undertaking various forms of work experience. The fourth group represented industry insiders, with members selected from a random sample of Irish organisations in a database employed for this research. In total, the questionnaire was piloted to 25 individuals. The results from the four groups involved in piloting the questionnaire were subsequently combined, leading to the need for a small number of minor adjustments to the questionnaire.

5.8.5. Sample Details

This current study used the *Irish Times* database from the top 1,000 organisations as its source. This database was divided into eighteen industry types, with each individual company examined to obtain the following information:

- 1. Company name: The name of the company and proof that it is registered and operating in the Republic of Ireland.
- Company postal address: Full postal address, including the street name, town or city, and the County in which the company head office operates, and where the Chief Financial Officer (CFO) is located.
- 3. Phone number: The contact details and phone numbers of the company, in particular the phone number of the CFO, if available.
- 4. Web page addresses: The web page addresses for the company. This was beneficial for gaining information about the company, e.g. confirming the postal address, phone number and the name of the CFO. Furthermore, these also contained extensive details concerning the products or services produced.
- 5. Email address: The database does not provide the email addresses of company CFOs, but does have the web address, and, at times an 'info' email address. The researcher searched the web page of each company to obtain the email address of the CFO, if available.
- 6. Number of employees: The current number of employees for each company, with a diagram demonstrating the existing movement of employees relative to the previous

year. The size of the company can be controlled by establishing the number of employees it has in the current year.

- 7. Company turnover: Current turnover figures for each company. These were used to define the size of each company as an additional control, i.e. in conjunction with the number of employees. A number of companies can contain a lower number of employees, but still have a larger turnover. If the size of these companies can be controlled (i.e. using the information concerning the number of employees), companies with a very large turnover can be excluded, i.e. the size of an organisation could be clarified by the number of employees and the level of turnover.
- 8. Name of the CFO: The database tended to provide the names of a number of directors within the organisation, along with, in some case, the name of the CFO. Almost 50% of the companies in the database provided the name of their CFO.

Table 5-1 identifies the number of companies within each industry/sector listed in The Irish Times top 1,000 database. The data was compiled for this current study based on the review undertaken by the researcher.

Number	Industry/Sector	Listed in The Irish Times	Actual list
1	Agribusiness	72	71
2	Communications	77	77
3	Construction	98	97
4	Energy	73	73
5	Financial Services	112	80
6	Food and Beverage	143	140
7	Health	96	95
8	Manufacturing	158	157
9	Media and Marketing	24	24
10	Non-profit	4	4
11	Pharmaceuticals	94	94
12	Professional Services	68	68
13	Property	34	31
14	Resources	53	53
15	Retailing	201	199
16	Technology	167	164
17	Tourism	34	30
18	Transport	104	103
	Total	1607	1560

Table 5-1: List of Industries Targeted the Current Study

The total number of companies listed in the database consisted of 1,607 companies, with the number for whom data was available being 1,560. This was followed by identification of the industry/sectors to be withdrawn from this study as being unlikely to implement ABC or ABM. Retail and non-profit organisations were excluded from the list (numbering 203), leaving the total number of companies at 1,357 (1,560 – 203).

A number of these companies spanned more than one industry type, e.g. Intel Ireland was listed in both the manufacturing and technology sectors. Following the compilation of the list, and the removal of duplicates, a list of 929 companies remained. However, two further issues subsequently arose: First, the researcher was unable to obtain a return envelope license to cover both Northern Ireland and the Republic of Ireland, leading to Northern Irish organisations being excluded. Second, a number of postal addresses were found to be incorrect, or companies had moved address. Table 5-2 shows that sixty-six companies were located in Northern Ireland and thirty-six survey packages were returned marked as having been sent to an incorrect postal address. These were thus also excluded from the analysis. Table 5-2 demonstrates that 824 large to medium Irish companies were the total number of companies targeted in this study.

Table 5-2: Total Companies Targeted by the Current Study						
Description	Subtotal	Total				
Total companies in our database list		929				
Subtract those with postal problems						
Available companies based in Northern Ireland	66					
Returned as wrong address	39					
Total companies removed from the list		105				
Total companies used in the survey		824				

Thus, the CFOs of the 824 Irish operated companies in the Republic of Ireland were contacted. Each CFO received the questionnaire package by post. In addition, they received reminders, and a number were also contacted by telephone and email.

5.8.6. Questionnaire Package

The questionnaire package contained eleven pages: the first consisted of an invitation letter, the second was a covering letter and an instruction letter, designed to guide the participants in completing the questionnaire. An ethics approval form was included, and the remaining eight pages consisted of the questionnaire (see the Appendices for additional details). The contact details for both the researcher and supervisors were included, in case those contacted were unhappy with the methods of communication, or wished to complain. Furthermore, a photograph of the research team was included at the bottom of the invitation letter, as the researcher believed this would increase the response rate by building confidence between the team of researchers and the participants, as arguments have been put forward suggesting that using pictures or photographs in a survey can marginally increase response rates (Gendall 1996, Kobayashi, Yoshikawa and Furuhashi 2011). In addition, a link to the online version of the questionnaire was included, along with a prepaid envelope.

In order for the study to be completed as professionally as possible, the researcher sent the survey package in a university envelope. Due to the survey being large in size, these were sent in batches. Each envelope and invitation letter was addressed to the CFO by name, if known, or to the 'Chief Financial Officer' if unknown. The invitation letter featured a reference number to track both the respondent companies and those that did not participate. In order to minimise instances of duplication, the first section answered by those using the online survey involved completing the reference number of the letter they had received. The researcher commenced the sending out of surveys during the final week of May 2014. The researcher focused on sending out batches by region, e.g. sending those to Dublin 1 one day, and to Dublin 2 the following day. After sending the questionnaires to all the organisations located in other counties of Ireland, e.g. organisations located in County Cork, followed by organisations located in the final week of June.

The follow up was initiated by an initial reminder, and sent three weeks after all survey packages had been dispatched. The reminder contained an identical reference number to that used in the original invitation letter, and was linked to the online version of the survey. This was followed two weeks later by a second reminder, sent to those companies failing to respond, including returning the invitation letter with an indication that they were unwilling to participate in the survey. This reminder had the identical company reference number and included a link to an online version of the questionnaire. The third and final reminder was sent two weeks following the second reminder. This followed the same procedure as the first two remainders, in terms of the company, reference number and the online link to the questionnaire. One week following the dispatch of the third reminder, the researcher began telephoning companies in an attempt to speak to the CFO. Where this was not possible, an attempt was made to obtain a personal email address and/or a voice-mail message left.

Overall, two groups of data were collected. The first was collected from the online version of the questionnaire, with all the data imported from the Qualtrics Software into an Excel file. The second was collected from a hard copy version of the questionnaire, with all responses collected and manually entered into the Excel file. Both groups of data were combined and imported into SPSS for coding and analysis.

5.9. Data Input and Coding

An Excel file was opened to code the questionnaire. All the questions were then transferred into the file, using the question number and the question section as a shortcut to the questions. Each question was numbered using the section number and the question number, i.e. Section Two in the questionnaire was given the number 2 and was followed by the question number (S2Q1). Thus, this file contained four columns. The first column contained the question number, together with the section number. The second column contained the variable name, or the question from the questionnaire. The third column contained the code for the question name. The final column contained the measurement code for that particular question. SPSS was used to preparing the data for analysis. Almost all of the required procedures for the preparation for data analysis are available in SPSS software.

5.9.1. Coding of Organisation's Industry

IND_t was used as a control variable to control the relationships between the dependent variable (ABCM_t) and the independent variable (IT_t and ECON_t). There was a different finding in terms of the level of implementation of industry type (Innes and Mitchell 1995, Kaplan and Cooper 1998, Clarke, Hill and Stevens 1999, Innes, Mitchell and Sinclair 2000, Cotton, Jackman and Brown 2003, Pierce and Brown 2004, Al-Omiri and Drury 2007). This control variable involved fourteen different types of industry. The following table assigns these to three main industry type groups: (1) manufacturing companies, (2) service companies, and (3) other types of industrial companies. If a company's main type of work was production, it was located under manufacturing companies. However, if a company's main type of work involved providing services, it was located under service companies, while if it could not be located under either of these two categories, it was located under other.

Industry Type	Group	Industry Type	Group	Industry Type	Group
Banking Consultancy Transport/tourism Insurance Media/ marketing Non profit	Service	Agribusiness Construction/property Technology Food and beverage Health/pharmaceuticals Manufacturing	Manufacturing	Retailing Energy/ resources	Other

Table 5-3: Industry Type Groups

5.9.2. Initial Assessment of the Data

The process of the initial assessment of data (or cleaning the data) involves preparing the data file in SPSS software for data analysis. Two important issues associated with cleaning the data were realised. First, identifying any missing data value, and second, coding the data value. There are many reasons for missing values appearing in any data set, i.e. through participants failing to answer one (or more) of the questions in a questionnaire, or answering incorrectly, or through data items from a hard copy version being incorrectly entered into the SPSS software. To identify missing data, the researcher ran a frequency test in SPSS (see Section 6.2 for more details) to reveal any missing values and errors; the minimum number and the maximum number were entered in the dataset.

5.9.3. Missing Data

It is difficult to obtain a complete data set in research relating to the social sciences as data collection involves human beings. It is, therefore, important to inspect all data files for missing data. SPSS employs a Missing Value Analysis technique that assists in identifying any missing values and offers different methods to deal with them (Pallant 2005, Pallant 2013). After running the SPSS frequency analysis with the minimum and maximum value test for each question, to check for coding error or missing values, the results revealed an acceptable level of missing values in the data set. Pallant (2005) stated that usually a small number of missing values would not affect an analysis. Therefore, the decision was made to leave the data as it was, without running any methods to forecast and/or simulate missing values.

5.9.4. Outliers

An outlier consists of a point that differs from the remaining data, e.g. a participant's answer that clearly differs from other answers within the data set. Such an answer can thus adversely affect the research results, by drawing the resulting average away from the median of the sample, particularly if the sample data or the study is small. Hawkins (1980) defined an outlier as follows:

...an outlier is an observation which deviates so much from the other observations as to arouse suspicions that it was generated by a different mechanism (Hawkins 1980, p. 205).

In addition, Gujarati (2012) defined outliers as:

...an outlying observation, or outlier, is an observation that is much different (either very small or very large) in relation to the observations in the sample (Gujarati 2012, p. 390).

There are a large number of statistical tests described in the literature as suitable for discovering outliers, e.g. robust regression techniques, M-estimator, Least Median of Square, and Least Square method. In addition, there are a large number of types of outliers capable of being tested using statistical means. In SPSS, outliers appear at the extremes of the test, as represented by the ID number identifying on which line of data an outlier is located, in comparison to the other data lines displayed. Upon the discovery of an outlier, a researcher should return to the source of raw data using the ID number, thereby allowing for the identification and confirmation of the presence of the outlier, followed by an attempt to resolve the issue. If this proves impossible, the outlier case must then be deleted, in order to cancel out its impact on the study.

In the current study, the majority of questions in the questionnaire were drawn up in a scalar format, and answering at the extremes (1 or 5) was not illustrative of outlier behaviour in the data set. The remaining questions allowed the participants to make a single choice between multiple proposed answers by clicking an applicable box relating to the chosen answer he/she believed to be the most appropriate. Therefore, no outliers are present in this study, leading to a lack of any need to run a test.

Following cleaning the data of missing data and outliers, the data file was considered to be prepared for analysis. The following chapter, Chapter 6, is a detailed descriptive statistic data analysis, and this was followed by applying the factor analysis.

5.10. Limitations of the Methodology Used

The following limitations of the research methodology should be noted.

1. It proved difficult to understand some forms of information relating to the participants at the time they filled out the questionnaire. The author attempted to target participants at the most appropriate time for data collection, taking into account their busy personal lives, e.g. holiday periods, along with their child rearing responsibilities and school duties. In addition, the researcher avoided busy working periods and in particular the end of the financial year when CFOs are fully engaged in preparing financial statements.

- It is difficult to understand and control some information concerning participants' behaviours, e.g. a CFOs' change of emotion, changes of behaviour and feelings, etc. These limitations are difficult to control for or forecast, and can influence any type of research method.
- 3. It is problematic to predetermine the degree of effort with which the respondents answered the questionnaire, particularly in relation to those with a high level of responsibility.
- 4. In any research using questionnaires as a method of data collection, there are difficulties obtaining the participants' contact details. In the current study, the researcher faced considerable difficulties obtaining the email addresses of CFOs, and approximately only 50% of emails were answered.
- 5. The cost of the sending the questionnaire package was very high. In addition, the size of the questionnaire was large. This led the researcher to conclude that there could be fewer questions. However, this would retract from the robustness of the study in meeting the research objectives.

5.11. Conclusion

This chapter discussed the research methodology and the data collection method for the current study. As discussed in earlier chapters, a contingency and positivist approach were used to fill in the research gaps, to achieve the research goals and objectives. In addition, this chapter argued that the most appropriate research method for this type of study was a survey to measure observations, as this supports the underlying philosophy of the study. Furthermore, this chapter discussed the research questions and the research hypotheses, in addition to the research model and the research 's key variables. An outline was given of the rationale for the use of the postal hard copy and online versions of the questionnaire as a suitable method to answer the research questions. There was also a detailed discussion of the design and construction of the questionnaire to increase response rates. Furthermore, this chapter discussed the sample size and the research population, as well as the participants targeted by the questionnaire.

CHAPTER SIX

Analysis of Data

6.1. Introduction

This chapter forms a comprehensive overview of the outcomes of the current study. As outlined in Chapter 5, the data collection took two forms: (1) an online questionnaire and (2) a hard copy. These two resources were assembled into a single file, with the online version being imported from Qualtrics software, followed by a hard copy which was added manually to the file. The data was subsequently exported to Excel to apply the SPSS software, which enabled an analysis of the data in a number of different ways.

This chapter is divided into a number of sections and subsections, with each section discussing a different level of statistical analysis. First, the discussion focusses at the general level, e.g. on the response rate to the questionnaire. Second, there is a comparison to similar studies focussing on ABC implementation response rates. Third, a comparison of the number (and type) of responses from organisations of various sizes is made, employing the findings of other studies conducted in relation to the implementation of ABC and ABM. Fourth, there is a discussion of the preparation of data analysis and descriptive statistics to present the association between variables, including the research model that is being run under regression analysis. Fifth, descriptive statistics and factor analysis performed between these two levels of data analysis are presented. Factor analysis involves KMO and Bartlett's test, a communalties test, a rotated component matrix test, a total variance explanatory test for two independent variables, and one control variable. Having applied factor analysis to the data, the second stage of the analysis involves introducing model estimations to directly address and test the central hypotheses proposed. Finally, tests of robustness and sensitivity are applied to illuminate further the extent to which specific aspects of IT and economic conditions affect the implementation of ABC/M at the sample firms.

6.2. Questionnaire Response Rate

As stated in Chapter 5, a total of 824 companies were sent the questionnaire package, which included a link to an online version of the questionnaire. Following the deletion of 13 returned questionnaires, which were found to be incomplete and unsuitable for use in this study, a compilation was made of the remaining total 171 clean and usable questionnaires. Thus, the rate of total usable responses was established as 20.75%, as shown in Table 6-1.

Table 6-1: Questionnaire Response Rate					
Description N					
Total questionnaires sent	824				
Usable responses	171				
Response rate	20.75%				

Table 6-2 compares the response rate in the current study with that of similar studies on the adoption and implementation of ABC and ABM, as conducted in the UK and other Anglo-Saxon countries (i.e. New Zealand and Ireland), thus resulting in the representation of a diverse global stage containing a shared cultural environment, language and history. These studies utilised an identical research method for data collection; i.e. explicit quantitative research methods. In each case, a survey questionnaire was used to collect data from a large number of companies. In theory, the questionnaire presents researchers with the foremost option for collecting data, along with a clear correlation with the response rate of all studies.

1 able	Table 0-2. Response Rate in Shiniai Studies							
Study	Population	Responses	Response rate					
This study	824	171	20.75%					
Pierce and Brown (2004)	526	122	23.20%					
Cotton et al. (2003)	748	296	40.00%					
Innes et al. (2000)	772	177	22.90%					
Clarke et al. (1999)	511	208	40.00%					
Innes and Mitchell (1995)	1000	251	25.10%					

Table 6-2: Response Rate in Similar Studies

In addition, the response rate of the current study is close to that of other studies on ABC and ABM. A similar number of companies (i.e. 161) responded to the questionnaire, as in Gosselin's (1997) study of Canadian manufacturing companies (Gosselin 1997). According to Krumwiede (1998), the average rate for response to a survey concerning the implementation of ABC is approximately 20%. Further published surveys with similar response rates are: (1) 19.6% Al-Omiri and Drury (2007); (2) 31% Krumwiede (1998); and (3) 39.5% Askarany et al. (2010).

The adoption rates of ABC and ABM identified in previous studies are presented in Table 6-3 (see below). Studies undertaken by Clarke et al. (1999) and Innes et al. (2000) identified a lower rate of adoption, while an increased rate was identified in later studies conducted by Cotton et al. (2003) and Pierce and Brown (2004). Pierce and Brown (2004) identified the highest adoption rate (i.e. 27.9%) of all studies focussing on companies adopting ABC and ABM, while Clarke et al. (1999) reported the lowest rate of implementation, as recorded in the studies covered in the table below (i.e. 11.8%) (Innes et al. 2000; Clarke et al. 1999; Cotton and Jackman et al. 2003; Pierce and Brown 2004).

ABC and ABM users % Ν Study This study 171 32 18.7% Pierce and Brown (2004) 122 34 27.9% Cotton et al. (2003) 296 60 20.3% 17.5% Innes et al. (2000) 177 31 Clarke et al. (1999) 204 24 11.8% Innes and Mitchell (1995) 74 352 21.0%

Table 6-3: ABC and ABM Adoption Rate in Similar Studies

6.3. Data Analysis Preparation

The current researcher used SPSS version 23 to prepare the data for analysis. Almost all the procedures required for the preparation of data for analysis are available in SPSS software. This section details the procedures taken to prepare (clean) the current study data set for the analysis process.

This study addressed two important issues relating to the cleaning of data; the first relates to the data values, and the second to the coding of those values. There are a number of reasons for the presence of missing values within any data set, with a proportion occurring if participants failed to answer one or more of the questions in the questionnaire, or gave an inaccurate answer. At the same time, data items from the hard copy version might have been incorrectly entered into the SPSS software. In order to identify the missing data, the researcher ran a frequency test in SPSS (see Section 5.9.3 for further details) to identify the missing values, and both the minimum and maximum numbers were subsequently entered into the data set. This test identifies the missing data, along with any error in the coding of the data.

6.4. Demographic Descriptive Statistics

The first stage of the data analysis in this current study required an assessment of the findings from the raw data collected. It should be noted that any missing data would be addressed in an appropriate manner, and that outliers would have been identified had there been any. As previously noted there were no outliers because the participants had to choose between multiple answers by clicking on an applicable answer. Pallant (2013), highlighted the existence of a number of uses for descriptive statistics, including: (1) the description of the characteristics of the research sample; (2) addressing specific research questions; (3) examining the research variables; and (4) the underlying the statistical techniques used to discuss the research questions posed (Pallant 2013, p. 49). This section presents the results based on the descriptive statistics run by the SPSS software for the majority of the questionnaires.

Table 6-4 illustrates the main operating location of each company, along with their type of business. Of the total companies responding, 40.4% operated only in Ireland and the UK, with the remaining 59.6%, operating globally. Private companies accounted for 67.8%, with the remaining 32.2% being public companies. The numbers of companies operating on a global basis in this study was higher than the number operating in Ireland and the UK only; i.e. there were more private than public companies.

Table 0-4. Companies "Location and Type of Business						
Company Location	Percentage	Company Type of Business	Percentage			
Ireland, UK or both	40.4%	Private company	67.8%			
Worldwide	59.6%	Public company	32.2%			
Total	100.0%	Total	100.0%			

Table 6-4: Companies' Location and Type of Business

Table 6-5 reveals the location of each company, along with their ownership type and product/service type, and a comparison of the costing system currently employed. It portrays the relationship between the costing system and the company's location. The most frequently employed system consists of a direct costing system, with seventy-one companies reporting their use of it. Twenty of these systems operated only in Ireland and the UK, while the remaining fifty-one operated internationally. The second most employed costing system is a traditional costing system, with fifty-eight companies currently using this system, thirty-one of whom operated in Ireland and the UK, and twenty-seven who operated internationally. The ABC system was used by thirty-two companies, i.e. twelve located in Ireland and the UK and twenty who operated overseas also. Finally, ten companies used an alternative system

identified in this study when operating in Ireland and the UK, and the remaining four when operating on a global basis.

The table also examines the relationship between the costing system and company ownership. Of the seventy-one companies currently using a direct costing system, fifty-one were privately owned and twenty were public companies. By comparison, of the fifty-eight companies currently using a traditional costing system, thirty-five were private owned and twenty-three were public. Of the thirty-one companies currently using an ABC system, twenty-five were privately owned and seven were public. Finally, ten companies (divided equally between private and public) stated they had an alternative costing system in place.

The table reveals the relationship between the costing systems and product type: (1) Of the seventy-one companies currently using a direct costing system, twenty-nine were production companies, thirty-two service companies, and ten were other types of company (i.e. neither production nor service). (2) Of the fifty-eight companies currently using a traditional costing system, thirty-seven were production companies, sixteen service companies and five alternative companies. (3) Of the thirty-two companies currently using an ABC system, fifteen were producers and fifteen were service companies, with the remaining two employing an alternative costing system. Finally, of the ten companies that confirmed using an alternative costing system, four were production companies, three service, and three other types of companies.

In conclusion, it was established that: (1) service companies made more frequent use of a direct costing system; (2) production companies made more frequent use of a traditional costing system; and (3) both production and service companies used an ABC system.

Tuble 0 5. Relationships Detween Cost, Docution, Ownership and Floduction Type									
Duimour cost mothed	Company Location		Company is		Product type			Tatal	
Primary cost method	Ireland/UK	Worldwide	Private	Public	Product	Service	Other	Total	
Direct costing system	20	51	51	20	29	32	10	71	
Traditional costing system	31	27	35	23	37	16	5	58	
ABC system	12	20	25	7	15	15	2	32	
Other system	6	4	5	5	4	3	3	10	
Total	69	102	116	55	85	66	20	171	

Table 6-5: Relationships Between Cost, Location, Ownership and Production Type

Table 6-6 outlines the type of company operations (i.e. production or service), along with their multiplicity of operations. Production companies comprised the highest number of respondents to the questionnaire (49.7%); the remainder were service providers (38.6%) and other companies, i.e. those who were neither product nor service providers (11.7%). Furthermore, the table demonstrates the multiplicity of production or service activities, with

58.8% of companies being multi-product or multi-service companies, of which, 36.5% were multiple similar companies, and 4.7% were multiple dissimilar companies. In summary, the majority of companies were producers and multi-producers.

Table 6-6. Company Floduct Type and Multiplicity							
Product type	Percentage	Product multiplicity	Percentage				
A producer	49.7%	Multiple products/services	58.8%				
A service provider	38.6%	Multiple similar	36.5%				
Other	11.7%	Multiple dissimilar	4.7%				
Total	100.0%	Total	100.0%				

Table 6-6: Company Product Type and Multiplicity

The industry type responding to this study is identified in Table 6-7. The responses were divided into four groups according to level of responsiveness. The group with the highest level of response was from the manufacturing industry (16.7%), with health and pharmaceutical companies making up 13.7%. The second group received similar responses from the following industries: construction (8.9%), consultancy (8.9%), transport (8.9%), and technology (8.3%). The third group were from agribusiness (7.1%), banking (5.4%), energy (5.4%), food and beverages (4.8%), insurance (4.2%), and retail companies (4.2%). Finally, the lowest number of respondents were from: (1) the media, (1.8%), and (2) non-profit industries (1.8%). Non-profits have therefore been excluded from the study; however, they are represented in the table, as some companies operate in more than one industry.

Table 6-7: Industry Type

Industry	%	Industry	%	Industry	%		
Agribusiness	7.1%	Banking	5.4%	Health/Pharmaceuticals	13.7%		
Construction/Property	8.9%	Energy/Resources	5.4%	Manufacturing	16.7%		
Consultancy	8.9%	Food and Beverage	4.8%	Media/Marketing	1.8%		
Transport/Tourism	8.9%	Insurance	4.2%	Non-profit	1.8%		
Technology	8.3%	Retailing	4.2%				

Table 6-8 reveals the length of time each company had been operating their current business, along with company size, as identified by revenue. This reveals 0.6% of companies had operated their businesses for between one and five years; 3.5% had operated their businesses for between eleven and fifteen years. In addition, 22.9% of all companies had been operating for between twenty-one and thirty years, and 55.3% of companies for over thirty years. The table demonstrates that: (1) 78.2% of companies had been in business for over twenty-one years; (2) 3% of companies earned less than \mathfrak{S} million, which represents the lowest revenue; (3) 26.1% of companies stated their annual revenue as between $\mathfrak{S}0$ and $\mathfrak{S}100$ million; and (4) 25.5% stated their annual revenue as greater than $\mathfrak{S}250$ million. The fact that this study focused on the top 1,000 Irish organisations is reflected in the length of time of operation and revenue; i.e. this

research deliberately focussed on companies who had been in business over a considerable length of time, and which also had high levels of revenue.

Table 0-a	Table 0-8. Length of Thile in Busiless and Revenue							
Been in business	Percentage	Revenue	Percentage					
1 to 5 years	0.6%	Less than 5m	3.0%					
6 to 10 years	3.5%	5 to 25m	11.5%					
11 to 15 years	10.6%	25 to 50m	17.6%					
16 to 20 years	7.1%	50 to 100m	26.1%					
21 to 30 years	22.9%	100 to 250m	16.4%					
More than 30 years	55.3%	Greater than 250m	25.5%					
Total	100.0%	Total	100.0%					

Table 6-8: Length of Time in Business and Revenue

6.4.1. Preliminary Cost Method Descriptive Statistics

Table 6-9 outlines the primary cost method and the length of use of this method among the 171 respondents. Seventy-one (71) companies applied direct costing systems to allocate the cost of products or services produced. The frequency percentage and the cumulative percentage of all companies surveyed (171) was established as 41.5%, representing the most frequently used costing system. Traditional costing systems were the second most used type, with fifty-eight companies (33.9%) reporting use of such a system. A total of 129 companies employed both these systems (i.e. the direct cost and traditional costing system), with a cumulative percentage of 75.4%. This indicates that a high percentage of companies have not changed, or are choosing to remain within a traditional system. Thirty-two companies (18.7%) employed ABC, and ten companies (5.8%) employed other costing systems not listed in the study questionnaire (i.e. private costing systems invented/designed for internal use by specific companies, such as risk modelling, actuarial modelling, mark to market and job costing). The table also reveals the number of years' companies have been using their current costing system, demonstrating that 28.1% have used their current costing system for over twenty years, and 26.3% have use their current costing system for over fifteen years. This suggests that many companies are satisfied with their existing costing systems. The table also reveals descriptive statistics, including standard deviation at 0.910; variance of 0.829; a result of 0.696 with the skewness statistic and a standard error of 0.186; and the kurtosis statistic -0.465 with a standard error of 0.369. The skewness and kurtosis are similar statistical tests, which can be either positive or negative, protecting a real-value random variable highlighting mean, and serving as a measure of the irregularity of the probability distribution.

Costing system	No	%	Length of Use	%	Desc. Stat	Stat	Std. E
Direct costing system	71	41.5%	5 Years	10.5%	Std. Dev	.910	
Traditional costing system	58	33.9%	10 Years	11.7%	Variance	.829	
ABC	32	18.7%	15 Years	26.3%	Skewness	.696	.186
Other	10	5.8%	20 Years	23.4%	Kurtosis	465	.369
			More than 20 Years	28.1%			
Total	171	100%	Total	100%			

Table 6-9: Costing System, Length of Use, and Descriptive Statistics

6.4.2. Management Accounting Department

Table 6-10 reveals the number of employees within the MA department (i.e. where a department is present), and, where there are none, spending on external consultants, and level of satisfaction. In total, 58% of companies stated they employed between one and five employees in their MA departments, and 51.5% of companies had spent less than $\leq 10,000$ on external consultants over the previous year. Furthermore, 45.8% of companies considered their MA department to be good, 23.2% rated it as very good, and 28.6% classified it as fair.

Table 6-10: Number of Employees, Spending on Outsourcing, Level of MA Department

Employees	Percentage	External/consultants	Percentage	Level	Percentage
1 to 5	58.4%	Less than 10,000	51.5%	Very poor	0.0%
6 to 10	12.1%	10,000 to 20,000	27.2%	Poor	2.4%
11 to 20	12.1%	20,000 to 30,000	13.0%	Fair	28.6%
21 to 30	8.7%	30,000 to 40,000	3.6%	Good	45.8%
31 to 40	2.0%	Greater than 40,000	4.7%	Very good	23.2%
41 to 50	1.3%				
Over 60	5.4%				
Total	100%	Total	100%	Total	100%

6.4.3. Level of Satisfaction with Existing Costing Method

Table 6-11 demonstrates the level of satisfaction with the costing methods currently employed; i.e. direct costing systems, traditional costing systems, and other costing systems. For this purpose, a 5-point scale was used (with 1 signifying very dissatisfied and 5 very satisfied). The table reveals: (1) 56.7% of companies stated their satisfaction with their current costing system as a means of meeting their informational requirements; (2) 53.9% of companies stated their satisfaction with their current costing system, as a means of providing them with timely information; (3) 57.5% were satisfied that the current costing system provided them with the necessary information; (4) 52.5% were satisfied that the current costing system met the needs of management; 51.1% stated that they were satisfied with the flexibility and responsiveness to change of the current costing system, relative to other costing systems. A considerable number of companies claimed to be satisfied with the current traditional costing system, with 54.3% being satisfied and 19.3% very satisfied; i.e. equivalent

to 73.6%. By comparison, 7.5% stated that they were dissatisfied and 0.7% claimed to be very dissatisfied, i.e. equivalent to 8.2%.

Table 6 11. Level of Banshaetion with Existing Costing Methods						
Is the cost method in use	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	
Meeting your information requirement?	1.4%	5.0%	17.7%	56.7%	19.1%	
Providing you with timely information?	0.0%	5.7%	19.9%	53.9%	20.6%	
Providing you with necessary information?	0.0%	7.1%	15.6%	57.4%	19.9%	
Meeting the needs of management?	0.0%	9.9%	16.3%	52.5%	21.3%	
Being flexible and responsive to changes?	2.1%	9.9%	21.3%	51.1%	15.6%	
Percentage	0.7%	7.5%	18.2%	54.3%	19.3%	

Table 6-11: Level of Satisfaction with Existing Costing Methods

6.4.4. Effectiveness of Business Strategy

Table 6-12 reveals the effectiveness of the business strategy of companies currently employing traditional costing methods. Nine 5-point scale questions were used (i.e. never, seldom, sometimes, most of the time, and always) to examine the level of satisfaction with the current system. In total, 39% of companies stated that engineering/production personnel were sometimes involved in the development of effective business strategies; 43.3% stated that sometimes organisational financial accountants were effectively involved in business strategies; and that sometimes 36.2% of MA personnel influenced business strategy. These are all internal factors. Moreover, in terms of the relevant external factors, 46.8% of companies stated that primarily their competitors influenced their business strategy; 43.3% observed that it was primarily market levels that informed shifts alterations in their business strategy; 52.9% observed that their strategies were primarily based on company sales; and 48.2% that customers primarily affected business strategy use. In addition, 38.3% of companies stated that suppliers had a degree of influence over their business strategy, and 35.7% that wholesalers or brokers had little effect on their business strategy. This data is shown in Table 6-12 below.

				87	
	Never	Seldom	Sometimes	Most of the time	Always
Engineering/Production	10.6%	16.3%	39.0%	22.7%	11.3%
Financial accountants	2.1%	19.9%	43.3%	28.4%	6.4%
Management accountants	5.0%	19.1%	36.2%	28.4%	11.3%
Competitors	4.3%	6.4%	24.8%	46.1%	18.4%
Market	1.4%	0.7%	15.6%	43.3%	39.0%
Sales	2.1%	5.7%	28.6%	52.9%	10.7%
Customers	2.1%	3.5%	13.5%	48.2%	32.6%
Suppliers	9.2%	22.0%	38.3%	22.7%	7.8%
Wholesalers or brokers	20.7%	35.7%	27.9%	12.9%	2.9%
Total	57.5%	129.3%	267.2%	305.6%	140.4%
Percentage	6.4%	14.4%	29.7%	34.0%	15.6%

Table 6-12: Effects on Business Strategy

Furthermore, when the confirmation level increases for those effecting business strategy from sometimes to most of the time, the percentage also increased.

6.4.5. Involvement in Changes to Management Accounting

Table 6-13 depicts the involvement of specific levels of management on changes to the MA processes within an organisation. A 5-point scale was used (i.e. never, seldom, sometimes, most of the time, and always) to examine the level of involvement in MA change. This study found: (1) 38.4% of the companies currently using traditional costing systems are seldom involved with company chairpersons in regard to changes to MA; (2) 26.8% never involved a chairperson in MA change; and 55.1% reported on the involvement of the chairperson negatively. Moreover, 40.4% of companies stated that company CEOs were sometimes involved in MA change, and 18.4% stated that CEOs were usually involved in MA change. This demonstrates a positive movement from sometimes to most of the time, with a 58.8% equivalence. Similarly, 47.5% of companies stated that sometimes company managers are involved in MA change, and 23.4% stated that managers were involved in MA change most of the time. Similarly, with regard to the question concerning the chairperson, a positive movement was identified from sometimes to most of the time from the equivalent of 70.9% of companies.

In addition, 46.1% of companies stated: (1) company financial accountants were involved in MA change most of the time; (2) 24.8% that financial accounting was sometimes involved in MA change, with this being indicated at higher levels in comparison with others, and 70.9% positively indicated a higher involvement in MA change; (3) 53.6% that company MA was usually implicated in changes to the costing system, along with MA processes in general; (4) 27.1% and that MA personnel had always been involved in MA change. This proved to be the best indicator, with 80.7% of companies identifying a positive involvement in MA change, ranging from sometimes to always. In addition, 55.3% of companies stated that general

management personnel were sometimes involved in general MA change, with 22.7% stating that general management personnel were typically always involved.

To summarise, Table 6-13 reveals that financial accountants and management accountants were more involved in alterations to MA than holders of other management posts within the included companies.

	Never	Seldom	Sometimes	Most of the time	Always	
Chairperson	26.8%	38.4%	20.3%	8.7%	5.8%	
CEO	9.2%	14.9%	40.4%	18.4%	17.0%	
Manager	8.5%	11.3%	47.5%	23.4%	9.2%	
Financial accountants	3.5%	3.5%	24.8%	46.1%	22.0%	
Management accountants	1.4%	2.9%	15.0%	53.6%	27.1%	
General management	7.8%	8.5%	55.3%	22.7%	5.7%	
Total	57.2%	79.5%	203.3%	172.9%	86.8%	
Percentage	9.5%	13.3%	33.9%	28.8%	14.5%	

Table 6-13: Involvement in Changes to MA

6.4.6. Reasons for not Adopting or for Rejecting ABC and ABM

Table 6-14 summarises the responses from companies not adopting an ABC costing system. The highest response frequencies revealed the reasons for failing to change to more modern costing systems, and were stated as follows: (1) 20.6% of companies were satisfied with their current costing methods; (2) 18.4% stated that there was no need to change; (3) 15.3% explained that they found change time consuming; and 12.6% (4) that senior management had no desire to change. In addition, the lower response frequencies for failing to change to more modern costing systems like ABC consisted of: (1) a lack of understanding (8.9%); (2) the high cost of change (8.4%); (3) other reasons (8.2%); and (4) none of the above (7.5%).

Table 6-14: Reasons for not Changing to ABC					
	Percentage				
Time consuming	15.3%				
Lack of understanding	8.9%				
Satisfied with the current method	20.6%				
High cost of change	8.4%				
No need for change	18.4%				
Senior management does not wish to change	12.6%				
Other reasons	8.2%				
None of the above	7.5%				
Total	100.0%				

Table 6-15 reveals the motivation behind the rejection of the implementation of ABC and ABM, as accompanied by the continued use of traditional MA costing systems. A five-point scale was used (i.e. completely disagree, disagree, neutral, agree, and completely agree) in twenty-three supplementary questions, in order to examine the reasons for rejecting the

implementation of such systems. The highest frequency was loaded towards agree, neutral and disagree. The table reveals the total number of companies currently using traditional costing systems, with the highest rate being neutral (neither disagree or agree) for the following questions: (1) 41.9% considered change to be time-consuming; (2) 52.9% indicated lack of IT resources; (3) 50.7%; indicated that the existing information system failed to support the new system; and (4) 50% pointed to the high cost of implementation and adoption. In addition, 49.3% highlighted the failure of senior management to support changes to these methods; 51.5% noted that middle management failed to understand the methods; 47.1% that first-line management had no understanding of the methods; and 39% utilised a customised method to calculate costs. Moreover, 52.2% stated that ABC and ABM did not provide valuable information; 50% that they found it too complex to implement an ABC and ABM system; 46.3% indicated a shortage of MA staff; and 40.2% pointed to their implementation team's dissatisfaction with the new system.

The second most common group of responses rated in the table indicated that companies currently using traditional costing systems, to some extent believe there is no reason to implement new methods, i.e. 57.4% stated that they were satisfied with their current costing method and 47.8% gave this reason to explain their rejection of ABC and ABM systems.

The third highest group of respondents rated, and negatively indicated, their reasons for rejecting the implementation of ABC and ABM: 44.9% indicated a lack of understanding at an accounting staff level; 39% pointed to the short product life cycle; and 44.9% explained change occurred because their organisation has a single product line. In addition, 44.1% stated that the decision could not be taken at their level; 53.7% highlighted lack of experience among MA staff; and 44.1% explained their company was of an insufficient size. In addition, 39.7% stated that senior management failed to understand the available methods; 36% that they had attempted to implement ABC and ABM without success; and 39% that there was no need for smaller firms to implement such a system. The table identifies a Std. deviation of between 0.801 and 1.128 for all questions.

	Completely	Disagreed	Neutral	Agree	Completely
	disagreed	Disugreeu	riounui	ingree	agreed
The company is satisfied with the current method	0.7	5.1	9.6	57.4	27.2
The change is perceived as time consuming	5.1	6.6	41.9	37.5	8.8
There is a lack of IT resources	11.0	11.0	52.9	16.9	8.1
The existing information system does not support these methods	8.1	10.3	50.7	24.3	6.6
The high cost of implementation and adoption	5.1	12.5	50.0	25.7	6.6
There is a lack of understanding at an accounting staff level	11.8	44.9	29.4	13.2	0.7
There is a lack of experience among MA staff	10.3	53.7	19.9	16.2	0.0
The decision cannot be taken at our level	16.9	44.1	19.1	15.4	4.4
Senior management does not support changes to these methods	11.0	22.8	49.3	14.7	2.2
Middle management does not understand the methods	9.6	21.3	51.5	16.2	1.5
First-line management does not understand the methods	8.8	19.9	47.1	21.3	2.9
We utilise a customised method to calculate costs	5.1	13.2	39.0	30.9	11.8
We have a short product life cycle	19.9	39.0	23.5	11.0	6.6
We only have a single product line	36.0	44.9	11.0	5.9	2.2
Our company is not large enough	28.7	44.1	18.4	7.4	1.5
Senior management does not understand these methods	18.4	39.7	22.8	17.6	1.5
ABC/ABM does not provide valuable information	11.0	17.6	52.2	14.7	4.4
It is too complex to implement	11.0	17.6	50.0	19.1	2.2
There is no need to implement these methods	2.2	9.6	22.1	47.8	18.4
Shortage of MA staff	10.3	22.1	46.3	16.9	4.4
We have tried to implement but failed	43.4	36.0	18.4	2.2	0.0
Smaller firms do not need to implement this system	17.6	39.0	35.3	6.6	1.5
The implementation team is not satisfied with the new system	21.2	36.4	40.2	2.3	0.0

Table 6-15: Reasons for Rejecting ABC and ABM

6.5. ABC and ABM Descriptive Statistics

Table 6-16 depicts only those companies currently using ABC and/or ABM. The highest use of the ABC system was found in recent years, with 37.5% of a total of thirty-two companies stating that they had begun to employ ABC in the last five years: 12.5% had used the system for between six and ten years; 28.1% had used the system for between eleven and fifteen years; and 21.9% had used the system for over fifteen years. In conclusion, the table reveals a decline in the use of ABC between years six and ten, followed by an increase in use during the past five years. The progress follows a U-shape, i.e. companies initially made greater use of ABC, with use declining after a number of years, before again increasing over the past five years. The table demonstrates the costing systems employed by companies prior to implementing the ABC system. The report reveals that companies equally reported a 12.5% level of use of direct costing systems, traditional costing systems and other costing systems. However, 62.5% of companies acknowledged their lack of knowledge concerning the costing systems they had employed prior to their implementation of ABC.

Table 6-16: Length of Time ABC in Use and Previous System Employed

Years	Percentage	Costing system previously used	Percentage
0 to 5 years	37.5%	Direct costing system	12.5%
6 to 10 years	12.5%	Traditional costing system	12.5%
11 to 15 years	28.1%	Don't know	62.5%
More than 15 years	21.9%	Other costing system	12.5%
Total	100.0%	Total	100.0%

Table 6-17 reveals a number of alternative costing systems used alongside (or in conjunction with) ABC. Of the sample, 53.1% stated that they had never used a direct costing system in conjunction with ABC; 46.9% stated that traditional costing systems were sometimes used alongside ABC; and 32.3% stated that they never, or seldom, used other costing systems in conjunction with ABC.

Table 6-17: The Use of other Costing Systems in Conjunction with ABC

				*	
Costing system	Never	Seldom	Sometimes	Most of the time	Always
Direct costing system	53.1%	18.8%	15.6%	6.3%	6.3%
Traditional costing system	28.1%	9.4%	46.9%	6.3%	9.4%
Other costing system	32.3%	32.3%	25.8%	6.5%	3.2%

Table 6-18 reveals the extent of improvement following the implementation of ABC. Of the thirty-two companies using ABC: (1) 71.9% stated that the costing system had led to improvements; (2) 56.3% identified improvement in the cost information provided at management level; (3) 71.9% highlighted improvement in the understanding of overhead costs; (4) and 65.6% claimed there had been an improvement in the understanding of costs and factors driving these costs. Meanwhile, 53.1% of companies identified an improvement in the overall profitability following the implementation of ABC.

Table 6-18: The Extent of Improvements as Result of ABC Implementation

Company improved in	Improvement
Improved understanding of overheads	71.9%
Cost information provided	56.3%
Your understanding of overhead costs	71.9%
Your understanding of costs and factors that drive these costs	65.6%
Your overall profitability	53.1%

Table 6-19 demonstrates the relationship between ABC implementation and the level of use of that implementation (companies might have implemented the system but not used it in all departments), as well as the level of integration with further information systems. When asked whether they had implemented ABC for all products and/or services, 37.5% of companies answered no, and 62.5% answered yes; including they employed all production/services and that ABC was integrated with other information systems.

Table 6-19: Relationship Between Implementation and Use						
Did your company	No	Yes				
Implemented in all productions/services	37.5	62.5				
Used in all productions/services	37.5	62.5				
Integrated with other information systems	37.5	62.5				

Table 6-20 reveals the level of ABM implementation. Of the 32 relevant companies, answers were obtained from twenty-three. Of these, seventeen implemented ABM, and 73.9% stated that they currently use ABM. Five of these companies (21.7%) stated that they were currently considering the adoption of ABM, and one company (4.3%) stated that, to date, they had not considered ABM. The table also reveals length of use, with 29.4% of companies having employed ABM over the previous five years; 5% having used it for between six and ten years; 29.4% having used it for between eleven and fifteen years; and 35.3% having used it for over fifteen years. The existence of a U-shaped pattern for the use of ABM can be observed, with companies beginning to use the system from eleven to over fifteen years previously, followed by a decline in its use from between six to ten years, then followed by a subsequent increase over the past five years.

Table 6-20: ABM Implementation and Length of Use

Best describes use of ABM	Frequency	Percentage	How long using ABM	Percentage
Presently using ABM	17	73.9%	0 to 5 years	29.4%
Presently considering ABM adoption	5	21.7%	6 to 10 years	5.9%
No consideration of ABM to date	1	4.3%	11 to 15 years	29.4%
			More than 15 years	35.3%
Total	23	100%	Total	100%

Table 6-21 shows the level of improvement in management since companies began using ABM. 20% of companies stated that they had not noted any improvement; 20% that they had noted considerable improvement; 60% that they had observed some improvement. In total, 80% of companies positively noted improvement, while the remainder remained neutral.

Table 6-21: Management Improvement						
Level of management improved	Percentage					
About the same	20%					
Somewhat better	60%					
Much better	20%					
Total	100%					

6.5.1. Current Management Accounting System

Table 6-22 reveals the companies' levels of satisfaction with their current MA systems. Of the total number: 50.9% viewed their current MA system as generally good, and 27.5% as average; thereby establishing that 78.4% of companies rated their current system as between average and good. In total, 53.2% of companies stated that their system effectively meets

current requirements, and 26.9% stated that their system was average, thus establishing that 80.1% of companies rated their system's performance as between average and good. In total, 48.5% of companies stated the quality and accuracy of the information provided by the current system was good, and 25.1% rated it as average, thus establishing that 73.6% scored it as being between average and good. In addition, 46.8% of the total number of companies surveyed stated that the capacity of their current system to adapt to future requirements was good, and 32.2% stated it was average, establishing that 79% of companies evaluated it as between average and good.

Table 6-22 demonstrates the degree to which users at senior management level understand the system. In total, 48% of companies claimed their understanding was good, and 26.3% stated that it was average, thus 74.3% of companies stated the degree of understanding was either average or good. In terms of the system's ability to provide information on time, 45% of companies ranked this as good, and 28.7% as average, thus 73.7% of companies considered the system's ability to provide information to be between average and good. When considering their finance teams' involvement in designing the current system, 44.4% of companies stated this involvement was good, and 26.9% that it was average, thus 71.3% of companies rated this involvement as between average and good.

Table 6-22 illustrates the relevance of the system in the context of organisational meetings. It reveals that 50.3% of companies rated relevance as good, and 26.3% as average, thus 76.6% of the companies surveyed rated this feature as between average and good. In addition, 55.6% of companies stated that the attitude of the MA teams during meetings was good, and 23.4% that it was average, thus 79% of companies selected a ranking between average and good.

Table 6-22: Description of Current	MA Sys	stem				
Current MA system		Poor	Average	e Good	Very good	
The current MA system as a whole	1.8%	4.7%	27.5%	50.9%	15.2%	
The extent to which this system meets current requirements	0.6%	5.3%	26.9%	53.2%	14.0%	
Quality and accuracy of the information provided	0.6%	1.8%	25.1%	48.5%	24.0%	
Ability of your system to adapt to future requirements	2.3%	4.7%	32.2%	46.8%	14.0%	
Understanding of the system at senior management level	1.8%	8.2%	26.3%	48.0%	15.8%	
System's ability to provide information on time	1.2%	7.0%	28.7%	45.0%	18.1%	
Finance team's involvement in designing the current system	2.3%	4.7%	26.9%	44.4%	21.6%	
Relevance to organisational meetings	1.8%	5.3%	26.3%	50.3%	16.4%	
Attitude of MA team at meetings	1.2%	1.8%	23.4%	55.6%	18.1%	

Table 6-23 depicts the organisations' level of engagement in online activities, as an indicator of activity management without the implementation of ABC and ABM. It reveals that 39.8% of companies never offer discounts online for the products or services they provide; 29.8% seldom offer online discounts; and 69.6% never to seldom offer discounts for online services.
Moreover, 48% of companies stated that they sometimes used the online facilities provided by suppliers, and 15.8% of companies that they never used such facilities. Furthermore, 35.7% of companies stated that they sometimes offer traditional products/services alongside their online offerings, and 31% of companies stated that they never offered these products/services. In addition, 33.3% of companies stated that they sometimes offer they never did. Finally, 38% of companies stated that they sometimes achieved cost/other benefits from their online activities in comparison with offline activities, while 28.7% of the companies stated they did not.

Table 6-23: Level of Engagement in Online Activities **Engagement in The Following Online Activities Never Seldom Sometimes Mostly Always** Offer discounts on online products/services 39.8% 29.8% 12.9% 11.1% 6.4% 14.0% Use online facilities from suppliers 15.8% 14.0% 48.0% 8.2% Offer traditional products/services alongside online offerings 31.0% 8.2% 35.7% 12.3% 12.9% Offer online support to customers, i.e. online ordering 28.7% 8.2% 33.3% 12.9% 17.0% Achieve cost/other benefits from online activities in 28.7% 11.7% 38.0% 9.4% 12.3% comparison to offline activities

The questionnaire sought information concerning companies' satisfaction with the current costing system. The results reported that 11.1% of companies were content with their current costing system; 70.2% were happy; and 13.5% classified the costing system as fair, thus 94.8% expressed positivity. In comparison, only 5.2% of companies expressed a negative view of their current costing system, with 3.5% stating they were unhappy and 1.8% that they were very unhappy.

Table 6-24 portrays the extent to which companies are influenced by the level of competition within the sector in which they are operating, e.g. in terms of pricing and promotion. It reveals that 53.8% of companies have altered their pricing levels to a considerable extent, and 34.5% stated that they have considered making significant changes, thus establishing that 88.3% of companies had considered making, or have made, changes to product or service pricing. Furthermore, 60.8% of companies stated that they had considerably altered the products/services they provide, and 18.7% stated that they have considered changing, thus 79.5% had considered changing, or had already changed the products/services they provide.

Furthermore, 58.5% of all the companies surveyed stated that the sale price of their products/services was influenced by the pricing structure to a considerable degree, and 19.3% stated that this was true to a great extent, leading to 77.8% of companies applying a pricing structure to determine sale price. In addition, 55% of companies stated that the purchase price of key materials highly influenced prices, and 17% claimed this was true to a great extent,

establishing that 72% of companies linked the purchase price of key materials to their pricing structures.

In terms of marketing, 40.4% of the companies surveyed stated that they were influenced by marketing issues, and 31% of companies that this was true to a great extent. In addition, 37.4% of companies stated that they had access to some level of advertising budget, and 24.6% of companies stated this is true to a lesser extent, thereby establishing that 62% of companies had access to some budget for advertising. This correlated with figures revealing that 35.1% of companies were somewhat engaged in a marketing strategy, and 32.2%, considerably engaged in a marketing strategy, establishing that 67.3% of companies were engaged in marketing activities.

In terms of product/service design, 48% claimed considerable involvement, and 18.1% reported engagement to a great extent. Furthermore, 56.1% of companies stated that they were engaged to a considerable extent in the reconsideration of sales prices, and 17.5% stated that they were engaged to a great extent. Finally, 50.3% of companies stated that they oversaw promotion and career progression to some extent, and 22.2% to a considerable extent.

Competition has effected	Not at all	Little extent	Some extent	Considerable extent	Great extent
Price levels	1.8%	4.7%	5.3%	53.8%	34.5%
The product/service you provide	4.7%	7.0%	8.8%	60.8%	18.7%
Selling price is influenced by price structure	5.3%	5.3%	11.7%	58.5%	19.3%
The purchase price of key materials	5.8%	9.4%	12.9%	55.0%	17.0%
Marketing issues	5.8%	17.0%	40.4%	31.0%	5.8%
The advertising budget	11.7%	24.6%	37.4%	19.3%	7.0%
The marketing strategy	4.7%	18.1%	35.1%	32.2%	9.9%
Product/service design	5.3%	12.3%	16.4%	48.0%	18.1%
Your organisation often reconsiders sales price	5.3%	7.6%	13.5%	56.1%	17.5%
Promotion and career progression	9.9%	14.6%	50.3%	22.2%	2.9%

Table 6-24: Influence of Competitive Forces in the Sector

6.5.2. Level of Information Technology Use

Table 6-25 depicts the companies' level of IT use, based on seventeen Yes/No survey questions aimed at determining the level of IT uptake within these companies. The table demonstrates that almost all companies employed IT, with 84.2% of the 171 companies stating that they had an IT department, and 83.6% stating they only hire employees with IT skills. In addition, 98.2% of companies stated they had a website, of which, 63.7% developed their websites in-house, and 36.3% outsourced their development. In total, 76% stated that they outsourced IT support.

Of the companies assessed, 69% stated that they conducted business online and 31% stated that they did not. Additionally, although 81.9% of companies communicated with their customers via the Internet, 62% did not offer their customers online support, while 38% did support their customers. Furthermore, 76.6% stated that they used the Internet to connect with suppliers, and 74.9% ordered materials or services online. In addition, 72.5% of companies' customised software was created in-house; and 98.8% used accounting software, 96.5% of whom considered accounting software to meet their general needs, while 87.7% of companies stated that the accounting software specifically met the requirements set out by management accountants.

In addition, the table reveals the companies' engagement in IT training: 84.8% offered training, with 69% hosting in-house training programmes in IT, and 75.3% funding outsourced employee training programmes. Finally, with regard to the MA departments within companies, 87.1% stated they had MA departments and 15.8% that they did not. Furthermore, 91.8% of companies stated that they did not outsource MA, while the remaining 8.2% did.

IT activity	No	Yes
Have an IT department	15.8%	84.2%
Require new employees to have IT skills	16.4%	83.6%
Have a website	01.8%	98.2%
Develop websites in-house	36.3%	63.7%
Outsource IT	24.0%	76.0%
Undertake business online	31.0%	69.0%
Use the Internet to link to customers	18.1%	81.9%
Customer online support	62.0%	38.0%
Internet to link with suppliers	23.4%	76.6%
Order materials or services online	25.1%	74.9%
Customised software created in-house	27.5%	72.5%
Use accounting software	01.2%	98.8%
Feel the accounting software employed meets its general needs	03.5%	96.5%
Feel the accounting software meets MA needs	12.3%	87.7%
Engage in training employees in IT	15.2%	84.8%
Host training programmes in IT held in-house	31.0%	69.0%
Fund outsourced employee training programmes in IT	24.7%	75.3%
MA department	12.9%	87.1%
Outsource MA	91.8%	8.2%

Table 6-25: Companies' Level of IT Activities

Table 6-26 reveals the number of IT training programmes provided by companies for their employees, and the amount allocated to IT training. The responses collected reveal that 40.6% of companies provided their employees with between four and six training programmes annually, and 29.4% provided their employees with between one to three programmes annually. At the extremes, 8.2% of companies did not provide training programmes and 14.1% provided over twelve training programmes each year. Furthermore, the table demonstrates the amount allocated to IT training programmes each year, with 36.3% of companies spending

less than €10,000 per year; 28.7% between €20,000 and €30,000 per year; and 14.6% spending over €50,000 each year.

Table 0-20. 11 Training Programmes and Spending						
IT training programmes provided	Percentage	Spending on IT training	Percentage			
None	8.2%	Less than 10,000	36.3%			
1 to 3 programmes	29.4%	10,000 to 20,000	13.5%			
4 to 6 programmes	40.6%	20,000 to 30,000	28.7%			
7 to 9 programmes	4.7%	30,000 to 40,000	3.5%			
10 to 12 programmes	2.9%	40,000 to 50,000	3.5%			
More than 12 programmes	14.1%	Greater than 50,000	14.6%			
Total	100.0%	Total	100%			

Table 6-26: IT Training Programmes and Spending

Table 6-27 reveals the number of employees in each company's IT department, along with the number of PCs or other IT devices: 48% of companies had departments comprised of between one and ten IT employees, and 31% had eleven to thirty employees in their IT departments; thus, establishing that approximately 79% of companies had between one and thirty employees within their IT departments. Based on response rates, 29.8% of companies owned between 101 and 150 devices, and 28.1% owned over 200 devices. In total, 62% of companies owned over 100 devices, while 38% owned fewer than 100.

Table 6-27: Number of IT Employees and Devices Owned

Number of employees	Percentage	Number of Devices/PC	Percentage
1 to 10	48%	1 to 10	2.9%
11 to 30	31%	11 to 30	7.6%
31 to 60	5.3%	31 to 60	15.2%
61 to 100	4.7%	61 to 100	12.3%
101 to 150	1.2%	101 to 150	29.8%
151 to 200	2.9%	151 to 200	4.1%
Over 200	7%	Over 200	28.1%
Total	100%	Total	100%

6.5.3. Economic Conditions

Table 6-28 demonstrates the respondents' perceptions of their current economic condition. When surveyed, 50.9% of all companies stated that there had been an increase in the number of products they produced; 32.2% claimed production was stable; 49.1% stated an increase in the number of services delivered recently; and 40.4% stated stability in terms of service delivery. In addition, 55.6% of companies stated that the number of supplier relationships they held was stable; 29.8% that their supplier numbers had increased; 54.4% stated an increase in the number of customers; and 26.3% stated their customer base was stable. Furthermore, 39.8% of companies reported a stable number of employees, and 33.3% reported an increase. In terms of gross profits, 42.1% of companies reported stability, whereas 33.9% reported an increase an increase, with just 43.5% reporting stability in terms of their net profits, whereas 32.4%

reported an increase. In addition, 42.4% of companies stated that they had retained stability with regard to the price of company products/services sales, whereas 26.5% had increased their prices, establishing that 65.3% of companies reported stability in stock market prices, and 18.6% noted an increase. Furthermore, 60% of companies reported that the amount they were owed by customers remained stable, and 26.5% reported a decrease. In addition, 71.2% of companies reported stability in the amount owed to suppliers, whereas 20% reported a decrease.

Table 0-28. Companies Leononne Conditions							
Changes in the following activity	V	Dooroogod	Stable	Turana and	V		
Changes in the following activity	Decreased	Decreased	Stable	Increaseu	Increased		
Number of products produced	0.6%	04.1%	32.2%	50.9%	12.3%		
Number of services delivered	0.0%	02.9%	40.4%	49.1%	07.6%		
Number of supplier relationships	0.6%	06.4%	55.6%	29.8%	07.6%		
Number of customers	1.8%	06.4%	26.3%	54.4%	11.1%		
Number of employees	1.2%	14.6%	39.8%	33.3%	11.1%		
Gross profit	2.3%	11.1%	42.1%	33.9%	10.5%		
Net profit	2.9%	10.6%	43.5%	32.4%	10.6%		
Products/services sales price	3.5%	23.5%	42.4%	26.5%	04.1%		
Stock market price for your organisation	6.6%	03.6%	65.3%	18.6%	06.0%		
Amount owed by customers	1.8%	26.5%	60.0%	09.4%	02.4%		
Amount owed to suppliers	1.8%	20.0%	71.2%	05.9%	01.2%		

Table 6-28: Companies' Economic Conditions

6.5.4. Organisational Size

Table 6-29 (below) displays the size of the organisations that responded to the questionnaire. Two methods were employed to establish organisational size; the first being annual turnover. The lowest rate of annual turnover reported was in the O-G million bracket, and the highest was over C50 million. The table demonstrates that forty-three companies (i.e. 25.1% of organisations) documented an annual turnover of between G0 million and G100 million. Furthermore, a response from five organisations (equivalent to 2.5%) recorded annual turnover of less than G million. Second the number of employees within each organisations (as detailed in the table below) was used to establish size. This commenced with organisations employing fewer than 100 employees, and ranged to those employing over 2,000. The employee method established the highest percentage of respondents as 19.9% (i.e. equivalent to thirty-four organisations reporting their number of employees to be between 250 and 500), while the lowest percentage was 11.7% (i.e. equivalent to twenty respondent organisations reporting over 2,000 personnel). In conclusion, the use of both methods ascertained that, on average, respondent organisations were medium to large in size, based on both annual turnover and number of employees.

Annual turnover	Frequency	Percent %	Number of employees	Frequency	Percent %
Less than 5m	5	2.9	Less than 100	35	20.5
€5m-€25m	19	11.1	100-250	28	16.4
€25-€50m	29	17.0	250-500	34	19.9
€50-€100m	43	25.1	500-1000	25	14.6
€100m-€250m	27	15.8	1000-2000	23	13.5
Greater than €250m	42	24.6	Greater than 2000	20	11.7
Total	165	96.5	Total	165	96.5
Missing System	6	3.5	System	6	3.5
Total	171	100.0		171	100

Table 6 20: Size of Persondant Organisations

Table 6-30 (below) compares the size of the companies examined in this current study with those analysed by Pierce and Brown (2004). It employs both methods, i.e. annual turnover and number of employees. Despite the discrepancies in total number of companies evaluated by both independent studies, i.e. the study of Pierce and Brown (2004) described as: "an empirical study of activity-based systems in Ireland" at 122 and the current study at 171, the table displays a number of commonalities between the two. Thus, a smaller percentage of companies displayed an annual turnover of lower than € million, and the smallest group represented companies with an employee number greater than 2,000. In the current study, forty-two companies (i.e. the second highest represented group, with 24.6% of the total) recorded an annual turnover of over €250 million, demonstrating a similar (but distinct) total

of companies detailed within Brown's research, representing forty companies in all (i.e. the highest represented groups by percentage of total companies at 32.8%). When comparing this study to that of Pierce and Brown (2004), it should also be noted that forty-two companies within the current study (the highest number represented groups by percentage of total companies at 25.1%) recorded an annual turnover of between S0 and E100 million, whereas Pierce and Brown's (2004) research covered a total of thirty-six companies (second highest represented groups by percentage of total companies at 29.5%). In addition, this current study details thirty-four companies that fall within the category of 250 to 500 employees (i.e. second highest represented groups by percentage of total companies at 19.9%) in contrast with thirtythree companies (i.e. highest represented groups by percentage of total companies at 27.0%) as identified by Pierce and Brown's (2004) analysis.

				0				,	
Annual turnover	This study Pierce and Brown (2004)		N of employees	This study		Pierce and Brown (2004)			
	Ν	%	Ν	%		Ν	%	Ν	%
Less than 5m	5	2.9%	1	0.8%	Less than 100	35	20.5%	12	9.8%
€5m-€25m	19	11.1%	3	2.5%	100-250	28	16.4%	25	20.5%
€25-€50m	29	17.0%	11	9.8%	250-500	34	19.9%	33	27.0%
€50-€100m	43	25.1%	36	29.5%	500-1000	25	14.6%	29	23.8%
€100m-€250m	27	15.8%	31	25.4%	1000-2000	23	13.5%	15	12.3%
Greater than €250m	42	24.6%	40	32.8%	Greater than 2000	20	11.7%	8	6.6%
Total	165	96.5%	122	100%	Total	165	96.5%	122	100%
Missing System	6	3.5	0	0	System	6	3.5%	0	0.0%
Total	171	100.0%	122	100.0%	Total	171	100.0%	122	100.0%

Table 6-30: Comparison of Organisational Size with Pierce and Brown (2004)

Table 6-31 (below) demonstrates the adoption status of ABC and ABM, with the highest percentage of total companies within an individual study in comparison to 27.9%, as recorded by Pierce and Brown (2004). Clarke et al. (1999) recorded the lowest percentage (i.e. 11.8%) of companies adopting ABC and ABM. In total, 19.3% of the companies reported in this study that have implemented ABC and ABM recorded a higher total result than that noted by Clarke et al. (1999). Furthermore, it should be highlighted that the outcome of this study is less than suggested by Pierce and Brown (2004), as the results are closer to those described by Cotton et al. (2003) and Innes et al. (2000). The results established in the current study accord with the results recorded in similar studies within Ireland, the UK and New Zealand (see Clarke et al. (1999); Innes et al. (2000); Cotton et al. (2003); and Pierce and Brown (2004)).

Table 6-31: Adoption Status of ABC and ABM

Study	Total responses	Currently using ABC and ABM	Percentage
The current study	171	32	18.70%
Pierce and Brown (2004)	122	34	27.90%
Cotton et al. (2003)	296	60	20.30%
Innes et al. (2000)	177	31	17.50%
Clarke et al. (1999)	204	24	11.80%
Innes and Mitchell (1995)	352	74	21.00%

6.6. Descriptive Statistics for Model Variables

Table 6-32 shows the dependent variable descriptive statistics and the location of the organisation participating as control variables in the study. Overall, 139 organisations (i.e. 81.3% of the total sample) stated that they were not implementing ABC and ABM. Thirty-two companies (i.e. 18.7%) stated that they had implemented ABC and ABM. Furthermore, the multinational variables revealed that 102 organisations (i.e. 59.6%) had operated on a global basis. Sixty-nine organisations (i.e. 40.4%) operated in Ireland and the UK, representing both dependent variables and control variables as binaries.

Table 6-32: The Im	plementation of	ABC and ABM	and Multinational	Companies

ABC and ABM Implementation	Frequency	%	Multinational	Frequency	%
Company not implemented ABC & ABM	139	81.3%	Worldwide	102	59.6%
Companies implemented ABC & ABM	32	18.7%	Ireland and UK	69	40.4%
Total	171	100%	Total	171	100%

Table 6-33 shows the industry type control variable groups, combined as (1) service companies, (2) manufacturing companies and (3) other companies. The methods used to combine these groups are shown in Table 6-33. Fifty-two companies (i.e. 30.4%) were service companies; sixteen companies (i.e. 9.4%) were other companies; and one hundred companies (i.e. 58.5%) were manufacturing firms. Three companies (i.e. 1.8%) are not represented.

Table 6-33 Industry Type Control Variable Groups					
Industry Group	Frequency	Percentage			
Service companies	52	30.4%			
Other companies	16	9.4%			
Manufacturing companies	100	58.5%			
Total	168	98.2%			
Missing System	3	1.8%			
Total	171	100%			

Table 6-34 reveals the size of each company, establishing that five companies (i.e. 2.9%) earned less than \mathfrak{S} million, representing the lowest level of revenue. Nineteen companies (i.e. 11.1%) stated that their annual revenue was between \mathfrak{S} and $\mathfrak{S}0$ million. Twenty-nine companies (i.e. 17%) reported annual revenues of between $\mathfrak{S}0$ and $\mathfrak{S}0$ million. Forty-three companies (i.e. 25.1%) reported annual revenue between $\mathfrak{S}0$ and $\mathfrak{S}10$ million. Twenty-seven companies (i.e. 15.8%) stated that their annual revenue was between $\mathfrak{S}0$ and $\mathfrak{S}100$ million. Twenty-seven companies (i.e. 24.6%) that their annual revenue exceeded $\mathfrak{S}250$ million.

In addition, the table describes the size of each organisation as measured by the number of employees. Thirty-five companies (20.5%) stated that they employed fewer than 100 employees; Twenty-eight (16.4%) employed between 100 and 250 employees; thirty-four (19.9%) employed between 250 and 500 employees; twenty-five (14.6%) employed between 500 and 1000 employees; twenty-three (13.5%) employed between 1,000 and 2,000 employees; Twenty (11.7%) employed over 2,000 employees; and six (3.5%) failed to state the number of employees employed (in that case this information was treated as a missing value).

This study model focused on revenue as a means of measuring a company's size as a control variable, in conjunction with the number of employees engaged in the descriptive statistics, intending to compare the size of organisation in the current study with other studies.

Revenue in millions	Frequency	Percentage	Number of employees	Frequency	Percentage
Less than €	5	2.9%	Less than 100	35	20.5%
€5 to €25	19	11.1%	100 to 250	28	16.4%
€25 to €50	29	17.0%	250 to 500	34	19.9%
€50 to €100	43	25.1%	500 to 1000	25	14.6%
€100 to €250	27	15.8%	1000 to 2000	23	13.5%
Greater than 250	42	24.6%	Greater than 2000	20	11.7%
Total	165	96.5%	Total	165	96.5%
Missing System	6	3.5%	Missing System	6	3.5%
Total	171	100%	Total	171	100%

Table 6-34: Organisational Size Represented by Revenue and Number of Employees

Table 6-45 depicts the descriptive statistics for the two independent variables and one control variable. As demonstrated above, the N value for the three variables is 171. The minimum level of IT within the organisation contains the minimum value of 0.44, and a maximum value of 2.05. The mean value is 1.221, and the Std. Deviation is 0.364. The organisation's economic condition minimum value is -0.89, and the maximum 1.78, with a mean value of 0.274. In addition, the Std. Deviation is 0.354. The organisation's level of competition describes a minimum value of one, and a maximum value of five, with the mean being 3.539, and the Std. Deviation 0.683.

6.7. Factor Analysis

This section presents a factor analysis as a means to assess the study variables. It begins with Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, and then presents the factor analysis for independent variables. It reports on the results of the communalties test, the rotated component matrix test, and the total variance explained test for level of IT, economic condition and organisational level of competition. In addition, it explains the tests included in the appendix; e.g. the Component Matrix, Component Transformation Matrix, Component Score Coefficient Matrix, Component Score Covariance Matrix, Correlation Matrix, Anti-image Matrices and Reproduced Correlations.

6.7.1. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Before the extraction of factors, a KMO and Bartlett's Test should be applied to evaluate how appropriate the respondent data is for factor analysis. Verbeke and Viaene (1999, p. 240) stated that KMO as a measure of sampling adequacy indicates that conducting factor analysis on data is appropriate. Williams et al. (2010, p. 5) stated "the KMO index, in particular, is recommended when the cases to variable ratio are less than 1:5. The KMO index ranges from zero to one, with 0.50 considered suitable for factor analysis". Bartlett's Test of Sphericity

should produce results that are significant (p<.05) for factor analysis, if it is to prove suitable (Williams, et al. 2010). Table 6-35 depicts the KMO and Bartlett's test results. The IT variable of IT totals 77.1%, and is reliable when it passes the recommended minimum of 60%. Bartlett's test is of high value, showing accurate measurements have been taken: DF 153, significance p<0.0005 and approximate Chi-Square of 1004.335.

- A company's economic condition signifies results at 64.9%, and is reliable when passing the recommended minimum of 60%. In addition, Bartlett's Test of Sphericity gives DF 45, significance p<0.0005 and an approximate Chi-Square of 758.923.
- Level of competition produces a result of 80.30%, and is reliable when it passes the recommended minimum of 60%. Bartlett's Test of Sphericity gives DF 36, significance p<0.0005 and an approximate Chi-Square of 570.102.

The hypothesis test exploring Bartlett's Test of Sphericity examines the research hypothesis, specifically testing the null hypothesis (H0: All correlation coefficients are closer to zero); thus, the correlation matrix is essentially an identity matrix. An identity matrix is a matrix in which all the diagonal elements are one, and all of the diagonal elements are zero. Thus, the researcher rejects the null hypothesis for the IT variable, the company economic condition variable and the level of competition variable. Moreover, the coefficients are not all zero, providing evidence as a basis to accept the second hypotheses (H1). Therefore, the requirement to run a factor analysis has been statistically fulfilled. Thus, as shown by each individual test, it is acceptable to conduct factor analysis tests for this study.

Variable	кмо	Bartlett's Test of Sphericity				
variable	KNIU	Chi-Square	Df	Sig.		
IT	0.771	1004.335	153	.000		
Economic conditions	0.649	1004.335	153	.000		
Competition	0.803	570.102	36	.000		

Table 6-35: Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity

6.7.2. Information Technology Factor Analysis

The organisational level of IT resources, as an independent variable, was assessed using the KMO and Bartlett's tests. This variable could be further examined via a communalties test, the rotated component matrix test, or the total variance explained test. These tests help to investigate variable relationships to establish complex concepts and then group them according to established IT factors. These factors are then addressed later in this chapter to examine the model.

6.7.2.1. Communalties Test

Table 6-36 depicts the communalties test. It highlights the ratio of differences between variables, as designated by factor analysis. The initial column presents the highest ratio recorded by the variables, and the principal axis factor. The extraction column shows the ratio of variable differences, as clarified by the retained factors. The highest variable values recommended in the joint factor analysis are lower values. As shown in Table 6-36, the variables excluded from the test include customer online support, ordering materials or services online, and using accounting software; scoring 0.487, 0.425 and 0.398 respectively, as highlighted in the table. These are the only variable ratios to report a significant deficit when assessed relative to the minimum requirement of 0.5.

Communalties	Initial	Extraction
Have an IT department	1.000	0.539
Has a website in-house	1.000	0.508
Does business online	1.000	0.583
Uses the internet to link with customers	1.000	0.612
Customer online support	1.000	0.487
Uses internet to link with suppliers	1.000	0.580
Orders materials or services online	1.000	0.425
Customised software created in-house	1.000	0.597
Uses accounting software	1.000	0.398
Feels the accounting software employed meets its general needs	1.000	0.701
Feels the accounting software meets management's accounting needs	1.000	0.719
Engages in training employees in IT	1.000	0.809
Hosts training programs in IT held in-house	1.000	0.700
Funds outsourced employee training programs in IT	1.000	0.685
IT training programs provided	1.000	0.639
Spending on IT training	1.000	0.751
Number of employees in IT	1.000	0.706
Devices/PCs owned	1.000	0.622
Extraction Method: Principal Component Analysis		

Table 6-36: IT Communalties Tests

6.7.2.2. Rotated Component Matrix Test

Table 6-37 illustrates the rotated component matrix test results for the original twenty-one questions, which were asked to deduce the impact of IT on the implementation and adoption of ABC and ABM in the top 1,000 Irish organisations. Four of the twenty-one questions posed were later deleted, due to overlapping component loading. Eighteen of the components or items provided a good, clean result. All eighteen items were loaded into five factors, with factor loadings of 0.524 or above. These were IT function, IT online, IT training, IT in-house software, and IT to meet management's needs. Therefore, these are the five key factors used when computing IT for the main regression (IT function, services online or customer online).

support, engages in training employees in IT, customised software created in-house, and providing for management's needs).

	Component						
	1	2	3	4	5		
Rotated Component Matrix ^a	Function	nOnline	Trainin	In houseM ^g software	lanagement needs		
Number of employees in IT	.816						
Spending on IT training	.809						
Devices/PCs owned	.744						
IT training programs provided	.725						
Uses the internet to link with customers		.761					
Internet to link with suppliers		.739					
Conducts business online		.654					
Orders materials or services online		.610					
Customer online support		.524					
Engages in training employees in IT			.877				
Funds outsourced employee training programs in IT	•		.809				
Hosts training programs in IT held in-house			.679				
Customised software created in-house				.650			
Has an IT department				.620			
Uses accounting software				.602			
Has a website in-house				.567			
Feels the accounting software meets management's	accountin	g needs			.832		
Feels the accounting software employed meets its g	eneral nee	eds			.817		
Extraction Method: Principal Component Analysis. a. Rotation converged in 6 iterations	Rotation	Method:	Varima	x/Kaiser No	rmalisation ^a		

Table 6-37: IT Rotated Component Matrix

6.7.2.3. Total Variance Explained

According to Hair et al. (1995), Pett et al. (2003) and Williams et al. (2010), in the sciences, factors should be arrested when at least 95% of the variance of a study can be explained. In the social sciences, the explained variance is typically as low as 50-60%, and a total number of components should have an eigenvalue greater than one. For the current study, total variance tests were run, as presented in Table 6-38; these detailed the level of explanation of the five IT variables. The factor associated with the IT functions produced 27.471% of the variance, as identified. The factor for online use of IT produced 10.597% of the variance. The factor for IT training programs, which were provided internally/externally by the organisation's employees, logged 9.304% of the variance. Building IT in-house software produced 7.165% of the variance. IT assisted the organisation to meet management's needs, creating 6.903% of the variance. Five factors were involved when discussing the impact of IT on the implementation of ABC and ABM, as described above. These were IT function, IT online, training in IT, building in house software, and IT used to meet management's needs. These factors describe 61.44% of the data.

				Tot	al Variance	e Explained			
on	Initial Figanyaluag			Extraction Sums of Squared			Rotation Sums of Squared		
lodi	mitiai Eigenvalues			Loadir	ngs		Loadir	ngs	
nen	Total	% of	Cumulative	Total	% of	Cumulative	Total	% of	Cumulative
÷	Total	Variance	%	Total	Variance	%	Total	Variance	%
1	4.945	27.471	27.471	4.945	27.471	27.471	2.898	16.099	16.099
2	1.908	10.597	38.068	1.908	10.597	38.068	2.619	14.548	30.646
3	1.675	9.304	47.372	1.675	9.304	47.372	2.247	12.483	43.130
4	1.290	7.165	54.537	1.290	7.165	54.537	1.842	10.233	53.362
5	1.243	6.903	61.440	1.243	6.903	61.440	1.454	8.078	61.440
6	.980	5.444	66.884						
7	.892	4.957	71.841						
8	.735	4.084	75.925						
9	.677	3.760	79.685						
10	.632	3.511	83.196						
11	.571	3.173	86.369						
12	.479	2.660	89.028						
13	.455	2.528	91.556						
14	.394	2.187	93.743						
15	.369	2.048	95.791						
16	.302	1.677	97.467						
17	.237	1.317	98.785						
18	.219	1.215	100.000						
Ext	raction	Method: P	rincipal Comp	onent A	Analysis				

Table 6-38: Explanation of Total Variance Caused by IT

As discussed in Section 5.6.2, a Cronbach Alpha test should be run to establish the interactions between factors. The IT function, as well as IT online and IT training programs within organisations and/or outside of organisations, all registered a high internal consistency, with Cronbach Alphas of 0.824, 0.720, and 0.769 respectively. These are in line with the expected results for Cronbach Alpha.

6.7.3. Economic Conditions Factor Analysis

The organisation's economic condition was introduced as the second independent variable, and successfully passed the KMO and Bartlett tests. Therefore, this variable could be further examined in the communalties test, the rotated component matrix test and the total variance explained test. These tests can be employed to investigate variable relationships for complex concepts, grouping them according to established economic factors. These factors are mentioned later in this chapter relative to model analysis.

6.7.3.1. Communalties Test

Table 6-39 below illustrates the communalties test results. The initial column presents the highest ratio recorded among the variables, and the principal axis factor. The extraction

column presents the ratio of variable difference, as clarified by the retained factors. The highest variable values recommended were combined factors, producing lower values. In this study, variables were excluded from the number of products produced and the number of supplier relationships; these scored 0.381 and 0.442 respectively, as included in the table. The variable ratios denote a significant deficit from the minimum requirement of 0.5.

Tuble 0 39. Organisation 3 Leonomic Conditions Communatives Test					
Communalities	Initial	Extraction			
Number of products produced	1.000	0.381			
Number of services delivered	1.000	0.758			
Number of supplier relationships	1.000	0.442			
Number of customers	1.000	0.549			
Number of employees	1.000	0.536			
Gross profit	1.000	0.894			
Net profit	1.000	0.867			
Products/services sales price	1.000	0.466			
Amount owed by customers	1.000	0.745			
Amount owed to suppliers	1.000	0.739			
Extraction Method: Principal Component Analysis					

Table 6-39: Organisation's Economic Conditions Communalities Test

6.7.3.2. Rotated Component Matrix Test

Table 6-40 shows the results for the impact of an organisation's economic conditions on the level of implementation of ABC and ABM, when conducted according to the original eleven questions in a rotated component matrix test. One question was deleted, due to the overlap in component loading, as apparent in relation to the initial eleven questions. A clean and functioning result was collected from ten components or items. Ten items were then loaded into three factors, showing factor loadings of 0.473 and above. These described the organisations' business growth, organisational product activity, and organisational liquidity. These are therefore the three key factors involved in computing economic conditions for the main regression (business growth, product/service activity, and liquidity).

	Component					
Rotated Component Matrix ^a	1	2	3			
	Business growth	Product activity	Liquidity			
Gross profit	.935					
Net profit	.927					
Number of employees	.653					
Products/services sales price	.622					
Number of supplier relationships	.473					
Number of services delivered		.862				
Number of customers		.698				
Number of products produced		.544				
Amount owed by customers			.851			
Amount owed to suppliers			.846			
Extraction Method: Principal Compone	ent Analysis. Rotation M	lethod: Varimax/Kaise	r			
Normalisation ^a	-					
a. Rotation converged in 5 iterations						

Table 6-40: Organisation's Economic Conditions Rotated Component Matrix

6.7.3.3. Total Variance Explained

Table 6-41 shows the impact of a company's economic condition on the implementation and adoption of ABC and ABM, as revealed by the total variance explained test, covering the level of explanation of the three economic variables. The factor, organisational business growth described 33.399% of the variance. The factor organisational product activity logged 16.291% of the variance. Finally, the factor organisational liquidity reported 14.062% of the total variance. Of the eleven questions in which the survey scrutinised economic conditions, ten items remained. When considering the impact of a company's economic condition on the implementation of ABC and ABM, three of the factors defined above (organisational business growth, organisational product activity, and organisational liquidity) explained 63.752% of the data.

0				Tot	al Variance	e Explained			
òm		Initial Figa	nyoluog	Extra	action Sum	s of Squared	Rota	tion Sums	of Squared
lodi		initial Eige	invalues		Loadir	ngs		Loadir	ngs
nen	Total	% of	Cumulative	Total	% of	%	Total	% of	%
•	Totai	Variance	%	Total	Variance	Cumulative	Total	Variance	Cumulative
1	3.340	33.399	33.399	3.340	33.399	33.399	2.876	28.762	28.762
2	1.629	16.291	49.690	1.629	16.291	49.690	1.793	17.926	46.688
3	1.406	14.062	63.752	1.406	14.062	63.752	1.706	17.064	63.752
4	.910	9.099	72.851						
5	.788	7.876	80.728						
6	.624	6.243	86.971						
7	.524	5.241	92.212						
8	.443	4.434	96.646						
9	.295	2.951	99.597						
10	.040	.403	100.000						
Ex	tractio	n Method: F	Principal Com	onent /	Analysis				

Table 6-41: Organisation's Economic Conditions Total Variance Explained

6.7.4. Level of the Competition Factor analysis

The organisational level of competition is among the four control variables that successfully passed the KMO and Bartlett's tests. Therefore, this variable is a subject for further examination in the communalties test, the rotated component matrix test, and the total variance explained test. These tests assist the author in investigating the variable relationships for complex concepts and in grouping them together as competitive factors. These factors are presented later in this chapter relative to model analysis.

6.7.4.1. Communalities Test

Table 6-42 below displays the communalties test results. The initial column presents the highest ratio recorded by the variables, and the principal axis factor. The extraction column presents the ratio for variable difference, which can then be clarified by the retained factors. The highest variable values are rarely recommended as a joint factor. In the study, the excluded variable was promotion and career progression, and this was the only variable ratio reporting a significant deficit of 0.297 (and highlighted in the table), from a minimum requirement of 0.5.

Table 6-42: Competition Communalties Tests		
Communalities	Initial	Extraction
Price levels	1.000	0.601
The products/services you provide	1.000	0.729
Your products/services selling price is influenced by price structure	1.000	0.640
The purchase price of key materials	1.000	0.457
Marketing issues	1.000	0.637
The advertising budget	1.000	0.693
The marketing strategy	1.000	0.766
Product/service design	1.000	0.494
Promotion and career progression	1.000	0.297
Extraction Method: Principal Component Analysis		

Table 6-42: Competition Communalties Test

6.7.4.2. Rotated Component Matrix Test

Table 6-43 displays the impact of organisational level competition on the implementation and adoption of ABC and ABM, as conducted using a rotated component matrix test. A single question was deleted, due to an overlap in component loading in the initial ten questions; i.e. the deleted question adversely affected the component loading for the results of the factor analysis test. A clean and functioning result was collected from nine components. Nine items were then loaded into the two factors, with factor loadings of 0.469 and above. The two key factors loaded were company product price and organisational promotion as a means of

establishing competition according to the main regression (product price and promotion and career progression).

	Con	nponent
Rotated Component Matrix ^a	1	2
	Price	Promotion
The marketing strategy	.875	
The advertising budget	.818	
Marketing issues	.670	
Product/service design	.648	
Promotion and career progression	.469	
The products/services you provide		.807
Your products/services selling price is influenced by price structure		.779
Price levels		.762
The purchase price of key materials		.651

Table 6-43: Organisation's Level of Competition Rotated Component Matrix

6.7.4.3. Total Variance Explained

Table 6-44 depicts the total variance revealed by the test results, to establish the impact of organisational levels of competition on the implementation and adoption of ABC and ABM, detailing the levels of competition among the variables. In total, 44.353% of this variance was attributable to the factor, organisational product price. Whereas, the factor organisational promotion logged 14.680% of the variance. From the ten questions designed to scrutinise organisational levels of competition, nine items were returned. Regarding the impact of organisational levels of competition on the implementation of ABC and ABM, two factors were given as defined above (organisational product price and organisational promotion), covering 59.033% of the data.

0	Total Variance Explained								
0m	т	nitial Fige	nvəlues	Extra	action Sum	s of Squared	Rota	ation Sums	of Squared
lod	1	Intial Eige	il values		Loadir	ngs		Loadir	ngs
nen	Total	% of	%	Total	% of	%	Total	% of	%
-	Total	Variance	Cumulative	Total	Variance	Cumulative	Total	Variance	Cumulative
1	3.992	44.353	44.353	3.992	44.353	44.353	2.688	29.861	29.861
2	1.321	14.680	59.033	1.321	14.680	59.033	2.625	29.172	59.033
3	.909	10.096	69.129						
4	.678	7.537	76.666						
5	.605	6.724	83.390						
6	.541	6.006	89.396						
7	.396	4.402	93.798						
8	.312	3.466	97.264						
9	.246	2.736	100.000						
Ext	raction	Method: P	rincipal Comp	onent A	Analysis				

Table 6-44: Organisation's Level of Competition Total Variance Explained

Further tests on the above factors are available on request from the author - namely the Component Matrix, Component Transformation Matrix, Component Score Coefficient Matrix, Component Score Covariance Matrix, Correlation Matrix, Anti-image Matrices, and Reproduced Correlations.

6.7.5. Factor Analysis Summary

In summary, the results for the factor analysis for the two independent variables and one control variable were as follows.

The first variable loaded related to the organisational level of IT resources, and comprises five factors: IT function, online service, IT training, in house software, and IT to meet management's needs. Four questions related to the IT function factor with acceptable loadings. In this case, five questions sought to answer the online service factor with good loading factors. In addition, there were three questions posed to answer the IT training provided factor with good loading. A further four questions related to building the in-house software factor with acceptable factor loading. Finally, two questions related to IT and providing management with the information necessary for good factor loading.

The second variable loaded related to organisations' economic conditions, and included three factors: organisation's business growth, organisation's product activity, and organisational liquidity. Five questions encompassed organisational business growth, each with a high loading. In addition, three questions covered the organisation's product activity, and two liquidity. Finally, the organisational level of competition was one of four control variables, including two factors, loaded as parts of the variable, namely (price and promotion). There were five questions answering the price question and four questions relating to promotion.

These factors were used in the final research model and the regression tests employed in the following sections. Figure 6-1 shows the main factors identified for each variable in the research model.



Figure 6-1: Factors Identified for Each Variable in the Research Model

6.8. Correlation Analysis of the Modelled Variables

Having applied factor analysis to the data, Table 6-45 shows the correlations between the dependent variables for the main research model. The correlations in place describe the relationship between two variables, while controlling for the effects of one or more additional variables. Correlations are a measure of linear association. In this study, the correlations between an organisation's levels of IT and its economic condition is significant at the 95% of confidence, at 0.038 which shows significance, at 0.05%; i.e. we are 95% certain that the levels of IT and economic conditions are not correlated. The table also details the correlation between the organisation's economic conditions and levels of competition is significant at the 95% of confidence, at 0.013 which shows significance, at 0.05%. Thus, we are 95% confident that the organisation's economic conditions and level of competition are not correlated. The correlation between an organisation's levels of IT and its competition is significant at the 95% of confidence, at 0.612 which is a significant correlation; but the Pearson Correlation is 0.039, meaning there is no correlation between the two variables (See Appendices for the correlation tests across questions).

		Tuoto o lot I cui	eon eon enanon		
			Level of IT	Economic condition	Competion
1	Level of IT	Pearson correlation	1.000	0.159^{*}	0.039
		Sig. (2-tailed)	-	.000	-
		Ν	171	171	171
2	Economic condition	Pearson correlation	0.159^{*}	1.000	-0.190*
		Sig. (2-tailed)	.000	-	.000
		Ν	171	171	171
3	Level of competition	Pearson correlation	0.039	-0.190*	1.000
		Sig. (2-tailed)	-	.000	-
		Ν	171	171	171

Table 6-45: Pearson Correlations Test

* Correlation is significant at the 0.05 level (95%).

The main reason for running a correlation matrix is to reveal any inter-correlations between the study variables; this ensures each of the independent variables is testing something different. Zikmund (2003) and Saunders et al. (2009) also stated that a correlation test can be employed to reflect the degree of connotation between two variables (Zikmund 2003; Saunders et al. 2009).

Saunders et al. (2009) further stated that correlation 'r' ranges from ± 1.0 to ± 1.0 and that a correlation result greater than ± -0.90 indicates a substantial positive or negative collinearity between study variables (Saunders et al. 2009). However, Ashford and Tsui (1991) stated that correlations above ± -0.75 indicate serious positive or negative collinearity between study variables, and therefore should be avoided (Ashford and Tsui 1991). The results of this study confirm that there is no collinearity between the variables.

6.9. Model Estimation Results

As detailed in Section 5.2, this study examines the level of ABC and ABM implementation; described as ABCM_t, and has two independent variables namely level of Information Technology IT_t and organisation economic conditions ECON_t and four control variables, namely company size SIZE_t, company industry type INDGRP_t, company level of competition COMP_t, and company multinational MULTI_t. A Pearson Correlations Test was applied to examine the relationship between the independent variables (see Section 6.8 correlation analysis of variables modelled for more details). Binary logistic regression LOGIT was employed to examine the binary (YES or NO) dependent variables ABCM_t on a number of independent variables (see Section 5.7 for more details). This study will test the central hypotheses of this thesis by estimating the following binary logistic regression model using data extracted from the sample firms:

$$ABCM_{t} = \alpha_{0} + \alpha_{1}IT_{t} + \alpha_{2}ECON_{t} + \alpha_{3}SIZE_{t} + \alpha_{4}INDGRP_{t} + \alpha_{5}COMP_{t} + \alpha_{6}MULTI_{t} + \epsilon_{t}$$

Where:

ABCM _t	= 1 if the organisation adopted ABC and ABM; 0 if the organisation did not adopt
	ABC and ABM but used another costing system to calculate the cost of products/services.

- IT_t = Average organisational level of IT in the sample, as defined by factor analysis test (see Section 5.3.1).
- $ECON_t$ = Average economic condition within the organisations in the sample, as defined by factor analysis (see Section 5.3.2).
- $SIZE_t$ = Company size in the sample, as measured by annual company revenue (see Section 5.4.1).
- $$\label{eq:INDGRPt} \begin{split} \text{INDGRP}_t &= \text{Company industry type group in the sample (i.e. service companies, manufacturing companies and other companies); see Section 5.4.2 and Table 6-33. \end{split}$$
- $COMP_t$ = Average organisational level of competition in the sample, as defined by a factor analysis test (see Section 5.4.3).
- $MULTI_t = 1$ if the company is operating only in Ireland/the UK; and 0 if the company is operating worldwide (see Section 5.4.4).
- ϵ_t = Error term.

The results for the thesis' main research model is presented in Table 6-46 and show a positive and significant (at 95%) association between ABCM_t and IT_t. This indicates that of the sample firms investigated, it is possible to assert with 95% confidence that level of IT resources within the firm resulted in increased implementation of ABC/M, thereby providing empirical support for Hypothesis 1. No statistically significant relationship was found between ABCM_t and ECON_t; meaning no relationship exists between the implementation of activity based costing/management and economic conditions. This also means Hypothesis 2 is not supported by the study findings. Moreover, none of the other control variables in the model have any significant association with the dependent variable.

				./
	Coefficient	Std.Error	t-value	t-prob
Constant	-3.218	1.540	-2.090	(0.038)**
IT _t	1.591	0.723	2.200	(0.029)**
ECONt	-0.662	0.603	-1.100	(0.274)
SIZE _t	-0.285	0.176	-1.620	(0.107)
IND _t	0.027	0.059	0.450	(0.654)
COMPt	0.257	0.353	0.728	(0.468)
MULTIt	-0.213	0.460	-0.463	(0.644)
Where:				
$ABCM_t = Dependent variable$	INDt	= Organisatio	n's industry	(no groups)
$IT_t = Level of IT$	COMPt	= Organisation	n's level of o	competition
$ECON_t$ = Organisation's economic condition	MULTI _t	= Multination	al organisat	ion or not?
$SIZE_t$ = Organisation size by revenue				
Log-likelihood ratio	-72.202			
Chi-squared	8.235	(p = 0.221)		
AIC	158.403			
** Significant at the 95% level of convergence	2			

Table 6-46: Main Model Estimation Results (Dependent Variable = $ABCM_t$)

The above section tested the research model, using factor analysis to combine a number of questions into a single variable. To provide further insights into the data, the research model was re-estimated without combining the questions, leading to the formation of dependent variables. In the section below, the model estimation results are presented for the model in which the most important questions (as identified from the factor analysis) led to the computation of IT_1 ; these are included as explanatory variables, rather than as an aggregate measure.

6.9.1. Further Tests: Individual Variables Measuring IT Resources

After identifying the factors that impacted the level of implementation of IT as a variable, the researcher focused on these questions and re-examined them three times from different perspectives. Each investigation involved applying a different set of questions to re-examine the level of IT resources available to the company, and testing the impact of a particular type of IT resource on ABC and ABM implementation.

The results of the IT factor analysis test (see Section 6.7.2 for more details) was loaded according to five factors namely: IT function, online activity, training, in-house software and meeting management needs. Model 1 tested the two sets of factors identified using the factor analysis test (IT function and in-house software). Each of these factors has a number of questions, the model coded these questions; for example, when the company has an IT department (ITDEPT_t), develops its website in-house (INHOUSE_t), creates software in-house (SOFTWARE_t), uses accounting software (ACCSOFTWARE_t), provides IT training programs (ITRAIN_t), spend on IT training (SPENDIT_t), number of employees in IT department (NUEMPIT_t), and devices/PCs owned (DEVICE_t). The results presented in Table

6-47 show three statistically significant findings. First, a statistically significant negative relationship (with 95% confidence) between SIZE_t and the dependent variable. Secondly ACCSOFTWARE_t is positively and statistically significantly associated with the dependent variable (at 99% confidence). This high level of significance indicates it is one of the key factors leading to the implementation of activity based costing/management in sample firms. Finally, the test results revealed evidence of a statistically positive significant association between DEVICE_t and the dependent variable, indicating that the more devices a company has, the more likely the firm will implement ABC/M.

Model 2 tests one set of factors as identified by the factor analysis test as an IT function. This set includes four questions. Model 3 tests one set of factors, as identified by the factor analysis test as in-house software. This includes four questions. The results for models 2 and 3 further supported the above findings. Namely, that larger firms are less likely to implement ABC and ABM, while the greater access a firm has to accounting software and the more devices the firm owns, the higher the probability that ABC/ABM will be implemented. The purpose of the nested model 2 and model 3 in Table 6-47 is to re confirm model 1 by re-testing the factors in different groups.

Table 6-47: IT Model 2 Results						
Model 1	Coefficient	Std.Error	t-value	t-prob		
Constant	-29.824	1.044	-28.600	(0.000)***		
ITDEPT _t	0.282	0.963	0.293	(0.770)		
INHOUSEt	-0.144	0.598	-0.241	(0.810)		
SOFTWAREt	0.801	0.727	1.100	(0.272)		
ACCSOFTWAREt	24.663	1.044	23.6	(0.000)***		
ITRAINt	0.098	0.202	0.482	(0.630)		
SPENDIT _t	-0.105	0.207	-0.505	(0.614)		
NUEMPIT _t	-0.129	0.156	-0.830	(0.408)		
DEVICEt	0.807	0.250	3.23	(0.002)***		
ECONt	-0.461	0.667	-0.691	(0.491)		
SIZE	-0.526	0.225	-2.340	(0.021)**		
INDGRP	-0.216	0.266	-0.813	(0.417)		
COMPt	0.540	0.390	1.390	(0.168)		
MULTI	-0.394	0.529	-0.746	(0.457)		
Model 2	Coefficient	Std.Error	t-value	t-prob		
Constant	-26.996	0.869	-31.100	(0.000)***		
ITDEPT _t	0.960	0.851	1.130	(0.261)		
INHOUSE	-0.006	0.511	-0.012	(0.990)		
SOFTWARE	0.499	0.631	0.791	(0.430)		
ACCSOFTWARE	24.483	0.8686	28.200	(0.000)***		
ECONt	-0.475	0.635	-0.748	(0.456)		
SIZE	-0.151	0.151	-1.000	(0.319)		
INDGRP _t	-0.276	0.236	-1.170	(0.244)		
COMP	0.314	0.353	0.889	(0.375)		
MULTI	-0.055	0.467	-0.118	(0.906)		
Model 3	Coefficient	Std.Error	t-value	t-prob		
Constant	-4.551	1.981	-2.300	(0.023)**		
ITRAIN ^t	0.107	0.198	0.542	(0.589)		
SPENDIT _t	-0.074	0.198	-0.377	(0.707)		
NUEMPIT	-0.134	0.151	-0.889	(0.376)		
DEVICE	0.807	0.241	3.35	(0.001)***		
ECONt	-0.340	0.645	-0.527	(0.599)		
SIZEt	-0.517	0.220	-2.350	(0.020)**		
INDGRP,	-0.274	0.259	-1.060	(0.292)		
COMPt	0.568	0.390	1.460	(0.147)		
MULTI	-0.286	0.514	-0.556	(0.579)		
Where:						
ABCM _t = Dependent variable	NUEN	$IPIT_t = Numb$	er of employe	ees in IT dep		
$ITDEPT_t$ = Have an IT department	DEVIC	$CE_t = Device$	es/PCs owned	1?		
$INHOUSE_t$ = Develops its website in-	-house ECON	= Organ	isation's econ	omic condition		
SOFTWARE: = Software created in-hou	Ise SIZE	= Organ	isation size b	v revenue		
$\Delta CCSOFTWARE = Use accounting software$		= Organ	isation's indu	stry group		
TRAIN = 0 Training programs provided COMP = Organisation's lovel of compatition						
SPENDIT. = Spending on IT training		$T_{L} = Multir$	ational organ	visation or not		
Log-likelihood ratio	-6/ /56	-,				
Chi-squared	20 2/15	(n - 0.0)	17)*			
AIC	1/8 011	(P = 0.01)	.,)			
*** Significant at the 000/ level of some	140.711					
** Significant at the 95% level of convergence	ice re					

** Significant at the 95% level of convergence * Significant at the 90% level of convergence

6.9.2. Further Tests: Individual Variables Measuring the Organisational Economic Conditions Variable

The research model focused on the economic condition variable factors identified in the factor analysis test (see Section 6.7.3.1). These questions re-examined the impact of economic conditions on levels of ABC and ABM implementation. This variable included different sets of questions, which were then employed to re-examine the organisations' economic conditions.

The model tests the set of questions identified in the factor analysis test as a business growth factor, which included five questions. Consistent with Table 6-46, a statistically positive association (at 90% confidence) was once again observed between the dependent variable and the level of IT resources within the firm. This provided support for Hypothesis 1. As the results in Table 6-48 show, when economic conditions are broken down relative to each question, no statistically significant associations are reported.

Table 6-48: Organisational Economic Condition Model 2					
	Coefficient	Std.Err	or t-valu	e t-prob	
Constant	-2.586	1.725	-1.50	0 (0.136)	
IT _t	1.567	0.798	1.960) (0.051)*	
COMPt	0.236	0.385	0.615	5 (0.540)	
SIZEt	-0.279	0.191	-1.46	0 (0.146)	
INDGRPt	-0.290	0.247	-1.17	0 (0.242)	
MULTIt	-0.134	0.493	-0.27	1 (0.787)	
RELATIONt	0.095	0.335	0.284	4 (0.777)	
EMPLOYEE _t	-0.116	0.312	-0.37	3 (0.710)	
GPt	0.756	0.875	0.864	4 (0.389)	
NPt	-0.838	0.821	-1.020	0 (0.309)	
SALESPRICE	-0.433	0.287	-1.51	0 (0.133)	
Where:					
$ABCM_t$ = Dependent variable	le	RELATION _t	= Number of the s	supplier relationship	
$IT_t = Level of IT$		EMPLOYEE _t	= Number of emp	loyees	
$COMP_t$ = Level of Competit	tion	GPt	= Gross profit		
SIZE _t = Organisation size	by Revenue	NPt	= Net profit		
$INDGRP_t = Organisation's Ind$	lustry in Groups	SALESPRICE	= Products/Servic	es sales price	
$MULTI_t$ = Multinational Org	anisations				
Log-likelihood ratio		-67.216			
Chi-squared		14.344	(p	= 0.1579)	
AIC		156.432			
*** Significant at the 99% lev	el of convergend	ce			

** Significant at the 95% level of convergence

* Significant at the 90% level of convergence

6.9.3. Further Tests: Using Raw Data Factors as Independent Variables

The above sections assessed the research model using factor analysis as variables, and then retested them using individual questions pertaining to those factors. This section describes the research model in relation to individual factors without combining them, and tests the level of IT resources and economic condition variables according to sets of factors; particularly examining the factors influencing the level of implementation. There were five factors in IT: IT function, (IT Factor 1) IT online activity (IT Factor 2), IT training (IT Factor 3), IT inhouse software (IT Factor 4), and IT that provides management with necessary information (IT Factor 5). There are three factors comprising the economic conditions variable. These are business growth (ECON Factor 1), products activity (ECON Factor 2), and liquidity (ECON Factor 3). Finally, there are two factors describing levels of competition. These are promotion (COMP Factor 1) and price (COMP Factor 2). Table 6-49 presents the regression results achieved when incorporating IT factors into the model. Table 6-50 includes the estimation results when economic factors are included in the model and Table 6-51 presents the estimation results when competition factors are included.

All three tables show that the level of IT available within firms is consistently associated with the dependent variable, once again providing further compelling support for the estimated results, as presented in Table 6-46 and further supporting Hypothesis 1. Interestingly, Table 6-50 shows the main factors that positively and significantly relate to the implementation of ABC/ABM and are IT function (IT Factor 1) and IT in-house software (IT Factor 4). This suggests the two are both facets of IT and increase organisation's likelihood of implementing of ABC and ABM.

According to the estimation results presented in Tables 6-49 to 9-51, overall a negative and significant correlation between the size of an organisation and the dependent variable can be observed, once again lending support to previous findings.

Finally, ECON Factor 1, business growth, appears only once, and shares a significant association (at 90% confidence) with the dependent variable.

Table 6-49: IT Factors Model						
	Model 1	Coefficient	Std.Error	t-value	t-prob	
Constant		-0.567	1.264	-0.448	(0.655)	
IT Factor 1		0.373	0.209	1.790	(0.076)*	
IT Factor 2		0.293	0.895	0.328	(0.744)	
IT Factor 3		-0.226	0.735	-0.308	(0.759)	
IT Factor 4		1.262	1.093	1.150	(0.250)	
IT Factor 5		-1.149	0.869	-1.320	(0.188)	
ECON _t		-0.807	0.618	-1.310	(0.193)	
SIZEt		-0.330	0.185	-1.780	(0.077)*	
INDGRP t		-0.254	0.241	-1.050	(0.294)	
MULTI _t		-0.122	0.481	-0.254	(0.799)	
	Model 2	Coefficient	Std.Error	t-value	t-prob	
Constant		-0.617	0.811	-0.762	(0.447)	
					· · · ·	
IT Factor 1		0.455	0.189	2.410	(0.017)**	
IT Factor 1 ECON _t		0.455 -0.702	0.189 0.590	2.410 -1.190	(0.017)** (0.236)	
IT Factor 1 ECON _t SIZE _t		0.455 -0.702 -0.348	0.189 0.590 0.180	2.410 -1.190 -1.930	(0.017)** (0.236) (0.055)*	
IT Factor 1 ECON _t SIZE _t INDGRP _t		0.455 -0.702 -0.348 -0.321	0.189 0.590 0.180 0.236	2.410 -1.190 -1.930 -1.360	(0.017)** (0.236) (0.055)* (0.175)	
IT Factor 1 ECON _t SIZE _t INDGRP _t MULTI _t		0.455 -0.702 -0.348 -0.321 -0.020	0.189 0.590 0.180 0.236 0.469	2.410 -1.190 -1.930 -1.360 -0.042	(0.017)** (0.236) (0.055)* (0.175) (0.966)	
IT Factor 1 ECON _t SIZE _t INDGRP _t MULTI _t	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient	0.189 0.590 0.180 0.236 0.469 Std.Error	2.410 -1.190 -1.930 -1.360 -0.042 t-value	(0.017)** (0.236) (0.055)* (0.175) (0.966) t-prob	
IT Factor 1 ECONt SIZEt INDGRPt MULTIt Constant	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient -0.722	0.189 0.590 0.180 0.236 0.469 Std.Error 0.960	2.410 -1.190 -1.930 -1.360 -0.042 t-value -0.751	(0.017)** (0.236) (0.055)* (0.175) (0.966) t-prob (0.454)	
IT Factor 1 ECONt SIZEt INDGRPt MULTIt Constant IT Factor 2	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient -0.722 0.771	0.189 0.590 0.180 0.236 0.469 Std.Error 0.960 0.778	2.410 -1.190 -1.930 -1.360 -0.042 t-value -0.751 0.990	(0.017)** (0.236) (0.055)* (0.175) (0.966) t-prob (0.454) (0.324)	
IT Factor 1 ECON _t SIZE _t INDGRP _t MULTI _t Constant IT Factor 2 ECON _t	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient -0.722 0.771 -0.658	0.189 0.590 0.180 0.236 0.469 Std.Error 0.960 0.778 0.598	2.410 -1.190 -1.930 -1.360 -0.042 t-value -0.751 0.990 -1.100	(0.017)** (0.236) (0.055)* (0.175) (0.966) t-prob (0.454) (0.324) (0.274)	
IT Factor 1 ECON _t SIZE _t INDGRP _t MULTI _t Constant IT Factor 2 ECON _t SIZE _t	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient -0.722 0.771 -0.658 -0.118	0.189 0.590 0.180 0.236 0.469 Std.Error 0.960 0.778 0.598 0.146	2.410 -1.190 -1.930 -1.360 -0.042 t-value -0.751 0.990 -1.100 -0.808	(0.017)** (0.236) (0.055)* (0.175) (0.966) t-prob (0.454) (0.324) (0.274) (0.420)	
IT Factor 1 ECON _t SIZE _t INDGRPt MULTI _t Constant IT Factor 2 ECON _t SIZE _t INDGRP _t	Model 3	0.455 -0.702 -0.348 -0.321 -0.020 Coefficient -0.722 0.771 -0.658 -0.118 -0.328	0.189 0.590 0.180 0.236 0.469 Std.Error 0.960 0.778 0.598 0.146 0.229	2.410 -1.190 -1.930 -1.360 -0.042 t-value -0.751 0.990 -1.100 -0.808 -1.430	$(0.017)^{**}$ (0.236) $(0.055)^{*}$ (0.175) (0.966) $t-prob$ (0.454) (0.324) (0.274) (0.274) (0.420) (0.155)	

	Model 4	Coefficient	Std.Error	t-value	t-prob
Constant		-0.381	0.886	-0.430	(0.668)
IT Factor 3		0.351	0.642	0.548	(0.585)
ECON _t		-0.569	0.595	-0.956	(0.341)
SIZEt		-0.127	0.151	-0.841	(0.402)
INDGRP _t		-0.356	0.227	-1.570	(0.119)
MULTI _t		0.057	0.448	0.128	(0.899)
	Model 5	Coefficient	Std.Error	t-value	t-prob
Constant		-1.484	1.128	-1.310	(0.190)
IT Factor 4		1.656	0.989	1.670	(0.096)*
ECON _t		-0.697	0.616	-1.130	(0.259)
SIZEt		-0.146	0.148	-0.984	(0.327)
INDGRP _t		-0.276	0.233	-1.180	(0.240)
MULTI _t		-0.089	0.462	-0.192	(0.848)
	Model 6	Coefficient	Std.Error	t-value	t-prob
Constant		0.655	1.041	0.629	(0.530)
IT Factor 5		-0.994	0.797	-1.250	(0.214)
ECON _t		-0.532	0.599	-0.888	(0.376)
SIZE _t		-0.101	0.149	-0.680	(0.497)
INDGRP _t		-0.353	0.227	-1.550	(0.123)
MULTI _t		0.071	0.450	0.159	(0.874)
	Model 7	Coefficient	Std.Error	t-value	t-prob
Constant		-1.403	1.106	-1.270	(0.207)
IT Factor 1		0.394	0.198	1.990	(0.049)**
IT Factor 4		1.100	1.033	1.070	(0.288)
ECON _t		-0.776	0.605	-1.280	(0.201)
SIZEt		-0.346	0.182	-1.910	(0.059)*
INDGRP _t		-0.270	0.240	-1.120	(0.263)
MULTIt		-0.120	0.480	-0.251	(0.802)
Where:					
ABCM _t	= Dependent variable	ECON _t	= Economi	c Condition	
IT Factor 1	= IT online function	SIZEt	= Organisa	tion size by F	Revenue
IT Factor 2	= IT online activity	INDGRP _t	= Industry	in Groups	
IT Factor 4	= IT in house software	MULTI _t	= Multinati	onal Organis	ations
IT Factor 3	= IT training				
IT Factor 5	= IT provides managemen	t with the necess	ary informatio	n	
Log-likelihood	ratio	-69.742			
Chi-squared		13.154	(p = 0	.156)	
AIC		159.485			
*** Significant	at the 99% level of converg	ence			
** Significant a	t the 95% level of converge	nce			

* Significant at the 90% level of convergence

Table 6-50: Economic Conditions Factors Model						
Model 1	Coefficient	Std.Error	t-value	t-prob		
Constant	-2.414	1.701	-1.420	(0.158)		
IT _t	1.301	0.775	1.680	(0.095)*		
ECON Factor 1	-0.710	0.406	-1.750	(0.082)*		
ECON Factor 2	0.312	0.459	0.679	(0.498)		
ECON Factor 3	-0.149	0.423	-0.353	(0.725)		
SIZEt	-0.260	0.190	-1.370	(0.172)		
INDGRPt	-0.217	0.243	-0.893	(0.373)		
MULTIt	0.031	0.481	0.064	(0.949)		
Model 2	Coefficient	Std.Error	t-value	t-prob		
Constant	-2.116	1.635	-1.290	(0.197)		
IT _t	1.388	0.740	1.880	(0.063)*		
ECON Factor 1	-0.571	0.350	-1.630	(0.105)		
SIZEt	-0.260	0.178	-1.460	(0.146)		
INDGRPt	-0.255	0.237	-1.080	(0.283)		
MULTIt	-0.028	0.471	-0.060	(0.952)		
Model 3	Coefficient	Std.Error	t-value	t-prob		
Constant	-2.614	1.640	-1.590	(0.113)		
IT _t	1.359	0.729	1.870	(0.064)*		
ECON Factor 2	-0.018	0.391	-0.046	(0.963)		
SIZEt	-0.278	0.180	-1.550	(0.124)		
INDGRPt	-0.304	0.234	-1.300	(0.196)		
MULTIt	-0.046	0.464	-0.100	(0.920)		
Model 4	Coefficient	Std.Error	t-value	t-prob		
Constant	-2.763	1.638	-1.690	(0.094)		
ITt	1.371	0.731	1.880	(0.063)*		
ECON Factor 3	-0.048	0.376	-0.126	(0.900)		
SIZEt	-0.313	0.178	-1.750	(0.081)*		
INDGRPt	-0.272	0.238	-1.140	(0.256)		
MULTIt	0.024	0.472	0.052	(0.959)		
Where:						
ABCM _t = Dependent variable	SIZE _t	= Organisatio	on size by Rev	venue		
IT_t = Level of IT	INDGRF	$P_t = Organisation$	on's Industry i	in Groups		
ECON Factor 1 = Business growth	MULTI _t	= Multination	nal Organisati	ions		
ECON Factor 2= product activity						
ECON Factor 3 = Liquidity						
Log-likelihood ratio	-68.697					
Chi-squared	11.764	(p = 0.10)	52)			
AIC	155.393	-				
*** Significant at the 99% level of conver	gence					
** Significant at the 050/ level of converge	-					

** Significant at the 95% level of convergence

* Significant at the 90% level of convergence

Table 6-51: Results of Competition Variable Factors Tests						
	Model 1	Coefficient	Std.Error	t-value	t-prob	
Constant		-2.058	1.624	-1.270	(0.207)	
IT _t		1.448	0.744	1.950	(0.053)**	
ECONt		-0.672	0.618	-1.090	(0.279)	
COMP Factor 1		-0.133	0.343	-0.388	(0.698)	
COMP Factor 2		0.336	0.302	1.110	(0.267)	
SIZEt		-0.280	0.179	-1.560	(0.120)	
INDGRP _t		-0.256	0.238	-1.070	(0.285)	
MULTIt		-0.022	0.469	-0.047	(0.963)	
	Model 2	Coefficient	Std.Error	t-value	t-prob	
Constant		-1.509	1.525	-0.990	(0.324)	
IT _t		1.541	0.729	2.110	(0.036)**	
ECON _t		-0.706	0.620	-1.140	(0.256)	
COMP Factor 1		0.032	0.311	0.102	(0.919)	
SIZEt		-0.301	0.175	-1.720	(0.087)*	
INDGRP _t		-0.296	0.236	-1.260	(0.210)	
MULTIt		-0.033	0.468	-0.071	(0.943)	
	Model 3	Coefficient	Std.Error	t-value	t-prob	
Constant		-2.399	1.383	-1.740	(0.085)	
ITt		1.441	0.741	1.950	(0.054)*	
ECONt		-0.617	0.599	-1.030	(0.305)	
SIZEt		-0.281	0.179	-1.570	(0.118)	
INDGRP _t		-0.269	0.236	-1.140	(0.257)	
MULTIt		-0.008	0.468	-0.016	(0.987)	
COMP Factor 2		0.290	0.278	1.040	(0.300)	
Where:						
ABCM _t	= Dependent variable	S	$IZE_t = Orga$	nisation size	by Revenue	
IT _t	= Level of IT	II	$NDGRP_t = Orga$	nisation's Ind	lustry in Groups	
ECON _t	= Organisation's Econom	nic Condition M	$IULTI_t = Mult$	inational Org	anisations	
COMP Factor 1	= COMP Price					
COMP Factor 2	= COMP Promotion					
Log-likelihood r	atio	-71.247				
Chi-squared		10.144	(p =	0.1187)		
AIC		156.494				
*** Significant	at the 99% level of conver	gence				
** Significant at	the 95% level of converg	ence				

** Significant at the 95% level of convergence * Significant at the 90% level of convergence

6.10. Conclusion

This chapter provided an in-depth examination of four key areas. First, it provided detailed descriptive statistics regarding the raw data for each question in the questionnaire. The statistics were calculated using SPSS software, i.e. preliminary descriptive statistics, demographic descriptive statistics, descriptive statistics describing the level of satisfaction with the existing costing system, and the effects on business strategy proceeding from descriptive statistics. Second, this chapter discussed the involvement in changes in MA descriptive statistics (including the reason for companies rejecting ABC and ABM descriptive statistics); ABC and ABM descriptive statistics; current MA system descriptive statistics. Third, this chapter provided information concerning the preparation of the data for analysis, i.e. a discussion of the initial assessment of data, along with the issues affecting missing data and outliers. Finally, there was a discussion of the logistics model, research hypothesis and control variables.

In addition, it explained and illustrated how the study variables were tested by processing and analysing the raw data systematically. Factor analyses were tested using raw data for the two main variables and a single control variable. KMO and the Bartlett's communalties test, a rotated component matrix test and a total variance explained test were conducted for the two independent variables and the control variable. In addition, the logistic model was used to test the research hypotheses. The model was tested in different ways to confirm the results. Two research model hypotheses were proposed as having produced the main effects regarding the level of ABC and ABM implementation in the top 1,000 Irish organisations. The following chapter discusses the findings presented here in greater detail.

CHAPTER SEVEN

Discussion of Findings and Concluding Remarks

7.1. Introduction

The primary objective of this research has been to identify whether relationships exist between certain contingent factors and ABC and ABM adoption in the top 1,000 Irish organisations (see Chapter 1, RQ1, RQ2 and RQ3). In particular, the research considered existing literature in the domain of management accounting, examining the dramatic changes to IT resources available to today's organisations, and the effects of recent economic conditions on organisations. Control variables used were size, industry type, level of competition, and multinational status. Having provided some analysis of the findings in the previous chapter, this chapter now presents some discussion of those findings, as well as an outline of the contributions of the study. Limitations of the study and suggestions for future research are also noted.

7.2. Discussion of the Research Findings

A principal finding of this study is that there is a statistically significant positive relationship between the levels of IT resources available to organisations and the levels of ABC and ABM implementation, which refers to RQ2, as outlined in Chapter 1. This finding provides both organisations and researchers in the field of MA with heightened understanding about how the levels of IT resources available to an organisation affect the cost systems it uses. Moreover, where more IT resources are available, this results in greater likelihood of ABC and ABM adoption. This finding positively supports Hypothesis 1, which identifies a positive relationship between the implementation of ABC and ABM and IT resourcing (see Section 5.3.1 for more details). Secondly, the study results indicate that there is no statistically significant relationship between an organisation's economic conditions and current levels of ABC and ABM adoption (RQ3 as per Chapter 1). The literature review revealed that in recent years, global economic conditions have undoubtedly affected organisations (Libby and Waterhouse 1996) in different countries (Giannone, Lenza and Reichlin 2011). Minimal evidence was available prior to this study of ABC and ABM implementation relative to an organisation's economic conditions. In this study, the findings did not report a positive relationship between the implementation of ABC and ABM and an organisation's economic condition.

A further finding is that there is generally a negative (but not entirely consistent) significant association between the size of an organisation and the likelihood that it will implement ABC/ABM. Although this finding was not included when modelling the main results, it emerged when testing for sensitivity and robustness. Also, no statistically significant association emerged between the dependent variable and levels of competition, industry group or whether a firm is a multinational organisation. As argued in the literature review and research methodology chapters, organisational size is a key factor affecting ABC and ABM implementation. Previous studies observed a positive relationship between an organisation's size and its choices concerning ABC and ABM implementation (Innes and Mitchell 1995, Malmi 1999, Pierce and Brown 2004, Al-Omiri and Drury 2007), although other studies reported no such relationship (Libby and Waterhouse 1996, Gosselin 1997, Krumwiede 1998, Baird, Harrison and Reeve 2004, Pierce and Brown 2004). The findings of this study further indicate no significant relationship between company size and the implementation of ABC and ABM.

Strong arguments included in the ABC adoption literature highlight the impact of industry type on implementation. For example, in the UK, the manufacturing sector implementation rate has been reported as lower than that for non-manufacturing organisations (Innes and Mitchell 1995, Kaplan and Cooper 1998, Innes, Mitchell and Sinclair 2000, Al-Omiri and Drury 2007). Others have argued that implementation rates in manufacturing organisations are higher than those in non-manufacturing organisations (Cotton, Jackman and Brown 2003, Pierce and Brown 2004). Irish organisations, according to Clarke Hill and Stevens (1999) have witnessed a much higher percentage of individuals in the drug, pharmaceutical, and healthcare industries adopting ABC, than in other industries (Clarke, Hill and Stevens 1999). This study confirms there is no statistically significant relationship between the implementation of ABC and ABM and industry type in an Irish context. However, this may be partly due to the fact that it did not compare and contrast two different types of industry (for example manufacturing and non-manufacturing), but instead examined all industries to ascertain whether one type would be more likely to implement an ABC system than another. Also, Clarke et al. (1999)

reported that national firms were less likely to adopt ABC than their multinational subsidiaries. However, this research discovered no statistically significant effect arising from multinational status on ABC and ABM implementation.

The literature also revealed that organisations within highly competitive environments are predicted as more likely to use sophisticated MA systems (Simons 1992, Shields 1995, Libby and Waterhouse 1996, Bjørnenak 1997, Anderson 2002, Al-Omiri and Drury 2007, Schoute 2009). This is because organisations are expected to differentiate themselves from others by considering costing systems (Bruns and Kaplan 1987, Guilding and McManus 2002). Elsewhere, the literature has stated that companies in highly competitive industries should implement ABC (Cooper 1988), leading to some studies suggesting a relationship between the intensity of competition and sophisticated management controls (Khandwalla 1972). This study confirms there is no statistically significant relationship between the implementation of ABC and ABM and the level of competition within an organisation. The literature explains ABC is one of the most important MA theories of the twentieth century (Johnson 1990, Turney 1991, Kaplan et al. 1992, Kaplan 1995, Clarke, Hill and Stevens 1999). Indeed, Lin, Collins and Su (2001) assert, "...no cost accounting system is perfect, including ABC, because of the near impossibility of tracking and attaching every resource cost to a particular activity" (Lin, Collins and Su 2001, p. 710).

In this research, the findings discussed in Section 6.5 revealed that 32 companies adopted and implemented ABC, 17 used ABM, with a further five companies considering ABM adoption. In addition, Section 6.4.6 discussed factors contributing to other companies' abandonment of ABC and ABM. The three most significant points raised in this regard concerned companies' satisfaction with current costing methods, the perception that there was no need for change, and the amount of time consumed when seeking to achieve ABC and ABM adoption. Apparent factors leading to companies rejecting implementation of ABC and ABM, preferring instead to use traditional MA costing systems are, a satisfaction with current costing methods and seeing no necessity to implement new methods. Finally, additional reasons for apparent disinterest in ABC and ABM utilisation might result from the following: 1) lack of connections between education and industry; 2) lack of understanding of associated techniques; 3) middle management resistance to change directed towards other systems, or towards the implementation of ABC and ABM; 4) perceived difficulties implementing the system and/or that the time consuming nature of management might not support investment; and 5) the costs of implementing the system.

A discussion of the findings is now presented under three different headings. The first relates to descriptive statistics, and is followed by some discussions of the factor analysis, relating to two independent variables and one control variable. The final part is the model test (see Chapter 6). Each heading provides some discussion and analysis, and some of these analyses are independent, while others support some measure of crossover.

7.2.1. Dependent Variables

A research model was adopted to establish the relationship between specified variable contingent factors and the level of ABC implementation in the top 1,000 Irish organisations (using a regression test and correlation analysis test). This was later used to provide additional insight into the particular connections between contingent factors and the level of ABC implementation. The following table summarises the related research hypotheses.

Hypothesis	Variable type	t-value	t-prob	Comment
Constant		-2.090	0.038**	Accepted
The adoption and implementation of ABC and ABM are directly related to a company's IT resourcing (IT_t)	Independent variable	2.200	0.029**	Accepted
The adoption and implementation of ABC and ABM are directly related to a company's current financial climate (ECON _t)	Independent variable	-1.100	0.274	Rejected
The adoption and implementation of ABC and ABM are directly related to organisational size (SIZE $_t$)	Control variable	-1.620	0.107	Rejected
The adoption and implementation of ABC and ABM are directly related to organisational industry type (IND _t)	Control variable	0.450	0.654	Rejected
The adoption and implementation of ABC and ABM are directly related to organisational competition levels (COMP _t)	Control variable	0.728	0.468	Rejected
Multinational companies are more likely to adopt and implement ABC and ABM systems than single-nationality companies (MULTI _t)	Control variable	-0.463	0.644	Rejected
Chi-squared	(p = 0.221)			

Table 7-1 Summary of Tested Research Model Hypotheses

As Table 7-1 depicts, six variables were employed to test the relationship between independent and dependent variables. Of these six hypotheses, some were accepted, and others rejected (see Table 6-46 for more details). The following sections discuss the individual variables in greater detail.

7.2.1.1. IT Variable

MA literature to date has indicated that IT is a key information driver (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003), and that the use of software has increased in business practices

(Iltuzer, Tas and Gozlu 2007). ABC is an important instrument for managing costs when embarking on new IT implementation projects, and moreover, is a useful management tool (Orwig et al. 2015). In this study, the regression analysis revealed a statistically significant positive relationship between the level of IT resources available to organisations and the level of ABC and ABM implementation. The main drivers for adoption appear to be online activity and in-house software. Many companies strengthened their online links with customers and suppliers (ordering and selling online, and providing online customer support), and also raised their level of spending on employee training to ensure effective utilisation of the newly available IT resources.

Liu and Pan (2007) stated that ABC concepts are apparent at the theoretical level in China. In 2011, they re-examined the implementation of ABC at a large public limited Chinese manufacturing company, also confirming the existence of a positive relationship between the prevalence of IT resources on levels of ABC implementation. In terms of IT availability as a variable in relation to levels of ABC implementation, and the present-day business environment, some comments are worth highlighting. First, there has recently been a significant increase in use of technology in the contemporary business environment (Liu and Pan 2011). This increase has enhanced MA practices within organisations, and improved accounting procedures in general. There has also been a notable increase in the use of cloud computing within the accounting domain. In recent years, companies' use of cloud computing has increased immensely. Cloud computing relies on a high availability of IT resources, and might explain why companies are altering their adoption of MA systems when implementing ABC. In addition, companies are focusing more on utilising IT, and there has also been an increase in the proportion of IT employees within organisations. Furthermore, there has been a rise in spending on training in how to use IT devices, and this has affected the related training provided by companies. Online activity has also increased in recent years, with the result that companies have strengthened their online links with customers and suppliers (ordering and selling online, and providing online customer support). Companies have also increased their level of spending on employee training to ensure they are can access the available IT resources. This has improved companies' ability to build in-house software and to enhance current software, even if cloud-based (Quinn, Strauss and Kristandl 2014). Therefore, any future software developments are expected to heighten the ability of firms to meet the needs of internal management with regard to decision-making (see Section 2.9.1 for more details).
7.2.1.2. Economic Condition Variable

The study findings suggest that an organisation's economic conditions have no impact on its level of ABC implementation. Whenever an organisation encounters economic difficulties, it typically reviews the prices of the products or services it provides. The following points may explain the relationship between an organisation's current economic conditions and its level of ABC implementation, specifically highlighting the effects of the current global economic crisis.

First, the external economic environment alters the internal economic environment at firms. For example, Boland and Vincent (2016, p. 24) observed that "Ireland's pubs, collectively, are deep in debt as a result of the financial crisis; many have closed in recent years". However, the impact of worsening economic conditions has had no palpable effect on changes to MA procedures within organisations based on the findings here. Therefore, neither internal nor external economic conditions have altered companies' adoption of costing systems. Second, when companies experience economic difficulties, they tend to focus on performance figures such as profit, excluding other MA information, and this could result in failure to revise the costs of products or services appropriately. This could result in a company failing to benefit from the adoption of ABC or ABM. Third, another factor causing companies not to implement more effective MA techniques is that they are not directly influenced by any professional or accounting regulations. For example, CIMA does not control MA within companies, in the manner that other regulatory bodies are responsible for financial accounting. Fourth, a change in MA cost systems could be prompted by business decisions, which are driven largely by internal factors. In comparison, financial accounting decisions, are most certainly externally influenced (perhaps driven by regulatory or political pressures).

7.2.2. Control Variables

Section 5.4 discussed and linked the independent variables tested in the current study to the relevant literature. This section discusses the findings in relation to the control variables included in the current study (size, industry type, whether the organisation is multinational, and the level of competition).

7.2.2.1. Changes in Competitive Climate

The findings of this study suggest the level of competition experienced by an organisation has no effect on its level of ABC implementation. This control variable was tested using a set of questions, and the factor analysis test results subsequently indicated that two key factors could affect level of competition - product prices and sales promotions. The following points address the impact of an organisation's current level of competition on levels of ABC implementation in relation to external business environments. First, Spedding and Sun (1999) stated that in order to survive in a competitive environment, companies must seek to maintain their profit margins, and improve costing techniques continuously. Furthermore, they added that traditional cost accounting practices have thus far been unable to respond to the changing levels of demand from managers in the manufacturing sector (Spedding and Sun 1999). This study has further confirmed that companies are less responsive to change, and specifically that they generally do not alter MA costing systems in reaction to additional pressure in the form of competition. Second, Lewis (1995) indicated that ABC systems can be employed to enhance global competition; therefore, companies should utilise ABC at the highest level when engaging in the global marketplace (Lewis 1995). The influence of global competition is growing, but the level of ABC adoption has not kept pace with it. New delivery channels and new products materialise more rapidly today than in the past and this enhances companies' emphasis on competitive sales prices. To ensure competitive sales prices, companies would be expected to update and maintain their costing systems to attain the best possible selling price. The findings presented here revealed that companies do not always update or maintain their current costing systems. Thus, they typically focus more on distribution channels, than on the cost of the product or service they provide. Third, Scapens et al. (2003) state that competition between new products, services, low-cost substitutes, and increasingly demanding customers has consistently increased global markets (Scapens et al. 2003). The expansion of growth economies in the Far East with the economic rise of China and India is creating large-scale effects globally. They also observe that product type, quality, cost and service play a vital role in response to the current competitive environment. This would seem to be confirmed to an extent by the findings here in that cost systems and the competitive environment are not linked.

7.2.2.2. Changes in Organisational Size

The findings of this study suggest organisational size has no effect on level of ABC implementation. Therefore, in the research model, the expectation was that there would be a relationship between company size and the level of ABC implementation. The impact of size on level of ABC implementation, in relation to the current global business environment, is now considered. First, (Scapens et al. 2003) asserted that structural changes occur within organisations and that one of the drivers of these is the organisation's size. Changes in

organisational structure can affect the style of MA. This study examined the link between company size and the level of ABC implementation. The assumption made was that larger companies would be more likely to implement ABC than smaller companies. This assumption was based on the resources available to large companies, and the fact that small companies are reliant on management when implementing any new system. The findings here indicate no direct relationship between firm size and ABC implementation. Second, large companies have a larger number of employees, making it potentially costly to provide and train employees in a new system. Meanwhile, small companies are subject to fewer issues in terms of the scale of resources when implementing a new system. Finally, Libby and Waterhouse (1996) observed a relationship between the size of an organisation's capacity for change. They also acknowledged that changes are not paradigm-shifting by nature, and can involve additions, substitutions, and deletions concurrent with MA systems (Libby and Waterhouse 1996, p. 147). Thus, this study supports Libby and Waterhouse's (1996) findings.

7.2.2.3. Changes in the Nationality of Organisations

The findings of this study suggest no relationship between nationality and level of ABC implementation. Whether a company is located in a single country, or international, and whether it is owned locally or by an overseas company, does not affect level of ABC implementation. The following points explore the impact of the national identity variable on level of ABC implementation, relating it to the modern business environment. First, the recognisability of the nationality of organisations has changed during the last two decades. For example, a company located in the Republic of Ireland could be a branch of an American company, as with Intel Ireland. Atkinson et al. (1997) argue that MA information could assist organisations who have been exposed to changes in national ownership. Equally important is the need for MA practices that avoid inhibiting change (Atkinson et al. 1997). The findings of this study suggest no direct relationship between multinationals and the level of ABC implementation. Second, if MA practices within companies operating in more than one country do not change, it is anticipated that this will affect management decisions, and consequently not facilitate effective MA practices. Atkinson et al. (1997) state that MA information should change in response to environmental change. They further assert that successful organisations must constantly adapt to changes in their environment, to proactively alter their practices responsively. These adjustments can affect MA in numerous ways. Any shifts resulting in changes to organisations and employee expectations require that information employed for decision-making and motivation must change concurrently (Atkinson et al. 1997). In some cases, organisations might then focus on changes to MA practices but not focus on changing the cost systems they use.

7.2.2.4. Industry Sector

This variable ascertains whether the industry sector affects the implementation of ABC or ABM. Organisational structures have changed dramatically worldwide during the last decade. Many companies now specialise in fast-changing environments in which they encounter fierce competition, and more groups of companies within such domains have dispersed into extensive online markets. Some organisations have increasingly focused on industry sector specialisation e.g. Apple, Microsoft, Google, eBay and Amazon are all large IT competitors. Changes to date have provoked a need for organisations to adapt and make changes to respond to the new environment. This will prove a significant factor affecting organisation's strategies and structure. The cost system is a vital component of any organisation's structure, and can be affected by continuous change to the relevant industry sector. Such changes are driving many companies to reassess the costing systems they employ, making industry sector an important control variable. The findings presented in this study suggest there is no relationship between industry type and the level of ABC implementation. Therefore, a company's industry type does not necessarily affect its level of ABC implementation. These results are consistent with some of those presented in the literature and not others and the impact of the industry variable on the level of ABC implementation is now discussed.

First, there is a debate on the relationship between the level of ABC implementation and the industry within which the organisation operates (examples are Innes and Mitchell 1995, Innes, Mitchell and Sinclair 2000, Cotton, Jackman and Brown 2003, Pierce and Brown 2004, Al-Omiri and Drury 2007). For example, Innes and Mitchell (1995) and Innes et al. (2000) reported that the implementation rate for manufacturing is lower than that for non-manufacturing organisations in the UK. This study addressed this apparent relationship from different angles, aiming to establish whether there is a relationship between the size and level of ABC implementation. The findings from this study suggest that no such relationship exists. Similarly, Kaplan and Cooper (1998, p. 228) recommended that service organisations are better suited to the implementation of ABC than manufacturing organisations. In support of this, Al-Omiri and Drury (2007) cited a statistical association between the service and financial sectors, and the implementation of ABC in the UK.

Second, other research indicates that the implementation of ABC is higher in manufacturing organisations than in non-manufacturing ones (Cotton, Jackman and Brown 2003, Pierce and Brown 2004). Another study, by Askarany et al. (2010), detected no relationship between ABC implementation and industry type (i.e. non-manufacturing and manufacturing companies are indistinguishable in this regard). The findings of this study are more consistent with those

reported by Askarany et al. (2010). As this study did not focus on a single sector, but rather examined all associated industries, this may have made it difficult to establish the nature of the relationship between variables.

7.2.2.5. Overall View

When reviewing the findings discussed thus far, the picture that emerges is one of stability rather than change, despite the increasing utilisation of technology (which could support ABC implementation) and the declining economic conditions (which could make firms more willing to explore their costs and costs systems). Burns and Scapens (2000) suggest organisational routines and rules shape the processes of change and/or stability in MA. Thus, they assert, changes in MA have manifested as changes to organisational rules and routines, with the consequence that MA systems and practices stand between the structuring properties of institutions and the daily actions and thoughts of members of organisations (Burns and Scapens 2000). They observe that "whether MA has not changed, has changed, or should change have all been discussed" (Burns, and Scapens 2000, p. 3). Conversely, Quinn (2011, pp. 345–346) concluded that the rules proposed by Burns and Scapens' (2000) framework are not essential to the process of MA change; although he did confirm that routines are a key factor in establishing the changes brought about in MA (Quinn 2011).

Therefore, organisational rules and routines affect the changes that comprise MA systems, and MA practices. Burns and Scapens' (2000) and Quinn (2011) argued that MA is broadly institutionalised, and therefore difficult to change. This renders MA within organisations resistant to change, leading to difficulties with the implementation of an ABC system. This is despite alterations to external and internal contingent factors over the last two decades, and changes to the typical level of advanced IT resources available to organisations which makes it easier to implement such a system. Additionally, as explored in this study, economic crisis, levels of competition, the size of organisations, industry type and multinationality all affect the application of MA practices. However, it is reasonable to speculate that some decisions not to change MA - such as to implement ABC - result from engrained existing routines and rules, as suggested by Burns and Scapens (2000) and Quinn (2011). Therefore, MA relies on doing things in a certain way, which makes it difficult to change or do things differently. Consequently, MA routines might explain changes, or lack thereof in MA, rather than other contingent factors (Quinn 2011). This points to a weakness in the nature of this study, representing an opportunity for future research (see below).

7.3. Contributions

The present research offers a number of contributions to the existing literature. Its key contributions are now noted.

First, only a small number of Irish studies have been conducted on ABC implementation in comparison to those in other English-language-speaking countries, particularly in relation to some of the contingent factors used in this study. This study is a unique Irish research study, due to its focus on the IT resources available to organisations. On the broader stage, it is unique in its focus on online activity and in-house software as particular IT contingency variables significantly influencing levels of ABC implementation. Also, little or no research has been conducted to date concerning the impact of the global economic crisis on levels of ABC implementation. This study offers a view of the impact of an organisations' economic condition as a current contingent factor, exploring how this affects levels of ABC implementation. Surprisingly, the findings show no relationship to ABC adoption and implementation. This is a particularly original contribution, as the Republic of Ireland was quite badly affected by the recent financial and economic crisis, and one would have expected some increase in the uptake of what is arguably a more superior costing system.

Second, this study differs from previous Irish studies as it controls for the size of target companies. Previous Irish studies examined all sizes of organisations as a group, and thus did not control for company size. The current study controlled for company size by focusing on the top 1,000 Irish organisations, as identified in the Irish Times. It should be noted here that controlling for the size of a company at a time of global economic crisis is challenging, as companies frequently struggle to maintain growth at such times. Furthermore, small sized companies may not have sufficient resources to implement an ABC system as it is costly to implement. The level of IT resources available to smaller companies might not be sufficient to support an ABC system, and so they might first need to enact improvements to the IT system prior to implementation of ABC. Having said that, and as outlined earlier, IT advances such as cloud computing may allow smaller firms to avail of complex hardware and software more readily than before. In addition, smaller companies may not need to implement such a system, as they typically have more transparent and lower overheads than larger ones. Smaller companies do not usually have complex production lines, typically producing one or two different products or services. Therefore, tracking associated overheads should be straightforward, meaning an ABC system would be unnecessary were they satisfied with the current costing system. In addition, this study differs from previous Irish studies by considering the issue of control within multinational organisations. Previous Irish studies have examined exclusively Irish organisations, not controlling for company nationality. The current study controlled for national and international ownership when identifying company type. Multinational companies are frequently larger in size and have more resources available to them, enabling them to operate within different working cultures across a variety of countries enacting different regulations. The level of IT available to multinational companies could prove beneficial in terms of the role of national companies, and multinational companies might be expected to have more opportunities to implement ABC.

Third, previous studies have reported a relatively low adoption rate for ABC (see Chapter 2). However, in the Irish context, the most recent study was conducted approximately 11 years ago. This is a sufficiently lengthy period to allow for organisational change. Therefore, this study further contributes by delivering a revised and up to date measure of the level of ABC adoption in companies located in the Republic of Ireland.

Fourth, factor analysis has been used to group sets of questions on contingent variables; namely the level of IT resources available to organisations and economic conditions. The study also grouped a contingent control variable, i.e. level of competition within the industry. The factor analysis identified certain components of these larger variables, which might not have been uncovered by other methods (see for example Table 6.37), which shows the groupings within the IT variable. The factor analysis method has not been used previously in studies examining levels of ABC implementation, either nationally or internationally. The four Irish studies on the implementation of ABC do not use factor analysis to group sets of questions and factors. Also to the best of this researcher's knowledge, no single international study has employed factor analysis to examine the independent variables affecting level of ABC implementation.

The final contribution to existing literature made by this study is that it not only examined the level of ABC and ABM implementation in the Irish firms, but also explored a number of IT contingent factors that could influence the level of implementation. In recent years, there has been a rapid growth in IT in all domains, which has allowed companies to improve their capacity to be active internally and externally in regard to communication, also increasing online activity. Similarly, the ability to create in-house software has increased and companies are now more able to customise software that has been created in-house. IT requirements have become necessary and urgent, encouraging companies' IT departments to negotiate associated requirements. In-house IT departments allow companies to develop and manage their own websites, interacting with both customers and the media. This is especially important to firms

offering professional accounting services (management or financial accounting services firms), an area under-explored when discussing the quality of the information available.

The study also offers some contributions to practitioners and educators. For accounting practitioners, the study suggests ABC and ABM are still relevant and used MA techniques, but are not - as might be expected - increasing in use as technology develops. Thus, management accountants still need to know (and be educated on) traditional costing methods. For IT practitioners, it may be useful to know that an in-house IT function and in-house software seems to affect ABC adoption. This is counter intuitive to the more recent trends to downsize or outsource IT functions and the long-standing use of purchased software (such as ERPs). From an educator's perspective, the findings here suggest that ABC/ABM adoption requires an interaction between in-house IT staff and management accountants. This should guide accounting educators towards increasing the level of IT understanding in accounting courses, which in turn may help increase ABC adoption levels over time.

7.4. Limitations of the Study

When conducting any social science or MA research, limitations arise and these are now outlined in the context of this study. Firstly, as mentioned in Section 5.10, the study sample included the top 1,000 Irish organisations. The size of the organisations responding to the study was thus medium-to-large. The findings reported cannot be thus generalised to all Irish companies, as a large number of small size organisations were excluded. In addition, because the sample was drawn from a single country, the generalizability of the findings obtained relative to other national settings may not be applicable. Second, the study methodology relied entirely on questionnaires as the principal tool for data collection and analysis. As noted, there are limitations to relying on quantitative research methods to collect research data and for data analysis. Therefore, utilising this research method for collecting data in isolation, and the statistical techniques employed limited the scope of the research (see Section 5.10 for more details regarding the limitations of the methodology used). Third, as noted the study targeted the top 1,000 Irish organisations. This means the questionnaire was sent to all companies in all sectors. Therefore, arguably the data obtained is not optimal as a basis for a large scale specific sector analysis. Fourth, additional variables that intervene between the independent variable and the dependent variable may remain unidentifiable. Furthermore, there may be unidentified mediator variables, mediating the relationship between the independent and dependent variables. Finally, the study excluded organisations with a postal address in Northern Ireland, due to the need for a return postal address license. Therefore, the study area

was confined to the Republic of Ireland, and organisations located and operating in, or with an office in the Republic of Ireland. Thus, future studies might usefully expand the data set collected by including organisations based in Northern Ireland.

7.5. Future Research Directions

As with any other research on MA, this research poses numerous additional questions that have arisen from the discussion, findings, and methodology utilised within it. Any future research conducted to address these questions should aim to provide additional insights into contingent factors influencing levels of ABC and ABM implementation, and to overcome the stated limitations of the current research. Therefore, the following are recommended as useful avenues for future research.

First, as this study focused on the largest 1,000 Irish organisations (covering medium/large size), future research could consider including smaller-sized organisations. In addition, undertaking similar studies in other countries for contrast purposes would facilitate an examination of the impact of IT and the economic conditions affecting levels of ABC and ABM implementation. Including smaller organisations in Ireland or in other countries would enhance the possibility of generalisation, thereby improving the relevance of the findings by increasing both organisational stakeholders' and researchers' understanding. Second, the study methodology involved a questionnaire as the principal data collection and analysis tool. Therefore, a complementary study could be conducted in Irish organisations, or in other countries, utilising different research methods or a mixed methods approach to support the findings. For example, a more in-depth study involving comparative case studies from participants engaged in different types of industry could be conducted. Third, it would be beneficial to explore other more focused studies concentrating on specific sectors, using the analysis method developed in this work, perhaps also including a case study analysis. Fourth, studies investigating the effects of differing levels of specific types of IT resources available to organisations in reference to the implementation and impact of ABC and ABM would be of interest. Fifth, as noted earlier in this chapter, the findings do not suggest any major changes in ABC adoption. As noted, this could be a result of the degree to which existing MA practices are deeply embedded as rules and routines and further studies could explore the nature of these phenomena in the context of ABC implementation. Thus, ABC-focused research in a qualitative style might generate more in-depth interpretations than is possible using the methods applied here.

Finally, this study was cross-sectional in nature, supporting examination of the influence of contingent factors on ABC and ABM implementation. These findings agreed with the stated research hypotheses, but did not align with the results of the regression analysis. Future research could be conducted to investigate the impact of contingent factors relative to ABC and ABM implementation, by conducting a longitudinal study. For example, data showing an organisation's economic conditions during a period of recession could provide an independent variable to be tested against ABC and ABM implementation. This work did not examine the impact of organisations' economic conditions during the period of recovery from recession. Thus, it would be useful to consider a longitudinal approach, applying the variable 'organisation's economic conditions', to a case study approach, by examining specific types of organisation during a period of recession and after recovery from recession.

7.6. Conclusion

The primary objective of this study is to examine the level of adoption and implementation of ABC and ABM in the top 1,000 companies in Ireland and in particular consider the effects of IT resourcing, economic conditions, industry, level of competition, size, and multi-nationality on the adoption of ABC and ABM. A contingency approach was used to address this objective, and to achieve associated objectives.

In summary, a significant positive correlation was found between levels of IT and the costing systems utilised by organisations. This finding is consistent with findings reported in previous research (Burns, Ezzamel and Scapens 1999, McWatters, Morse and Zimmerman 2001, Anderson 2002, Scapens et al. 2003). In addition, the literature stated that IT influences MA (Burns, Ezzamel and Scapens 1999, Russel and Siegel 1999, Davenport 2000, Parr and Shanks 2000, Markus et al. 2000, Granlund and Malmi 2002, Scapens et al. 2003, Scapens and Jazayeri 2003), and the findings of this study confirm a largely positive relationship between levels of IT resources and ABC and ABM implementation. However, this study has provided a more in-depth examination of the components of IT. On the contrary, there was no significant correlation with economic conditions, which one might intuitively expect. This suggests other factors explain the adoption (or lack thereof) of MA techniques such as ABC, and thus more research is required.

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APPENDICES

Appendix A: Invitation Letter

Scoil Ghnó DCU DCU Business School



Niall O'Carroll A&L Goodbody A&L Goodbody Head Office 28 North Wall Quay Dublin 1

Dear Niall O'Carroll,

Your company is listed in the Irish Times Top 1000 Irish companies. We hope you are willing to participate in an important study of this group of companies. The survey (enclosed) is on cost systems.

By participating in this research project we hope to gain evidence on cost systems in top Irish companies. This will lead to improved education and an improved understanding of how factors such as technology and the recession have affected how Irish business use cost systems.

If you like, you can also fill out the survey online at [http://goo.gl/aw3yvD]. It should take no more than 15 minutes to complete. Instructions are given at the beginning of the survey. By participating you will be entered in a draw for a small gift and/or receive an executive summary of findings on request.

If for some reason you do not wish to participate, please be kind enough to return this letter in the enclosed envelope so that we will not issue any follow up letters or calls. You can also select the do not wish to participate option online.

If you any questions, please feel free to contact us by email [otman.elafi2@mail.dcu.ie] or telephone [Tel: 01-7006952; Mobile: 085-7250020] at any time. Alternatively, Otman may follow up with a phone call/post or email in the coming weeks.

Thank you for your time and consideration. Yours Sincerely, Channe Elali

Otman Elafi, on behalf of the Research Team.











Prof. Saleem Hashmi

Baile Atha Cliath 9, Èire Dublin 9, Ireland T +35317005265 F +35317005446

F +35317005446 E <u>dcubs@dcu.ie</u> www.dcu.ie/dcubs

Ollscoil Chathair Bhaile Atha Cliath Dublin City University

Mr. Otman Elafi

Dr. Martin Quine Dr. Mark Mulgrew Dr. Dermot Brabazon

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Scoil Ghnó DCU DCU Business School



20 January 2015 Ref: 1111

You are reviewing a survey in management accounting cost systems.

Dear participate,

Welcome to our survey of costing systems utilised in Irish organisations. This survey is on cost systems, specifically the use of Activity-Based Costing (ABC) and Activity-Based Management (ABM). The survey is being conducted by a team of researchers from Dublin City University and the University of Ulster.

This survey is strictly confidential. Your participation is voluntary, but much appreciated. A report of the findings will be provided to you on request, however, under no circumstances will your individual responses be made available to anyone outside of our research team. Please do not separate the pages of this survey. Any references used on this page are purely to identify non-responses.

This research has been approved by the Dublin City University Research Ethics Committee, Ref REC/2014/12. This survey should take about 15 minutes to complete. Before completion, please confirm you have read the Plain Language Statement overleaf and we assume your consent to participate in this survey.

Thank you in advance for your participation. If you have any queries regarding the study, please do not hesitate to email me at [otman.elafi2@mail.dcu.ie] or call on [Tel: 01-7006952; Mobile: 085-7250020].

Yours faithfully,

Atman Ekeli

Otman Elafí,

On behalf of the Research Team.

Baile Atha Cliath 9, Eire Dublin 9, Ireland

T +35317005265 F +35317005446 E <u>dcubs@dcu.ie</u> www.dcu.ie/dcubs

Ollscoil Chathair Bhaile Atha Cliath Dublin City University

Appendix B: DCU Research Ethics Committee Approval



Dear Otman,

This research proposal qualifies under our Notification Procedure, as a low risk social research project. Therefore, the DCU Research Ethics Committee approves this research proposal. Please note approval is subject to receipt of correspondence from each School confirming their agreement to participate in the study. Materials used to recruit participants should state that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. Should substantial modifications to the research protocol be required at a later stage, a further submission should be made to the REC.

Yours sincerely,

Vonal O'Mathina

Dr. Donal O'Mathuna Chairperson DCU Research Ethics Committee

DEU Research & Innovation

Talghde & Nuálaíocht Tacaíocht Ollscoil Chathair Bhaile Átha Cliath, Baile Átha Cliath, Éire

Research & Innovation Support Dublin City University, Dublin 9, Ireland

T +353 1 700 8000 F +353 1 700 8002 E research@dcu.ie www.dcu.ie

Appendix C: First Reminder

20 January 2015 114

Scoil Ghnó DCU DCU Business School

Roy Somers Irish Daily Star Independent House 27-32 Talbot Street Dublin 1

Dear Roy Somers,

Recently, you received a survey package from us to participate in a major study of management accounting systems utilised in top 1000 Irish companies, conducted by the Dublin City University and the University of Ulster.

We are writing to you as a gentle reminder, as we have not had a response from you. We would appreciate if you could complete the survey and returned to us. If you like another copy of the survey, please contact Otman Elafi, or you can also fill out the survey online at [http://goo.gl/aw3yvD], and please enter the reference above. It should take no more than 15 minutes to complete.

If you have any questions, please don't hesitate to contact Otman by email [otman.elafi2@mail.dcu.ie] or telephone [Tel: 01-7006952; Mobile: 085-7250020] at any time.

Thank you for your time and consideration, Yours Sincerely, Chan Elall

Otman Elafí,

On behalf of the Research Team.



Mr. Otman Elafi



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Dr. Mark Mulgrew Dr. Dermot Brabazon



Prof. Saleem Hashmi

Baile Atha Cliath 9, Èire Dublin 9, Ireland

T +35317005265 F +35317005446 E <u>dcubs@dcu.ie</u> www.dcu.ie/dcubs

Ollscoil Chathair Bhaile Atha Cliath Dublin City University

Appendix D: Second Reminder

Scoil Ghnó DCU DCU Business School



20 January 2015 Ref: 26

Chief Financial Officer Comex Mckinnon Castlebaggot Baldonnel Road Dublin 22

Dear Chief Financial Officer,

Recently, you received a survey package from us to participate in a major study of management accounting systems utilised in top 1000 Irish companies, conducted by the Dublin City University and the University of Ulster.

We are writing to you as a gentle reminder, that closing date to complete the survey is **Friday**, 8th of July. If you have not participated yet we would appreciate if you could complete the survey online at [http://goo.gl/aw3yvD] it should take no more than 10 minutes to complete.

If you have any questions, please don't hesitate to contact Otman by email [otman.elafi2@mail.dcu.ie] or telephone [Tel: 01-7006952; Mobile: 085-7250020] at any time.

Thank you for your time and consideration, Yours Sincerely,

Amen Ekeli

Otman Elafí,

On behalf of the Research Team.

Baile Atha Cliath 9, Eire Dublin 9, Ireland T +35317005265 F +35317005446 E dcubs/@dcu.ie www.dcu.ie/dcubs

Ollscoil Chathair Bhaile Atha Cliath Dublin City University

Appendix E: Plain Language Statement

REC/2014/12

DUBLIN CITY UNIVERSITY Plain Language Statement

The adoption and implementation of activity-based costing / management in multiproduct/multi-services in Irish and UK companies

I. Introduction to the Research Study

The overall target of this research is to identify and understand the adoption and implementation of activity-based costing and activity-based management in multi-product and multi services in Irish and UK companies. The study is headed by Mr Otman Elafi, under supervision of Dr Martin Quinn DCU Business School. Prof Saleem Hashmi, Dr Dermot Brabazon, DCU School of Mechanical & Manufacturing Engineering. Dr Mark Mulgrew, University of Ulster, Department of Accounting, Finance and Economics. Dr Martin Quinn can be contacted on +353 1 7005144 or martin.quinn@dcu.ie. Mr Otman Elafi can be contacted on +353 1 7006952 or otman.elafi2@mail.dcu.ie.

II. Details of what involvement in the Research Study will require

The research will involve the following:

- An online version of the questionnaire will be shortly available on Qualtrics survey web
 page, and a printed copy will be released.
- Follow-up interviews with a number of chief management and financial accounting personal who express their wish to be participate.

III. Potential risks to participants from involvement in the Research Study (if greater than that encountered in everyday life)

There are no potential risks.

IV. Benefits (direct or indirect) to participants from involvement in the Research Study

The research findings will be published as part of a PhD.

V. Advice as to arrangements to be made to protect confidentiality of data, including that confidentiality of information provided is subject to legal limitations

No personal data will be collected, other than demographic data. Any data collected will be confidential and no personal or corporate identifiers used.

VI. Advice as to whether or not data is to be destroyed after a minimum period

Interview data will be retained after the end of the project. No identifying data will be retained with the interview data. Survey data will also be similarly retained.

VII. Statement that involvement in the Research Study is voluntary

Participants may withdraw from the research at any time.

If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000

Appendix F: Prepaid Postage License

Postage will be paid by Licensee.

No Postage Stamp Required

Otman Elafi Room Q224 Dublin City University Business School Glasnevin **Freepost F5067** Dublin 9

Appendix G: Research Questionnaire

SECTION 1

Which of the following is the primary costing method used to cost your products/services?

a) Direct costing system.

b) Traditional absorption costing.

c) Activity-Based Costing (ABC)/Time-Drive Activity-Based Costing (TDABC).

d) Other method.

Now Complete Sections 4, 5 and 6.
 Now Complete Sections 2, 3, 5 and 6 and specify the method below:

Now Complete Sections 2, 3, 5 and 6.
 Now Complete Sections 2, 3, 5 and 6.

Please specify the other costing method that you use in your organisation?

SECTION 2

1. Indicate the approximate number of years your organisation has used this costing method?

	0 to 5 years	G to 10 years	□ 11 to 15 years	🛛 16 to 2	20 year	s 🛛	More t	han 20	years
2.	Please indicate below used in your organise	w your level of satisf ation in terms of:	action with the costin	g method	Ve dissati	ry isfied	Neutral	l V sati	′ery isfied
	1. Meeting informat	ion requirements on	product/service cost.		1	2	3	4	5
	2. Providing you wit	th timely information	n.		1	2	3	4	5
	3. Providing you wit	th necessary informa	tion for decision mak	ing.	1	2	3	4	5
	4. Meeting the needs	s of management for	cost control.		1	2	3	4	5
	5. Being flexible and	d responsive to chan	ges.		1	2	3	4	5

SECTION 3

 Please indicate the extent to which you perceive the stakeholders below affect business strategy on a scale of 1 (never) to 5 (always). 	w Nev	Never Sometimes Always						
1. Engineering/production.	1	2	3	4	5			
2. Financial accountants.	1	2	3	4	5			
3. Management accountants.	1	2	3	4	5			
4. Competitors.	1	2	3	4	5			
5. The market.	1	2	3	4	5			
6. The sales department.	1	2	3	4	5			
7. Customers.	1	2	3	4	5			
8. Suppliers.	1	2	3	4	5			
9. Wholesalers or brokers.	1	2	3	4	5			

 Indicate involvement of the following in accounting in your organisation on a sc 	n changing management ale of 1 (never) to 5 (always).	Never Someti			imes Always			
1. The Chairperson.		1	2	3	4	5		
2. CEO.		1	2	3	4	5		
3. Departmental Manager.		1	2	3	4	5		
4. Financial accountants.		1	2	3	4	5		
5. Management accountants.	-	1	2	3	4	5		
6. Other general management.		1	2	3	4	5		

- 3. Please indicate why your primary costing method has not changed to more modern techniques such as ABC? *Please tick at least four*
 - Time consuming.
 - Lack of understanding.
 - Satisfied with the current method.
 - High cost to change.
 - No need for change.
 - Senior management does not want to change.
 - □ There are other reasons for not changing.
 - Others please specify:

4.	Methods such as ABC and ABM have been cited as improvements to	Com	pletely	al Completely			
	traditional costing and management systems. For each of the following,	disa	agree	_	agree		
	piease fale why your organisation has rejected this approach.					-	
	 The company is satisfied with the current method. 	1	2	3	4	5	
	2. The change is perceived as time consuming.	1	2	3	4	5	
	3. There is a lack of IT resources.	1	2	3	4	5	
	4. The existing information system does not support these methods.	1	2	3	4	5	
	5. The high cost of implementation and adopting.	1	2	3	4	5	
	6. There is a lack of understanding at an accounting staff level.	1	2	3	4	5	
	7. There is a lack of experience of management accounting staff.	1	2	3	4	5	
	8. The decision could not be taken at our level.	1	2	3	4	5	
	9. Top management does not understand these methods.	1	2	3	4	5	
	10.Middle management does not understand the methods.	1	2	3	4	5	
	11.First-line management does not understand the methods.	1	2	3	4	5	
	12. We utilise a customised methods to calculate costs.	1	2	3	4	5	
	13. We have a short product life cycle.	1	2	3	4	5	

	Comp	letely	Neutral Comple		oletely
	dis a	+	agree		
14. We only have a single product line.	1	2	3	4	5
15.Our company is not large enough.	1	2	3	4	5
16.Top management does not support changes to these methods.	1	2	3	4	5
17.ABC/ABM does not provide valuable information.	1	2	3	4	5
18.It is too complicated to implement.	1	2	3	4	5
19 There is no need to implement these methods.	1	2	3	4	5
20.Shortage of the management accounting staff.	1	2	3	4	5
21. We have tried to implement but failed.	1	2	3	4	5
22.Smaller firms do not need to implement this system.	1	2	3	4	5
23 The implementation team is not satisfied with the new system.	1	2	3	4	5
24.If there are other reasons not in the above list please specify.					

SECTION 4

- 1. Indicate the approximate number of years your organisation has used Activity-Based Costing/Time-Driven Activity-Based Costing (ABC/TDABC)?
 - 0 to 5 years G to 10 years □ 11 to 15 years

□ More than 15 years

2

1

3

4

5

- 2. What costing system was used before implementing ABC/TDABC?
 - Direct costing system.
 - Traditional absorption costing system.
 - Don't know.

Other method - please specify

3. If any other costing methods are used in your organisation, alongside or Never Sometimes Always conjunction with ABC/TDABC, how often are they used? 1. Direct costing system. 1 2 4 5 3 2 3 5 2. Traditional absorption costing system. 1 4

3. Other costing method.

 For each of the foll as a result of the im improvement) to 5 	. For each of the following, please indicate the extent of improvement as a result of the implementation of ABC/TDABC on a scale of 1 (no improvement) to 5 (greatly improved).					No vemen	Neutra t	il Ga imp	reatly proved	
1. Your cost system	1. Your cost system. 1 2					3	4	5		
2. Cost information	n provide	d.				1	2	3	4	5
3. Your understand	ing of ov	verhead costs	5.			1	2	3	4	5
4. Your understand	ing of co	osts and facto	ors that drive	these cos	sts.	1	2	3	4	5
5. Your overall pro	fitability					1	2	3	4	5
5. Is ABC/TDABC in	nplement	ed in all prod	luction/servi	ce units i	n your org	ganisati	on?		Yes	🗆 No
6. Is ABC/TDABC us	ed in all	production/s	ervice units i	in your o	rganisatio	n?			Yes	🗆 No
7. If no, please provid	e an esti	mate of the p	ercentage of	use?					%	
8. In terms of the imp	lementat	ion ABC/TD	ABC within	your org	anisation:					
1. What percentage	e of the in	nplementatio	on has been a	chieved a	at the pres	ent tim	e?		%	
2. How long did your organisation take to implement ABC/TDABC? Mor								Month	s	
3. Duration of time	that you	think is need	ded to compl	ete imple	ementation	1?			Month	S
9. Is your ABC/TDAI	BC system	m integrated	with other in	formatio	n systems	?			Yes	□ No
10.Has/did the implem	entation	of the ABC/	TDABC pro	cess stay	ed within	the pla	nned so	chedule	?	
🛛 Not at all 🔲 To a l	ittle exte	nt 🛛 To som	ne extent 🗖 🤇	To a cons	siderable o	extent	🛛 To	a very	great e	xtent
11. Which of the follow (ABM)?	ving five	stages best d	lescribes you	r organis	ation's us	e of Ac	tivity-	Based	Manag	ement
	a)	Presently us	sing ABM							
	b)	Presently in	nplementing	ABM						
	c)	Presently co	onsidering Al	BM adop	tion					
	d)	No consider	ration of AB	M to date	:					
	e)	Rejected Al	BM after ass	essment						
12. Approximately how	v long ha	s your organ	isation used	ABM?						
0 to 5 years		🛛 6 to 10 y	ears	🛛 11 t	o 15 years	5	\Box M	lore that	m 15 y	rears
 Please provide an e 	stimate o	of the % com	plete of ABN	/I in your	organisat	ion to d	late?		%	
14. Did the implement	ation of A	ABM process	s stay on sche	edule?			•			
not at all to a l	ttle exte	nt 🛛 to som	ne extent 🗖 t	to a consi	iderable e	xtent	🛛 to	a very ;	great e	xtent
15.In your opinion, to	what ext	ent has mana	igement impr	oved sin	ce the imp	lement	ation	of ABN	1?	
Much worse	□ Some	what worse	About th	e same	□ Some	what b	etter	$\square N$	luch b	etter

SECTION 5

1.	Please rate management accounting in your organisation on the items below on a scale of 1 (very poor) to 5 (very good).	V Po	oor .	e V	Good			
	1. The current management accounting system as a whole.	1	2	3	4	5		
	2. The extent this system meets current requirements.	1	2	3	4	5		
	3. The quality and accuracy of the information provided.	1	2	3	4	5		
	4. The ability of your system to adapt to future requirements.	1	2	3	4	5		
	5. The degree of understanding of the system at top management level.	1	2	3	4	5		
	6. The system's ability to provide information on time.	1	2	3	4	5		
	7. The finance team's involvement in designing the current system.	1	2	3	4	5		
	8. Relevance to organisational meetings.	1	2	3	4	5		
	9. The attitude of management accounting team at meetings.	1	2	3	4	5		
2.	Please indicate if your organisation engages in any of the following activities to reduce costs or offer different products/services on a scale	Nev	er	Average	e Al	ways		
	of 1 (never) to 5 (always).	•				,		
	 Offers discount online products/services. 	1	2	3	4	5		
	2. Uses online facilities from suppliers.	1	2	3	4	5		
	3. Offers traditional products/services alongside online offerings.	1	2	3	4	5		
	4. Offers online support to customers - such as online ordering.	1	2	3	4	5		
	 Achieves cost/other benefits from its online activities compared to offline activities. 	1	2	3	4	5		
3.	3. Are there any other activities your organisation uses to reduce the costs of products/services that have no							

been listed? Please indicate.

4. Overall, how happy are you with your primary costing method? (Please rate)

Very unhappy	Unhappy	🗖 Fair	🗖 Happy	Very happy
--------------	---------	--------	---------	------------

<u>S</u>	ECTION 6					
1.	To what extent have the following been affected by the level of	Not a	t all	Unsure	A	large
	competition within your sector on a scale of 1 (not at all) to 5 (a large				e	xtent
	extent)?	•				(
	1. Price levels.	1	2	3	4	5
	2. The products/services you provide.	1	2	3	4	5
	3. The selling price is influenced by price structure.	1	2	3	4	5
	4. The purchase price of key materials.	1	2	3	4	5
	5. Marketing issues.	1	2	3	4	5
	6. The advertising budget.	1	2	3	4	5
	7. The marketing strategy.	1	2	3	4	5
	8. Product/service design.	1	2	3	4	5
	9. Your organisation often reconsiders sales price.	1	2	3	4	5
	10.Promotion and career progression.	1	2	3	4	5
2.	For each of the following, please rate on a scale of 1 (decrease) to 5	Decre	ease	Stable	Inc	crease
	(increase) how your organisation has changed within the last 4 years.	•		-		
	1. Number of the products produced.	1	2	3	4	5
	2. Number of services delivered.	1	2	3	4	5
	3. Number of the supplier relationships.	1	2	3	4	5
	4. Number of customers.	1	2	3	4	5
	5. Number of employees.	1	2	3	4	5
	6. Gross profit.	1	2	3	4	5
	7. Net profit.	1	2	3	4	5
	8. Products/services sales price.	1	2	3	4	5
	9. Stock market price for your organisation.	1	2	3	4	5
	10.Amount owed by customers.	1	2	3	4	5
	11.Amount owed to suppliers.	1	2	3	4	5
3.	Please indicate the availability of the Information technology in your organisation.	anisati	on in 1	the follo	wing	
	1. Have an IT department within the organisation?				Yes [N o
	2. Require new employees to have a level of IT knowledge?				Yes [No
	3. Have a website?				Yes [No
	4. Develop its website in-house?				Yes [No
	5. Outsource any information technology/systems?				Yes [No

6. Do business online?

🛛 Yes 🗆 No

	7. Use the internet to link with customers?	🛛 Yes 🗖 No
	8. Have customer online support?	🛛 Yes 🗖 No
	9. Use the internet to link with suppliers?	🛛 Yes 🗖 No
	10.Order materials or services online?	🛛 Yes 🗖 No
	11.Have customised software created in-house?	🛛 Yes 🗖 No
	12.Use accounting software?	🗆 Yes 🗖 No
	13.Feel the accounting software employed meets its general needs?	🛛 Yes 🗖 No
	14.Feel the accounting software meets management accounting needs?	🛛 Yes 🗖 No
	15.Engage in training employees in IT?	🛛 Yes 🗖 No
	16.Host training programs in IT in-house?	🗆 Yes 🗖 No
	17.Fund outsourced employee training programs in IT?	🛛 Yes 🗖 No
	18.Indicate the approximate number of IT training programs provided by your organisation	n each year?
	□ None □ 1-3 □ 4-6 □ 7-9 □ 10-12 □	More than 12
	19. Indicate the approximate spending incurred on IT training programs each year in ${\mathbb E}/{\mathbb E}?$	
	□ Less than 10000 □ 10-20000 □ 20-30000 □ 30-40000 □ 40-50000 □ Great	ter than 50000
	20.Please indicate the approximate number of employees in IT within your organisation?	
	□ 1-10 □ 11-30 □ 31-60 □ 61-100 □ 101-150 □ 151-200	🗆 Over 200
	21. Roughly how many devices/PCs does your organisation own/lease?	
	□ 1-10 □ 11-30 □ 31-60 □ 61-100 □ 101-150 □ 151-200	O ver 200
	22.Please indicate the primary accounting software used by your organisation? If you do n	ot know the
	system used, please leave this question blank.	
1	Management accounting department:	
	1 Does your organisation have a management accounting or similar department?	□ Yes □ No
	 Does your organisation have a management accounting or similar department? If yes, roughly how many employees are there in this department? 	a 163 a 160
	\Box 1-5 \Box 6-10 \Box 11-20 \Box 21-30 \Box 31-40 \Box 41-50 \Box 51-60	□ 60 Over
	3 Does your organisation outsource any aspects of management accounting to a	Yes D No
	consultancy firm?	
	4. Roughly how much has your organisation spent on external consultants for management	t accounting
	services in each year? €/± □ Less than 10000 □ 10.€20000 □ 20.30000 □ 30.40000 □ Grea	ter than 40000
	5 How would you describe the level of management accounting in your organisation?	ici tilali 40000
	□ Very poor □ Poor □ Fair □ Good □	Very good
5	Demographic Information	
	1. Primary operating market Ireland IVK Both I	Worldwide
	2 Is the organisation Private company Dublic company	

3. Is your organisati	on 🗆	A Producer	🛛 A Serv	vice Provider	ſ	Other	
			Multiple products/services				
4. Please specify typ	Multiple similar						
			Multiple di	ssimilar			
5. Industry:	🗆 Agri	business	Constructio	n/Property	🛛 Bankin	g	
	Cons	ultancy	Energy/Res	ources	🛛 Transp	ort /Tourism	
Technology	🗖 Food	and Beverage	Health/Pha	rmaceuticals	🗆 Insurar	ice	
Manufacturing	🛛 Med	ia/Marketing	🛛 Non-profit		🗆 Retaili	ng	
6. How many years	has your organi	sation been in b	usiness?				
1 -5	G -10	11-15	16-20	21-30	🗆 Mor	re than 30	
7. Roughly how mu	ch annual reven	ue/income in €/:	£ does your firn	1 generate pe	er year?		
Less than 5m	🛛 5-25m	🛛 25-50m	50-100	100-250	m 🛛 Gre	ater than 250m	
8. Roughly how ma	ny employees ha	ave the organisa	tion?				
Less than 100	100-250	250-500	500-1000	□ 1000-20	000 🗖 Gre	ater than 2000	
9. Would you be wi	lling to take part	in a follow up	study, which m	ay involve a	face-to-	🛛 Yes 🗖 No	
face or telephone	Company name	s, please provu	te the following	contact det	aus		
	Participant nam				_		
	Addresse:						
	Address.				-		
					_		
	Email:						
	Phone number:						
If you have any addition	nal comments in	1 regards to you	r costing metho	d, please use	e the follow	ving space.	

Thank you for completing the questionnaire. I appreciate your time and effort in answering these questions, If you have any additional comments or question please email me at <u>otman.elafi2@mail.dcu.ie</u>

Thank you for your help
Appendix H: Coding List

S5Q1-5	The degree of understanding of the system at top management level	TOPMGTUND	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-6	The system's ability to provide information on time	ONTIMEINFO	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-7	The finance team's involvement in designing the current system	FININVOLV	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-8	Relevance to organisational meetings	RELEV	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-9	The attitude of management accounting team at meetings	ATT	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q2-1	Offers discount online products/services	DISC	1 = Never; $2 = $ Seldom; $3 = $ Sometimes; $4 = $ Most of the time; $5 = $ Always
S5Q2-2	Uses online facilities from suppliers	ONLINE	1 = Never; $2 = $ Seldom; $3 = $ Sometimes; $4 = $ Most of the time; $5 = $ Always
S5Q2-3	Offers traditional products/services alongside online offerings	OFFERONL	1 = Never; $2 = $ Seldom; $3 = $ Sometimes; $4 = $ Most of the time; $5 = $ Always
S5Q2-4	Offers online support to customers - such as online ordering	ONLINESUPP	1 = Never; $2 = $ Seldom; $3 = $ Sometimes; $4 = $ Most of the time; $5 = $ Always
S5Q2-5	Achieves cost/other benefits from its online activities compared to offline activities	BENEFIT	1 = Never; 2 = Seldom; 3 = Sometimes; 4 = Most of the time; 5 = Always
S5Q4	Happy with primary cost	HAPPY	-2 = Very unhappy; -1 = Unhappy; 0 = Fair; 1 = Happy; 2 = Very happy
S6Q1-1	Price levels	PRICE	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very great extent
S6Q1-2	The products/services you provide	PROVIDE	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very great extent
S6Q1-3	Your products/services selling price is influenced by price structure	INFLUPRICE	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very great extent
S6Q1-4	The purchase price of key materials	KEYMAT	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very great extent
S6Q1-5	Marketing issues	MKTISS	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very great extent

S6Q1-6	The advertising budget	ADVERT	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
			great extent
S6O1-7	The marketing strategy	MARKET	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
	6		great extent
S6O1-8	Product/service design	DESIGN	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
~~~			great extent
S6O1-9	Your organisation often reconsiders sales price	RECONS	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
~~ (- )			great extent
S6O1-10	Promotion and career progression	CAREER	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
502110	romotion and career progression	Criticizit	great extent
S6Q2-1	Number of the products produced	NUMBERPROD	-2 = V Decrease; $-1 =$ Decrease; $0 =$ Stable; $1 =$ Increase; $2 = V$ Increase
S6Q2-2	Number of services delivered	NUMBERSERV	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-3	Number of supplier relationships	RELATION	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-4	Number of customers	CUSTOMER	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-5	Number of employees	EMPLOYEE	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-6	Gross profit	GP	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-7	Net profit	NP	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-8	Products/services sales price	SALESPRICE	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-9	Stock market price for your organisation.	SHARE	-2 = V Decrease; -1 = Decrease; 0 = Stable; 1 = Increase; 2 = V Increase
S6Q2-10	Amount owed by customers	OWEDBY	2 = V Decrease; $1 =$ Decrease; $0 =$ Stable; $-1 =$ Increase; $-2 = V$ Increase
S6Q2-11	Amount owed to suppliers	OWEDTO	2 = V Decrease; $1 =$ Decrease; $0 =$ Stable; $-1 =$ Increase; $-2 = V$ Increase
S6Q3-1	Have an IT department	ITDEPT	0 = No; 1 = Yes
S6Q3-2	Requirement for new employees	NEWEMP	0 = No; 1 = Yes
S6Q3-3	Have a website	WEBSITE	0 = No; 1 = Yes
S6Q3-4	Develop website in-house	INHOUSE	0 = No; 1 = Yes
S6Q3-5	Outsource IT	OUTSOURCE	0 = No; 1 = Yes
S6Q3-6	Business online	BUSONLINE	0 = No; 1 = Yes
S6Q3-7	Use the internet to connect with customers	INTERLINK	0 = No; 1 = Yes
S6Q3-8	Customer online support	CUSTONLSUPF	P0 = No; 1 = Yes
S6Q3-9	Internet to connect with suppliers	INTERLINKSU PP	0 = No; 1 = Yes
S6Q3-10	Order materials or services online	MATONLINE	0 = No; 1 = Yes
S6Q3-11	Customised software created in-house	SOFTWARE	0 = No; 1 = Yes

S6Q3-12	Use accounting software	ACCSOFTWAR	0 = No; 1 = Yes
S6O3-13	Feel the accounting software employed meets its general needs	SOFTGENEED	0 = No; 1 = Yes
S6Q3-14	Feel the accounting software meets management accounting needs	SOFTMGTNEE D	0 = No; 1 = Yes
S6Q3-15	Engage in training employees in IT	ENGAGE	0 = No; 1 = Yes
S6Q3-16	Host training programs in IT held in-house	HOST	0 = No; 1 = Yes
S6Q3-17	Fund outsourced employee training programs in IT	FUND	0 = No; 1 = Yes
S6Q3-18	IT training programs provided	ITRAIN	0 = None; $1 = 1$ to 3; $2 = 4$ to 6; $3 = 7$ to 9; $4 = 10$ to 12; $5 =$ More than 12
S6Q3-19	Spending on IT training	SPENDIT	1 = Less than 10000; 2 = 10000 to 20000; 3 = 20000 to 30000; 4 = 30000 to 40000; 5 = 40000 to 50000; 6 = Greater than 50000
S6Q3-20	Number of employees in IT	NUEMPIT	1 = 1 to 10; $2 = 11$ to 30; $3 = 31$ to 60; $4 = 61$ to 100; $5 = 101$ to 150; $6 = 151$ to 200; $7 = 0$ ver 200
S6Q3-21	Devices/PCs does owned	DEVICE	1 = 1 to 10; $2 = 11$ to 30; $3 = 31$ to 60; $4 = 61$ to 100; $5 = 101$ to 150; $6 = 151$ to 200; $7 = 0$ ver 200
S6Q4-1	Management accounting department	MGTACCDEPT	0 = No; 1 = Yes
S6Q4-2	Number of employees	NUEMP	1 = 1 to 5; $2 = 6$ to 10; $3 = 11$ to 20; $4 = 21$ to 30; $5 = 31$ to 40; $6 = 41$ to 50; $7 = 51$ to 60; $8 = 0$ ver 60
S6Q4-3	Outsource management accounting	OUTMGT	0 = No; 1 = Yes
S6Q4-4	Spent on external / consultants	CONSULT	1 = Less than 10000; 2 = 10000 to 20000; 3 = 20000 to 30000; 4 = 30000 to 40000; 5 = Greater than 40000
S6Q4-5	Level of management accounting	LEVELMA	1 = Very poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very good
S6Q5-1	Location	LOCATE	1 = Ireland, UK and Both; 2 = Worldwide
S6Q5-2	Is the organisation Private or Public	PRIVPUB	1 = Private company; 2 = Public company
S6Q5-3	Is your organisation	ORG	1 = A producer; $2 = A$ service provider; $3 = O$ ther
S6Q5-4	Type of product/service	TYPE	1 = Multiple products/services; 2 = Multiple similar; 3 = Multiple dissimilar
			1 = Agribusiness; 2 = Construction/Property; 3 = Banking; 4 = Consultancy; 5 = Energy/Resources;
S6Q5-5	Industry	IND	6 = Transport /Tourism; 7 = Technology; 8 = Food and Beverage; 9 = Health/Pharmaceuticals; 10 =
			Insurance; 11 = Manufacturing; 12 = Media/Marketing; 13 = Non-profit; 14 = Retailing
\$606	Been in husiness	REEN	1 = 1 to 5 years; $2 = 6$ to 10 years; $3 = 11$ to 15 years; $4 = 16$ to 20 years; $5 = 21$ to 30 years; $6 = 10$
2000	been in business	DELIN	More than 30 years
S6Q7	Revenue	REV	1 = Less than 5m; 2 = 5 to 25m; 3 = 25 to 50m; 4 = 50 to 100m; 5 = 100 to 250m; 6 = Greater than 250m
S6Q8	Employees	EMPLOYEES	1 = Less than 100 emp; 2 = 100 to 250 emp; 3 = 250 to 500 emp; 4 = 500 to 1000 emp; 5 = 1000 to 2000 emp; 6 = Greater than 2000 emp

## **Appendix I: IT Resources Correlations**

The following table shows a number of correlations between the IT resources factors. For example, it shows the correlation matrix, anti-image covariance, antiimage correlation, reproduced correlation and residual correlation for the nineteen IT resources questions.

	Correlation Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Have an IT department						_	_			_	_						
2	Develop a website in-house	.412																
3	Business online	.297	.315															
4	Use the internet to connect with customers	.211	.312	.471														
5	Customer online support	.136	.095	.363	.334													
6	Internet to connect with suppliers	.221	.202	.387	.430	.248												
7	Order materials or services online	.198	.281	.379	.329	.132	.432											
8	Customised software created in-house	.459	.454	.303	.328	.114	.296	.264										
9	Use accounting software	.102	.032	.044	.090	029	060	.064	.179									
10	Feel the accounting software employed meets its general needs	.178	.056	.146	.157	.082	.123	.112	.098	021								
11	Feel the accounting software meets management accounting needs	.032	.053	.132	.053	006	.092	.032	.011	.125	.412							
12	Engage in training employees in IT	.273	.173	.329	.147	.080	.207	.146	.232	046	.010	.096						
12	Host training programs in IT held in-house	.436	.342	.450	.240	.073	.296	.290	.360	.162	.146	.171	.616					
14	Fund outsourced employee training programs in IT	.130	.178	.212	.124	049	.149	.058	.305	.066	034	.038	.620	.421				
15	IT training programs provided	.246	.303	.246	.055	.200	.115	.200	.243	.043	057	.019	.287	.406	.268			
16	Spending on IT training	.342	.386	.359	.181	.257	.179	.309	.306	051	.058	046	.263	.344	.266	.694		
17	Number of employees in IT	.134	.212	.276	.176	.319	.108	.188	.172	084	.091	098	.135	.123	.141	.476	.598	
18	Devices/PCs does owned	.399	.321	.226	.079	.250	.117	.109	.246	.051	003	011	.155	.218	.231	.424	.525	.539

	Anti-image Covariance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Have an IT department																	
2	Develop a website in-house	085																
3	Business online	014 -	.026															
4	Use the internet to link with customers	001 -	.110 -	.133														
5	Customer online support	.007	.059 -	.138 -	.137													
6	Internet to link with suppliers	017	.047 -	.044 -	.145	078												
7	Order materials or services online	.029 -	.060 -	.084 -	.041	.064 -	.205											
8	Customised software created in-house	156 -	.150 .	.000 -	.057	.001 -	.074 -	022										
9	Use accounting software	029	.080 .	.007 -	.078	006	.137 -	072 -	.109									
10	Feel the accounting software employed meets its general needs	112	.051 .	.018 -	.036	026	.010 -	024 -	.022 .	082								
11	Feel the accounting software meets management accounting needs	.077 -	.050 -	.065	.022	.027 -	.045	.034 .	.042 -	.109 -	.324							
12	Engage in training employees in IT	070	.042 -	.023	.014	056	.011 -	009 .	.032 .	123	.067 ·	046						
12	Host training programs in IT held in-house	082 -	.047 -	.100	.001	.063 -	.044 -	032 -	.008 -	.109 -	.071 -	010	181					
14	Fund outsourced employee training programs in IT	.119	.002 -	.006 -	.033	.117 -	.030	.074 -	.117 -	.059 -	.002	.023	243	006				
15	IT training programs provided	.021 -	.021 .	.041	.067	051	.002	.009 -	.009 -	.036	.105 ·	065	.006	105	009			
16	Spending on IT training	047 -	.046 -	.043 -	.001	008	.024 -	077 -	.007 .	064 -	.035	.042	.008	.008	036	196		
17	Number of employees in IT	.103	.020 -	.041 -	.050	055	.031 -	019 -	.018 .	038 -	.111	.095	032	.051	.026	073	.110	
18	Devices/PCs owned	174 -	.063 .	.009	.073	077 -	.026	.043	.030 -	.049	.079 ·	055	.053	.005	093	.000	.060	191

Anti-image Correlation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Have an IT department																	
2 Develop a website in-house	144																
<b>3</b> Business online	025	043															
<b>4</b> Use the internet to connect with customers	001	178	229														
5 Customer online support	.011	.088	220	209													
6 Internet to connect with suppliers	028	.074	074	231	115												
7 Order materials or services online	.047	090	136	063	.091	308											
8 Customised software created in-house	271	242	001	094	.001	118	035										
9 Use accounting software	043	.111	.010	110	007	.187	096 -	.154									
<b>10</b> Feel the accounting software employed meets its general needs	180	.076	.029	056	037	.015	035 -	.033	.107								
11 Feel the accounting software meets management accounting needs	.120	073	102	.033	.037	065	.048	.062 -	.140 -	449							
12 Engage in training employees in IT	147	.081	048	.028	103	.021	018	.064	.210	.124	083						
12 Host training programs in IT held in-house	172	091	209	.002	.117	086	060 -	.016 -	.188 -	131 -	019	438					
14 Fund outsourced employee training programs in IT	.224	.003	011	059	.194	052	.125 -	.210 -	.091 ·	003	.037	527	013				
15 IT training programs provided	.042	041	.083	.130	092	.003	.017 -	.017 -	.060	.189	115	.014	249	018			
16 Spending on IT training	107	098	097	002	015	.051	158 -	.015	.119 -	071	.082	.022	.021	086	502		
17 Number of employees in IT	.199	.036	080	093	094	.056	034 -	.034	.060 ·	189	.158	071	.115	.052	160	266	
18 Devices/PCs owned	326	110	.017	.130	127	045	.073	.054 -	.076	.131 -	089	.115	.010	181	.000	141	383

Reproduced Correlation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Have an IT department																	
2 Develop a website in-house	.506																
3 Business online	.312	.335															
<b>4</b> Use the internet to connect with customers	.269	.320	.527														
5 Customer online support	.083	.148	.384	.368													
6 Internet to connect with suppliers	.198	.246	.536	.574	.353												
7 Order materials or services online	.280	.323	.459	.500	.316	.468											
8 Customised software created in-house	.536	.531	.358	.367	.079	.299	.355										
<b>9</b> Use accounting software	.319	.266	039	.028	206	056	.036	.325									
<b>10</b> Feel the accounting software employed meets its general needs	.150	.052	.222	.159	.156	.139	.103	.024	.066								
<b>11</b> Feel the accounting software meets management accounting needs	.126	004	.136	.035	017	.047	.001	.001	.109	.668							
12 Engage in training employees in IT	.197	.162	.367	.140	004	.268	.162	.238	065	001	.128						
12 Host training programs in IT held in-house	.431	.376	.443	.276	.040	.324	.280	.454	.147	.164	.243	.658					
14 Fund outsourced employee training programs in IT	.208	.175	.249	.041	089	.149	.090	.247	-	106	.034	.723	.589				
<b>15</b> IT training programs provided	.334	.334	.269	.046	.217	.063	.133	.267	030	004	037	.354	.369	.355			
16 Spending on IT training	.379	.400	.375	.175	.354	.170	.241	.318	052	.041	052	.301	.359	.285	.671		
17 Number of employees in IT	.202	.245	.292	.122	.428	.117	.176	.119	184	.059	080	.114	.135	.090	.578	.677	
18 Devices/PCs owned	.378	.382	.222	.061	.240	.023	.141	.297	.051	.038	042	.139	.248	.166	.592	.652	.584

Residual Correlation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Have an IT department																	
2 Develop a website in-house	094																
<b>3</b> Business online	015	020															
<b>4</b> Use the internet to connect with customers	058	007	057														
5 Customer online support	.053	053	021	034													
<b>6</b> Internet to connect with suppliers	.023	044	150	145	105												
7 Order materials or services online	082	042	080	171	184 -	.036											
8 Customised software created in-house	077	077	055	038	.036 -	.002	091										
<b>9</b> Use accounting software	217	234	.083	.062	.177 -	.004	.028	146									
<b>10</b> Feel the accounting software employed meets its general needs	.028	.004	076	002	075 -	.016	.009	.074 ·	087								
<b>11</b> Feel the accounting software meets management accounting needs	094	.057	004	.018	.011	.045	.032	.010	.015	255							
12 Engage in training employees in IT	.076	.011	038	.007	.084 -	.061	016	006	.020	.011	032						
12 Host training programs in IT held in-house	.006	034	.007	036	.033 -	.028	.010	094	.015	018	072	042					
14 Fund outsourced employee training programs in IT	078	.003	037	.083	.040	-	032	.058	.066	.072	.004	103	168				
15 IT training programs provided	087	031	023	.009	016	.052	.067	024	.074	053	.056	067	.037	087			
16 Spending on IT training	037	014	016	.006	097	.008	.069	012	.001	.017	.005	038	015	018	.023		
17 Number of employees in IT	069	032	017	.055	109 -	.009	.012	.053	.100	.032	018	.021	012	.051	102	079	
18 Devices/PCs owned	.020	061	.004	.018	.009	.093	032 -	051	.000	041	.030	.017	030	.065	168	127	045

## **Appendix J: Organisation Economic Conditions Correlations**

The following tables show a number of correlations between the organisations' level of competition according to correlations. For example, they show the correlation matrix, antiimage covariance, anti-image correlation, reproduced correlation and residual correlation, affecting the ten organisations' economic conditions.

	<b>Correlation Matrix</b>	1	2	3	4	5	6	7	8	9
1	Number of products produced									
2	Number of services delivered	.322								
3	Number of supplier relationships	.291	.206							
4	Number of customers	.138	.436	.286						
5	Number of employees	.224	.105	.412	.331					
6	Gross profit	.187	.074	.443	.275	.575				
7	Net profit	.220	.042	.378	.232	.541	.954			
8	Products/services sales price	.024	.082	.175	.232	.179	.450	.446		
9	Amount owed by customers	119	051	138	168	112	091	048	.177	
10	Amount owed to suppliers	203	.050	170	014	214	168	149	046	.569

	Anti-image Covariance	1	2	3	4	5	6	7	8	9
1	Number of products produced									
2	Number of services delivered	235								
3	Number of supplier relationships	138	042							
4	Number of customers	.042	263	057						
5	Number of employees	046	.035	094	143					
6	Gross profit	.044	016	057	005	036				
7	Net profit	055	.025	.041	.006	001	072			
8	Products/services sales price	.059	021	.000	136	.097	026	013		
9	Amount owed by customers	014	.006	.008	.142	062	.025	018	198	
10	Amount owed to suppliers	.109	066	.023	102	.093	003	002	.124	342

	Anti-image Correlation	1	2	3	4	5	6	7	8	9
1	Number of products produced									
2	Number of services delivered	322								
3	Number of supplier relationships	192	060							
4	Number of customers	.060	387	084						
5	Number of employees	069	.055	148	232					
6	Gross profit	.185	070	251	024	173				
7	Net profit	222	.106	.175	.027	004	922			
8	Products/services sales price	.082	030	.000	203	.153	114	055		
9	Amount owed by customers	021	.009	.013	.232	107	.121	084	315	
10	Amount owed to suppliers	.164	103	.036	164	.159	012	007	.195	588

	<b>Reproduced Correlations</b>	1	2	3	4	5	6	7	8	9
1	Number of products produced									
2	Number of services delivered	.433								
3	Number of supplier relationships	.343	.309							
4	Number of customers	.406	.589	.404						
5	Number of employees	.275	.149	.458	.329					
6	Gross profit	.197	.017	.502	.296	.656				
7	Net profit	.168	012	.477	.268	.635	.879			
8	Products/services sales price	.033	.034	.256	.193	.356	.560	.560		
9	Amount owed by customers	290	026	211	064	189	049	021	.260	
10	Amount owed to suppliers	224	.128	234	.002	277	218	194	.144	.709

	<b>Residual Correlations</b>	1	2	3	4	5	6	7	8	9
1	Number of products produced									
2	Number of services delivered	111								
3	Number of supplier relationships	051	103							
4	Number of customers	268	153	118						
5	Number of employees	052	045	046	.002					
6	Gross profit	010	.057	060	022	081				
7	Net profit	.052	.055	099	036	094	.075			
8	Products/services sales price	009	.048	080	.039	177	109	114		
9	Amount owed by customers	.171	025	.073	104	.078	042	027	083	
10	Amount owed to suppliers	.020	078	.065	016	.063	.050	.045	189	140

#### **Appendix K: Organisations Level of Competition**

### Correlations

The following tables show a number of correlations between the organisations' level of competition according to correlations. For example, it shows the correlation matrix, antiimage covariance, anti-image correlation, reproduced correlation, and residual correlation in nine organisations according to responses to level of competition questions.

		1	2	3	4	5	6	7	8
1	Price levels								
2	The products/services you provide	.585							
3	Selling price is influenced by price structure	.476	.634						
4	The purchase price of key materials	.382	.409	.381					
5	Marketing issues	.375	.508	.456	.370				
6	The advertising budget	.215	.359	.367	.212	.582			
7	The marketing strategy	.278	.259	.176	.163	.522	.637		
8	Product/service design	.215	.436	.297	.315	.452	.384	.488	
9	Promotion and career progression	.276	.283	.172	.360	.295	.326	.318	.317

	Anti-image Covariance	1	2	3	4	5	6	7	8
1	Price levels								
2	The products/services you provide	185							
3	Selling price is influenced by price structure	097	170						
4	The purchase price of key materials	094	022	076					
5	Marketing issues	022	071	061	086				
6	The advertising budget	.093	030	105	.022	130			
7	The marketing strategy	124	.059	.086	.058	094	221		
8	Product/service design	.111	135	015	085	056	.034	178	
9	Promotion and career progression	071	024	.068	178	.012	085	039	074

	Anti-image Correlation	1	2	3	4	5	6	7	8
1	Price levels								
2	The products/services you provide	382							
3	Selling price is influenced by price structure	179	365						
4	The purchase price of key materials	150	040	126					
5	Marketing issues	042	157	121	147				
6	The advertising budget	.183	069	215	.039	273			
7	The marketing strategy	244	.136	.177	.103	200	482		
8	Product/service design	.189	267	027	131	102	.064	338	
9	Promotion and career progression	109	043	.108	245	.019	144	066	108

	<b>Reproduced</b> Correlation	1	2	3	4	5	6	7	8
1	Price levels								
2	The products/services you provide	.655							
3	Selling price is influenced by price structure	.619	.679						
4	The purchase price of key materials	.522	.576	.540					
5	Marketing issues	.425	.536	.459	.403				
6	The advertising budget	.232	.351	.267	.247	.614			
7	The marketing strategy	.143	.264	.178	.174	.597	.720		
8	Product/service design	.299	.400	.329	.294	.552	.572	.574	
9	Promotion and career progression	.279	.355	.302	.266	.435	.426	.417	.379

	<b>Residual Correlations</b>	1	2	3	4	5	6	7	8
1	Price levels								
2	The products/services you provide	070							
3	Selling price is influenced by price structure	144	045						
4	The purchase price of key materials	140	167	159					
5	Marketing issues	050	028	003	033				
6	The advertising budget	018	.008	.100	035	032			
7	The marketing strategy	.135	005	002	011	075	083		
8	Product/service design	084	.036	032	.021	100	188	085	
9	Promotion and career progression	003	073	130	.094	140	100	099	062

#### **Appendix L: Influencers of Business Strategy**

The following tables show a number of correlations between the influences upon strategic factors associated with business. For example, it shows the competitive communalities tests, the rotated component matrix test, and total variance. In addition, it shows the correlation matrix, anti-image covariance, anti-image correlation, reproduced correlation, and residual correlation arranged according to nine questions based on influencers of business strategy.

Communalities	Initial	Extraction
Engineering	1.000	.368
Financial accountants	1.000	.659
Management accountants	1.000	.579
Competitors	1.000	.694
Market	1.000	.741
Sales	1.000	.369
Customers	1.000	.637
Suppliers	1.000	.702
Wholesalers or brokers	1.000	.683
Extraction Method: Principal Component Analysis		

	-	Component	
Rotated Component Matrix ^a	1	2	3
	External effects	Internal effects	<b>Others effects</b>
Market	.853	-	-
Competitors	.803		
Customers	.760		
Sales	.540		
Financial accountants		.778	
Management accountants		.722	
Engineering		.593	
Wholesalers or brokers			.818
Suppliers			.816
Extraction Method: Principal Compone	ent Analysis. Rotation I	Method: Varimax wit	h Kaiser
Normalisation ^a	-		
a. Rotation converged in 4 iterations			

			Tota	ıl Vari	ance Expl	ained				
Component	I	nitial Eige	envalues	ES	xtraction Squared L	Sums of oadings	Rotation Sums of Squar Loadings			
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	2.853	31.695	31.695	2.853	31.695	31.695	2.319	25.762	25.762	
2	1.410	15.661	47.357	1.410	15.661	47.357	1.643	18.250	44.013	
3	1.169	12.992	60.349	1.169	12.992	60.349	1.470	16.336	60.349	
4	.933	10.366	70.714							
5	.809	8.985	79.699							
6	.589	6.546	86.245							
7	.470	5.226	91.470							
8	.456	5.066	96.537							
9	.312	3.463	100.000							
Extraction N	/lethod	l: Principa	l Component	Analy	sis		-			

	<b>Correlation Matrix</b>	1	2	3	4	5	6	7	8		
1	Engineering										
2	Financial accountants	.235**									
3	Management accountants	.143*	.468***								
4	Competitors	.150*	.183**	.271**							
5	Market	035	.053	.145*	.630***						
6	Sales	.141*	.087	.278***	.303***	.257**					
7	Customers	.236**	.146*	.223**	.518***	.514***	.372***				
8	Suppliers	.051	.258**	.190*	.231**	.082	.108	.247**			
9	Wholesalers or brokers	.063	.123*	.106	.202**	.106*	.112*	.206**	.405***		
**	*** Significant at the 00% level of convergence										

*** Significant at the 99% level of convergence ** Significant at the 95% level of convergence * Significant at the 90% level of convergence

	Sig. (1-tailed)	1	2	3	4	5	6	7	8
1	Engineering								
2	Financial accountants	.003							
3	Management accountants	.047	.000						
4	Competitors	.039	.016	.001					
5	Market	.340	.268	.044	.000				
6	Sales	.049	.156	.000	.000	.001			
7	Customers	.003	.043	.004	.000	.000	.000		
8	Suppliers	.277	.001	.013	.003	.169	.102	.002	
9	Wholesalers or brokers	.229	.074	.106	.009	.108	.095	.008	.000

	Anti-image Covariance	1	2	3	4	5	6	7	8
1	Engineering								
2	Financial accountants	147							
3	Management accountants	.012	301						
4	Competitors	081	022	067					
5	Market	.152	.008	.016	263				
6	Sales	049	.062	158	046	023			
7	Customers	159	.011	020	087	178	143		
8	Suppliers	.069	129	021	070	.073	.008	097	
9	Wholesalers or brokers	010	002	.007	043	.010	021	040	277

	Anti-image Correlation	1	2	3	4	5	6	7	8
1	Engineering								
2	Financial accountants	189							
3	Management accountants	.015	423						
4	Competitors	124	037	113					
5	Market	.230	.013	.027	517				
6	Sales	059	.082	209	071	035			
7	Customers	227	.018	031	162	328	211		
8	Suppliers	.087	176	028	114	.118	.011	148	
9	Wholesalers or brokers	012	003	.009	067	.015	026	059	35

	<b>Reproduced Correlations</b>	1	2	3	4	5	6	7	8
1	Engineering								
2	Financial accountants	.442							
3	Management accountants	.439	.587						
4	Competitors	.138	.144	.286					
5	Market	.011	079	.105	.676				
6	Sales	.216	.207	.311	.465	.429			
7	Customers	.159	.174	.306	.664	.634	.453		
8	Suppliers	.036	.316	.226	.242	.088	.071	.241	
9	Wholesalers or brokers	066	.180	.105	.238	.128	.036	.228	.677

	<b>Residual Correlations</b>	1	2	3	4	5	6	7	8
1	Engineering								
2	Financial accountants	207							
3	Management accountants	296	119						
4	Competitors	.011	.039	016					
5	Market	046	.132	.040	046				
6	Sales	076	121	033	162	173			
7	Customers	.077	028	082	146	120	081		
8	Suppliers	.015	058	036	011	006	.037	.007	
9	Wholesalers or brokers	.129	057	.001	036	022	.076	023	272

#### **Appendix M: Involvement of Change in MA**

The following tables show a number of correlations between the influences upon management accounting factors. For example, it shows the competitive communalities tests, the rotated component matrix test, and the total variance. In addition, it shows the correlation matrix, antiimage covariance, anti-image correlation, reproduced correlation, and residual correlation arranged according to six questions pertaining to the role of change in management accounting.

Communalities	Initial	Extraction			
Chairperson	1.000	.672			
CEO	1.000	.652			
Manager	1.000	.559			
Financial accountants	1.000	.570			
Management accountants	1.000	.684			
General management	1.000	.253			
Extraction Method: Principal Component Analysis					

	Comp	onent
Deteted Component Matrix 8	1	2
Kotated Component Matrix	Management involvement	Accountants involvement
Chairperson	.812	
CEO	.797	
Manager	.722	
General management	.442	
Management accountants		.824
Financial accountants		.743
Extraction Method: Principal Component Analysis.	Rotation Method: Varimax	with Kaiser
Normalisation ^a		
a. Rotation converged in 3 iterations		

			Tota	l Vari	ance Expl	ained			
Component	Initial Eigenvalues			E	xtraction Squared L	Sums of oadings	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	% Cumulative	Total	% of Variance	% Cumulative
1	2.228	37.135	37.135	2.228	37.135	37.135	2.034	33.908	33.908
2	1.162	19.373	56.508	1.162	19.373	56.508	1.356	22.600	56.508
3	.925	15.412	71.920						
4	.680	11.327	83.248						
5	.560	9.328	92.576						
6	.445	7.424	100.000						
Extraction M	Extraction Method: Principal Component Analysis								

	<b>Correlation Matrix</b>	1	2	3	4	5
1	Chairperson					
2	CEO	.531***				
3	Manager	.390***	.424***			
4	Financial accountants	.106	.247**	.147*		
5	Management accountants	.038	.140*	.206**	.306***	
6	General management	.161*	.221**	.314***	.083	.163*
***	*** Significant at the 99% level of convergence					
** Significant at the 95% level of convergence						
* S	ignificant at the 90% level of con	vergence				

	Sig. (1-tailed)	1	2	3	4	5
1	Chairperson					
2	CEO	.000				
3	Manager	.000	.000			
4	Financial accountants	.108	.002	.043		
5	Management accountants	.328	.052	.008	.000	
6	General management	.030	.005	.000	.168	.028

	Anti-image Matrices	1	2	3	4	5
1	Chairperson					
2	CEO	286				
3	Manager	152	151			
4	Financial accountants	.015	138	007		
5	Management accountants	.056	017	111	239	
6	General management	006	062	180	.009	087

	Anti-image Correlation	1	2	3	4	5
1	Chairperson					
2	CEO	437				
3	Manager	217	225			
4	Financial accountants	.020	187	009		
5	Management accountants	.072	023	141	276	
6	General management	007	084	226	.010	100

QN	VARIABLE	NAME	MEASUREMENT
S1	Primary cost method	COST	1 = direct; $2 = $ trad; $3 = $ ABC; $4 = $ Other
S2Q1	Number of years	YEAR	1 = 0 to 5 years; $2 = 6$ to 10 years; $3 = 11$ to 15 years; $4 = 16$ to 20 years; $5 =$ More than 20 years
S2Q2-1	Meeting information requirements	MEET	1 = Very dissatisfied; 2 = Dissatisfied; 3 = Neutral; 4 = Satisfied; 5 = Very satisfied
S2Q2-2	Providing you with timely information	TINFO	1 = Very dissatisfied; 2 = Dissatisfied; 3 = Neutral; 4 = Satisfied; 5 = Very satisfied
S2Q2-3	Providing you with necessary information	NESS	1 = Very dissatisfied; 2 = Dissatisfied; 3 = Neutral; 4 = Satisfied; 5 = Very satisfied
S2Q2-4	Meething the need of management	MGTNEED	1 = Very dissatisfied; 2 = Dissatisfied; 3 = Neutral; 4 = Satisfied; 5 = Very satisfied
S2Q2-5	Being flexible and responsive to changes	FLEX	1 = Very dissatisfied; 2 = Dissatisfied; 3 = Neutral; 4 = Satisfied; 5 = Very satisfied
S3Q1-1	Engineering	ENG	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-2	Financial accountants	FA	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-3	Management accountants	MA	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-4	Competitors	COMP	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-5	Market	MKT	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-6	Sales	SALES	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-7	Customers	CUST	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-8	Suppliers	SUPP	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q1-9	Wholesalers or brokers	WHOLE	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-1	Chairperson	CHAIR	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-2	CEO	CEO	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-3	Manager	MGR	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-4	Financial accountants	FINACCS	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-5	Management accountants	MGTACCS	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q2-6	General management	GENACC	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S3Q3-1	Time consuming	TIMCONS	0 = No; 1 = Yes
S3Q3-2	Lack of understanding	LACK	0 = No; 1 = Yes
S3Q3-3	Satisfied	SAT	0 = No; 1 = Yes
S3Q3-4	High cost	HIGHC	0 = No; 1 = Yes
S3Q3-5	No need	NONEED	0 = No; 1 = Yes
S3Q3-6	Senior management	SENMGT	0 = No; 1 = Yes
S3Q3-7	Other reasons	OTHRES	0 = No; 1 = Yes
S3Q3-0	Non of the above	NONABV	0 = No; 1 = Yes

S3Q4-1 The company is satisfied with the current method	CURSAT	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-2 The change is perceived as time consuming	PERCV	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-3 There is a lack of IT resources	LACKIT	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-4 The existing information system does not support these methods	POORINFO	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-5 The high cost of implementation and adoption	HIIMPCST	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-6 There is a lack of understanding at an accounting staff level	ACSTFLACK	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-7 There is a lack of experience of management accounting staff	LACKEXP	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-8 The decision could not be taken at our level	NODECIS	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-9 Top management does not support changes to these methods	NOTOPSUP	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-10 Middle management does not understand the methods	NOMIDSUP	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-11 First-line management does not understand the methods	NOFSTSUP	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-12 We utilise a customised methods to calculate costs	CUSTOM	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-13 We have a short product life cycle	SHTLIFE	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-14 We only have a single product line	SINGLFE	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-15 Our company is not large enough	SMALL	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-16 Top management does not understand these methods	MGTNOUND	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-17 ABC/ABM does not provide valuable information	ABCPOOR	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-18 It is too complicated to implement	COMPL	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-19 There is no need to implement these methods	NONEEDMETH	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-20 Shortage of the management accounting staff	STAFSHORT	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-21 We have tried to implement but failed	FAILED	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-22 Smaller firms do not need to implement this system	SMALLNONEED	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S3Q4-23 The implementation team is dissatisfied with the new system	IMPSTFNSAT	1 = Completely disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Completely agree
S4Q1 Number of years used	YEARSUSED	1 = 0 to 5 years; $2 = 6$ to 10 years; $3 = 11$ to 15 years; $4 =$ More than 15 years
S4Q2-1 Cost system were used	COSTSYSUSED	1 = direct; $2 = $ trad; $3 = $ Don't know; $4 = $ Other
S4Q3-1 Direct	DIRECT	1 = Never; $2 =$ Seldom; $3 =$ Sometimes; $4 =$ Most of the time; $5 =$ Always
S4Q3-2 Traditional	TRAD	1 = Never; 2 = Seldom; 3 = Sometimes; 4 = Most of the time; 5 = Always

S4Q3-3	Other	OTHER	1 = Never; 2 = Seldom; 3 = Sometimes; 4 = Most of the time; 5 = Always
S4Q4-1	Your cost system	YOUR	1 = No improvement; 2 = Indicating no improvement; 3 = Neutral; 4 = Indicating improvement; 5 =
			Greatly improved
S4Q4-2	Cost information provided	INFOPROV	1 = No improvement; 2 = Indicating no improvement; 3 = Neutral; 4 = Indicating improvement; 5 =
			Greatly improved
S4Q4-3	Your understanding of overhead costs	OVERUNDER	1 = No improvement; 2 = Indicating no improvement; 3 = Neutral; 4 = Indicating improvement; 5 =
			Greatly improved
S4Q4-4	Your understanding of costs and factors that drive these costs	COSTUNDER	1 = No improvement; 2 = Indicating no improvement; 3 = Neutral; 4 = Indicating improvement; 5 =
			Greatly improved
\$404-5	Your overall profitability	PROFIT	1 = No improvement; 2 = Indicating no improvement; 3 = Neutral; 4 = Indicating improvement; 5 =
5 - 9 - 0	Tour overan prontability	I KOI II	Greatly improved
S4Q5	Implemented in all production/service	IMPRODSERV	0 = No; 1 = Yes
S4Q6	Used in all production/service	USEDPRODSERV	V0 = No; 1 = Yes
S4Q7	Please provide an estimate of the percentage of use?	PERCENTUSE	No cod required
S4Q8-1	What percentage of the implementation	PERCENTIMP	No cod required
S4Q8-2	How long	LONG	No cod required
S4Q8-3	Duration of time	DURAT	No cod required
S4Q9	Integrated with other information systems	INTEG	0 = No; 1 = Yes
S4Q10	Stayed within the planned schedule	ONCOURSE	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
			great extent
04011	Dest describes use of ADM	ADMINE	1 = Presently using ABM; 2 = Presently implementing ABM; 3 = Presently considering ABM
54Q11	Best describes use of ABM	ABMUSE	adoption; 4 = No consideration of ABM to date; 5 = Rejected ABM after assessment
S4Q12	How long using ABM	ABMLONG	1 = 0 to 5 years; $2 = 6$ to 10 years; $3 = 11$ to 15 years; $4 =$ More than 15 years
S4Q13	Estimate of the percentage complete	PERCENTCOMP	No cod
C4014	Des assess stars on askadala	DDOCESSCUED	1 = Not at all; 2 = To a little extent; 3 = To some extent; 4 = To a considerable extent; 5 = To a very
54Q14	Processes stay on schedule	PROCESSCHED	great extent
S4Q15	Management improved	MGTIMPROV	-2 = Much worse; $-1$ = Somewhat worse; $0$ = About the same; $1$ = Somewhat better; $2$ = Much better
S5Q1-1	The current management accounting system as a whole	CURRSYS	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-2	The extent to which this system meets current requirements	MEETREQ	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-3	The quality and accuracy of the information provided	QUALACCINFO	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good
S5Q1-4	The ability of your system to adapt to future requirements	ADAPTFUT	1 = Very poor; 2 = Poor; 3 = Average; 4 = Good; 5 = Very good