Information Technology, Knowledge Management and Competitiveness: An Empirical Study in the South African Hospitality Context

BY

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Abstract

The current contribution of the hospitality industry to South Africa's GDP is estimated at 8.7% and this is targeted to increase to 9.4% by 2015. Yet, hospitality organisations in South Africa are under increasing pressure to remain competitive. One emerging school of thought links knowledge to competitiveness. Knowledge management has been the focus of much recent research, but there are few studies that investigate the potential competitive gains of knowledge in combination with IT, and even fewer within the context of the hospitality industry. The purpose of this paper is to examine the joint and independent effects of knowledge content, knowledge processes, and IT resources on the competitiveness of hospitality organisations. A research model was developed following a review of the literature. To test the model, a structured questionnaire was developed and a survey was conducted in hospitality organisations across South Africa. 112 Hospitality organisations participated from a sample of 656. Knowledge and IT together significantly and positively influence the financial performance of hotels. Results indicated that the acquisition, conversion, protection and application knowledge processes, knowledge content, IT infrastructure quality and IT capabilities significantly and positively affect market, financial, employee and customer performance, while knowledge sharing significantly and positively affects market, financial and employee customer performance. The mediating role of knowledge application on the relationship between knowledge processes and competitiveness was confirmed. The resulting models had adjusted R^2 of .210 for market performance, .226 for financial performance, .118 for employee performance and .117 for customer performance. The findings of this paper benefit the hospitality industry by providing guidance to managers of hotels in their decisions to invest in knowledge management and IT to improve market, financial, employee and customer performance.

An earlier version of this study's research model and design was presented at the 12th annual Global Technology Management Association (GITMA) World Conference held in Las Vegas in June 2011. Citation: Cohen, J.F., Inward, K., Toleman, M. (2011). 'Knowledge Management, Information Technology Resources, and the Competitiveness of Hospitality Organisations' Twelfth Annual *Global Information Technology Management (GITMA) World Conference*, Las Vegas, USA, June 2011.

Declaration

I declare that this is my own, unaided work except as acknowledged in the text. It has not been submitted before for any other degree at this or any other university.

Karen Olsen 28 February 2012

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Dedication

I owe a big thank you to my husband Graham, who cheerfully, steadfastly and lovingly supported me throughout this long and sometimes difficult process.

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1 Introduction

1.1 IT and Knowledge

The competitiveness of firms has been the focus of intense research. One perspective that has gained ground is that of the Resource Based View (RBV), which asserts that companies can achieve and sustain competitive advantage through the judicious acquisition and application of resources (Grant, 1996). To remain competitive, firms need to identify and develop resources and capabilities aligned with the firm's strategic priorities, enabling the firm to deliver products and services better or cheaper than its competitors (Prahalad & Hamel, 1990). IT resources and capabilities can play a central role in the competitiveness of organisations and hospitality is no exception (McFarlan, 1984; Piccoli, 2008; Karadag & Dumanoglu, 2009). Much hospitality IT resources have been described as increasing employee productivity, maximising revenue and supporting customer service goals (Siguaw, Enz & Namasivayam, 2000).

Hospitality firms use IT to track customer's personal data and interaction history, to infer preferences, likes and dislikes. In-room technologies such as Internet access, voicemail and TV based services deliver services to customers directly. Workflow systems automate business processes, Intranets disseminate information throughout the organisation or the chain. Bookings are received from Global Distribution Systems (GDS), Central Reservation Systems (CRS), e-Travel agencies and the systems of Tour Operators, and these systems are often integrated with the front-office property management system. Yield management systems are used to maximise revenues. Customer loyalty programmes are used to enhance customer retention. Cross selling is performed with centralised reservations systems. In addition, hospitality firms are building the IT capabilities needed to acquire, deploy, manage and align IT with the business plan (Ravichandran & Lertwongsatien, 2005).

Knowledge is another important organisational resource and an enabler of firm competencies (Grant, 1996). This is especially true for service organisations where product delivery often entails personal contact with the customer (Bouncken, 2002). Indeed knowledge is needed to conceive of original product offerings that are desirable to customers; knowledge enables companies to be responsive, by being sensitive to industry conditions and events that affect them; knowledge of customers allows companies to create personalised products that better match the needs of their customers, and to build relationships with their customers to foster customer intimacy; knowledge improves the quality of decision making across the board. quality of service delivery depends upon knowledge (Chen, Tsou & Huang, 2009). In a hospitality organisation, knowledge is located in many different places. It is found in the minds of people, embedded in computer systems, printed on brochures or hand-written on client feedback forms. This paper argues that the IT capability of the firm needs to be deployed together with its knowledge resources in order to improve its competitiveness.

1.2 Research Problem

The hospitality industry is a knowledge intensive service industry (Pizam, 2007). As such, hospitality firms are well positioned to benefit from the application of IT in combination with knowledge to achieve and sustain competitive advantage. Despite

this, the hospitality industry was initially slow to embrace information technology (Buhalis & Main, 1998). A more recent survey indicates that the industry still lags behind other sectors in terms of IT penetration (Deloitte, 2010a). Moreover, technology acquisition by hospitality firms is often driven by operational focuses like cost reduction rather than long-term strategic priorities (Siguaw et al., 2000). As a result, hospitality firms have not reaped rewards matching the huge sums invested in IT (Brown & Stange, 2002).

Hospitality organisations depend on their human resources and are vulnerable to the loss of knowledge when key personnel leave the organisation. Notwithstanding this, the hospitality industry is afflicted with high staff turnover. Deloitte (2010a) reported the average turnover rate of hospitality firms to be 31% and staff costs to comprise approximately 45% of operating expenses.

In order to overcome the knowledge loss associated with high staff turnover, while meeting their customer service objectives, hospitality firms need to devise ways to acquire, retain and apply knowledge. Hospitality firms need to know how IT and knowledge resources can be applied together to increase competitiveness. This paper seeks to answer this question.

There is a paucity of research related to the linkages between knowledge management and competitiveness within the hospitality industry context (Cooper, 2006). This study attempts to fill this theoretical gap by proposing a broad integrated model of hospitality organisation competitiveness as a function of IT and knowledge resources.

1.3 Aims and Objectives of the Study

First, this study draws on theories of the Resource Based View (RBV), Knowledge Based View (KBV) and Absorptive Capacity (AC) to develop a model of the influence of knowledge management processes, knowledge content and IT resources on competitiveness in hospitality organisations.

Second, this study aims to collect valid and reliable data to test the hypothesised relationships between IT, knowledge and competitiveness in hospitality firms. Data was collected from informants representing hospitality organisations using the sample survey method and a structured questionnaire. Data was analysed through correlation and regression analysis to determine the effects of knowledge and IT resources on competitiveness.

Third, this study will also add to the growing body of knowledge on knowledge management in the hospitality industry and provide practical steps for hospitality managers interested in how IT and knowledge may be applied to improve the firm's competitiveness.

1.4 Importance of the Study

This study focuses on firms in the hospitality industry. The hospitality industry is a significant and growing contributor to South Africa's GDP — it's current contribution is 8.7% of GDP and this is targeted to increase to 9.4% by 2015 (Ministry of Tourism RSA, 2010).

This study also makes an important *theoretical* contribution by developing and testing a model that integrates knowledge and IT resources.

This study makes an additional *practical* contribution. Results from this study will be important for hospitality firm managers because it will provide them with empirical evidence of the links between competitiveness and knowledge and IT resources. IT managers in hospitality establishments who are charged with the responsibility to acquire and deploy IT resources to deliver greater value to the firm will benefit from this evidence base.

1.5 Report Structure

The remainder of this document is divided into the following chapters:

Literature Review: In this chapter, the literature related to knowledge management, IT and competitiveness is reviewed. The theoretical background is outlined. The research model is presented and the constructs described. The hypotheses are then developed. *Research Methodology:* This chapter describes the methodology that was used to test the hypotheses. The research method is outlined; the construction of the research instrument is described; the operationalisation of research variables is described; the outcome of pre-testing and pilot testing is discussed; the sampling frame and sampling method is reviewed; the characteristics of respondents are outlined; the method of in which the questionnaire was administered is discussed; ethical considerations are listed; tests for reliability, validity and common method bias are outlined; the strategy for testing the hypotheses is expounded; limitations related to the survey are listed. *Research Findings:* This chapter describes research findings. The results of data screening, outlier and missing value analyses are presented; the profile of respondents is summarised according to a variety of criteria; the measures of tested for validity and reliability and common method bias is assessed; descriptive statistics are presented; correlation analysis is performed; control variables are assessed for relevance; hypotheses are tested using correlation analysis; regression analysis is used to test for independent effects. *Discussion of Results:* In this chapter, the outcome of each hypothesis is discussed in the context of the literature as well as the theoretical framework. *Conclusion: T*his chapter starts with a summary of the study, followed by limitations, suggestions for future research and managerial considerations.

The literature related to knowledge management and competitiveness is reviewed in the next section.

2 Literature Review

Two streams of literature namely information technology value and knowledge value inform this research. This chapter opens with a review of the literature related to the effect of knowledge processes and knowledge content on competitiveness. Thereafter follows a review of literature related to the effect of IT on competitiveness. The research contribution of this paper and shortcomings of previous studies are presented next. This is followed by the presentation of the research model and the development of hypotheses within the context of applicable theories.

2.1 Past Research

This section summarises the empirical research into knowledge and firm performance, as well as IT and firm performance.

2.1.1 Knowledge and Knowledge Management

The words "data", "information" and "knowledge" are all used in the knowledge management literature to describe properties of observable facts. "Data" generally refers to an observable disparate fact (Friké, 2009), "information" refers to organised data (Bhatt, 2001) and "knowledge" refers to information that is ready to be applied within the organisation because it has been imbued with meaning and context through a process of interpretation and sense-making (Davenport & Prusak, 1998).

The management of knowledge in the organisation is commonly referred to as "knowledge management", and whereas a universal definition does not exist, the different definitions commonly emphasise the concept of value creation from the manipulation and movement of knowledge resources by knowledge management processes (Carlucci, Marr & Schiuma, 2004; Civi, 2000). The definition of knowledge management put forward by Von Krogh (1998) best frames this study and encapsulates both these concepts, namely:

"the process of manufacturing value-adding activities from the knowledge resources of the firm"

2.1.2 Knowledge Management Processes

The literature has spent considerable effort describing knowledge management processes, with many studies identifying and describing the various mechanisms responsible for the movement and processing of knowledge. Knowledge enters the firm through a process of purposeful acquisition (Jantunen, 2005; Darroch, 2003; Gold, Malhotra & Segars, 2001), obtainment (Liu, Chen & Tsai, 2004) or generation (Hattendorf, 2002; Davenport & Prusak, 1998). Knowledge creation refers to new knowledge being added to the stock of knowledge available to the organisation (Alavi & Leidner, 2001; Bhatt, 2001; Lee, Lee & Kang, 2005). In order to become useful, acquired knowledge goes through a process of codification (Davenport & Prusak, 1998), refinement (Liu et al., 2004) or conversion (Gold et al., 2001) which standardises and categorises knowledge. Knowledge is then preserved in the organisation through the process of storage (Liu et al., 2004; Hattendorf, 2002; Alavi & Leidner, 2001). In time, repetitive storage of knowledge leads to knowledge accumulation (Lee et al., 2005). Ultimately the knowledge needs to be used, as it is only when applied that its worth is realised. Knowledge is made available for use throughout the organisation through the processes variously named as distribution

(Bhatt, 2001), dissemination (Jantunen, 2005; Darroch, 2003), transfer (Alavi & Leidner, 2001, 2001; Hattendorf, 2002) and sharing (Lee et al., 2005; Liu et al., 2004; Davenport & Prusak, 1998). Knowledge is ultimately leveraged through the processes of knowledge application (Alavi & Leidner, 2001, Hattendorf, 2002, Bhatt, 2001) and knowledge utilisation (Jantunen, 2005; Lee et al., 2005). Gold et al. (2001) captured the knowledge life cycle processes as knowledge acquisition, conversion, protection and application. Gold et al.'s set of dimensions is widely popular, leveraged in the work of Lin (2007a) and Lindsey (2002).

2.1.3 Knowledge Content

In contrast with the vast body of knowledge regarding knowledge processes, there are somewhat fewer studies that focus on knowledge content.

In 1967, Polanyi differentiated between tacit and explicit knowledge and this categorisation has remained popular ever since (Choi & Lee, 2003; Alavi & Leidner, 2001). Tacit knowledge is highly contextual, not easily transferred, cannot be aggregated and cannot be appropriated through the assertion of property rights (Grant, 1996). Explicit knowledge on the other hand, is formally documented and is easily transferred. Nonaka (1994) however suggests that static categorisation is not appropriate as knowledge constantly and dynamically shifts between "tacit" and "explicit" states. While the academic differentiation between static and explicit knowledge is noted, in this study the term "knowledge" is intended to refer to both tacit and explicit knowledge, without further distinction.

Some authors have sought to categorise the knowledge content of an organisation. The knowledge classifications put forward by Lundvall & Johnson (1994) are know-why, which refers to the hierarchy of goals in the organisation; know-what, which represents the business objects; know-who, which relates to the people in the organisation and their responsibilities and know-how, which refers to the detailed knowledge required to perform a process activity.

Other authors compared the relative value of the various knowledge domains within the organisation. Treacy & Wiersema (1993) proposed that organisations focus their activities on three core values namely customer intimacy, product leadership and operational excellence, where customer intimacy aims to achieve long term relationships with customers by striving to understand and satisfy their unique requirements, product leadership aims to offer the most innovative products in terms of the features desired by customers and operational excellence aims to provide products and services to customers at the lowest cost and highest convenience. In line with this, Tanriverdi (2005) identified product, customer and managerial knowledge resources as having the most strategic value to the organisation. Karaszewski (2008) identified knowledge of customer requirements, knowledge of new technological and product solutions, knowledge of management methods, knowledge of employees qualifications and knowledge of regional political and economic influences as the key knowledge content areas needed to compete internationally.

In the hospitality context, Bouncken (2002) classified strategic knowledge content into task-specific knowledge which refers to the detailed knowledge and know-how required to perform a task; task-related knowledge which refers to the framework of

quality standards and shared values governing all activities within the organisation; transactive memory which refers to knowledge of the organisational structure and the responsibilities of various parties and guest-related knowledge. Yang & Wan (2004) identified knowledge of competitors, job associates, customers, products and services and operating procedures as strategic knowledge content for a hospitality firm.

2.1.4 Knowledge and Organisational Competitiveness

There is a rich body of research on knowledge management and the connection between knowledge management and competitiveness.

Numerous factors were studied in a knowledge management context for their impact upon aspects of firm performance. Most studies focused on knowledge management processes as opposed to knowledge content. Process oriented studies explore the mechanisms that move knowledge through the enterprise throughout its life cycle. Such studies are those of Zheng, Yang & McLean (2010), Liu & Tsai (2007), Darroch, (2005) and Gold et al. (2001). In contrast with these process-oriented studies, Wu & Shanley (2009) found empirical evidence of the moderating effect of knowledge stocks (which relate to knowledge content in this study) on the relationship between knowledge acquisition from external sources and innovative performance. Tanriverdi (2005) explored aspects of both knowledge process and content in his study by expressing knowledge management capability as a function of product, customer and managerial knowledge processes. In their study, Tippins & Sohi (2003) also included aspects of both knowledge process (information acquisition & dissemination) and knowledge content (organisational memory).

Some authors emphasised the effect of specific types of knowledge on firm performance. Choi, Poon & Davis (2008) and Choi & Lee (2003) studied the effect of tacit versus explicit knowledge management focus on firm performance. Choi et al. (2008) investigated the effect of an internal versus external knowledge management focus on firm performance. Sher & Lee (2004) found that both endogenous and exogenous knowledge positively enhances dynamic capabilities when knowledge management is moderated by IT applications. Salojärvi, Furu & Sveiby (2005) examined sustainable growth from the perspective of knowledge management maturity. Moving beyond knowledge itself, some authors turned to structural factors to explain the impact of knowledge management on firm performance. Notably some of these factors are responsiveness to knowledge (Darroch, 2003), organisational culture (Zheng et al., 2010; Nguyen, Neck & Nguyen, 2009; Gold et al., 2001), entrepreneurial orientation (Li, Huang & Tsai, 2009), organisational structure (Zheng et al., 2010), organisational strategy (Zheng et al., 2010) and human resources (Nguyen et al., 2009; Chuang, 2004).

Relatively few authors focused on empirical studies of the relationship between knowledge management and competitiveness in a hospitality context. Yang (2009) explored determinants of knowledge sharing in Taiwanese hotels and Yang (2007) investigated the effect of knowledge sharing and learning on organisational effectiveness.

From the review of the literature as presented, knowledge acquisition, conversion, protection, sharing and application are valid knowledge management process dimensions. A firm's knowledge of internal entities (e.g. employees, products and

services, processes, operational procedures) and stakeholders in the firm's task environment (i.e. customers, suppliers and intermediaries), constitute the knowledge content of the firm. The interaction between knowledge processes and knowledge content allow the exploitation of knowledge resources and constitutes the knowledge capability of the firm.

Appendix D summarises previous research on the connection between knowledge management and competitiveness.

2.1.5 IT and Firm Performance

Over the years, many authors have studied the performance of IT resources within organisations with somewhat inconsistent results. Brynjolfsson (1993) investigated the disparity between IT investments and productivity gains reported by various researchers, a state of affairs he referred to as the "productivity paradox". Brynjolfsson concluded that the disparity is more likely to be caused by measurement errors related to firm-level inputs and outputs, rather than the mismanagement of IT. Subsequent to the initial publication of Brynjolfsson's article, numerous researchers have sought to further clarify the relationship between investment in IT resources and firm performance.

Some studies found a positive direct link between IT investment and firm performance (Brynjolfsson & Hitt, 1996; Mahmood & Mann, 2005; Mitra, 2005; Bharadwaj, Bharadwaj & Konsynski, 1999), and also between IT usage and firm performance (Devaraj & Kohli, 2003; Salwani, Marthandan, Norzaidi & Chong, 2009). Li & Ye (1999) showed that greater IT investment leads to greater firm profitability in cases where firms operate in a more dynamic environment with an externally oriented strategy.

Some researchers asserted that IT investment has an indirect connection with firm performance. For instance, Bhatt & Grover (2005) postulated that IT investment is, in itself, insufficient to bring about an improvement in firm performance, instead wielding its influence on firm performance through the intervention of mediators and moderators in the causal chain, e.g. IT usage (Salwani et al., 2009), integration of IT into the process through business process reengineering (Albadvi, Keramati & Razmi, 2007) and organisational learning (Tippins & Sohi, 2003). Zhang (2005) found that IT support for product flexibility, when moderated by unique, complementary knowledge and information, affects firm performance. Dibrell, Davis & Craig (2008) concluded that investment in IT fuels a firm's innovation capability, which is widely used as a measure of firm performance (Zheng et al., 2010; Liao, Wu, Hu & Tsuei, 2009; Choi et al., 2008). Chen et al. (2009) found that a firm's innovation orientation and its' IT capability are the primary drivers of service delivery innovation, which in turn affects both financial and non-financial firm performance. Ravichandran et al. (2005) found that IS resources yield their impact on firm performance through their support for the firm's core competencies and furthermore that it is when IS resources are applied that core competencies are developed or strengthened.

Some authors considered whether IT performance is influenced by the co-presence of other organisational resources. Zhang (2007) showed that when IT is complemented by unique knowledge and information, firm performance increases in terms of Return

on Sales (ROS) and Return on Assets (ROA). Zhang (2007) also showed that when IT is complemented by unique vertical integration and related diversification, there is an increase in ROS. Powell & Dent-Micallef (1997) viewed technology resources, human resources and business resources as complimentary resources and showed that they are all three positively associated with firm performance and furthermore that when technology resources are complemented by human resources, there are gains in terms of firm performance.

The implication of the reviewed literature for this research paper is that, while there is a connection between IT technology investments and firm performance, there is considerable empirical support for this relationship being wielded in an indirect manner and in the co-presence of complimentary resources.

Various authors investigated the performance of IT resources in the hospitality industry. Salwani et al. (2009) found that front-end application functionalities are relatively insignificant in their contribution to business performance. In contrast, Ham, Kim & Jeong (2005) demonstrated that front-office, back-office and banqueting applications affect firm performance positively, but that guest related IT applications have no effect on business performance. In a later study however, Karadag et al. (2009) found that guest related IT applications are perceived to be productive by hotel managers although no empirical evidence was collected to support this. Sigala (2003) showed that the integration of application systems is essential to achieve productivity gains. This finding was corroborated by Salwani et al. (2009), who found that e-commerce contributes to firm performance, especially when back-end IT applications are integrated with key suppliers and distributors. Scaglione, Schegg & Murphy (2009) showed that having a web presence positively influences hotel revenues.

A number of researchers explored the role of IT resources as enablers of knowledge management. Evidence of the important role of IT in providing a technical foundation for knowledge management was presented by Lin (2007a), who found that knowledge management maturity is significantly influenced by IT diffusion. IT supports knowledge management by automating systematic processes and by creating linkages between information fragments (Mohrman, Finegold & Mohrman, 2003). Nonetheless, IT should be applied to knowledge management initiatives in a productive manner and not simply for the sake of technology. In this regard, Gloet & Terziovski (2004) found that IT best supports knowledge management when it focuses on quality and productivity, rather than technological advancement.

Some researchers sought to clarify the role of IT in fuelling the firm's knowledge process capability. Gold et al. (2001) found that, together with the organisational structure and culture, technology provides the infrastructural platform for the firm's knowledge process capability. Liu et al. (2004) found that, by enabling the acquisition, refinement and storage of data, IT enables a firm's knowledge management capability. Further to the studies by Gold (2001) and Liu et al. (2004), Wang, Klein & Jiang (2007) found that, through its support for the acquisition, conversion, protection and application of knowledge, IT enables the firm's knowledge based dynamic capability, and this in turn improves firm performance. Lee & Choi (2003) found that IT supports knowledge creation by allowing for the integration and synthesis of knowledge.

Other studies explored the relationship between IT resources and competitiveness in a knowledge management context. Chuang (2004) found that technical knowledge management resources are not associated with competitiveness. Tippins & Sohi (2003) found that the organisational learning mediates the relationship between IT competency and firm performance.

Appendix E contains a table summarising previous research relating to the relationship between Information Technology and competitiveness.

No previous studies were found that explored the joint and independent effects of knowledge content, knowledge process and IT resources on competitiveness in a hospitality context.

2.2 Contributions and Shortcomings of Prior Research

The previous review of the literature on the relationship between knowledge management and competitiveness on the one hand and Information Technology and competitiveness on the other illustrates the major issues that researchers have explored. There are very few studies that consider the joint impacts of knowledge management processes, content and IT resources on competitiveness, and none specific to the service sector and none in the hospitality industry. The hospitality industry is knowledge intensive and has traditionally achieved poor returns from their IT investments. Through the development and testing of a research model, this study intends to fill this gap and furnish useful guidelines to hospitality practitioners. The next section describes the theoretical underpinnings of the research model and the development of the model's hypotheses.

2.3 Theoretical Background

The research model presented in this paper is underpinned by three theoretical perspectives: the resource-based view, the knowledge-based view and absorptive capacity. Each of these is discussed in turn below.

2.3.1 Resource-Based View of the Firm

Information systems research that examines the relationship between IT capabilities and firm performance is grounded in the resource-based view (RBV) theory of the firm. According to this theory, a firm may attain long term competitive advantage through the judicious picking of resources that are valuable, rare, inimitable and non-substitutable and that are used by the firm to create products and services that are superior to those of its competitors (Barney, 1991). The RBV assumes that strategic resources are imperfectly mobile and heterogeneously distributed amongst firms. Since the resources are heterogeneously distributed, not all firms have access to the same resources. Since these resources are also imperfectly mobile, they cannot easily move to other firms.

In contrast to the RBV, Makadok (2001) discussed a process perspective and proposed that competitive advantage stems from the judicious application of resources and the creation of dynamic capabilities. Makadok (2001) however proposed that the resource picking and dynamic capability creating mechanisms of rent creation are in

fact complementary, which implies that superior resource picking skills lead to superior deployment of resources and vice versa.

The resource-based view of the firm has been used to inform the competitive advantage that may be gained from IT resources, as they comply with the characteristics of strategic resources as stated above.

According to the RBV, strategic resources provide a firm with a sustained competitive advantage due to the extended time needed for competitors to catch-up, referred to as the response lag (Piccoli, 2008). the response lag stems from the time needed to acquire and implement a comparable bundle of IT capabilities, as well as the time needed to entrench it into the organisation and its network of business associates (Piccoli, 2008). Piccoli (2008) identified four drivers of the response lag, namely (i) the extent and complexity of a firm's IT competency, including all IT technical and human resources, IT capabilities, information repositories (ii) resources complementary to the IT capabilities (i.e. resources that are more productive when applied with IT), since these would also need to be imitated in order to gain the competitive edge. With complementary resources, competitive advantage lies in the clustering of resources (Foss, 1998). (iii) the extended time needed to complete a complex IT project and (iv) pre-emption mechanisms such as switching costs, co-specialised tangible and intangible investments. A further consideration is that there are lag effects between IT investment and firm performance making it even harder for competitors to catch-up since there is a considerable delay before returns start to materialise (Weill, 1992).

Hence the firm's unique bundle of strategic resources constitute a barrier to entry for other firms, as strategic resources are built up over time and represent a considerable investment, and are not easily imitated by other firms (Barney, 1991).

2.3.2 Knowledge-Based View of the Firm

The RBV alleges that to derive long term competitive advantage, a firm needs to use its resources to create competencies that can be used to give rise to unique products and services that are desirable to customers as they satisfy their needs (Prahalad et al., 1990).

In an organisation, knowledge resides in a myriad of locations and in widely different formats, such as in the minds of individuals, formal documents like procedure manuals, hand written notes, brochures, patents, informal communications like email messages, business rules contained in computer systems, paper files and electronic databases.

A number of issues arise when knowledge is not managed as an organisational resource. With subject matter experts sparsely distributed in the firm, their knowledge may not available to their colleagues at the time when it is needed. Without an integrating mechanism, there could be islands of specialist expert knowledge rather than an integrated body of knowledge. Innovation could be impeded since it relies on a broad and deep base of integrated knowledge. The written knowledge that resides in formal, informal documents and in electronic and paper formats is often not labelled nor integrated and could be very difficult to pinpoint and access relevant knowledge

when needed. The organisation could be vulnerable to the loss of core knowledge when experts leave the firm. Autocratic decisions may not be informed by the most relevant knowledge. There could be little collaboration across hierarchical organisation structures and knowledge may not flow freely across these artificial boundaries.

The knowledge based view (KBV) of the firm builds upon the theoretical foundation of the RBV by viewing knowledge as the primary factor of production from which a firm can derive competitive advantage (Grant, 1996). As knowledge is a strategic asset, is can be used to create a capability that provides the firm with long term competitive advantage. Davenport, De Long & Beers (1998) listed the key knowledge management process focuses as (i) the creation and accumulation of knowledge stores (ii) the extraction and access of knowledge (iii) the processes responsible for the flow of knowledge. Further to this, Alavi & Leidner (2001) conceptualised a knowledge based capability that viewed knowledge as dynamic knowledge content that is acquired externally, created internally, stored and retrieved, shared internally, transferred externally and eventually applied by knowledge management processes enabled through IT resources. The strategic knowledge content of the organisation is firm-specific because information that is general in nature and commonly available is easily transferred and does not conform to the characteristics of a strategic asset while firm-specific knowledge is more likely to confer competitive advantage (Spender, 1996). Firm-specific knowledge is rare, because it is contextualised; it is valuable because it provides the firm with the capacity to act and react; it is inimitable because it is contextual and it is non-substitutable because it is not freely available.

2.3.3 Absorptive Capacity

Absorptive capacity refers to the ability of a firm to identify valuable knowledge, integrate it into its knowledge stock and apply it to the firm's advantage (Cohen & Levinthal, 1990).

At individual level, this ability is a function of the amount of prior related knowledge a person has, while at the organisational level, absorptive capacity does not refer to the aggregate of absorptive capacities of all individuals in the firm, but rather to the absorptive capacity of the individuals positioned along the path travelled by knowledge (Cohen & Levinthal, 1990). Organisational level absorptive capacity may be imported into the firm by sending staff onto training courses and through research and development (Cohen & Levinthal, 1990; Liao & Wu, 2009). It may also be manufactured as a side product of knowledge application as explained below.

Knowledge acquisition is enhanced through absorptive capacity because absorptive capacity increases the awareness of a firm to new related knowledge from external sources which may otherwise not be detected; a firm that possesses heightened sensitivity to a topic is able to recognise and appreciate the potential opportunity or threat presented by new knowledge (Cohen & Levinthal, 1990; Corrales, 2010). Such a firm will more readily acquire new knowledge, assimilate it and apply it, in the process exploiting business opportunities or protecting itself against threats proactively (Corrales, 2010). In this manner absorptive capacity enhances the competitiveness of firms by positioning the firm to gain first mover advantages.

The knowledge conversion process assimilates new knowledge with existing knowledge and create linkages between the knowledge segments. The linkages enable recall. The more diverse the knowledge that is related and linked, the greater the capacity for innovation (Wang, Wang & Horng, 2009).

Knowledge application builds absorptive capacity as it is through repetitive use that knowledge is internalised, additional detail is obtained and assimilated and a deep level of understanding developed (Cohen & Levinthal, 1990).

Knowledge sharing is more effective the greater the base of prior common knowledge that exists between individuals (Cohen & Levinthal, 1990). Knowledge sharing only takes place where the same language is spoken by all parties (Cohen & Levinthal, 1990). The greater the absorptive capacity, the more effective the knowledge sharing process (Kharabsheh, 2007).

Organisations that have not developed absorptive capacity are vulnerable because they are not sensitive to opportunities and threats (Cohen & Levinthal, 1990). Such organisations cannot react quickly because they assimilate new knowledge slowly (Welsch H, Liao J & Stoica, n.d.); they do not innovate new applications for existing knowledge (Liao & Wu, 2009); they do not realise the value of absorptive capacity (Cohen & Levinthal, 1990); they resist new knowledge entering the firm (Cohen & Levinthal, 1990); they do not enter into cooperative ventures with innovative firms (George, Zahra, Wheatley & Khan, 2001).

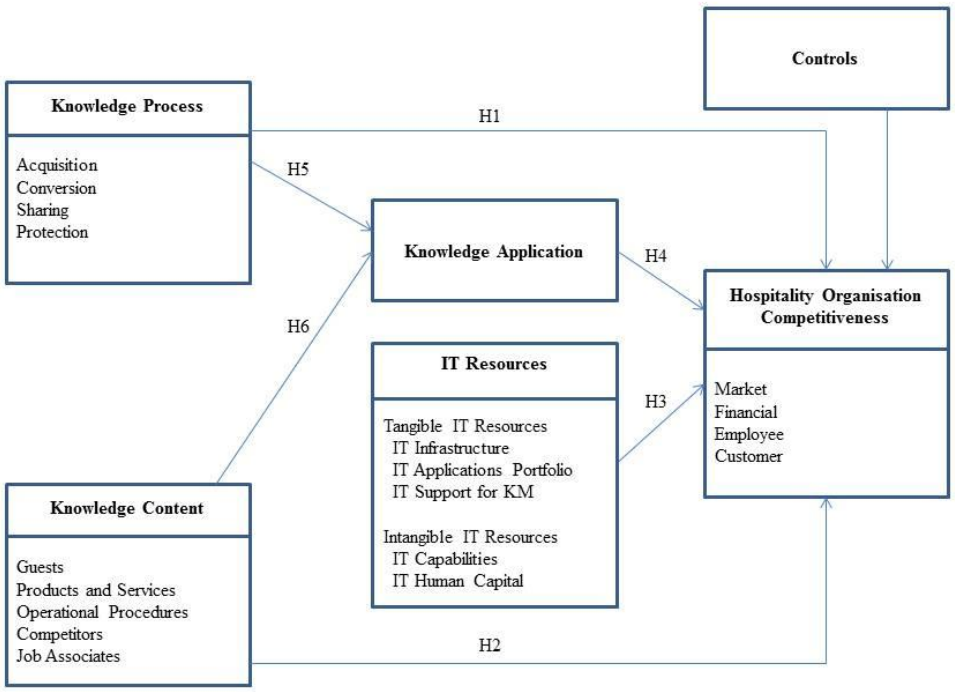
Drawing on the above theories, a research model is developed in the next section. The research model will be described followed by the definition of its constructs and a discussion of hypothesized relationships.

2.4 Research Model and Hypotheses

2.4.1 Research Model

Based on the above theoretical background, a research model can be developed (Figure 1). Hospitality organisation competitiveness is presented as the dependent variable. Drawing on the KBV, knowledge processes and knowledge content are shown as independent variables which drive competitiveness (H1 and H2). Drawing on the RBV, IT resources are shown as independent variables influencing competitiveness (H3). In addition to the direct effects of knowledge process and knowledge content on hospitality organisation competitiveness, the model draws on absorptive capacity theory to hypothesise knowledge application as mediating the effect of the independent variables knowledge acquisition, conversion, protection, sharing and content on hospitality organisation competitiveness (H4, H5 and H6).

Figure 1: Research Model



The dependent and independent variables as they relate to the research model (figure 1) are discussed next.

2.4.2 Dependent Variable: Hospitality Organisation Competitiveness

Various authors have conceptualised the competitive position of an organisation. As shown by table 1 below, the studies reviewed conceptualised competitiveness according to a number of different dimensions.

Table 1: Dimensions of Competitiveness in Previous Studies

Competitiveness Dimension	**Measure**	**Authors**
Productivity		
	Productivity	Ravichandran et al. (2005), Mahmood & Mann (2005)
Financial Performance		
	Return on investment	Li et al. (2009), Liao & Wu (2009)
	Cash flow from operations	Liao & Wu (2009)
	Return on equity	Li et al. (2009) Zack, McKeen & Singh (2009)
	Return on assets	Li et al. (2009), Zhang (2007), Zack et al. (2009)
	Cost control	Liao & Wu (2009), Chen et al. (2004) Zack et al. (2009)
	Profitability	Zheng et al. (2010), Liao & Wu (2009), Zack et al. (2009), Choi et al. (2008), Lee & Sukoco (2007), Ravichandran et al. (2005), Tippins & Sohi (2003), Lee & Choi (2003), Bharadwaj (2000)
	Return on sales	Li et al. (2009); Zhang (2007)
	Net profit margin	Li et al. (2009)
	Gross profit margin	Li et al. (2009)

	Return on capital	Wang, Hult, Ketchen & Ahmed (2009)
	Earning per share	Wang et al. (2009)
	Revenue	Deveraj & Kohli (2003)
	Revenue Per Available Room	Scaglione et al. (2009)
Market Performance		
	Market share	Lee & Choi (2003)
	Entry into new markets	Ravichandran et al. (2005)
Customer Performance		
	Customer satisfaction	Zack et al. (2009), Lee & Sukoco (2007)
	Customer retention	Zack et al. (2009), Tippins & Sohi (2003)
	Acquisition of new customers	Chen et al. (2009)
	Customer loyalty	Chen et al. (2009)
Competitive Advantage		
	Competitive advantage	Chen et al. (2009), Nguyen et al. (2009)
	Competitiveness	Liu et al. (2004)
Innovation Capability		
	Innovativeness	Zheng et al. (2010), Liao & Wu (2009), Choi et al., (2008), Lin (2007b), Lee & Sukoco. (2007), Lee & Choi (2003) Choi et al. (2008), Zack et al. (2009), Gold et al. (2001)
	Rate of new product development	Zack et al. (2009)
Products and Services		
	Quality	Zack et al. (2009)
Brand		
	Image	Chen et al. (2009)
	Reputation	Chen et al. (2009)
Growth		
	Growth	Zheng et al. (2010); Choi et al. (2008); Lee & Choi (2003) Choi et al. (2008)
	Sales growth	Wang et al. (2009), Liao & Wu (2009), Li et al. (2009), Lee & Sukoco (2007), Tippins & Sohi (2003)
	Employee growth	Li et al. (2009)
	Market share growth	Liao & Wu (2009), Li et al. (2009) Choi et al. (2008), Lee & Sukoco (2007)
Employee performance		
	Employee commitment	Mohrman et al. (2003)
Partnership Performance		
	Strength of alliance with key partners	Liao & Wu (2009)
	Stability of alliances	Liao & Wu (2009)
	Ability to sustain relationshios with key people	Liao & Wu (2009)

While some studies used actual figures to measure firm performance (Ravichandran et al., 2005), other studies used measures of relative performance based on the perception of the interviewee (Liao & Wu, 2009; Li et al., 2009; Choi et al., 2008; Tippins & Sohi, 2003; Powell & Dent-Micallef, 1997).

This paper uses the conceptualisation of competitiveness put forward by Ottenbacher (2007), whereby the competitiveness of an organisation is demonstrated in terms of its market performance, financial performance and the enhancement of employee and customer relationships. Market performance relates to the firm's ability to grow

existing markets and capture new markets. Financial performance relates to the firm's ability to use assets profitably. Employee performance relates to the firm's ability to attract and retain adequately skilled employees. Customer performance relates to the firm's ability to attract and retain customers.

2.4.3 Independent Variables

The research model proposes knowledge processes, knowledge content and IT resources as independent variables. In the model, knowledge application mediates the relationship between knowledge processes and knowledge content on the one hand and organisational performance on the other. Each of the independent variables is discussed in greater detail below.

2.4.3.1 Independent Variable: Knowledge Management Processes

The four knowledge management processes by Gold et al (2001) namely knowledge acquisition, conversion, protection and application are described together with the description of knowledge sharing by Lin (2007b).

Knowledge Acquisition refers to those management processes concerned with obtaining new organisational knowledge (Gold et al., 2001). New knowledge may be acquired as a matter of course or purposefully, to narrow strategic knowledge gaps identified through a formal process (Bouncken, 2002).

There are a number of ways in which new organisational knowledge is acquired. New knowledge may be imported into the firm from external knowledge sources such as the firm's network of trading partners (Gold et al., 2001) or from human, textual or electronic sources such as patent documents (Timonen & Järvenpää, 2005). Knowledge may also be acquired from internal sources through internal environmental scanning (Danskin, Englis, Solomon, Goldsmith & Davey, 2005) or by encouraging the exchange of knowledge between employees (Bhatt, 2001).

Popular knowledge creation mechanisms include benchmarking (Gold et al., 2001), collaboration (Gold et al., 2001, Lee & Choi, 2003), research and development (Danskin et al., 2005; Bhatt, 2001) and experimentation (Bhatt, 2001).

Knowledge acquisition supports new product development (Liu et al, 2004) and innovation capability (Liao & Wu, 2009; Darroch, 2005; Darroch, 2003)

Knowledge Conversion: Knowledge conversion processes are those processes that make knowledge useful (Gold et al., 2001). Knowledge occurs at different locations in the organisation, inside incongruent artefacts, in divergent presentation formats and at different levels of summarisation (Bhatt, 2001). For example, there is knowledge in people's minds, and also in forms, procedures, policies, computer systems, and in free-format documents (Yang & Wan, 2004). Knowledge is often duplicated across the organisation, in irreconcilable formats.

Knowledge conversion makes knowledge useful by standardising its' representation across the firm, by structuring unstructured knowledge, by combining and integrating knowledge originating from different sources, by applying meaningful sequencing, by

organising and cataloguing knowledge so that it may be readily located, and by removing obsolete knowledge.

The conversion process has the effect of augmenting knowledge to prepare it for application (Nonaka, Toyama & Nagata, 2000). The knowledge conversion process also creates new knowledge by integrating knowledge from different internal and external sources into the existing organisational knowledge stock. New knowledge is filtered to ensure that only relevant knowledge is integrated into the organisational knowledge base (Gupta & McDaniel, 2002).

Knowledge conversion processes are an integral part of knowledge management capability because they synthesise disparate knowledge thereby making it usable and accessible (Gold et al., 2001).

Knowledge Protection processes are concerned with safeguarding knowledge against malicious or inadvertent damage or theft (Gold et al., 2001). Knowledge assets provide the organisation with significant competitive advantage hence need to be protected. Safeguarding of knowledge is especially relevant since there is a global trend towards integration of processes and IT systems with value chain partners, which could leave knowledge assets exposed and vulnerable.

Human resource-oriented protection mechanisms (e.g. employee codes of conduct) aim to convince employees to protect sensitive knowledge through their behaviour (Gold et al., 2001). Processes-oriented protection mechanisms restrict the access to knowledge on as as-needs basis (Norman, 2001). IT systems protect knowledge by restricting or tracking access to certain classes of information (Gold et al., 2001). In some contexts, legal structures that protect knowledge such as patents and copyrights may even be employed (Norman, 2001; Hurmelinna, Kyläheiko & Jauhiainen, 2007).

In addition to explicit protection mechanisms, knowledge is also protected by its inherent characteristics. This especially applies to knowledge that is not documented, complex and specialised. Such knowledge is more ambiguous and is inherently better protected (Lee, Chang, Liu & Yang, 2007).

Organisations that have a positive attitude towards the safeguarding of knowledge also support the development and dissemination of knowledge as well as other knowledge related initiatives such as continuous learning, an innovative culture and a management approach based on competencies (Marqués & Simón, 2006).

Knowledge Sharing processes are responsible for the diffusion of relevant knowledge in the organisation. At the individual level, sharing entails talking to staff members to gather information, while at the organisational level, sharing entails recording, cataloguing, arranging, reusing and transferring knowledge based on experiences (Lin, 2007b). Sharing goes beyond making information available and involves the collection, preparation, dissemination of knowledge by a sender and the internalisation of knowledge by a recipient (Hendriks, 1999). Hierarchical organisational structures can inhibit the free flow of knowledge and impede the sharing of knowledge across the organisation, in both horizontal and vertical directions. To be effective, knowledge management needs to be practiced across the

full length of the value chain including all internal and external partners (Danskin et al., 2005).

Knowledge Application processes refer to those processes aimed at utilising knowledge (Gold et al., 2001). This implies applying the knowledge that was previously acquired and converted to the benefit of the organisation.

Knowledge is applied by repackaging existing information in a different context (Bhatt, 2001) or by finding new applications for existing knowledge (Gold et al., 2001) through innovation. Applied knowledge guides actions and decisions.

It is critical that accumulated knowledge be used, firstly to encourage a culture of "learning by doing" (Gupta & McDaniel, 2002) and secondly to enhance the value of knowledge by enriching it with contextual information regarding its application (Gupta & McDaniel, 2002).

2.4.3.2 Independent Variable: Knowledge Content

Knowledge Content refers to all repositories of knowledge within the organisation. This refers to formalised knowledge located inside documents and computer systems as well as the knowledge residing in individuals.

Knowledge content that is firm specific is less susceptible to imitation and substitution than general purpose knowledge, and is hence more valuable as a source of sustained competitive advantage (Andreu, Baiget & Canals, 2008). In the hospitality context, firm-specific strategic knowledge includes knowledge of competitors and job associates (Yang & Wan, 2004); knowledge of the firm's customers, products, services and operating procedures (Haggie & Kingston, 2003; Tanriverdi & Venkatraman, 2005; Yang & Wan, 2004; Holsapple & Wu, 2008).

Knowledge related to *customers* refers to the needs, preferences and purchasing habits of guests (Bouncken, 2002). Service delivery of most hospitality products involve guest interaction, hence knowledge of guests can be used to improve service quality. Knowledge of customers enables hospitality firms to personalise product offerings to cater for the unique requirements of their guests. Knowledge of guests also forms essential input into the product development process, to ensure that new products meet the expectations of their target markets (Deloitte, 2010b). The identification of repeat customers further allows the firm to extend special promotions to them.

Knowledge regarding *products and services* relates to research, development and operational knowledge used by the firm in the product development and sales processes (Markides & Williamson, 1994). Knowledge related to environmental trends could inform the product development process, for example hospitality firms could decide to equip premium rooms with exercise equipment in line with the modern movement towards healthy living (Deloitte, 2010b). Knowledge of the firm's own products informs refurbishment planning. Data related to the demand patterns of specific customer segments could inform the product development process, for example new menu options could be included to appeal to Asian guests (Deloitte,

2010b). Knowledge of the channels used by customer segments could influence marketing and pricing decisions.

Managerial knowledge relates to the operations of the firm (Tanriverdi, 2005). Knowledge of occupancy rates, lead times and cancellations may inform capacity planning and yield management decisions. Knowledge of service consumption could also inform planning and procurement processes. Knowledge of supplier exposure could inform supplier negotiations. Guest feedback may highlight opportunities for service improvement and training. Knowledge of the timing of cash flows is essential for financial management. Knowledge of regional events could influence demand predictions. Knowledge of products and services offered by local companies could inform the product development process as these may be packaged together with the hospitality firm's own products to create attractive customer experience product offerings. Knowledge of the condition and availability of rooms informs housekeeping management. Knowledge of staff skills and qualifications could inform staff acquisition decisions. Knowledge of service delays could inform process improvement decisions.

Knowledge regarding *competitors* relates to the products and service offerings of rival firms. Information related to the products and services offered by competitors may inform the firm's own product development decisions. Regional occupancy rates could serve as benchmarks for the hospitality firm.

Knowledge regarding *job associates* relates to the rules, processes and policies of value chain partners of the firm, such as travel agents, tour operators and suppliers who collaborate with the firm in a mutually beneficial manner to serve the customer (Crotts, Buhalis & March, 2000). This knowledge could be used to identify important partnerships that require nurturing and could point to opportunities for building new relationships. Information related to the products and services of competitors could inform product development as well as day-to-day pricing decisions. Knowledge of the requirements of tour operators could enrich sales proposals. Information related to local suppliers of goods and services may inform procurement decisions.

The competitive gains that could accrue when knowledge resources (processes and content) are deployed together with IT resources are the focus of this study. Dimensions of IT resources are described next.

2.4.3.3 Independent Variable: IT Resources

In this paper, "*IT Resources*" refer to both tangible and intangible IT resources. Tangible IT resources comprise of IT infrastructure, IT applications and IT support for knowledge management. Intangible IT resources refer to IT human resources and IT capabilities. The next sections describe the conceptualisation of tangible and intangible resources.

IT Infrastructure Quality

IT Infrastructure comprises the technological hardware, system software and network resources that provide a platform for IT applications to run on (Salwani et al., 2009; Hu & Xiang, 2008; Bhatt & Grover, 2005; Ravichandran et al., 2005).

The quality of the IT infrastructure determines its flexibility and this in turn defines the IT capability that will be derived from it (Bharadwaj, 2000; Chen et al., 2009; Ravichandran et al., 2005). Flexible IT infrastructure possesses characteristics that are necessary for agility namely modularity (Bhatt & Grover, 2005), scalability (Bhatt & Grover, 2005), degree of standardisation (Bhatt & Grover, 2005) and integration (Sigala, 2003). *Modularity* reduces the firm's vulnerability to technical obsolescence by allowing new modules to be slotted in and out with minimal impact on the remaining applications (Ravichandran, 2005). *Scalability* ensures that IT capacity is able to process increased volumes in line with business growth, thereby avoiding disruptions to operations due to the replacement of infrastructure (Ravichandran, 2005). *Standardisation* of hardware and system software platforms reduces learning curves and recurring maintenance costs. IT support personnel can also be better leveraged in a standardised environment (Ravichandran, 2005). *Integration* eliminates the need to perform error-prone and labour-intensive recapturing of transactions into separate applications.

IT Applications Portfolio

The IT applications portfolio refers the structured collection of existing, planned and potential IT applications of the firm, selected by the management of the enterprise to achieve defined business objectives. The applications portfolio of a hospitality organisation consists of front-office systems, back-office systems, restaurant and banquet management systems and guest-related applications (Ham et al., 2005). Front-office systems address customer relationship management (CRM), reservation, check-in/check-out, yield management, guest accounting, invoicing, property management and housekeeping functions (Ham et al., 2005). Back-office systems address human resource management, finance (accounts receivable, accounts payable and general ledger), procurement and other support functions (Ham et al., 2005). Restaurant and banquet management systems address point-of-sale, menu management, sales analysis, beverage control, inventory and conferencing and banqueting functions (Ham et al., 2005). Guest related applications are typically in-room applications and include energy management systems, electronic locking systems, call accounting systems, guest operated devices, TV based services, Internet access, voice mail and wake-up call systems (Ham et al., 2005).

IT Support for Knowledge Management

IT resources can be applied to facilitate the acquisition, conversion, protection, sharing and application of knowledge. In their study, Wang et al. (2007) conceptualised IT Support for Knowledge Management as the collection of information technologies that support each of these knowledge management processes. Jackson (1994) summarised the functions that are performed when gathering, storing, communicating, disseminating and synthesising knowledge, as follows:

Gathering	:	Pulling, searching, data entry
Synthesis	:	Analysis, creation, contextualisation
Storage	:	Linking, indexing, filtering
Dissemination	:	Pushing, publishing, notification
Communication	:	Sharing, collaboration, group decisions

In their studies, Jackson (1994), Wang et al. (2007) and De Carvalho & Ferreira (2001) each outlined technology that supports each of the knowledge management processes, as summarised in Table 2 below.

In this study, IT Support for Knowledge Management refers to the technologies that support the acquisition, conversion, protection, sharing and application of knowledge.

Table 2: IT Systems Supporting the Knowledge Management Processes

Knowledge Process	Corresponding IT Systems	Reference
Acquisition	Document management systems, Optical character recognition (OCR)	Jackson (1994)
	Data warehouses, Database index system Internet search engines	Wang et al. (2007)
Conversion	Intranet, document management	De Carvalho & Ferreira (2001)
	Artificial intelligence, electronic address books	Wang et al. (2007)
	Innovation support tools	De Carvalho & Ferreira (2001)
Protection	Access control, encryption, security certificates, firewalls, antivirus, spam protection	Shipsey (2010)
Sharing	Email, e-collaboration tools	Jackson (1994)
	Groupware	De Carvalho & Ferreira (2001)
	Discussion forums	Meroño-Cerdan et al. (2008)
	Shared databases, repositoris	Meroño-Cerdan et al. (2008)
	E-meetings	Wang et al. (2007)
	Group decision support	Jackson (1994)
	Broadcast software	Wang et al. (2007)
	Knowledge portals	De Carvalho & Ferreira (2001)
Application	Knowledge based systems	De Carvalho & Ferreira (2001)
	Workflow	Meroño-Cerdan et al. (2008)
	Document management systems	De Carvalho & Ferreira (2001)
	Decision support systems	Eom (2001)

IT Capabilities

A firm's IT capability refers to "*the firm's ability to mobilise and deploy IT-based resources in combination or copresent with other resources and capabilities*" (Bharadwaj, 2000). Four management principles are key to the orderly governance of the firm's IT capabilities, namely i) a formalised methodology for IS planning, ii) a mature, well developed systems development process, iii) well defined service quality criteria for all IS support tasks and iv) continuous monitoring of all computer systems (COBIT 3rd Edition Management Guidelines, 2000). These principles are intangible factors that provide the framework within which the IT resources are governed and deployed.

The formalised methodology for IS planning produces an IS strategic plan, that is devised in collaboration with business and IT leaders, and that is aligned to the business goals and priorities (COBIT, 2000). The systems development process progresses development projects through a number of well-defined stages, starting

with requirements analysis, and ending with deployment (COBIT, 2000). Support of computer systems entails providing a mechanism for the recording of reported incidents and the tracking thereof to resolution (COBIT, 2000). Monitoring of computer systems is performed on a continuous basis to ensure that agreed service levels are met (COBIT, 2000).

When adhered to, these intangible factors are key determinants of the measure in which IT resources influence firm performance (Bharadwaj, 2000; Chen et al., 2009).

IT Human Resources

IT human resources consist of the technical and managerial staff supporting the IT infrastructure and applications (Ravichandran et al., 2005; Bharadwaj, 2000). IT technical staff is responsible for the creation, customisation, configuration, installation and deployment of IT infrastructure and applications. IT managerial staff are responsible for harnessing and directing the firm's IT resources, liaising with business stakeholders, managing IT projects, planning the acquisition, deployment and disposal of IT resources and ensuring alignment between IT and business strategies (Bharadwaj, 2000). The value of IT staff depends upon their skill levels (Chen et al., 2009; Ravichandran et al., 2005; Bharadwaj, 2000) as well as their knowledge of the firm-specific context (Ravichandran, 2005).

IT Human resources contribute to firm performance by anticipating business needs and innovating and deploying IT solutions faster than the firm's competitors (Bharadwaj, 2000).

Hypothesised relationships between competitiveness and the independent knowledge process, knowledge content, and IT resource variables are discussed next.

2.4.4 Hypotheses

2.4.4.1 The effects of knowledge process on the competitiveness of a hospitality organisation

A firm's knowledge process capability arises through the continuous process of acquisition, conversion, protection and sharing of knowledge. A number of previous studies have established a positive connection between a firm's knowledge process capability and aspects of its performance (Gold et al., 2001; Lee et al., 2005; Liu et al., 2004; Holsapple & Wu, 2008). The dimensions of knowledge processes discussed in this paper are acquisition, conversion, protection and sharing. Their effects on the competitiveness of a hospitality organisation are hypothesised next.

Knowledge acquisition is positively related to the firm's responsiveness to knowledge (Darroch, 2005). Effective organisations are those that align themselves to their business environment and continually proactively adapt to external changes (Civi, 2000). Such responsiveness relies on an ongoing process of learning and unlearning, which is facilitated by the acquisition of new knowledge (Civi, 2000). New knowledge could be acquired through environmental scanning, acquiring competitive intelligence, and keeping abreast of best industry practices, such firms will be better

positioned to innovate and be responsive to market needs (Wu & Shanley, 2009; Nielson, 2006) Financial performance will benefit from the improved decision making that follows from picking superior knowledge resources (Enz, 2010b), while employee performance will be enhanced by knowledge acquisition because knowledge work is best performed in a learning environment (Jackson et al., 2003). Customer performance will be affected by the acquisition of knowledge because capturing information related to guests (for example special needs, preferences, special requests and use of facilities) and regular performance benchmarking can be used to improve service quality (Minghetti, 2003).

Past empirical studies support a positive direct relationship between knowledge acquisition and organisational effectiveness (Gold et al., 2001) and operating performance (Liu & Tsai, 2007). Hence,

H1-a: The greater the knowledge acquisition in a hospitality organisation, the greater its competitiveness

Knowledge Conversion: When knowledge is scattered across the organisation in different storage mechanisms, it is hard and time-consuming to find and it is also more difficult to understand fragmented information (Bhatt, 2001).

By keeping knowledge standardised, integrated, catalogued, relevant and current, knowledge conversion processes make knowledge useful (Gold et al., 2001). In the absence of conversion processes, organisational knowledge would be fragmented, disparate, disorganised, outdated, irrelevant and unreliable. Unconverted knowledge cannot easily be disseminated nor shared. Knowledge conversion is necessary and benefits productivity, since information can be found quickly (Hou & Chien, 2010), decision making is improved since the information is believable, complete and easy to understand (Melkas, Uotila & Kallio, 2010), employees are more satisfied because they feel empowered when they have access to the knowledge they need to perform their day-to-day tasks (Melkas et al., 2010), customers are more satisfied due to the improved service enabled by integrated data (Akhavan & Heidari, 2008), customer retention is enhanced by the management of long-term customer relationships which rely on integrated data (Anand, Ward & Tatikonda, 2010) and the integrated knowledge base also benefits the development of a sound and fitting marketing strategy, informed by insights provided by the integrated knowledge base (Tsai & Li, 2007).

Liu et al. (2004) presented empirical evidence to show that the refinement and storage of knowledge has a direct positive influence on the competitiveness of an organisation. Hence,

H1-b: The greater the knowledge conversion in a hospitality organisation, the greater its competitiveness.

Knowledge sharing processes are responsible for the diffusion of relevant knowledge in the organisation. Coordinated knowledge sharing initiatives overcome structural barriers by encouraging the distribution of knowledge across organisational boundaries (Willem & Buelens, 2007).

The value of knowledge increases as knowledge is shared, as this leads to the creation of new knowledge (Nonaka, 1994). If not shared, knowledge may be lost, as happens when an employee leaves the organisation, or when knowledge is only partially transferred (Yang, 2007). Knowledge that is lost in this manner can lead to a decrease in customer satisfaction, productivity, quality of management decisions or other adverse organisational performance outcomes (Argote, 1999).

Knowledge sharing leverages the knowledge of different specialists to combine knowledge in new and different ways, thereby benefiting market performance (Liu & Tsai, 2007; Thomas & Keithley, 2002) and resulting in superior innovation performance (Hurmelinna-Laukkanen & Tarkiainen, n.d.). Financial performance benefits from operational efficiencies as best practices and lessons learnt are shared and reused (Durcikova & Fadel, 2010) and employee performance is increased because knowledge sharing promotes a collaborative culture that transfers skills, promotes learning, and motivates employees (Thomas et al., 2002). Finally, customer performance is enhanced through knowledge sharing's positive influence on service quality as knowledge sharing promotes teamwork in the resolution of customer service needs (Hu, Horng & Sun 2009).

Yang (2007) and Yang (2009) presented empirical evidence of knowledge sharing's positive influence on organisational effectiveness. Chen, Hailin & Hongming (2008) showed that knowledge sharing improves both a firm's short-term and long-term performance. Hence,

H1:c: The greater the knowledge sharing in a hospitality organisation, the greater its competitiveness

Knowledge protection processes are responsible for safeguarding the organisation's assets. According to the knowledge-based view of the firm, knowledge assets are a key source of competitive advantage due to their high value, rarity and inimitability. Knowledge assets need to be protected from theft, inappropriate use and imitation by competitors (Gold et al., 2001). Failure to protect knowledge assets results in loss of competitive advantage.

Market performance is positively influenced by knowledge protection because knowledge fuels the firm's innovation capability; if unprotected, knowledge would be vulnerable to appropriation and the firm would lose its competitive edge (Lee & Sukoco, 2007; Lin, 2007a). Knowledge protection lengthens the imitation lag, which is the period from date of launch until competitors imitate the product or service; during this period the firm enjoys higher profitability and faster market share growth (Hurmelinna-Laukkanen & Tarkiainen, n.d.). Financial performance may further benefit from knowledge protection as scarce and valuable knowledge resources need to be protected from imitation by competitors (Hou & Chien, 2010). Employee performance is enhanced by knowledge protection because firms that safeguard their knowledge resources also support continuous learning (Marqués & Simón, 2006) and include interventions and programmes aimed at increasing the retention and loyalty of key employees and these measures may increase employee satisfaction (Päällysaho & Kuusisto, 2008). Customer performance is enhanced through knowledge protection as customers expect their confidential data to be safeguarded (Swann, 2005). Hence,

H1-d: The greater the knowledge protection in a hospitality organisation, the greater its competitiveness

2.4.4.2 The effects of knowledge content on hospitality organisation competitiveness

Knowledge resources related to customers, products and services and management practices are complementary (Tanriverdi & Venkatraman, 2005). Hence the collective value of the firm's knowledge repositories is more than the sum of the individual value.

Customer performance benefits from the personalised customer service that may be tailored from guest related knowledge (Bouncken, 2002). Knowledge of the needs and preferences of customers, may allow the hotel to anticipate customer expectations and offer personalised service. Knowledge of frequent and profitable guests provides an opportunity for differential service. Knowledge of previous adverse service encounters with guests could allow the hotel to safeguard itself against future damages arising from the same individuals. Knowledge of sales patterns related to its products and services may allow the hotel to improve its offerings by ensuring that services are bundled appropriately, priced attractively and are made available on the most suitable channels.

Market performance is enhanced through the acquisition of knowledge content related to competitors (Karim, 2011). Knowledge of competitors' products and services could inform the product development process, to ensure the relevance and competitiveness of own product offerings. Knowledge of occupancy and price patterns for the region could be used as benchmarks for the hotel's own performance. Knowledge of resellers, sales intermediaries and distributors may assist with the identification of opportunities for process improvement along the value chain, and could also provide opportunities for exploitation of synergies and collaboration in the creation of value added packages. Knowledge of brand promises may allow chain-affiliated hotels to comply with service standards laid down by the franchisor or group.

Employee performance is enhanced by firm-specific knowledge that is structured, relevant, organised and integrated as such knowledge is ready to be applied and is easy to locate (Bhatt, 2001). Knowledge of processes makes it possible for work to be driven in an orderly and consistent manner from inception to conclusion. Task specific knowledge with the necessary know-how required for the performance of day-to-day activities enables employees to do their work without constant reference to other staff members (Bouncken, 2002). Hence,

H2: The greater the knowledge content of a hospitality organisation, the greater its competitiveness.

2.4.4.3 The effects of tangible and intangible IT resources on hospitality organisation competitiveness

The first tangible IT resource that will be considered is the IT infrastructure.

IT infrastructure refers to the physical components that enable the IT capabilities of the firm. This consists of the hardware, system software and network infrastructure. IT infrastructure forms the foundation of the firm's IS capability because it (i) provides a common and core IS technical platform; (ii) supports the implementation of business strategies and processes by providing information and data as and when needed during the course of business operations; and (iii) provides a flexible platform for business applications and (iv) provides mechanisms for dissemination of information within the firm (Sääksjärvi, 2000; Weill, Subramani & Broadbent, 2002).

IT infrastructure has a strong positive effect on market share as it enables electronic channels (Weill et al., 2002). IT Infrastructure also has a strong positive effect on sales (Buhalis, 2011), as it is estimated that in 2011, hospitality establishments in the USA received 13% of total bookings from Central Reservation Systems (CRS's), 8% from Global Distribution Systems (GDS's), 27% from Online Travel Agents (OTA's)) and third party web sites and 16% from the hospitality establishment's own web site (Green & Lomanno, 2012). Without IT infrastructure, these sales would be lost. IT infrastructure also enhance sales due to cross selling at point-of-service (Amdekar, 2006), and contain costs through improved operational efficiencies and the elimination of waste, theft and shrinkages, for example through energy conservation systems, security cameras and surveillance systems and stock control systems (Amdekar, 2006). IT Infrastructure also protects the assets and revenue of the firm (Weill et al., 2002). IT infrastructure also benefits employee performance through employee satisfaction due employees being empowered to be productive (Sarosoja, Gibler & Levainen, 2004). IT infrastructure enhances customer performance due to better management of customer expectations (Buhalis, 1998), the ability to personalise products and services according to customer preferences (Amdekar, 2006), the provision of in-room technologies such as Internet access, and pay-per-view TV (Amdekar, 2006), the establishment of links to third party experience providers allowing accommodation bookings to be packaged with a lifestyle event (Amdekar, 2006), and by helping 'yield' decisions to be made on the basis of lifetime customer value rather than maximum room rate (Amdekar, 2006). IT infrastructure can also facilitate the implementation of guest loyalty programmes between all the hospitality organisations belonging to a chain, or in a single organisation, to reward loyal customers.

Especially in information intensive industries, the more IT infrastructure is integrated, the greater the IS effectiveness (Sääksjärvi, 2000). In the hospitality context, Sigala (2003) demonstrated that the adoption of information and communication technologies (ICT's) to accept bookings increases productivity when these ICT's are integrated with the organisation's front-office system. Integration may stretch to other value chain partners outside the geographic boundaries of the firm leading to further productivity gains (Salwani et al., 2009). When applications are disparate, there is a risk of transactions being lost resulting in customer service degradation. Business flow is also interrupted resulting in decreased focus and productivity.

The higher the *quality* of IT infrastructure, the greater its' longevity because it will grow with the business, the more flexible, the more readily it can serve as a platform for future applications, the more robust the IT platforms, the more the firm's IT resources are able to be exploited effectively and the more positive the effect on firm performance (Ravichandran, 2005). The quality of IT infrastructure as demonstrated by its modularity, scalability, degree of standardisation and integration, is what makes IT infrastructure valuable, since it is ready to support future business strategies and organisational growth while minimising costs, it is scarce because it takes considerable time to establish and is inimitable due to being grounded in context (Ravichandran et al., 2005). Hence,

H3-a: The greater the quality of the IT infrastructure of a hospitality organisation, the greater its competitiveness.

The second tangible IT resource that will be considered is the IT applications portfolio.

IT applications are organised collections of software programmes that are used to accomplish specific tasks. Several researchers have studied the productivity of IT applications in the hospitality industry. Ham et al., (2005) introduced four types of IT applications, namely front-office, back-office, banqueting and guest operated in-room devices, and examined the connection between each type and the performance of a hospitality establishment. Specifically, front-office IT applications were found to have the strongest positive effect on a hospitality firm's performance, followed by restaurant and banquet IT applications and finally back-office IT applications (Ham et al., 2005). With regard to the productivity benefits of guest-operated in-room applications, Ham et al. (2005) found no evidence of a link between these applications and firm performance, while Karadag & Dumanoglu (2009), in their study of 122 upscale hotels in Turkey, reported that according to the perception of hotel managers, in-room IT applications support the firm's operations and decision-making activities.

H3-b: The greater the support of the IT applications portfolio for the operations or decision making activities of a hospitality organisation, the greater its competitiveness.

The third tangible IT resource that will be considered is IT support for knowledge management.

IT support for knowledge management entails automated mechanisms that support the acquisition, conversion, protection, sharing and application of knowledge.

Knowledge acquisition is supported by technology that allows searching, exploring data linkages and retrieving data, for example the Internet provides a rich source of information about local events, competitive product offerings, supply sources and best practices. Many sites offer the ability to subscribe to newsfeeds, thereby facilitating the acquisition of external knowledge from industry experts while text analysis tools

automatically create linkages between knowledge components (Böhnstedt, Scholl, Rensing & Steinmetz, 2010).

Knowledge conversion is supported by technology that allows comparison, categorisation, summarisation, amalgamation, classification, storage and retrieval of data (Lindvall, Rus & Sinha, 2002). Database technology supports the storage of large amounts of data, the connection of disparate data fragments and the categorisation and summarisation of data (De Carvalho & Ferreira, 2001).

Knowledge protection is supported by technology that protects knowledge resources from theft, unauthorised access, corruption and catastrophic losses. Access control routines prevent unauthorised access to systems, encryption routines ensure that sensitive data cannot be interpreted outside the system, firewalls, antivirus and spam protection software protect the company's IT resources from malevolent software (Shipsey, 2010).

Knowledge sharing is supported by technology that facilitates knowledge exchange in social interactions (Lindvall et al., 2002). Document management systems allow documents to be shared within the organisation (Lindvall et al., 2002). Groupware allows facilitates electronic discussions, collaboration and knowledge transfer between experts and novices (De Carvalho & Ferreira, 2001). Shared knowledge directories, Intranets and knowledge portals allow knowledge to be shared internally between departments (Olivera, 2000; De Carvalho & Ferreira, 2001), for example the service standards and procedural knowledge of a chain could be shared with its affiliated hotels through a knowledge portal, enhancing the consistency of service standards within the chain (Bouncken, 2002). Electronic bulletin boards enable knowledge to be shared across a wide geographic area (Olivera, 2000).

Knowledge application is supported by technology that prompts the use of knowledge according to the context in which it occurs. Two examples of the IT support for knowledge application provided by Gronau (2002) are the use of technology to create a virtual library of information of suppliers and intermediaries to inform the business planning process, and the storage of customer's menu suggestions and use of these during menu planning. Workflow systems automate the business process by routing work to the next responsible party in the process, upon completion of an activity (De Carvalho & Ferreira, 2001). Decision support systems use knowledge to trigger actions, thereby allowing the firm to leverage its knowledge to increase its capacity for action (Sean, 2001).

Through its support for knowledge management, IT enhances the firm's knowledge based dynamic capability, which in turn positively affects firm performance (Wang, Klein & Jiang, 2007). Hence,

H3-e: The greater the IT support for knowledge management in a hospitality organisation, the greater its competitiveness

The first intangible IT resource that will be considered is IT capabilities.

IT Capabilities are defined in terms of the quality and sophistication of the core IS processes of planning, systems development, IS support and IS monitoring (Ravichandran et al., 2005).

The IS planning process delivers an IS strategic plan, which aligns the acquisition, development and deployment of IT resources with business goals and priorities (Goldsmith, 1991). The greater the quality of the IS planning process, the clearer the IT goals, the more IS resources are aligned to business goals, the more business goals are achievable and the less technology is wastefully acquired for its own sake (Weill, 2004).

The IS acquisition process aims to ensure that new IS resources are brought into the organisation in an orderly fashion and meet expectations in terms of quality, time and cost (COBIT, 2000). The more successful the IS acquisition process, the higher the quality of the IS resources picked, the more orderly their deployment and the better they will meet the business requirements.

The IS support process aims to ensure that support activities meet agreed service quality standards, that system outages resolved in an orderly manner and that system specialists are on-hand to support the operational staff (COBIT, 2000). The better the IS support processes, the faster the resolution of system issues and the less adverse impact on operations. IS support is a critical function in a hospitality organisation, which relies on its IT systems for many aspects of its operations. IT downtime could result in lost sales as significant volumes of bookings are received from external sources such as online travel agents (OTA's) and global distribution systems (GDS's). System non-availability can also negatively affect service levels, if check-out and invoicing cannot be performed. System outages result in labour-intensive manual actions needing to be performed, this could in turn result in financial losses being incurred, for instance if telephone calls are billed incorrectly. Technical support could also be rendered directly to guests who experience connectivity issues, for example through a dedicated technical concierge (Hyatt, 2012).

The IS monitoring process continuously checks the availability of IT systems and reports any outages (COBIT, 2000). The more successful the IT systems monitoring function, the sooner a performance problem is diagnosed, the sooner corrective action can be taken, the less the impact on operations. Hence, IT capabilities make the organisation more responsive thereby enhancing market responsiveness (Liang, You & Liu, 2010). Employee performance may be enhanced through a cooperative and stable working environment brought about by successful IT implementations, while customer performance could be enhanced through improved customer relationship management (Yang, 2008).

H3-c: The greater the IT capabilities of a hospitality organisation, the greater its competitiveness.

The second intangible IT resource that will be considered is IT human resources.

IT human resources refer to technical and managerial IT staff (Ravichandran et al., 2005; Bharadwaj, 2000). Technical and managerial IT human resources have specialist knowledge acquired through formal training and honed through experience (Jackson, Hitt & DeNisi, 2003). Skilled and experienced IT human resources who also possess firm-specific knowledge are valuable to the firm, as firm-specific knowledge is ready to be applied (Grant, 1996). As IT resources grow in skills, experience and familiarity with the firm context, they learn faster, are able to recognise patterns faster, understand complex issues faster, identify relevant knowledge faster, and become more innovative when devising IT solutions (Cohen & Levinthal, 1990). This is due to the increased absorptive capacity that results from exposure to different applications and technical environments (Melkas et al., 2010) which increase the individual's ever-expanding network of mental associations of issues, solutions and contextual factors, providing a source of knowledge which is used to inform similar situations when they occur (Cohen & Levinthal, 1990). Over time, IT technical staff witness different solutions being applied to the same type of problem, allowing them to be more resourceful when devising IT solutions (Cohen & Levinthal, 1990). It takes considerable time for IT technical resources to develop the depth and breadth of technical knowledge that provides a foundation for accelerated problem solving and solution development. Managerial IT resources draw from their knowledge acquired through training and experience in the same way as technical IT resources.

The unique combination of firm-specific knowledge, experience and skills makes it very hard for a competitor to imitate IT human resources, and almost impossible to do so at short notice. Yet without these specialist IT human resources, the firm would be less responsive, less innovative, less able to resolve complex issues when they arise, less able to develop and deploy IT solutions to meet business objectives. Hence IT human resources are scarce, inimitable and valuable and conform to the characteristics of strategic resources, which provide the firm with competitive advantage. There is also empirical evidence of the strong positive effect of human resources upon firm performance (Ravichandran et al., 2005; Hu & Xiang, 2008). Hence,

H3-d: The greater the skill of the IT human resources of a hospitality organisation, the greater its competitiveness.

2.4.4.4 The effects of knowledge application on hospitality organisation competitiveness

Knowledge is applied when it is used to inform decisions based on which actions are taken. Market performance is believed to benefit from the increased responsiveness brought about by knowledge application (Darroch, 2005), financial performance is believed to be influenced by improved innovation capability (Lin, 2007b) and innovation performance (Jantunen, 2005) that results from knowledge application, employee performance is believed to benefit from increased worker competencies resulting from applying knowledge (Grant, 1996) and customer performance is believed to be enhanced through the application of specialised knowledge related to

previous customer interactions (Davenport & Klahr, 1998). Knowledge regarding customer needs and preferences is used to achieve higher levels of customer service through personalisation; knowledge regarding customer support interactions is used to improve customer service (Davenport & Klahr, 1998);

Knowledge application grows the organisation's knowledge assets. Each successive application enriches knowledge with contextual and spatial information. Firm-specific knowledge is valuable because it is easier to recall and can immediately be applied to new contexts (Turkson & Riley, 2008). For this reason, knowledge application causes the knowledge assets to appreciate, while most other assets depreciate when used (Carneiro, 2000).

In their study, Seleim & Khalil (2007) presented empirical evidence to support the direct positive effect of knowledge application on organisational performance.

H4: The greater the knowledge application capability in a hospitality organisation, the greater its competitiveness.

2.4.4.5 The effects of knowledge process on knowledge application

Knowledge acquisition necessarily precedes knowledge application, since knowledge is first acquired, then assimilated and then applied (Krstić & Petrović, 2011).

Knowledge acquisition builds absorptive capacity. As firms develop higher absorptive capacity, they identify new relevant knowledge more easily and are able to understand its potential for application more readily (Cohen & Levinthal, 1990).

If knowledge is renewed on a continuous basis through the acquisition of new knowledge, it remains up-to-date and is more likely to be trusted and applied, as outdated knowledge is seldom applied (Mahdi, Almsafir & Yao, 2011).

In their study, Seleim & Khalil (2007) presented empirical evidence to support the mediating effect of knowledge application on the relationship between knowledge acquisition and organisational performance. Hence,

H5-a: The greater the knowledge acquisition, the greater the degree of knowledge application.

Knowledge conversion processes essentially harmonise knowledge from different sources across the organisation, thereby making the knowledge useful, and encouraging its' application. If difficulties are experienced accessing organisational knowledge, for example due to ineffective search mechanisms, insufficient cross-references or fragmentation, the extent of use will be limited (Kulkarni et al., 2007). A further consideration is that since knowledge stocks pertaining to different domains are complementary (Tanriverdi & Venkatraman, 2005), failing to convert knowledge degrades all related knowledge stocks and weakens the potential for knowledge application. Hence,

H5-b: The greater the knowledge conversion, the greater the degree of knowledge application.

Knowledge sharing is mentioned by Gold et al. (2001) as one of the knowledge application processes. Knowledge application is dependent upon knowledge sharing (Grant & Baden-Fuller, 2004), as it is through collaboration that specialists recognise the connections to prior related knowledge and access the specialised knowledge that is relevant to the current task and context (Cohen & al., 1990). Hence,

H5-c: The greater the knowledge sharing, the greater the degree of knowledge application.

Knowledge protection processes are responsible for the security of the knowledge base from theft or accidental or malicious damage (Gold et al., 2001). Security breaches can lead to the erosion of integrity of the knowledge base. If knowledge cannot be trusted, it is less likely to be used. Visible protection processes inspire confidence in the knowledge base and encourage its use. Hence,

H5-d: The greater the knowledge protection, the greater the degree of knowledge application.

2.4.4.6 The effects of knowledge content on knowledge application

As knowledge is applied in the actual decisions and operational processes of the firm, the stocks of knowledge are enriched with new context (Cohen & Levinthal, 1990). Contextualised knowledge stocks are ready for application.

As the stocks of knowledge grow, absorptive capacity increases, and the potential for the application of knowledge is more quickly understood and it is faster to innovate new uses for existing knowledge. Hence,

H6: The greater the quality of knowledge content, the greater the degree of knowledge application

2.4.5 Control Variables

Control variables are used to account for factors other than the theoretical constructs of interest, which could explain variance in the dependent variables. In this study, size, lodging segment, lodging type, chain affiliation and star rating are used as control variables. *Size:* The size of a hotel affects its profitability as larger establishments realise economies of scale (Orfila-Sintes & Mattsson, 2007; Barros, 2005). *Lodging Segment:* The lodging segment typically defines the level of service that is offered by a hospitality organisation and influences its profitability, as evidenced by budget and luxury establishments better weathering the recent economic downturn, when compared with the overall hospitality market (Hotel Yearbook 2011). *Lodging Type:* (e.g. standard hotel, motel, all-suite, extended stay, casino) affects the profitability of the establishment, as was evidenced by the higher profitability of all-suite establishments during the late 1990's and early 2000's (Rogerson & Kotze, 2011). *Chain Affiliation*: Chain affiliated hotels benefit from brand loyalty, inter-company referrals across the brand, sharing of guest history with other hotels in the

brand, established policies and procedures and are more profitable than independent hotels (O'Neill & Mattila, 2006).

2.5 Chapter Conclusion

In this chapter, prior literature was reviewed, the research model was presented and its theoretical underpinnings defined, the constructs were defined and hypotheses (summarized in Table 3 below) were presented. The next chapter describes the research method that is used to test the hypotheses.

Table 3: Summary of Hypotheses

H1-a	The greater the knowledge acquisition in a hospitality organisation, the greater its competitiveness
H1-b	The greater the knowledge conversion in a hospitality organisation, the greater its competitiveness.
H1-c	The greater the knowledge sharing in a hospitality organisation, the greater its competitiveness
H1-d	The greater the knowledge protection in a hospitality organisation, the greater its competitiveness
H2	The greater the knowledge content of a hospitality organisation, the greater its competitiveness.
H3-a	The greater the quality of the IT infrastructure of a hospitality organisation, the greater its competitiveness.
H3-b	The greater the support of the IT applications portfolio for the operations or decision making activities of a hospitality organisation, the greater its competitiveness.
H3-c	The greater the IT capabilities of a hospitality organisation, the greater its competitiveness.
H3-d	The greater the skill of the IT human resources of a hospitality organisation, the greater its competitiveness.
H3-e	The greater the IT support for knowledge management in a hospitality organisation, the greater its competitiveness
H4	The greater the knowledge application capability in a hospitality organisation, the greater its competitiveness.
H5-a	The greater the knowledge acquisition, the greater the degree of knowledge application.
H5-b	The greater the knowledge conversion, the greater the degree of knowledge application.
H5-c	The greater the knowledge sharing, the greater the degree of knowledge application.
H5-d	The greater the knowledge protection, the greater the degree of knowledge application.
H6	H6: The greater the quality of knowledge content, the greater the degree of knowledge application.

3 Methodology

This chapter discusses the manner in which data was collected and analysed to test the hypotheses.

3.1 Research Methodology

Empirical research is performed using quantitative, qualitative or mixed approaches. Qualitative research is based upon the belief that reality is subjective and contextual, hence reality exists only in the minds of people (Nwokah, Kiabel & Briggs, 2009). In qualitative research, data is gathered by a highly skilled, subjective and participating researcher who collects in-depth data from a small number of purposefully selected participants using loosely structured methods such as interviews, observations or focus groups (Patel, Patel, Tang & Elliot, 2006). The research questions are stated upfront but the research design evolves as data collection progresses. Data is analysed through the subjective interpretation of the researcher. Qualitative research findings are less generalisable to a broader population, and need to be viewed within the social context within which they occurred (Patel et al., 2006). Qualitative research is often applied during the exploratory stages of analysis, when the subject matter is complex and poorly understood (Patel et al., 2006).

In contrast, quantitative research is based upon the positivist belief that an objective reality exists and that it may be gleaned through analysis of observations drawn at random from a sample of units representative of the population (Patel et al., 2006). In quantitative research, a research model is formulated within the framework of existing theory (Patel et al., 2006). All concepts within the scope of the research are well defined before data collection begins (Patel et al., 2006). A large quantity of structured data is typically collected by field workers using a standardised instrument such as a questionnaire with mostly closed-ended questions. Data analysis typically involves the application of statistical methods (Patel et al., 2006). Because the sample is representative of the population, the findings may then be generalised to the population (Patel et al., 2006). Quantitative research methods are rigorous and highly structured. Quantitative research is best applied during descriptive research, when the research objective is to arrive at a predictive model that allows generalisation to a broader population (Patel et al., 2006).

This study follows the quantitative approach and uses the sample survey method. This suits the research objective of observing the interrelationships between the selected variables as manifested within a sample, and generalising the findings to the broader population of hospitality establishments in South Africa. This method yields a set of quantified metrics that are valid at a specific point in time and may be used by subsequent similar studies for comparison purposes.

The steps are to construct a questionnaire and define the strategy for measurement of research variables (discussed in paragraphs 3.2, 3.3 and 3.4), define a sampling strategy and the strategy for questionnaire administration to key informants with due consideration of ethical concerns (discussed in paragraphs 3.5, 3.6, 3.7 and 3.8), define techniques for assessing reliability and validity as well as the analytical approach to hypothesis testing (discussed in paragraphs 3.9, 3.10 and 3.11) and outline the limitations of the study (discussed in paragraph 3.12).

3.2 Instrument Construction

A structured questionnaire with closed questions was developed to capture information from key informants on each of the study's variables. The questionnaire was compiled following a comprehensive literature review to build constructs to test the hypotheses adequately. The unit of analysis is the organisation and all dimensions were measured from the perspective of the focal firm.

3.3 Measurement of Research Variables

Valid multiple scale items that operationalise the constructs were borrowed and adapted to the hospitality context. All constructs were measured using multiple items.

In line with Ottenbacher (2007), hospitality organisation competitiveness was conceived as having four dimensions, namely market performance, financial performance, employee performance and customer performance. Market performance was measured with 3 items, financial performance was measured using 6 items, employee performance was measured via 3 items and customer performance was measured with 4 items. All items originated from Ottenbacher (2007) except the last item for customer performance, namely "trust of our customers in our organisation", which was included because recent studies (Eid, 2011; Dahiyat, Akroush & Abu-Lail, 2011; Yen & Horng, 2010; Kim, Ferrin & Rao, 2009) have demonstrated the sustained interest in the trust in the context of organisational competitiveness. Lastly, responses to items for the hospitality organisation competitiveness variables were measured on a 7-point Likert scale from 1 (='much worse than competitors') to 7 (='much better than competitors').

The independent variables are knowledge management process, knowledge content and IT resources, all having direct independent effects on competitiveness. Knowledge management process and knowledge content each furthermore have a mediated effect on competitiveness via knowledge application / utilisation.

Knowledge management process was operationalised as a multidimensional construct, with dimensions of knowledge acquisition, knowledge conversion, knowledge protection and knowledge sharing. *Knowledge acquisition processes* are defined as those processes that create knowledge in the organisation, either by procuring new knowledge or by processing existing knowledge (Gold et al., 2001). Knowledge acquisition was measured by twelve items from Gold et al. (2001). *Knowledge conversion processes* are defined as those processes that convert knowledge into a form that facilitates retrieval and sharing (Gold et al., 2001). Knowledge conversion was composed of seven items from Gold et al. (2001); *Knowledge sharing processes* are defined as those processes that transfer knowledge internally to subunits within the firm, as well as externally to other organisations (Wang et al., 2009). Knowledge sharing comprised of eight items from Gold et al. (2001), Lee et al. (2005) and Wang et al. (2009). *Knowledge protection processes* are defined as those processes that secure the organisation's knowledge from inappropriate use or theft (Gold et al., 2001). Knowledge protection had seven items from Gold et al. (2001). *Knowledge application processes* are defined as those processes that relate to the utilisation of knowledge (Gold et al., 2001). Knowledge application had nine items from Gold et al. (2001). Responses to all items pertaining to knowledge management process variables

were measured on a 7-point Likert scale from 1 (='strongly disagree') to 7 (='strongly agree').

Knowledge content is defined as those repositories of knowledge that are available to the firm. A new scale was developed for this one dimensional construct, which was measured by twenty-one items. These items measured the organisation's level of knowledge regarding elements in its internal environment (i.e. employees, products, services and operating procedures) as well as its micro environment (i.e. customers, competitors, suppliers and associates). The theoretical domain for the scale items was drawn from the work of Tanriverdi & Venkatraman (2005) who identified product, customer and managerial knowledge as strategic resources, as well as the work of Porter (1985) who identified the forces in an organisation's micro environment. Responses to items for the knowledge content construct were measured on a 7-point Likert scale from 1 (='very poor') to 7 (='very good').

IT resources was operationalised as a multidimensional construct with dimensions of IT applications portfolio, IT infrastructure quality, IT human resources, IT capabilities and IT support for knowledge management. *IT Applications portfolio* is defined as the hotels' collection of front-office, back-office, restaurant and banqueting and in-room IT applications. IT Applications Portfolio was measured by twenty-eight items from Ham et al. (2005) and Sigala (2003). Responses to items in for the IT applications dimension were measured on a 7-point Likert scale from 1 (='extremely poor') to 7 (='excellent'). *IT infrastructure quality* is defined as the extent to which the firm's IT infrastructure is a source of value to the firm, by allowing the exploitation of business opportunities, providing responsiveness to business changes and supporting knowledge sharing and innovation (Bhatt & Grover, 2005). IT infrastructure quality comprised of five items from Bhatt & Grover (2005). *IT human capital* is defined as the technical and managerial IT skills available to the organisation. IT Human capital was composed of two items from Chen et al. (2009). *IT capabilities* are defined as those practices that enable the provision of IT services to the firm (Ravichandran et al., 2005; Baradwaj, 2000). IT capabilities had four items from Ravichandran et al. (2005) and Bharadwaj (2000). *IT support for knowledge management* is defined as the extent to which the firm's IT capability supports the acquisition, conversion, protection, sharing and application of knowledge. The scale for the IT support for knowledge management dimension was newly developed and comprised of five items derived from the knowledge management literature. Five items were designed to measure the degree of IT support for each of the five knowledge management processes namely acquisition, conversion, sharing, protection and application. Responses to the items in IT infrastructure quality, IT human resources, IT capabilities and IT support for knowledge management were measured on a 7-point Likert scale from 1 (='strongly disagree') to 7 (='strongly agree').

The hotels participating in this survey had very different demographic characteristics that could have an impact upon their competitiveness. The first control variable was *firm size*, expressed in terms of number of rooms (Siguaw et al., 2000; O'Neill & Mattila, 2006). The second control variable was *age of property*, expressed in years (O'Neill & Mattila, 2006). The third control variable was *property type*, e.g. hotel, motel, all-suite, extended stay, limited service or resort (O'Neill & Mattila, 2006). The fourth control variable was *lodging segment* (e.g. budget, economy, midprice, upscale, luxury) (Siguaw et al., 2000). The fifth control variable was *location type*,

e.g. inner-city, suburban, airport, highway (O'Neill & Mattila, 2006). The fifth control variable was *market type* (e.g. tourist, casino, corporate, convention, health and spa) (Siguaw et al., 2000). The sixth control variable was *service orientation,* i.e. service differentiation or service standardisation (Wang, Wang, Ma & Qiu, 2010). The eighth control variable was *chain affiliation* (Siguaw et al., 2000; O'Neill & Mattila, 2006). The ninth control variable was the *province,* indicative of the province of South Africa in which the hospitality establishment was located (O'Neill & Mattila, 2006).

Some additional demographic details collected for descriptive purposes were the ownership type (e.g. chain owned, franchise, independent), the management type (e.g. owner, management contract) and the star rating.

The items used to measure each of the dimensions and constructs are summarised in Table 4 below.

Table 4: Construct Measurement

Variables		Number of Items	Example Items	Supporting literatures
KA	Knowledge acquisition	12	Our organisation has processes for acquiring knowledge about competitors within our industry	Gold et al. (2001)
KV	Knowledge conversion	7	In our organisation, the knowledge of individuals is recorded in a structured way, so that others in the organisation may benefit from it	Gold et al. (2001)
KS	Knowledge sharing	8	Our organisation has systems and venues for people to share their knowledge with others in the company	Wang et al. (2009); Gold et al. (2001); Lee, Lee & Kang (2005).
KP	Knowledge protection	7	Our organisation has processes to protect knowledge from inappropriate use	Gold et al. (2001)
KU	Knowledge application / utilisation	9	Our organisation has processes for applying knowledge learned from experiences	Gold et al. (2001)
KC	Knowledge content (Internal & External)	21	Characteristics of our customers Customer's tastes and preferences	New scale
IA	IT Applications Portfolio	28	Customer Relationship Management (CRM) Property Management System (PMS) - reservations, check-in/check-out, guest accounting and invoicing	Ham et al. (2005) and Sigala (2003).
IQ	IT Infrastructure Quality	5	Our IT systems are modular	Bhatt & Grover (2005).
IH	IT Human Capital	2	Technical IT skills (programming, systems analysis and design, network configuration etc.) are available within our organisation	Chen et al. (2009).
IC	IT Capabilities	4	We have a formalised methodology for	Ravichandran et al. (2005)

Variables		Number of Items	Example Items	Supporting literatures
			IS (Information System) planning	
IK	IT Support for Knowledge Management	5	In our organisation, IT facilitates the acquisition of knowledge about our customers, suppliers and/or competitors	New scale
CP	Competitiveness	16	Increasing room occupancy rates Opening new markets	Espino-Rodriguez and Padrón-Robaina (2005); Ottenbacher (2007); Tari et al. (2010)

A complete list of survey questionnaire items is attached as Appendix C.

3.4 Pre-Testing & Pilot Testing

The questionnaire was refined through pre-testing and pilot testing. Pre-testing focused on instrument clarity and question wording. During pre-testing, the questionnaire was sent to three members of the IS department at Wits University who were invited to comment on the questions and wordings. Feedback received highlighted several improvement areas. Grammatical and spelling errors were highlighted. Questions that were worded in a dubious manner and that could be interpreted in more than one way were highlighted. Inconsistent use of punctuation marks was detected. The questionnaire was duly adapted and was also made available electronically on a web based document sharing site to facilitate data collection. The online survey questionnaire is attached as Appendix B.

Pilot testing was then performed. The survey was sent to a convenience sample of general managers from nine hotels selected on the basis of the author's familiarity with these establishments. The managers were asked to complete the survey and also provide feedback that could be used to make the questionnaire more meaningful and relevant. Nine responses were received. Of these, three were incomplete and six were complete. The completed responses were visually scanned to detect anomalies. The wording of all items was once again scrutinised to ensure correspondence to the source, nonetheless in some cases the original wording was changed slightly to achieve consistency of terminology across all items included in the questionnaire. Headings and sub headings were reconsidered. Performance measures were re-assessed and employee turnover and customer trust in the hotel were added as measures of employee and customer performance respectively. Wording of hospitality organisation competitiveness measures were changed to ensure parallelism. Following confirmatory literature verification, the following additional control variables were inserted into the model at this stage: *age of property* (Martínez-Ros & Orfila-Sintes, 2009; O'Neill & Mattila, 2006; Barros, 2005), *location type* (Martínez-Ros & Orfila-Sintes, 2009; O'Neill & Mattila, 2006) and *province* (Scaglione et al., 2009; O'Neill & Mattila, 2006; Barros, 2005). Three additional demographic questions were added to the questionnaire namely *ownership type* (Martínez-Ros & Orfila-Sintes, 2009), *management type* (Martínez-Ros & Orfila-Sintes, 2009) and *Star Rating* (Scaglione et al., 2009), for descriptive purposes. Finally, feedback was received regarding difficulties encountered when navigating the electronic survey. As a result, the hosting platform for the electronic version of the questionnaire was changed to a

different web based survey collection site because an alternate site offered better navigation, presentation and survey collection control features.

3.5 Sampling Frame, Sampling Method

The sampling frames for this study consist of all accommodation providers listed in either one or both of the 2010-2011 AA Accommodation Guide for South Africa and the 2010 Solomon's Guide. Backpacker hostels, camping grounds and bed and breakfast establishments were excluded from the sampling frame. Only hotels, motels, boutique hotels, guest houses, resorts and lodges of 15 rooms and above were considered. There are 157 such establishments listed only in the AA Accommodation Guide and 352 listed only in the Solomon's Guide, while 57 establishments are listed in both AA Accommodation Guide and Solomon's Guide. To achieve greater representation of international hotel groups, a further 93 establishments were added to the sampling frame following Internet searches for accommodation providers across all provinces of South Africa. During data collection, it transpired that 3 establishments in the sampling frame had closed down prior to commencement of this study. The resulting sampling frame thus consisted of 656 hospitality establishments all of whom were targeted for inclusion in the study.

3.6 Characteristics of Respondents / Key Informants

The unit of analysis in this study is the hospitality organisation. The choice of key informant to respond on behalf of their hospitality organisation was the general manager or owner. This was decided because only persons at the highest level of seniority would have sufficient knowledge to complete all questions and would provide the most reliable estimates across the study's variables.

3.7 Method of Questionnaire Administration

Data was collected between February and August 2011 from respondents representing the 656 establishments identified in section 3.5 above. A combination of electronic mail, land mail and drop-off distribution methods was used. Emails were sent to the general managers of the 656 establishments, inviting them to complete the survey hosted on the Internet. These establishments were selected because their email addresses were listed in the accommodation guides comprising the sampling frame. Seventeen responses were registered on the website however of these, 9 had only completed the three ethical clearance questions, leaving all other questions blank. The survey was then moved to a new Internet site and its appearance was enhanced to be more user-friendly. Reminder emails quoting the new web address were sent approximately two months after the initial invitation, followed by a second reminder one month later. A high number of emails were returned undelivered throughout the process. With the initial invitations, first reminders and second reminders respectively 66, 72 and 70 emails were returned undelivered. Efforts were made to determine the correct email address pertaining to undelivered responses through internet lookups. Furthermore wherever the telephone number was available, the establishments were telephoned in advance of sending the invitation by email, to confirm the email address and also to introduce the survey. Altogether in the first month, 17 responses were collected via the website, none in months two and three, 22 in the fourth month, 19 in the fifth month, 6 in the sixth month and 17 in the seventh month.

To supplement the email collection method, surveys in paper format were hand delivered to hotels in the major cities. The survey questionnaires were handed to respondents and in most cases a pick up appointment was set at a later date depending on the availability of the respondents. Respondents were also informed that the survey could be completed electronically. As a contingency measure, a self-addressed postage paid envelope was also provided and some hotels returned their surveys in this manner by land mail. In the fourth month, 8 establishments in the Pretoria area were visited and 3 responses were collected in this manner. In the seventh month, a further 90 establishments in Cape Town, Durban, Johannesburg and Pretoria were visited and 52 responses were physically collected from hotels during this time, while a further 3 hotels that had been visited opted to register their survey responses on the website. All hotels visited were selected because of their convenient location.

Finally, surveys in paper format, accompanied by a self-addressed postage paid envelope, were mailed to the general managers of 68 hotels located outside the major cities visited. These hotels were randomly selected. Nine responses were received via land mail.

At the end of the data collection period, 47 establishments that were included the sampling frame remained inaccessible and had not received the survey in any format whatsoever. Altogether 84 respondents completed the survey electronically, 55 paper surveys were collected from the respondents and a further 9 paper surveys were received via land mail.

Table 5 below summarises the timing of all responses received as well as the manner in which they were collected.

Table 5: Responses by Month and Collection Method

Month	Collected	Land Mail	Website	Total
1			17	17
2				
3				
4	3		22	25
5			19	19
6			6	6
7	52	9	20	81
Total	**55**	**9**	**84**	**148**

3.8 Ethical Considerations

Approval for this survey was sought and obtained from the Ethics Committee of the University of the Witwatersrand. The protocol number is H100631. Refer Appendix A-1 for the clearance certificate.

Both electronic and paper survey forms were accompanied by a covering letter (refer Appendix A-2), introducing the survey and outlining the ethical considerations. It was emphasised that participation in the research was voluntary and that respondents were free to withdraw at any time. Respondents were also assured that the information they provided would be held confidentially and would only be used in the aggregate

without identifying the respondent or the hotel name. As an incentive to participate, a summary of the findings of this study was offered to all respondents.

Both printed and electronic versions of the survey required respondents to explicitly acknowledge that they were voluntary research participants, that they understood that they were free to withdraw their contribution at any time, and that they expected to receive no remuneration for completing the survey.

3.9 Reliability and Validity

Prior to hypothesis testing, face validity, content validity, construct validity, convergent validity and discriminant validity were considered, together with scale reliability.

Face validity and *content validity* are two judgemental assessments of validity. An instrument has *face validity* when its questions appear to make sense to someone who is not necessarily an expert in the field of study and who assesses the instrument at face value (Nunnully, 1978). In this study, the instrument was subjected to pre-testing by academic experts in the field of instrument compilation, to assure its face validity. An instrument has *content validity* when, to the best judgement of an expert in the field of study, the questions are relevant and complete as they relate to the content domain at hand and the targeted population. When an instrument has *content validity*, its questions span across the entire content domain so as to capture all aspects of the construct (Rungtusanatham, 1998). In this study, *content validity* was assured through extensive review of the literature to find previously validated instruments and furthermore through solicitation of the best judgement of academics and experts in the field of hospitality.

Construct validity is achieved when the operationalisation accurately captures the latent construct that the measures intend to capture (Gefen & Straub, 2005). Construct validity is tested by means of Principal Component Analysis (PCA). PCA is a variable reduction technique that enables reduction of a large set of inter-correlated variables to a smaller number of composite, uncorrelated, unidimensional variables. The technique involves grouping items together according to their covariation thereby identifying the latent variables, termed "factors", underlying the items (Leech, Barrett & Morgan, 2008). A factor loading, which indicates the strength of the relationship between the item and the factor on the basis of the correlation between the item and the factor, is computed for each item. The composite index score represents the average of scores for those items with significant factor loadings. Factor loadings of between 0.50 and 0.70 are considered practically significant (Hair, Black, Babin, Anderson & Tatham, 2006). In this study, items with a factor loading of 0.60 or greater, were retained. In cases where an item has a significant loading with respect to more than one factor, the item was eliminated, on the basis that it is an impure measure of the underlying construct.

Discriminant validity holds when two or more unrelated measures, gathered independently of one another, do not correlate with one another in line with expectations. To test for discriminant validity, all items across constructs are analysed with PCA to determine the factor loadings of each item with regard to each of the constructs. Each item should have a significant loading with the construct it is

measuring. Furthermore, the item's loadings with other constructs should be insignificant. In this study, a loading of 0.60 or greater was considered as significant.

Composite or scale reliability refers to the extent to which a construct is represented by its items. A *reliable* scale has internal consistency as demonstrated by the correlation between items measuring the same concept. A *reliable* measure is furthermore stable when repeated measurements from the same source yield the same outcome (Straub, 1989). Cronbach's coefficient alpha test is the most commonly used measure of internal consistency reliability and is used in this study to assess *composite or scale reliability*. It applies to composite scores and measures the average correlation of each item with every other item in the composite score. In accordance with findings by Nunnally (1978), this study considers 0.70 as the acceptable cut-off point for the Cronbach alpha test.

3.10 Statistical Assumptions

Multiple regression assumes that variables have normal distributions. Where the variable distribution displays evidence of skewness or kurtosis, or where there are significant outliers, the regression outcomes could be distorted.

Data was screened for substantial outliers and these were removed from the data. This was achieved through the examination and potential removal of cases on each questionnaire item where the standardised score is greater ± 3.

Visual inspection of residuals was used to check for skewness, kurtosis and heteroskedasticity. Firstly, a histogram of residuals associated with the dependent variable, after accounting for the effect of independent variables, was examined to check that the distribution has a normal shape (Pryce, 2002). Secondly, a normal probability plot of residuals was examined to check that the errors lie in a straight line along the diagonal (Pryce, 2002). Thirdly, a scatter plot of the standardised residuals on the standardised predicted values was examined to check that the residuals are scattered in a spherical pattern resembling a bird's nest and do not fan out in a funnel shape, as this indicates the presence of heteroskedasticity (Pryce, 2002).

The correlation between independent variables was examined as collinearity could influence or distort the regression outcome.

3.11 Common Method Bias

Common method bias refers to the degree to which correlations between items differ as a result of a methods effect (Meade, Watson & Kroustalis, 2007). Podsakoff, MacKenzie, Lee & Podsakoff (2003) identified four leading causes of methods effects namely common source, which occurs when the same rater provides the scores for the predictor and criterion variables (e.g. when the rater attempts to rate items consistently, provides ratings perceived to be socially acceptable, or provides the same rating regardless of content), item characteristics (e.g. the item wording creates an expectation for a certain response, the same scale anchors are used throughout the questionnaire or items are worded ambiguously), item context effects (e.g. arising from the placement of an item relative to the other items) and measurement context effects (predictor and criterion variables are measured at the same time or location).

The presence of common method variance was examined by performing principal component analysis on all items in the model simultaneously, with the expectation that in order to rule out common method bias, the first factor should not account for more than 50% of the variance. This method is known as Harman's single factor test (Harman, 1967) and is widely used (Podsakoff et al, 2003).

3.12 Strategy for Testing Hypotheses

Hypotheses were tested through Pearson correlation analysis. The significance of Pearson's correlation coefficient (r) is indicated by p. In this study, the significance level required to support a hypothesis is $p < 0.05$.

First H1 (a to d), H2, H3 (a to d), H4 and H6 were tested by examining the significance of the correlation coefficient. H5 (a to d) were tested in three steps. Firstly, the correlation between knowledge acquisition, conversion, sharing and protection and the four hospitality organisation competitiveness variables was obtained. If insignificant, the mediation hypothesis would be rejected but if significant, testing for mediation would proceed. Secondly, the correlation between the four knowledge process variables and knowledge application was examined. If insignificant, the mediation hypothesis would be rejected but if significant, testing for mediation would proceed. Thirdly, the partial correlation between hospitality organisation competitiveness and knowledge acquisition, conversion, sharing and protection, while controlling for knowledge application, was obtained. If significant, the mediation hypothesis would be rejected, if not significant, the mediation hypothesis would be accepted.

Thereafter stepwise regression analysis was used to detect independent effects of the independent variables upon market, financial, employee and customer performance. Stepwise regression is a statistical method that compiles a predictor model by selecting for inclusion, on an iterative basis, the next independent variable that has the largest contribution to explaining the variance of the dependent variable (King, 2008); the stepwise inclusion of variables into the regression model proceeds while included variables prove to be significant, and iteration stops with the first non-significant variable (Brace, Kemp & Snelgar, 2009). Goodness of fit of the regression equation is indicated by the coefficient of determination R^2 which shows the amount of variance of the dependent variable accounted for by the independent variables (Leech et al., 2008).

3.13 Limitations

Some accommodation types, namely backpacker hostels, camping grounds and bed and breakfast establishments were excluded from this study. Furthermore micro-sized accommodation providers, having less than 15 rooms, were excluded from this study. This was because such small establishments were deemed unlikely to invest in Information Technology and to engage in significant knowledge management practices in the same manner as larger establishments. Results from this study may not be generalisable to these excluded establishments.

Different data collection methods were employed in different geographic locations and this has resulted in responses not being distributed evenly across all provinces. Care was however taken that across geographic locations, survey requests were representative of the different accommodation types. Due to the data collection strategy adopted – e.g. following up non-respondents with direct, in-person visits- has resulted in a non-random sampling i.e. not all members of the original sampling frame could be visited and followed up with in the same way. Therefore, no claims can be made that the responding organisations are representative of the population. None-the-less, the organisations targeted cover a fair cross-section of accommodations types and sizes, as well as geographic locations.

Data collection was biased towards larger establishments. Time and resource constraints did not permit extensive data collection from establishments with less than 50 rooms, although these establishments represent almost half the population.

Data was collected over an elapsed period of seven months. During this time some changes may have occurred within the macro environment that impacted general competitive conditions as they relate to the hospitality industry.

Measures of hospitality organisation competitiveness were subjective and self-reported as objective measures were not available. Subjective measures of competitiveness are commonly used in the absence of objective measures (refer for example Liao & Wu, 2009; Li et al., 2009; Choi et al., 2008; Tippins & Sohi, 2003; Powell & Dent-Micallef, 1997). Prior research suggests that objective and subjective measures of competitiveness are strongly correlated (Dawes, 1999).

Ideally a survey should be completed by more than one respondent to avoid single respondent bias. However this would not have been practical due to the small size of some hotels in the sample and was further precluded due to resource and time constraints.

3.14 Conclusion

In this chapter, the research method was outlined and motivated, instrument construction was explained, the results of pre-testing and pilot testing were listed, the measurement of research variables was detailed, the sampling frame and sampling method was described, the profile of respondents was defined, the method of questionnaire administration was detailed, the ethical considerations were described, the strategy for testing reliability and validity was explained, the strategy for testing hypotheses was stated and limitations of this survey were listed. The next chapter describes the research findings.

4 Research Findings

This chapter presents the study's findings. First, data is screened for missing values, outliers and distributional properties. Next the response profile is presented, followed by tests for reliability and validity, correlations and regressions. The chapter concludes by presenting a summary of the hypotheses that were supported and those rejected.

4.1 Data Screening, Missing Values and Outlier Analysis

4.1.1.1 Data Screening

Altogether 148 responses were received over the collection period. Despite efforts to eliminate micro-sized establishments from the sampling frame, four responses were received from organisations with less than 15 rooms and they were thus eliminated from the dataset. A further four responses were received from inappropriate key respondents (2 reception staff, 1 debtors clerk and 1 personal assistant) and those were also eliminated from the dataset. The remaining 140 responses represent an overall effective response rate of 23.18%. This response is consistent with those reported in similar studies such as Brown & Dev (1999).

These remaining 140 responses were screened to identify cases or variables with large amounts of missing data. Of these 140 cases, a further 26 were deleted because the respondents had failed to complete a number of pages of the questionnaire. Thus 114 responses remained with enough complete data for further analysis.

4.1.1.2 Outlier Analysis

The remaining data was then screened for univariate outliers. A good method of detecting potential univariate outliers involves the examination of cases on each questionnaire item where the standardised score is greater ± 3. This enables the identification of cases with unusually high or unusually low values on an item compared to other cases in the sample. A review of standardised scores revealed that 16 cases were potential outliers on more than one questionnaire item. Two of these cases were outliers on more than 5% of the items. These 2 cases were then deleted from the sample. For the other 14 cases, there was no indication that responses on other items were unusual. Screening did not reveal coding errors. Following deletion of the 2 cases, 112 cases remained for meaningful statistical analysis.

4.1.1.3 Missing Values

Of the remaining 112 cases, 16 cases were missing only one observation, while 11 cases were missing two or more observations. Of the eleven cases missing two or more observations, one case was missing 12 observations, but since 11 of the missing values pertained to the "knowledge content" construct, this case was retained as being meaningful to all other dimensions. None of the other 10 cases were missing more than 4 observations (see table 6 below). An examination of the missing data did not reveal any underlying pattern. Missing values were recorded using mean substitution.

Table 6: Number of cases with missing values

No. of missing values in a case	No. of cases
1	16
2	5
3	1
4	4
12	1

4.1.1.4 Skewness and Kurtosis

All items were examined for skewness and kurtosis. The following items were eliminated as they exhibited low variation, and were both peaked and highly skewed: KA1, KA2, KA3, KA4, KA5, KA6, KA11, KS5, KP3, KU4, KC6, KC8, KC11, KC18, KC19, KC20, KC21, IK3 and IK5 (refer Appendix C for detail of deleted items).

Given the number of alternative measures available, it was decided to eliminate these items rather than attempt a transformation.

4.2 Respondent Profile and Demographics

The final sample consisted of 112 usable observations.

4.2.1 Respondents by Region

The regional profile of these usable responses is shown in table 7 below.

Across all regions, most respondents were inner city (41%) and suburban (25%) establishments. There were also 11 coastal establishments located in the Western Cape, Kwazulu Natal and Eastern Cape. In Gauteng and Western Cape, there were 8 airport and highway hotels. Most of the respondents from Eastern Cape, Free State, Limpopo, Mpumalanga, North West and Northern Cape provinces were from establishments located in the countryside or in game or nature reserves.

Table 7: Respondents by Province

Province	Number of Establishments in Population	Percentage of Total Population	Number of Establishments in Sample	Percentage of Total Sample	Percentage Difference Sample & Population
Eastern Cape	52	7.99	2	1.79	-6.2
Free State	20	3.07	2	1.79	-1.28
Gauteng	143	21.97	36	32.14	10.17
Kwazulu-Natal	97	14.90	17	15.18	0.28
Limpopo	41	6.30	4	3.57	-2.73
Mpumalanga	63	9.68	7	6.25	-3.43
North West	23	3.53	1	0.89	-2.64
Northern Cape	5	0.77	4	3.57	2.8
Western Cape	207	31.80	39	34.82	3.02
Total	**651**	**100.00**	**112**	**100.00**	

4.2.2 Respondents by Establishment Size

Large organisations are very well represented in the sample, with 48% of the sample consisting of establishments with more than 100 rooms and 11% of the sample consisting of establishments with more than 250 rooms. Smaller organisations (between 15 and 50 rooms) are less well represented in this sample. The profile of usable responses according to organisation size is shown in table 8 below.

Table 8: Respondents by Establishment Size (number of rooms)

Number of Rooms	Number of Establishments in Population	Percentage of Total Population	Number of Establishments in Sample	Percentage of Total Sample	Percentage Difference Sample & Population
15-30	195	29.95	13	11.61	-18.34
31-50	118	18.13	9	8.04	-10.09
51-75	114	17.51	25	22.32	4.81
76-100	77	11.83	11	9.82	-2.01
101-150	61	9.37	20	17.86	8.49
151-200	33	5.07	12	10.71	5.64
201-250	24	3.69	10	8.93	5.24
251-300	8	1.23	4	3.57	2.34
301-400	14	2.15	6	5.36	3.21
>400	7	1.08	2	1.79	0.71
Total	**651**	**100.00**	**112**	**100.00**	**0.0**

4.2.3 Respondents by Property Type

Most of the responses were obtained from establishments describing themselves as hotels but there were some using alternative descriptions of property type. None the less, all fit the definition and are part of the population of hospitality organisations considered in this study. Table 9 below shows the profile of responses according to descriptor of property type:

Table 9: Respondents by Property Type

Property Type	Number of Establishments in Sample
Hotel	98
All-suite	4
Extended Stay	2
Limited Service	8
Total	**112**

4.2.4 Respondents by Market Type

Properties catering for either or both business and leisure markets were well represented across size bands and were further well distributed amongst the different lodging segments. The “market type” categories in this table were derived from the “market type” options selected in the questionnaire. Options “corporate” and “convention” were taken to represent the “business” market type while the options “tourist”, “casino”, “health and spa” were interpreted as representing the “leisure”

market type. Some respondents had checked options spanning from both "business" and "leisure" groups. These comprise the "business and leisure" market type in this table. Table 10 below shows the profile of usable responses according to size, lodging segment and market type.

Table 10: Respondents by Market Type

Market Type	Sum of Count
Mostly Business	51
Mostly Leisure	35
Business & Leisure	26
Grand Total	**112**

4.2.5 Respondents by Chain Affiliation, Ownership Type and Management Type

There was good representation of both chain affiliated and independent hotels, with 60% of the establishments being chain affiliated. Of those, roughly half were still independently owned and managed rather than under management contract. 40% of the hotels were not chain affiliated and the majority (three quarters) of those were owner managed.

As reported in a later paragraph in this study, chain affiliation was re-coded in 1 case and ownership type was re-coded in 16 cases (refer section "4.2.10 Corrected and Substituted Demographic Data"). Table 11 below shows the profile of usable responses according to chain affiliation, ownership type and management type.

Table 11: Respondents by Chain Affiliation, Ownership Type and Management Type

Chain Affiliation / Managed By	Independent	Franchise	Other	Total
Not Chain Affiliated	**41**		**4**	**45**
Owner	32		1	33
Management Contract	9		2	11
Other			1	1
Chain Affiliated	**31**	**12**	**24**	**67**
Owner	25	6		31
Management Contract	5	6	20	31
Other	1		4	5
Summary	**72**	**12**	**28**	**112**
Owner	**57**	**6**	**1**	**64**
Management Contract	**14**	**6**	**22**	**42**
Other	**1**	**0**	**5**	**6**

4.2.6 Respondents by Service Orientation

Respondents were asked to indicate the service focus of their establishment. Two options were provided, namely "service standardisation", which was explained as "providing a consistent and repeatable guest experience" and "service differentiation" which was explained as "meeting the needs of individual customers". Many

respondents selected both options. Table 12 below shows the profile of usable responses according to size of property, service focus and lodging segment.

Most economy and mid-price establishments focused primarily on service standardisation while offering a slightly differentiated service to selected customers, for example stocking the in-room fridge with a regular guest's favourite beverages. Upscale and luxury establishments were interestingly split across the service types.

Table 12: Respondents by, Service Focus and Lodging Segment

	Lodging Segment				
Service Focus	**Economy**	**Mid-price**	**Upscale**	**Luxury**	**Grand Total**
Differentiation	1	18	12	8	39
Standardisation	5	24	14	7	50
Both Differentiation and Standardisation	3	10	6	4	23
Grand Total	**9**	**52**	**32**	**19**	**112**

4.2.7 Respondents by Age of Establishment

Respondents ranged the full gamut from well-established to newly constructed establishments. Table 13 below shows the profile of usable responses according to age of property.

Table 13: Respondents by Age of Property

Age of Property	**Grand Total**
Less than 5 years	10
5-10 Years	18
11-20 Years	40
21-30 Years	19
31-50 Years	13
51-70 Years	7
71-100 Years	1
Older than 100 Years	4
Total	**112**

4.2.8 Respondents by Job Title

The vast majority of respondents (91.96%) had management or executive level job titles, and almost half the respondents (45.54%) were general managers. Table 14 below shows the profile of usable responses according to job title.

Table 14: Respondents by Job title

Job Title	Number of Establishments
Executive	2
Owner	4
General Manager	51
Front Office Manager	20
Operations Manager / Duty Manager	24
Food and Beverage Manager	3
Human Resources Manager / Administrator	2
Revenue Manager	3
Unspecified	3
Grand Total	**112**

4.2.9 Corrected and Substituted Demographic Data

Some demographic data was missing and was substituted. Five cases had unspecified lodging segments (i.e. budget through luxury), these were derived based on the star rating of the hotels as specified by the respondent. In addition, two cases had indicated more than one lodging segment, e.g. "mid-price & upscale". These two cases were coded at the higher segment level. Two cases had an unspecified property type, however in both cases the hotel name had been supplied by the respondent; hence the missing demographic data could be followed up from the hotel web site. One case had an unspecified province which was completed on the basis of the post office stamp on the return envelope. The market type had been omitted in 5 cases, however in all 5 cases the hotel name had been indicated by the respondent, hence the market type was obtained from the hotel web site. The chain affiliation was missing in one case, and was deduced from the domain of the contact email address given by the respondent, which belonged to a well-known hospitality brand. Sixteen establishments did not report as being chain affiliated, however they reported as chain owned. This study recorded all chain owned hotels as being, by definition, chain affiliated. The ownership type was changed accordingly. In 11 cases, location type had been omitted on paper surveys and was completed at the point of collection from the hotel. In 4 cases, the age of the property was omitted on paper surveys and was completed by following up at the point of collection at the hotel. Table 15 below provides a summary of demographic data completed in this manner:

Table 15: Number of Cases with Missing / Substituted Demographic Data

Demographic Data Corrected	No of Cases
Property type	2
Lodging segment	7
Market type	5
Province	1
Chain Affiliation	1
Owned By	16
Location Type	11
Age of Property	4

Thus all demographic data was able to be completed and there were no further missing demographic details.

4.2.10 Summary of Respondents' Demographic Characteristics

The sample contains observations for all provinces of South Africa. The sample is fully representative of Gauteng, Western Cape, Kwazulu-Natal and Northern Cape provinces, while the other five provinces are under-represented. Respondents are mostly from hotels with more than 50 rooms. Smaller establishments (50 rooms and less) are under-represented in this sample. Almost half the respondents are mid-price establishments, while upscale and luxury establishments together almost constitute the other half of the sample, with the balance being comprised of economy lodgings, which are less well represented. The sample consists overwhelmingly of hotels and other property types (e.g. all-suite, limited service, extended stay, motel, self-catering) are less easily distinguished as most respondents simply referred to their establishments as hotels. Nonetheless all responding types fit the definitions of hospitality organisations (accommodation providers) used in this study. Business and leisure accommodations are evenly represented in the sample. Slightly more than half of the sample consists of chain affiliated establishments. Most establishments in the sample are owned independently. Slightly more than half of the establishments in the sample are owner managed, with the balance being subject to management contract and other management styles. Inner-city and suburban establishments comprise two-thirds of the sample, with the balance being made up of coastal, game reserve, country, highway and airport establishments. Almost half the respondents offer a purely standardised service to their guests, one-third of respondents differentiate their service to provide a unique guest experience and the balance tailor their services to contain elements of both service standardisation and differentiation. Three-quarters of the sample consists of establishments of 30 years old or less.

4.3 Reliability and Validity of Measures

An analysis was performed on the 12 items that measured the components of knowledge acquisition; other analyses were performed on the 7 items for knowledge conversion, the 8 items for knowledge sharing, the 7 items for knowledge protection, the 9 items for knowledge application, the 21 items for knowledge content, the 5 items for IT infrastructure quality, the 2 items for IT human resources, the 4 items for IT capabilities, the 5 items for IT for knowledge management and the 16 items for hospitality organisation competitiveness. Cronbach's alpha was used to examine the reliability of the instruments.

The following sections present the results of validity and reliability tests for each of the above constructs. We begin with the dependent hospitality organisation competitiveness construct.

4.3.1 Hospitality Organisation Competitiveness

Each of the dimensions of hospitality organisation competitiveness was measured using multi-item scales. To examine the unidimensionality, convergent and discriminant validity of items for each of the four hospitality organisation competitiveness dimensions, principal component analysis with varimax rotation was used. Items were allowed to load only onto their associated construct. All items had

factor loadings exceeding 0.60 hence no items were deleted. All 16 items grouped into the four distinct dimensions of hospitality organisation competitiveness based on market performance, customer performance, financial performance and employee performance. Three items loaded onto two factors (CP1, CP4 and CP12) and they fell short of the 0.65 cut-off level, but these items were nonetheless retained for reasons explained below. CP1 ("increasing room occupancy rates") was retained as a measure of market performance rather than financial performance because increasing the room occupancy rate does not necessarily lead to increased profitability, in fact the opposite may be achieved if room rates are discounted. Moreover, room occupancy rates are considered a measure of market performance because maximal occupancy is only achieved when an establishment is able to attract the market for both weekday and weekend accommodations (Jeffrey & Barden, 2000). Despite its cross-loading, CP4 ("profitability of hotel services in the last three years") was retained as a measure of financial performance because it had a clear dominant loading onto the financial performance factor. Despite its cross-loading, CP12 ("competencies of employees") was retained as a measure of employee performance. Competent employees possess the necessary and relevant skills and know-how to perform their daily tasks. In a case study amongst employees of a large international hotel in Pakistan, Afaq, Yussof, Khan, Azam & Thukiman (2011) found that employee performance is significantly affected by employee capabilities, which are in turn nurtured through training.

Cronbach's alpha, with a cutoff value of 0.70, was used to examine the reliability of each of the four hospitality organisation competitiveness constructs. All four constructs exhibited reliability in excess of 0.70.

Table 16 displays the items and factor loadings for the rotated factors, as well as the variance and Cronbach alpha coefficient for each construct. Loadings of less than 0.40 are omitted to improve readability of the table.

Table 16: Hospitality Organisation Competitiveness – Factor Loadings

Item	Competitiveness Based on Market Performance	Competitiveness Based on Customer Performance	Competitiveness Based on Financial Performance	Competitiveness Based on Employee Performance
CP1*	0.631		0.419	
CP2	0.871			
CP3	0.809			
CP4*	0.408		0.729	
CP5			0.718	
CP6			0.811	
CP7			0.782	
CP8			0.733	
CP9			0.861	
CP10				0.832
CP11				0.887
CP12*		0.502		0.599
CP13		0.830		

Item	Competitiveness Based on Market Performance	Competitiveness Based on Customer Performance	Competitiveness Based on Financial Performance	Competitiveness Based on Employee Performance
CP14		0.829		
CP15		0.847		
CP16		0.771		
Cronbach's alpha	0.888	0.911	0.922	0.847
Percent variances explained	7.038	12.686	52.770	6.384

Notes: *Retained because it appears to be a relevant scale item. Cronbach's alpha decreases when any scale item is deleted.

4.3.2 Knowledge Process

Each of the knowledge process variables (acquisition, conversion, sharing and protection) was measured by multi-item scales. To examine the unidimensionality, convergent and discriminant validity of items for each of the knowledge acquisition, knowledge conversion, knowledge sharing and knowledge protection constructs, principal component analysis with varimax was used. All items had factor loadings exceeding 0.60 hence no items were deleted. There were three items namely KA10, KA12 and KV6 that loaded on more than one item. Notwithstanding this these items were retained because they are relevant scale items and furthermore their loadings on the principal factor are very close to the significant level of 0.65. Item KV6 combined into the knowledge sharing rather than the knowledge conversion construct, this is thought to be due to the wording of this item which focuses on the processes for replacing outdated knowledge. Such processes would entail the identification of outdated knowledge and the sourcing of replacement knowledge — both of which would be achieved through consultation and debate. It follows that item KV6 combined into the knowledge sharing construct. A further two items namely KA7 and KP5 were retained due to their relevance despite having loadings that fell marginally short of the cutoff level of 0.65. The factor loadings for items KV3, KV4, KV5, KV7 and KP4 fell short of the cutoff of 0.60 and these items were consequently dropped at this point.

Cronbach's alpha, with a cutoff value of 0.70, was used to examine the reliability of the instruments. All constructs exhibited reliability in excess of 0.70.

Table 17 displays the items and factor loadings for the rotated factors, as well as the variance and Cronbach alpha coefficient for each construct. Loadings of less than 0.40 are omitted to improve reliability. The items previously eliminated due to skewness / kurtosis namely KA1, KA2, KA3, KA4, KA5, KA6, KA11, KS5, KP3, KU4, KC6, KC8, KC11, KC18, KC19, KC20, KC21, IK3 and IK5 (refer section "4.1.1.4 Skewness and Kurtosis" and Appendix C) are not reflected in this table either.

Table 17: Knowledge Process – Factor Loadings

Survey Item	Knowledge Acquisition	Knowledge Conversion	Knowledge Sharing	Knowledge Protection
KA7*	0.618			
KA8	0.752			
KA9	0.795			
KA10*	0.632	0.457		
KA12*	0.670		0.402	
KV1		0.692		
KV2		0.727		
KV6*			0.643	0.407
KS1			0.694	
KS2			0.791	
KS3			0.827	
KS4			0.834	
KS6			0.772	
KS7			0.783	
KS8			0.716	
KP1				0.846
KP2				0.857
KP5*				0.645
KP6				0.699
KP7			0.486	0.692
Cronbach's alpha	0.819	0.748	0.938	0.903
Percent variances explained	**7.692**	**5.173**	**49.988**	**9.643**

Notes: *Retained because it appears to be a relevant scale item. Cronbach's alpha decreases when any scale item is deleted.

4.3.3 Knowledge Content

The knowledge content variable had items related to the dimensions of knowledge of guests, products and services, operational procedures, competitors and job associates. This knowledge would originate from both internal and external sources. Principal component analysis with varimax rotation was performed on the 14 knowledge content items that remained after skewness and kurtosis checks (refer section "4.1.1.4 Skewness and Kurtosis" and Appendix C). Items were consecutively dropped until a single factor emerged. Items KC3, KC4, KC5, KC7 and KC12 were dropped in this manner. The final knowledge content factor represents knowledge of guests, products, services and competitors and consists of remaining items KC1, KC2, KC9, KC10, KC13, KC14, KC15, KC16 and KC17. Items related to marketing, operations, and sales intermediaries are thus dropped from the knowledge content construct. The items that remained to represent this construct were deemed to be the most directly relevant to hospitality organisation competitiveness and aligned well to the categories of knowledge content identified by Davenport, De Long & Beers (1998), namely internally- and externally-sourced knowledge content. They are thus merged into a

single unidimensional knowledge content construct. All items had factor loadings exceeding 0.60.

Cronbach's alpha, with a cut-off value of 0.70, was used to examine the reliability of the knowledge content construct. This construct exhibits reliability in excess of 0.70.

Table 18 displays the items and factor loadings for the rotated factor, as well as the variance and Cronbach alpha coefficient. Loadings of less than 0.40 are omitted to improve clarity.

Table 18: Knowledge Content – Factor Loadings

Item	**Knowledge Content**
KC1	0.759
KC2	0.731
KC9	0.830
KC10	0.770
KC13	0.752
KC14	0.847
KC15	0.807
KC16	0.860
KC17	0.842
Cronbach's alpha	0.929
Percent variances explained	64.137

4.3.4 Knowledge Application

The knowledge application variable was intended as a unidimensional construct measured by multiple items. Unidimensionality was confirmed using principal component analysis. All items had factor loadings exceeding 0.65 thereby confirming convergent validity. Since there was only one factor there were no cross loadings. No items were deleted.

Table 19: Knowledge Application – Factor Loadings

Item	**Knowledge Application / Utilisation**
KU1	0.751
KU2	0.780
KU3	0.830
KU5	0.885
KU6	0.863
KU7	0.898
KU8	0.880
KU9	0.846
Cronbach's alpha	0.941
Percent variances explained	**71.084**

4.3.5 IT Resources

Each of the variables for IT resources was measured using multi-item scales. To examine the unidimensionality, convergent and discriminant validity of items for each of the IT infrastructure quality, IT human capital and IT capabilities constructs, principal component analysis with varimax rotation was used. All 14 items had factor loadings exceeding 0.60.

However, only two factors were identified. The first factor consisted of the IT capabilities and IT human resources items and the second the IT infrastructure quality items. The loadings for two items namely IC3 ("we have well-defined service quality criteria for all IS support tasks") and IC4 ("we continuously monitor the performance of our computer systems") fell marginally short of the cut-off level of 0.65, however these items were retained due to their relevance to the IT capabilities construct. All items for the IT infrastructure quality construct loaded against one factor as expected. The loading for one item namely IQ1 ("our IT systems are modular"), was marginally lower than the cut-off level of 0.65, notwithstanding this the item was retained due to its relevance. Three items namely IC2, IC3 and IC4 loaded against both IT infrastructure quality and IT capabilities factors, but were nonetheless retained based on their high primary loadings. It was also decided to retain IC4 despite its high cross-loading because this is the only item that measures the degree of systems monitoring in place at the establishment. Constant monitoring of IT systems is necessary in order to ensure systems availability and ensure robustness of the IT capability (Debreceby & Gray, 2009). Item IQ5 also displayed relatively high cross-loadings.

Thus the PCA resulted in two IT resources factors representing IT infrastructure quality and IT capabilities. Cronbach's alpha, with a cutoff value of 0.70, was used to examine the reliability of the instruments. Both constructs exhibited reliability in excess of 0.70.

There were 5 items for IT Support for Knowledge Management, but this construct was dropped as its items did not load in any way that made theoretical sense.

Table 20 displays the items and factor loadings for the rotated factors, as well as the variance and Cronbach alpha coefficient for each construct. Loadings of less than 0.40 are omitted to improve clarity.

Table 20: IT Resources – Factor Loadings

Survey Item	IT Infrastructure Quality	IT Capabilities (including IT human resources)
IQ1*	0.684	
IQ2	0.845	
IQ3	0.824	
IQ4	0.811	
IQ5	0.734	0.433
IH1		0.776
IH2		0.770
IC1		0.763
IC2	0.465	0.763
IC3*	0.488	0.726
IC4*	0.525	0.567
Cronbach's alpha	0.895	0.897
Percent variances explained	**59.653**	**10.026**

Notes: *Retained because it appears to be a relevant scale item. Cronbach's alpha decreases when any scale item is deleted.

4.3.6 IT Applications

For IT applications, respondents were presented with a set of applications and asked to indicate the extent to which each application played a role in driving business performance. A composite score was obtained for IT applications by adding the individual scores for all IT application items IA1 to IA28 for each of the observations. PCA analysis was then conducted with IT Applications and the four composite scores for market, financial, employee and customer competitiveness. All five composite scores loaded onto a single factor accounting for 60.91% of the variance. The IT applications measure thus cannot be discriminated from hospitality organisation competitiveness and is dropped from further analysis. However, a list of the applications and the mean scores (from highest to lowest) is presented in Appendix F in order to illustrate the applications considered to be the most important, on average, to the performance of the responding establishments.

4.4 Common Method Bias

One potential issue which may occur when having a single respondent provide ratings for both dependent and independent variables is common method bias. This refers to variance that is attributable to the data collection method rather than the underlying variables. The presence of common method variance was examined by performing principal component analysis on all items in the model simultaneously, with the expectation that in order to rule out common method bias, the first factor should not account for more than 50% of the variance. This method is known as Harman's single factor test (Harman, 1967) and is widely used (Podsakoff, MacKenzie & Lee, 2003). When principal component analysis was performed in this manner, the first factor accounted for 38.880% of the variance, which is less than the cut-off value of 50% (i.e. less than a majority of variance is accounted for by the first factor). Common

method bias was thus deemed not to be present to any significant extent in this study and the analysis proceeded.

4.5 Descriptive Statistics

Following the above tests for validity and reliability, a composite index score was calculated for each of the constructs by computing the average of the items for each construct remaining after the PCA's. Descriptive statistics for the composite indices are provided in Table 21 below:

Table 21: Descriptive Statistics

Variable	Number of Items	Cronbach Alpha	Mean	Std. Deviation
Knowledge Acquisition	5	.819	5.7035	.93418
Knowledge Conversion	3	.800	5.3036	1.25446
Knowledge Sharing	7	.932	5.4949	1.09064
Knowledge Protection	5	.903	5.5133	1.11165
Knowledge Application	8	.941	5.6655	.97138
Knowledge Content	9	.929	5.6283	.85819
IT Infrastructure Quality	5	.895	5.5743	.87613
IT Capabilities	6	.897	5.2939	1.06784
Hospitality Organisation Competitiveness based on Market Performance	3	.888	5.1822	.99362
Hospitality Organisation Competitiveness based on Financial Performance	6	.922	5.2657	.89154
Hospitality Organisation Competitiveness based on Employee Performance	3	.847	5.2768	1.10680
Hospitality Organisation Competitiveness based on Customer Performance	4	.921	5.8163	.86551

Note: N=112 for all variables

4.6 Correlation Analysis

Bivariate correlations between the model's main effects variables and the four hospitality organisation competitiveness variables were obtained and analysed to assess the existence and extent of association between the dependent and independent variables. Table 22 below provides an overall correlation matrix for the nine independent variables knowledge acquisition, knowledge conversion, knowledge sharing, knowledge protection, knowledge application, knowledge content, IT infrastructure quality, IT capabilities and IT application portfolio plus the four dependent variables related to hospitality organisation competitiveness as well as two control variables (size and age of property).

From Table 22 it is also apparent that all variables related to knowledge process, knowledge content and IT resources are significantly correlated with market performance, financial performance and employee performance. There is a weaker correlation between customer performance and the knowledge process variables, with the exception of knowledge protection which emerges as strongly associated with customer performance.

Table 22: Pearson Correlations between Variables

	Knowledge Acquisition	Knowledge Conversion	Knowledge Sharing	Knowledge Protection	Knowledge Application	Knowledge Content	IT Infrastructure Quality	IT Capabilities	IT Applications Portfolio	Market Performance	Financial Performance	Employee Performance	Customer Performance	Number of Rooms	Age of Property
Knowledge Acquisition	1														
Knowledge Conversion	.48(**)	1													
Knowledge Sharing	.57(**)	.61(**)	1												
Knowledge Protection	.56(**)	.59(**)	.64(**)	1											
Knowledge Application	.64(**)	.59(**)	.82(**)	.80(**)	1										
Knowledge Content	.54(**)	.45(**)	.60(**)	.57(**)	.64(**)	1									
IT Infrastructure Quality	.41(**)	.36(**)	.44(**)	.59(**)	.56(**)	.55(**)	1								
IT Capabilities	.56(**)	.41(**)	.49(**)	.62(**)	.63(**)	.57(**)	.72(**)	1							
IT Applications Portfolio	.60(**)	.41(**)	.57(**)	.65(**)	.66(**)	.71(**)	.66(**)	.76(**)	1						
Market Performance	.39(**)	.26(**)	.26(**)	.27(**)	.26(**)	.44(**)	.30(**)	.42(**)	.55(**)	1					
Financial Performance	.43(**)	.36(**)	.41(**)	.41(**)	.45(**)	.59(**)	.42(**)	.42(**)	.55(**)	.69(**)	1				
Employee Performance	.28(**)	.27(**)	.29(**)	.30(**)	.25(**)	.36(**)	.27(**)	.28(**)	.34(**)	.47(**)	.44(**)	1			
Customer Performance	.19(*)	.22(*)	.17	.26(**)	.22(*)	.38(**)	.30(**)	.22(*)	.31(**)	.56(**)	.55(**)	.61(**)	1		
Number of Rooms	.23(*)	.17	.16	.27(**)	.22(*)	.18	.29(**)	.35(**)	.33(**)	.11	.12	.10	-.05	1	
Age of Property	-.23(*)	-.03	-.08	-.04	-.00	-.07	.037	-.07	-.06	-.21(*)	-.08	-.25(**)	-.20(*)	-.01	1

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

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

4.7 The Effects of Control Variables on Hospitality Organisation Competitiveness

4.7.1 Age and Size

"Age of property" and "size of property" are scale variables. Their effect upon the four hospitality organisation competitiveness dimensions is shown in the above correlation table. In this sample the size of a property is not significantly associated with any of the four hospitality organisation competitiveness dimensions. However the age of a property is significantly associated with market performance ($r = -.21$, $p<0.05$), employee performance ($r = -.25$, $p<0.05$) and customer performance ($r=-.20$, $p<0.05$). The older the establishment, the poorer its performance along these three dimensions.

4.7.2 Lodging Segment

The lodging segment is a classifier of property according to the degree of sophistication and the quality of services (Enz, 2010b). This study uses the categories of lodging segments from Siguaw et al. (2000) namely budget, economy, mid-price, upscale and luxury.

Past research has shown that lodging segment type can impact performance (O'Neill & Mattila, 2006). Lodging segment was considered here in terms of its possible impact on hospitality organisation competitiveness.

Spearman correlation coefficients were obtained between lodging segment and the four hospitality organisation competitiveness measures. As is apparent from Table 23, a statistical difference at a weak 5% level of significance was found between lodging segment and market performance. Hence lodging segment was used as a control variable in analyses related to market performance.

Table 23: Spearman Correlations Between Lodging Segment and Market, Financial, Employee and Customer Performance

	Lodging Segment
Lodging Segment	1.000
Market Performance	0.224 *
Financial Performance	0.077
Employee Performance	0.054
Customer Performance	0.171

4.7.3 Province and Location Type

Province was considered because of the different income levels and degrees of affluence across South Africa and it was believed that this could influence the performance and competitiveness of hotel establishments.

A one-way between subjects ANOVA was conducted to compare the effect of province on market performance, financial performance, employee performance and customer performance respectively. As is apparent from Table 24, no statistically significant differences were found for any of the four performance levels across provinces. Province is therefore dropped from further analyses.

Table 24: Means and Standard Deviations Comparing Performance Per Province

		Market Performance		Financial Performance		Employee Performance		Customer Performance	
Province	N	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Gauteng	36	5.444	0.9529	5.542	0.8604	5.667	1.02972	6.060	0.7317
Western Cape	39	5.086	1.0023	5.036	0.9816	5.017	1.01148	5.724	0.8900
Kwazulu-Natal	17	5.179	0.8687	5.392	0.760	5.137	1.31265	5.779	0.829
Other	20	4.900	1.1034	5.108	0.758	5.200	1.1208	5.588	1.0204
Total	112	5.182	0.994	5.266	0.892	5.277	1.107	5.817	0.8655
F		1.049		1.330		1.630		1.050	
Sig		0.405		0.237		0.125		0.404	

The location type is a classifier of the local market (Enz, 2010b). The following location types were used in this study: inner-city, suburban, airport and highway.

Past research has shown that location type can impact performance (Barros, 2005; O'Neill & Mattila, 2006). Location type was considered here in terms of its possible impact on competitiveness.

A one-way between subjects ANOVA was conducted to compare the effect of location type on market performance, financial performance, employee performance and customer performance respectively. As is apparent from Table 25, no statistically significant differences were found for any of the four performance levels across location types. Location type is therefore dropped from further analyses.

Table 25: ANOVA Results for the Effect of Location Type on Market, Financial, Employee and Customer Performance

		Market Performance		Financial Performance		Employee Performance		Customer Performance	
Location Type	N	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Inner-City	47	5.078	1.055	5.218	0.92118	5.262	1.074	5.589	0.812
Suburban	28	5.202	0.931	5.256	0.85163	5.452	0.970	5.955	0.896
Beach / Coastal	12	5.086	1.156	5.208	1.06393	4.917	1.304	6.083	0.567
Airport & Highway	10	5.533	0.670	5.550	0.90284	5.433	1.101	6.125	0.626
Game / Nature Reserve / Mountains	15	5.314	1.005	5.289	0.79549	5.178	1.338	5.850	1.176
Total	112	5.086	1.156	5.208	1.064	4.917	1.304	6.083	0.567
F		.530		.296		.567		1.638	
Sig		.714		.880		.687		.170	

4.7.4 Market Type

The market type of a hospitality establishment shows whether the establishment mostly caters for the leisure or the business market, or both.

A one-way between subjects ANOVA was conducted to compare the effect of market type on market performance, financial performance, employee performance and customer performance respectively. As is apparent from Table 26, a statistically significant difference was found in respect of employee performance. Market type was used as a control variable in analyses related to employee performance. Hospitality organisations that cater mostly to the business market report better levels of employee satisfaction and competencies.

Table 26: ANOVA Results for the Effect of Market Type on Market, Financial, Employee and Customer Performance

		Market Performance		Financial Performance		Employee Performance		Customer Performance	
Market Type	N	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Business & Leisure	26	5.040	1.224	5.225	1.100	4.936	1.196	5.692	0.873
Mostly Business	51	5.197	0.962	5.364	0.774	5.634	0.992	5.866	0.830
Mostly Leisure	35	5.268	0.859	5.153	0.892	5.010	1.071	5.836	0.925
Total	112	5.182	0.994	5.266	0.892	5.277	1.107	5.816	0.866
F		0.399		0.608		5.289		0.356	
Sig		0.672		0.546		0.006**		0.701	

4.7.5 Chain Affiliation

The chain affiliation refers to the brand association of the hotel. Chain affiliation affects the competitiveness of a hospitality establishment, as the brand affects customer satisfaction levels and also room revenues (O'Neill & Mattila, 2004). In this study, hospitality organisations that operate outside a chain affiliation are regarded as independent.

An independent samples t-test was conducted to compare the effect of chain affiliation on market performance, financial performance, employee performance and customer performance respectively. As is apparent from Table 27, a difference that is significant at a 1% level was found amongst the financial performances between chain affiliated and independent hotels ($t=2.926$, $p < 0.01$). Inspection of the two group means indicate that the average financial performance score for chain affiliated hotels ($M = 5.461$) is significantly higher than the score for independent hotels ($M = 4.975$). Chain affiliation was used as a control variable in analyses related to financial performance.

Table 27: Comparison Between Chain Affiliated and Independent Hotels on market, financial, employee and customer performance.

	Chain Affiliated	N	Mean	Std. Deviation	t	df	p
Market Performance	Yes	67	5.289	0.983	1.393	110	.166
	No	45	5.023	0.999			
Financial Performance	Yes	67	5.461	0.861	2.926	110	.004**
	No	45	4.975	0.865			
Employee Performance	Yes	67	5.438	1.092	1.901	110	.060
	No	45	5.037	1.097			
Customer Performance	Yes	67	5.853	0.832	.551	110	.583
	No	45	5.761	0.920			

4.7.6 Service Orientation

Service orientation refers to the degree to which the hospitality establishment caters for differentiated service versus standardised service. The service orientation reflects the market strategy of the firm, and influences the number and quality of human resources needed by the organisation. The service orientation of an organisation influences its propensity for radical innovation and this in turn affects its competitiveness (Martínez-Ros & Orfila-Sintes, 2009).

A one-way between subjects ANOVA was conducted to compare the effect of service orientation on market performance, financial performance, employee performance and customer performance respectively. As is apparent from Table 28, no statistically significant differences were found for any of the four performance levels across service orientations. Service orientation is therefore dropped from further analyses.

Table 28: ANOVA Results for the Effect of Service Orientation on Market, Financial, Employee and Customer Performance

		Market Performance		Financial Performance		Employee Performance		Customer Performance	
Service Orientation	N	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Differentiation & Standardisation	23	4.943	1.17099	5.174	0.988	5.246	1.25617	5.946	0.989
Differentiation	39	5.205	0.83286	5.227	0.833	5.308	1.14039	5.673	0.889
Standardisation	50	5.274	1.02325	5.338	0.902	5.267	1.02795	5.869	0.787
Total	112	5.182	0.99362	5.266	0.892	5.277	1.10680	5.816	0.866
F		0.889		0.319		0.026		0.880	
Sig		0.414		0.728		0.975		0.418	

4.8 Hypothesis Testing

4.8.1 Testing of Hypotheses

The testing of hypotheses was firstly carried out through correlation analysis. Thereafter, the independent relative effects of the variables on performance were examined using multiple regression analysis. The correlations as reflected in Table 22 are discussed below.

Hypothesis H1-a: Knowledge acquisition was found to be significantly associated with market performance ($r = .39$, $p < 0.01$), financial performance ($r = .43$, $p < 0.01$), employee performance ($r = .28$, $p < 0.01$) and customer performance ($r = .19$, $p < 0.05$). Thus empirical support was found for H1-a. Hospitality organisations that purposefully take steps to acquire knowledge (e.g. by sending staff on training courses, purchasing competitive intelligence or buying IT applications with embedded knowledge) are more competitive those that don't.

Hypothesis H1-b: Knowledge conversion was found to be significantly associated with market performance ($r = .26$, $p < 0.01$), financial performance ($r = .36$, $p < 0.01$), employee performance ($r = .27$, $p < 0.01$) and customer performance ($r = .22$, $p < 0.05$). Thus empirical support was found for H1-b. These findings show that hospitality organisations can increase their competitiveness by putting in place processes to document, standardise, categorise, label, integrate and update knowledge.
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Hypothesis H1-c: Knowledge sharing was found to be significantly associated with market performance ($r = .26$, $p < 0.01$), financial performance ($r = .41$, $p < 0.01$) and employee performance ($r = .29$, $p < 0.01$). However knowledge sharing was not significantly associated with customer performance ($r = .17$, n/s). Thus only partial empirical support was found for H1-c. These findings mean that firms that encourage the sharing of knowledge vertically, horizontally and across organisational boundaries, experience benefits in terms of market, financial and employee performance. By contrast, knowledge sharing does not significantly affect customer performance.

Hypothesis H1-d: Knowledge protection was found to be significantly associated with market performance ($r = .27$, $p < 0.01$), financial performance ($r = .41$, $p < 0.01$), employee performance ($r = .30$, $p < 0.01$) and customer performance ($r = .26$, $p < 0.01$). Thus empirical support was found for H1-d. These findings show that firms that put in place procedures to protect their knowledge assets are more competitive than ones that don't.

Hypothesis H2: Knowledge content was found to be significantly associated with market performance ($r = .44$, $p < 0.01$), financial performance ($r = .59$, $p < 0.01$), employee performance ($r = .36$, $p < 0.01$) and customer performance ($r = .38$, $p < 0.01$). Thus empirical support was found for H2. These findings confirm that hospitality firms that purposefully build their repositories of knowledge related to entities internal and external to the firm.

Hypothesis H3-a: IT infrastructure quality was found to be significantly associated with market performance ($r = .30$, $p < 0.01$), financial performance ($r = .42$, $p < 0.01$), employee performance ($r = .27$, $p < 0.01$) and customer performance ($r = .30$, $p < 0.01$). Thus empirical support was found for H3-a. These findings confirm that hospitality organisations can increase their competitiveness by putting in place IT infrastructure.

Hypothesis H3-b: Hypothesis H3-b is related to the association between IT applications and the competitiveness of a hospitality organisation. During PCA, it was decided to drop the IT applications construct due to its low discriminant validity. This hypothesis has fallen away.

Hypothesis H3-c: IT Capabilities was found to be significantly associated with market performance ($r = .42$, $p < 0.01$), financial performance ($r = .42$, $p < 0.01$), employee performance ($r = .28$, $p < 0.01$) and customer performance ($r = .22$, $p < 0.05$). Thus empirical support was found for H3-c. These findings show that firms that put processes in place to plan, acquire, implement, support and monitor their IT capability and that furthermore have technical and managerial IT skills, are more competitive than firms that don't.

Hypothesis H3-d: Hypothesis H3-d is related to the association between IT human resources and the competitiveness of a hospitality organisation. During PCA, IT capabilities and IT human resources merged into a single construct. The items relating to IT human resources are thus treated as part of the above hypothesis. H3-d has fallen away.

Hypothesis H3-e: Hypothesis H3-e was related to IT Support for Knowledge Management. During PCA, all items for this construct were dropped. This hypothesis hence has fallen away.

Hypothesis H4: Knowledge application was found to be significantly associated with market performance ($r = .26$, $p < 0.01$), financial performance ($r = .45$, $p < 0.01$), employee performance ($r = .25$, $p < 0.01$) and customer performance ($r = .22$, $p < 0.05$). Thus empirical support was found for H4. These findings confirm that hospitality organisations can increase their competitiveness through the application of their knowledge resources.

Hypotheses H4-a, H4-b, H4-c, H4-d and H5 relate to the mediation of the relationship between knowledge process and content on the one hand, and market, financial, employee and customer performance on the other. Three conditions need to hold in order to prove mediation. Firstly, the knowledge process or content variable needs to be significantly associated with the hospitality organisation competitiveness variable. These were confirmed in Table 22, except with regards to knowledge sharing and customer performance. Secondly, the knowledge process or content variable needs to be significantly associated with knowledge application. Table 22 confirms these relationships. Thirdly, the partial correlation between the knowledge process or content variable and the hospitality organisation competitiveness variable, when controlling for knowledge application, must not be significant. If all three conditions hold, then knowledge application is said to fully mediate the relationship between knowledge process or content and competitiveness. Table 29 hereunder reflects the partial correlation of knowledge process and content variables with hospitality organisation competitiveness variables when controlling for knowledge application and is used in testing hypotheses H5-a to H5-d and H6.

Table 29: Partial Correlation Knowledge Process / Hospitality Organisation Competitiveness Controlling for Knowledge Application

	Market Performance	Financial Performance	Employee Performance	Customer Performance
Knowledge Acquisition	r = .31, p = .001	r = .20, p = .033	r = .16, p = .100	r = .07, p = .474
Knowledge Conversion	r = .14, p = .144	r = .14, p = .144	r = .16, p = .097	r = .11, p = .244

Knowledge Sharing	r = .09, p = .360	r = .08, p = .392	r = .15, p = .119	r = -.02, p = .854
Knowledge Protection	r = .11, p = .251	r = .10, p = .276	r = .17, p = .072	r = .15, p = .121
Knowledge Content	r = .36, p = .000	r = .44, p = .000	r = .27, p = .005	r = .32, p = .001

Hypothesis H5-a: Knowledge acquisition is significantly associated with market, financial, employee and customer performance (refer hypothesis H1-a) thus satisfying the first mediation condition. From Table 22 it may be seen that knowledge acquisition is also significantly associated with knowledge application ($r = .64$, $p < 0.01$) thus satisfying the second mediation condition. From Table 33 it may be seen that when partially correlated with hospitality organisation competitiveness, while controlling for knowledge application, knowledge acquisition remains significant for market performance ($r = .31$, $p < 0.01$) and financial performance ($r = .20$, $p < 0.05$) but is no longer significantly associated with employee performance ($r = .16$, n/s) and customer performance ($r = .07$, n/s). Thus knowledge application fully mediates the relationship between knowledge acquisition and employee performance and customer performance, and partially mediates the relationship between acquisition and market performance and financial performance.

Hypothesis H5-b: Knowledge conversion is significantly associated with market, financial, employee and customer performance (refer hypothesis H1-b) thus satisfying the first mediation condition. From Table 22 it may be seen that knowledge conversion is also significantly associated with knowledge application ($r = .59$, $p < 0.01$) thus satisfying the second mediation condition. From Table 33 it may be seen that the partial correlation between knowledge conversion and hospitality organisation competitiveness, when controlling for knowledge application, was not significant at the 5% level of significance for any one of the four competitiveness variables. Thus knowledge application fully mediates the relationship between knowledge conversion and market, financial, employee and customer performance.

Hypothesis H5-c: Knowledge sharing is significantly associated with market, financial and employee performance but not customer performance (refer hypothesis H1-c). Thus the first mediation condition is satisfied for the hospitality organisation competitiveness variables except customer performance. From Table 22 it may be seen that knowledge sharing is also significantly associated with knowledge application ($r = .82$, $p < 0.01$) thus satisfying the second mediation condition. From Table 33 it may be seen that the partial correlation between knowledge sharing and hospitality organisation competitiveness, when controlling for knowledge application, was not significant at the 5% level of significance for any one of the four hospitality organisation competitiveness variables. Thus knowledge application fully mediates the relationship between knowledge sharing and market, financial, and employee performance.

Hypothesis H5-d: Knowledge protection is significantly associated with market, financial, employee and customer performance (refer hypothesis H1-d). Thus the first mediation condition is satisfied for the four hospitality organisation competitiveness variables. From Table 22 it may be seen that knowledge protection is also significantly associated with knowledge application ($r = .80$, $p < 0.01$) thus satisfying the second mediation condition. From Table 33 it may be seen that the partial

correlation between knowledge protection and hospitality organisation competitiveness, when controlling for knowledge application, was not significant at the 5% level of significance for any one of the four hospitality organisation competitiveness variables. Thus knowledge application fully mediates the relationship between knowledge protection and market, financial, employee and customer performance.

Hypothesis H6: Knowledge content is significantly associated with market, financial, employee and customer performance (refer hypothesis H2) thus satisfying the first mediation condition. From Table 22 it may be seen that knowledge content is also significantly associated with knowledge application ($r = .64$, $p < 0.01$) thus satisfying the second mediation condition. From Table 33 it may be seen that the partial correlation between knowledge content and hospitality organisation competitiveness, when controlling for knowledge application, was significant at the 1% level of significance for all four hospitality organisation competitiveness variables. Thus knowledge application only partially mediates the relationship between knowledge content and market, financial, employee and customer performance.

The analysis above has provided valuable insights regarding the association between knowledge process, knowledge content and IT resources on the one hand and the competitiveness of hospitality organisations on the other. Regression analysis is now used to explore the unique effects of the knowledge process, knowledge content and IT resources variables on hospitality organisation competitiveness.

4.8.2 Regression Analysis – Effects of Knowledge Processes (Acquisition, Conversion, Protection and Sharing) and Knowledge Content on Knowledge Application

To explore the relative effects of knowledge process (acquisition, sharing, protection, conversion) and knowledge content on knowledge application, a stepwise regression analysis was conducted. The results of this step-wise regression analysis are presented in Table 30 below. Knowledge sharing, protection and acquisition each emerged as having significant independent effects on knowledge application and collectively accounted for 81% of the variance.

Table 30: Stepwise Multiple Regression Analysis: Knowledge Application Regressed on Knowledge Process and Knowledge Content variables

Model		Unstandardised Coefficients		Standardised Coefficients	R Square	R Square Change
		B	Std. Error	Beta		
1					.671	.671
	(Constant)	1.655	0.273			
	Knowledge Sharing	0.730	0.049	0.819 **		
2					.798	.126
	(Constant)	0.882	0.235			
	Knowledge Sharing	0.464	0.050	0.521 **		
	Knowledge Protection	0.405	0.049	0.464 **		
3					.810	.012
	(Constant)	0.519	0.267			
	Knowledge Sharing	0.419	0.052	0.471 **		

Knowledge Protection	0.364	0.050	0.417 **		
Knowledge Acquisition	0.146	0.056	0.141 *		

*$p < 0.05$; **$p < 0.01$.

4.8.3 Regression Analysis – Effects of Knowledge Application and IT Resources on Hospitality Organisation Competitiveness

Stepwise multiple regression was carried out to investigate the relative effects of knowledge application and the IT resource variables on the four dimensions of competitive performance.

Tables 32, 33, 34 and 35 below show the outcome of stepwise multiple regression for knowledge application, IT infrastructure quality, IT capabilities and IT applications portfolio, predicting market performance, financial performance, employee performance and customer performance respectively. Age of property was added as a control variable in the equations for market, employee and customer performance. Lodging segment was added as a control variable in the equation for market performance. Chain affiliation was added as a control variable in the equation for financial performance. Market type was added as a control variable in the equation for employee performance.

Table 31 below summarises the control variables that apply to each of the four performance dimensions (see section 4.1 above).

Table 31: Control Variables Applicable to Hospitality Organisation Competitiveness Dimensions

	Market Performance	Financial Performance	Employee Performance	Customer Performance
Chain Affiliation		✓		
Lodging Segment	✓			
Age of Property	✓		✓	✓
Market Type			✓	

Table 32: Market Performance Regressed on Knowledge Application and IT Resources

Model	Unstandardised Coefficients		Standardised Coefficients	R Square	R Square Change
	B	Std. Error	Beta		
1.				.175	.175
(Constant)	3.124	0.435			
IT Capabilities	0.389	0.081	0.418 **		
2.				.224	.049
(Constant)	2.513	0.483			
IT Capabilities	0.382	0.079	0.411 **		
Lodging Segment	0.254	0.097	0.222 *		

*$p < 0.05$; **$p < 0.01$.

Of the independent variables, only the IT capabilities ($t=4.864$, $p < 0.01$) and the control variable Lodging Segment ($t=-2.631$, $p < 0.05$) emerged as significant predictors of market performance.

Table 33: Financial Performance Regressed on Knowledge Application and IT Resources

Model		Unstandardised Coefficients		Standardised Coefficients	R Square	R Square Change
		B	Std. Error	Beta		
1.					.198	.198
	(Constant)	2.950	0.450			
	Knowledge Application	0.409	0.078	0.445 **		
2.					.240	.042
	(Constant)	2.268	0.521			
	Knowledge Application	0.281	0.093	0.307 **		
	IT Infrastructure Quality	0.252	0.103	0.247 *		

*$p < 0.05$; **$p < 0.01$.

Of the independent variables, only knowledge application (t=3.040, $p < 0.01$) and IT infrastructure quality (t=2.454, $p < 0.05$) emerged as a significant predictors of financial performance.

Table 34: Employee Performance Regressed on Knowledge Application and IT Resources

Model		Unstandardised Coefficients		Standardised Coefficients	R Square	R Square Change
		B	Std. Error	Beta		
1.					.080	.080
	(Constant)	3.725	0.512			
	IT Capabilities	0.293	0.095	0.283		
2.					.134	.054
	(Constant)	4.068	0.516			
	IT Capabilities	0.277	0.093	0.268**		
	Age of Property	-0.010	0.004	-0.232*		

*$p < 0.05$; **$p < 0.01$.

Of the independent variables, only IT Capabilities (t=2.994, $p < 0.01$) and the control variable Age of Property (t=-2.597, $p < 0.01$) emerged as significant predictors of employee performance. It is noteworthy that the employee performance of older properties is worse than that of newer properties.

Table 35: Customer Performance Regressed on Knowledge Application and IT Resources

Model		Unstandardised Coefficients		Standardised Coefficients	R Square	R Square Change
		B	Std. Error	Beta		
1.						
	(Constant)	4.177	0.507			
	IT Infrastructure Quality	0.294	0.090	0.298 **		
2.						
	(Constant)	4.318	0.501			
	IT Infrastructure Quality	0.302	0.088	0.305 **		
	Age of Property	-0.007	0.003	-0.210 *		

*$p < 0.05$; **$p < 0.01$.

Of the independent variables, only IT Infrastructure Quality (t=3.422, $p < 0.01$) and the control variable Age of Property (t=-2.352, $p < 0.05$) emerged as significant predictors of customer performance. It is noteworthy that the customer performance of older properties is poorer than that of newer properties.

4.8.4 Verification of Statistical Assumptions

A scatter plot of the standardised residuals on the standardised predicted values was obtained and examined to check that the residuals are scattered in a spherical pattern resembling a bird's nest and do not fan out in a funnel shape, as this indicates the presence of heteroskedasticity (Pryce, 2002). These plots did not reveal the presence of heteroskedasticity. Refer Appendix G for residual plots.

There is significant collinearity between independent variables (refer Table 22). This was addressed through the use of stepwise regression, which ensures the selection of only those independent variables with the strongest predictive effect on the dependent variable.

4.8.5 Analysis of Model Fit

Model fit statistics are presented in table 36 below.

Table 36: Summary of Model Fit Statistics for All Dimensions of Competitiveness

	Model No	**df**	**F(df)**	**p**	**Adjusted R^2**
Market Performance	2	2,109	15.718	.000	.210
Financial Performance	2	2,109	17.238	.000	.226
Employee Performance	2	2,109	8.406	.000	.118
Customer Performance	2	2.109	8.335	.000	.117

Note: Model number refers to the model number in the first column of tables 36, 37, 38 and 39.

The variance in the dependent variable explained by the model is 21% for market performance, 22.6% for financial performance, 11.8% for employee performance and 11.7% for customer performance.

The sample of hotels contained only a few small hotels and these were all 4 or 5 star establishments. Even though statistical control for hotel size did not prove to be significant, a separate analysis was nonetheless conducted excluding hotels of 20 rooms or less. Of the 112 hotels in the sample, 103 had more than 20 rooms. The adjusted R^2 changed to 21.7% for market performance, 23.6% for financial performance, 14.5% for employee performance and 14.3% for customer performance. These changes in R-squared are not materially different.

4.9 Conclusion

In this chapter, the profile of respondents was presented. Descriptive tables were displayed to show the number of respondents according to various dimensions such as hotel size, lodging segment and province. The reliability and validity of measures was then ascertained. Hypotheses were then tested. Results revealed that all knowledge processes are correlated with the competitiveness of a hospitality organisation but application plays an important mediating role, specifically in the case of financial performance where knowledge application was found to be an independent predictor. IT infrastructure was an independent predictor of customer and financial performance. Older hotels were found to be less competitive, while chain affiliated hotels and luxury hotels were found to be more competitive. A summary of the hypothesis testing is presented in Table 37, and the findings are discussed in the next chapter.

Table 37: Summary of Outcome of Hypotheses Testing *("accepted" and "rejected" refers to the outcome of correlation analysis)*

Hypothesis		**Market Performance**	**Financial Performance**	**Employee Performance**	**Customer Performance**
H1-a	Knowledge acquisition is associated with hospitality organisation competitiveness	Accepted	Accepted	Accepted	Accepted
H1-b	Knowledge conversion is associated with hospitality organisation competitiveness	Accepted	Accepted	Accepted	Accepted
H1-c	Knowledge sharing is associated with hospitality organisation competitiveness	Accepted	Accepted	Accepted	Rejected
H1-d	Knowledge protection is associated with hospitality organisation competitiveness	Accepted	Accepted	Accepted	Accepted
H2	Knowledge content is associated with hospitality organisation competitiveness	Accepted	Accepted	Accepted	Accepted
H3-a	IT infrastructure quality is associated with hospitality organisation competitiveness	Accepted	Accepted Independent effects confirmed with regression analysis	Accepted	Accepted Independent effects confirmed with regression analysis
H3-b	The firm's IT applications portfolio is associated with hospitality organisation competitiveness	IT applications portfolio was dropped during PCA. This hypothesis fell away.			
H3-c	IT capabilities are associated with hospitality organisation competitiveness	Accepted Independent effects confirmed with regression analysis	Accepted	Accepted Independent effects confirmed with regression analysis	Accepted
H3-d	IT human resources are associated with hospitality organisation competitiveness	IT human resources and IT capabilities were merged into a single construct during PCA. This hypothesis fell away.			
H3-e	IT support for knowledge management is associated with hospitality organisation competitiveness	All items for this construct were dropped during PCA. This hypothesis fell away.			
H4	Knowledge application is associated	Accepted	Accepted	Accepted	Accepted

Hypothesis		Market Performance	Financial Performance	Employee Performance	Customer Performance
	with hospitality organisation competitiveness		Independent effects confirmed with regression analysis		
H5-a	Knowledge application mediates the relationship between knowledge acquisition and hospitality organisation competitiveness	Rejected No independent effect of knowledge application on market performance	Rejected Independent effect found through regression analysis	Accepted No independent effect of knowledge application on employee performance	Accepted No independent effect of knowledge application on customer performance
H5-b	Knowledge application mediates the relationship between knowledge conversion and hospitality organisation competitiveness	Accepted No independent effect of conversion on knowledge application	Accepted No independent effect of conversion on knowledge application	Accepted No independent effect of conversion on knowledge application	Accepted No independent effect of conversion on knowledge application
H5-c	Knowledge application mediates the relationship between knowledge sharing and hospitality organisation competitiveness	Accepted No independent effect of knowledge application on market performance	Accepted Confirmed with regression analysis	Accepted No independent effect of knowledge application on employee performance	Accepted No independent effect of knowledge application on customer performance
H5-d	Knowledge application mediates the relationship between knowledge protection and hospitality organisation competitiveness	Accepted No independent effect of knowledge application on market performance	Accepted Confirmed with regression analysis	Accepted No independent effect of knowledge application on employee performance	Accepted No independent effect of knowledge application on customer performance
H6	Knowledge application mediates the relationship between knowledge content and hospitality organisation competitiveness	Rejected No independent effect of knowledge content on knowledge application	Rejected No independent effect of knowledge content on knowledge application	Rejected No independent effect of knowledge content on knowledge application	Rejected No independent effect of knowledge content on knowledge application

5 Discussion of Results

This study examined the application of knowledge management processes, knowledge content and IT resources in the hospitality industry in South Africa and the extent to which they contribute to the competitiveness of the hospitality firm. This chapter discusses and interprets the findings that were presented in the previous chapter.

5.1 Knowledge Processes

5.1.1 Knowledge Acquisition

Knowledge acquisition was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness. Market performance was hypothesized to be enhanced through the acquisition of knowledge. Through environmental scanning, acquiring competitive intelligence, and keeping abreast of best industry practices, firms will be better positioned to innovate and be responsive to market needs (Wu & Shanley, 2009; Nielson, 2006) Financial performance was hypothesized to benefit from the improved decision making that follows from picking superior knowledge resources (Enz, 2010b), while employee performance was theorized to be enhanced by knowledge acquisition because knowledge work is best performed in a learning environment (Jackson et al., 2003). Customer performance was hypothesized to be affected by the acquisition of knowledge because capturing information related to guests (for example special needs, preferences, special requests and use of facilities) and regular performance benchmarking can be used to improve service quality (Minghetti, 2003). Empirical results supported all four relationships; suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior knowledge acquisition practices. Hospitality establishments that put processes in place to perform environmental scanning and acquire competitive intelligence, who regularly measure their performance against industry benchmarks, and who keep abreast of best industry practices, achieve better competitiveness. These findings provide support for the importance of knowledge acquisition as a knowledge process, its role in building the knowledge assets of the firm, and the theory that the acquisition of specialised knowledge can create organisational value (Grant, 1996).

5.1.2 Knowledge Conversion

Knowledge conversion was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness because market performance is enhanced when a more considered and fitting marketing strategy is developed with the benefit of knowledge conversion processes (Tsai & Li, 2007). Financial performance is enhanced through productivity gains resulting from integrating, organising, structuring, coordinating and distributing knowledge (Hou et al., 2010), and improved decision making abilities resulting from the availability of data that is believable, complete, easy to interpret and well presented (Melkas et al., 2010). Employee performance can be enhanced through the empowerment of employees resulting from the availability of knowledge that is easy to interpret and understand and can be applied without reference to specialists (Melkas et al., 2010). Customer performance

is enhanced due to the higher customer satisfaction resulting from superior service enabled by integrated customer data (Akhavan & Heidari, 2008) and by the increased customer retention made possible by the integrated data that supports long-term customer relationships (Anand et al., 2010). Empirical results support all four relationships suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior knowledge conversion practices. Hospitality establishments that encourage employees to record knowledge for the benefit of others in the organisation and furthermore routinely identify and replace outdated knowledge achieve better competitiveness. These findings provide support for the importance of knowledge conversion as one of the knowledge processes, its role in keeping the knowledge assets of the firm relevant and usable, and the theory that the capacity for aggregation of knowledge increases when knowledge is standardised (Grant, 2001).

5.1.3 Knowledge Protection

Knowledge protection was hypothesised to be associated with hospitality organization competitiveness because organisational effectiveness and responsiveness benefits from the protection of knowledge assets (Gold et al., 2001, Lee & Sukoco, 2007; Ngah, Hoo & Ibrahim, 2009). Market performance is positively influenced by knowledge protection because knowledge fuels the firm's innovation capability; if unprotected, knowledge would be vulnerable to appropriation and the firm would lose its competitive edge (Lee & Sukoco, 2007; Lin, 2007). Knowledge protection lengthens the imitation lag, which is the period from date of launch until competitors imitate the product or service; during this period the firm enjoys higher profitability and faster market share growth (Hurmelinna-Laukkanen & Tarkiainen, n.d.). Financial performance may further benefit from knowledge protection as scarce and valuable knowledge resources need to be protected from imitation by competitors (Hou & Chien, 2010). Employee performance was hypothesized to be enhanced by knowledge protection because firms that safeguard their knowledge resources also support continuous learning (Marqués & Simón, 2006) and include interventions and programmes aimed at increasing the retention and loyalty of key employees and these measures may increase employee satisfaction (Päällysaho & Kuusisto, 2008). Customer performance was hypothesized to enhance through knowledge protection as customers expect their confidential data to be safeguarded (Swann, 2005). Empirical results supported the four relationships suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior knowledge protection practices. Hospitality establishments that protect knowledge from theft and inappropriate use, value the knowledge embedded in individuals, clearly identify restricted knowledge and regularly communicate the importance of protecting knowledge, increase their competitiveness. These findings provide support for the importance of knowledge protection as one of the knowledge processes, its role in safeguarding the knowledge assets of the firm, and the theory that knowledge should be protected because it is a scarce and valuable organisational resource that is critical in the achievement and maintenance of the firm's competitive position (Grant, 1996).

5.1.4 Knowledge Sharing

Knowledge sharing was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness. Market performance was hypothesized to be enhanced through superior product quality as through sharing, the knowledge of different specialists is brought together (Liu & Tsai, 2007; Thomas & Keithley, 2002), (b) superior innovation performance (Hurmelinna-Laukkanen & Tarkiainen, n.d.), . Financial performance was hypothesized to benefit from operational efficiencies as best practices and lessons learnt are shared and reused (Durcikova et al., 2010) and employee performance is increased because knowledge sharing promotes a collaborative culture that transfers skills, promotes learning, and motivates employees (Thomas et al., 2002). Finally, customer performance was hypothesized to be enhanced through knowledge sharing's positive influence on service quality as knowledge sharing promotes teamwork in the resolution of customer service needs (Hu, Horng & Sun 2009). Empirical results supported three of the relationships, only customer performance was not associated with knowledge sharing practices. Results nonetheless suggest that higher performing hospitality establishments have superior knowledge sharing practices. Hospitality establishments that provide venues where employees can share knowledge, put processes in place to share knowledge, and encourage knowledge to be shared freely between employees across departments, their superiors and subordinates, can experience superior financial, employee and market performance. These findings provide support for the importance of knowledge sharing as an organisational knowledge processes (Nonaka, 1994).

However, no significant effects were found for the effects of knowledge sharing on customer performance. The reason for this could be that sharing of customer-related knowledge was not specifically measured and that the generic mechanisms in place for knowledge sharing may not be directly promoting the sharing of knowledge necessary to improve service delivery/customer satisfaction.

5.1.5 Knowledge Application

Knowledge application was hypothesised to be associated with the four dimensions of competitiveness because market performance is believed to benefit from the increased responsiveness brought about by knowledge application (Darroch, 2005), financial performance is believed to be influenced by improved innovation capability (Lin, 2007b) and innovation performance (Jantunen, 2005) that results from knowledge application, employee performance is believed to benefit from increased worker competencies resulting from applying knowledge (Grant, 1996) and customer performance is believed to be enhanced through ithe application of specialised knowledge related to previous customer interactions (Davenport & Klahr, 1998). Empirical results supported all four of these relationships suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior knowledge application practices. Hospitality establishments that apply knowledge learnt from experiences, use knowledge to solve new problems, apply knowledge to deal with changing competitive conditions and use knowledge in the development of new products and services experience superior financial, employee and market performance. These findings provide support for the importance of knowledge application as one of the knowledge processes, its role in entrenching knowledge and creating new knowledge and the theory that the knowledge is the

primary factor of production and that organisations can gain competitive advantages when applying specialised knowledge (Grant, 1996).

5.2 Knowledge Content

Greater knowledge content was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness. Market and financial performance are enhanced through the complimentarity of customer, product and managerial knowledge content resources (Tanriverdi & Venkatraman, 2005). Market performance is also enhanced through the acquisition of knowledge content related to competitors (Karim, 2011). Employee performance is enhanced by firm-specific knowledge that is structured, relevant, organised and integrated as such knowledge is ready to be applied and is easy to locate (Bhatt, 2001). Customer performance benefits from the personalised customer service that may be tailored from guest related knowledge (Bouncken, 2002). Empirical results supported all four of these relationships suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior knowledge content. Hospitality establishments that have knowledge content related to their customers, products and services and competitors achieve superior financial, employee and market performance. These findings provide support for the importance of knowledge content, its role in informing business operations and the theory that firm-specific knowledge content is a strategic asset, as it is valuable since it is ready for application, it is scarce since it is context specific and it is inimitable since it is not readily available. For this reason, firm-specific knowledge content provides the firm with competitive advantage (Grant, 1996).

When the relative effects of the above factors was considered, it was found that knowledge application had the strongest influence on the competitiveness of a hospitality organisation, both directly and indirectly, as a mediator of the relationship between knowledge acquisition, conversion, sharing and protection on the one hand and hospitality organisation competitiveness on the other.

5.3 IT Resources

5.3.1 IT Infrastructure Quality

IT Infrastructure quality was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness. Firstly, it was argued that market performance should be enhanced through IT infrastructure's ability to provide electronic channels by providing connectivity to external partners and customers (Weill et al., 2002). Secondly, it was argued that financial performance could be enhanced through the IT infrastructure's ability to support sales and bookings received from the GDS, CRS and Internet channels (Buhalis, 2011), increase sales from cross selling at point-of-service (Amdekar, 2006), and contain costs through improved operational efficiencies and the elimination of waste, theft and shrinkages (Amdekar, 2006). Thirdly, it was argued that employee performance could be enhanced through an IT infrastructure that empowers employees to be productive (Sarosoja, Gibler & Levainen, 2004). Fourthly, it was argued that customer performance would be enhanced by better management of customer expectations (Buhalis, 1998), the ability to personalise products and services according to customer preferences (Amdekar, 2006), the provision of in-room technologies such as Internet

access, and pay-per-view TV (Amdekar, 2006), the establishment of links to third party experience providers allowing accommodation bookings to be packaged with a lifestyle event (Amdekar, 2006), and by helping 'yield' decisions to be made on the basis of lifetime customer value rather than maximum room rate (Amdekar, 2006). Empirical results supported all four of these relationships suggesting that hospitality is knowledge intensive and that higher performing hospitality establishments have superior IT Infrastructure. Hospitality establishments that have modular and scalable IT systems that can handle multiple applications and use commonly agreed IT standards experience superior financial, employee and market performance. Earlier studies (Law & Jogaratnam, 2005) found information technology to be underutilised and undervalued within the hotel industry. This study's findings now provides added empirical support for the importance of IT infrastructure, its role in providing the technological foundation for IT applications and the theory that IT is a scarce and valuable organizational asset that may be applied to the competitive advantage of the organisation (Barney, 1991).

5.3.2 IT Capabilities

IT Infrastructure was hypothesised to be associated with the four dimensions of hospitality organisation competitiveness. First, market performance is hypothesized to be enhanced by IT capabilities that support external relationships and market responsiveness (Liang et al., 2010). Financial performance is hypothesized to improve because, through IT capability, wasteful IT decisions can be minimised as IT acquisition happens in accordance with a strategic plan aligned with business priorities (Weill, 2004).Employee performance may be enhanced through a cooperative and stable working environment brought about by successful IT implementations, while customer performance could be enhanced through improved customer relationship management (Yang, 2008) and the introduction of technical specialists that assist guests to resolve technology and connectivity issues (Hyatt, 2012). Empirical results supported all four of these relationships suggesting that higher performing hospitality establishments have superior IT Capabilities. Hospitality establishments that have a formalised methodology for IS planning, have a mature, well defined systems development process, have well defined service quality criteria for all IS support tasks and continuously monitor the performance of their computer systems achieve better market, financial, employee and customer performance. These findings provide support for the importance of IT capabilities, its role in maximising returns from the IT assets of the firm and the theory that intangible IT resources are performance enhancing (Bharadwaj, 2000).

The relative importance of tangible IT infrastructure resources versus intangible IT capabilities was examined, and it was found that IT capabilities (i.e. intangible IT resources) had independent effects on market and employee performance while IT infrastructure (i.e. tangible IT resources) has the greatest impacts on customer and financial performance. This suggests that by supporting the firm's current operations and portfolio of customers, tangible IT resources contribute towards financial and customer performance. Intangible IT resources on the other hand, are driven by employee performance and support the future market growth of the organisation.

5.4 Chapter Conclusion

This chapter discussed the research findings. Results were mostly consistent with theory and showed that knowledge acquisition, conversion and protection are associated with all four measures of hospitality organisation competitiveness namely market, financial, employee and customer performance, while knowledge sharing is only associated with market, employee and financial performance. Knowledge application is associated with all four competitiveness measures. Knowledge application is also a mediator of the relationship between knowledge acquisition, conversion, sharing and protection on the one hand and competitiveness on the other. IT infrastructure and IT capabilities are each associated with different dimensions of competitiveness. The next chapter discusses the implications of these findings for theory and practice and concludes the study.

6 Conclusion

6.1 Summary of the Study

This study drew on RBV, KBV and absorptive capacity theory to develop a research model aimed at testing the effects of knowledge and IT resources on the competitive performance of hospitality organisations in South Africa. Data was collected using a structured questionnaire that was administered to senior managers within 112 hospitality organisations operating in South Africa. Findings from this study were that knowledge processes (acquisition, conversion, protection, sharing and application), together with knowledge content and IT resources have either direct or indirect positive effects on four dimensions of hospitality organisation competitiveness, namely market, financial, customer and employee performance.

The findings support the RBV by providing evidence that the firm's IT and knowledge resources contribute towards its competitiveness. Moreover, consistent with the RBV both tangible and intangible organisational resources have the potential to influence firm performance. This was especially so in this context where tangible IT resources influenced financial and customer performance and intangible IT resources influenced market and employee performance.

The findings support the KBV by providing evidence that the acquisition, conversion, protection, sharing and application of knowledge resources contribute to market, financial, employee and customer performance.

The findings support absorptive capacity theory by providing evidence that the application of knowledge enhances the effect of knowledge acquisition, conversion, protection and sharing on competitiveness. This means that without the ability to absorb and apply knowledge in organisational routines and decision making, the performance effects of knowledge acquisition, sharing and protection processes are lost.

The limitations of this study, recommendations for practice, and suggestions for future research are presented next.

6.2 Limitations of the Study

In considering the implications of this study, there are some limitations that need to be acknowledged. *Firstly*, this study is not representative of all geographic regions in South Africa, with especially the Eastern Cape region being poorly represented. If it had been included, performance differences between regions could have been more pronounced, as the Eastern Cape is one of South Africa's poorest provinces. *Secondly*, this study is not representative of smaller establishments. All establishments with less than 15 rooms were eliminated from the study. Only 22 hotels with 50 or fewer rooms were included. Larger hotels are thus better represented and the results more generalisable to that demographic. Knowledge management dynamics and the use of IT are necessarily different in smaller establishments. Hence the conclusions from this study may not be directly generalisable to smaller hotels. *Thirdly*, data for this study was study was collected using a single respondent. This could lead to a common method bias and although this was tested and discounted, the use of multiple

informants may have improved the validity of the results. For example, the use of matched pair responses from a hotel's general manager and IT manager would have been a preferable strategy. *Fourthly*, knowledge content in this survey covered a limited number of domains namely customers, products and services, financial performance and competitors.

6.3 Suggestions for Future Research

The following suggestions are made for future research. *Firstly*, future research may wish to better explore interrelationships amongst the knowledge constructs. For example, knowledge content could be viewed as being a function of the four knowledge management processes namely knowledge acquisition, conversion, protection and sharing. Moreover, interactions should be explored. For example, the more knowledge is acquired, converted into a useful format, enriched through sharing and protected from theft and inappropriate use, the greater might be the contribution of knowledge content to competitiveness. *Secondly*, the effect of chain affiliation on knowledge processes could be studied in a hospitality context to confirm that chain affiliation increases the acquisition, conversion, sharing and protection of knowledge. How knowledge is shared across affiliated organisations should also be explored. *Thirdly*, future research could focus on the role of knowledge management and IT in small hotels in South Africa. The hospitality industry in South Africa is dominated by small independent businesses that are owner-managed (Theta, 2007). Further understanding how IT and knowledge resources could be deployed for competitive advantage in a small hotel would have high relevance in South Africa.

6.4 Managerial Guidelines

Many hospitality managers seek to understand the benefits that would be achieved by implementing knowledge management processes, knowledge content and IT resources. On the basis of the empirical results presented in this paper, some practical guidelines are offered to hospitality managers. *Firstly*, hospitality firms need to create, protect and use stores of relevant knowledge within the work environment in order to improve the performance of employees and customers. The findings from this survey indicate that knowledgeable employees perform their work better, regardless of the co-presence of IT applications, and that this has direct benefits in terms of customer retention and satisfaction. Specifically — knowledge of competitors could be acquired by purchasing competitive intelligence; benchmarks relevant to the hospitality industry should be obtained and the organisation should regularly measure itself against these; a team should be appointed to identify and implement industry best practices; appreciation for the value of knowledge should be entrenched in the work ethic of the organisation through regular and clear communication to staff; restricted knowledge should be clearly labelled; processes should be put in place to protect knowledge from theft and inappropriate use; knowledge learned from experiences should be documented and used to inform operational processes; processes should be put in place to apply organisational knowledge when solving problems that occur on a day-to-day basis; innovation processes should use knowledge resources in the design of products and services. *Secondly*, when knowledge stores in the work place are deployed together with IT applications, there are direct benefits in terms of financial performance. Hospitality firms should look to strengthen their IT capabilities by adopting a formal methodology for IS planning, by

defining service quality criteria for all IS support tasks, by continuously monitoring the performance of their computer systems and considering the quality of their IT infrastructure.

6.5 Conclusion

This study had three objectives. *Firstly*, it aimed to propose a model to further our understanding of the extent to which knowledge and IT contributes to competitiveness in the hospitality industry. The joint and independent effects of knowledge content, knowledge processes and IT resources were demonstrated through valid and reliable data having been collected from hospitality firms in South Africa. As a result, this study has answered the calls for more research into both IT and knowledge within the hospitality industry and added much needed empirical evidence to the growing body of knowledge on the hospitality industry.

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Appendix A: Ethics Clearance Details

A-1 Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (NON MEDICAL)
R14/49 Olsen

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER H100 631**
PROJECT	Information technology, knowledge management and competitiveness: An empirical study in the South African hospitality context
INVESTIGATORS	Ms K Olsen
DEPARTMENT	Information System
DATE CONSIDERED	18.06.2010
DECISION OF THE COMMITTEE*	Approved Unconditionally
NOTE:	

Unless otherwise specified this ethical clearance is valid for 2 years and may be renewed upon application

DATE 15.07.2010 **CHAIRPERSON** .....
(Professor R Thornton)

cc: Supervisor : Prof J Cohen

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

.....
Signature

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

A-2 Ethics Covering Letter

Welcome to "Information Technology, Knowledge Management and Competitiveness", a web-based survey that examines the contribution of information technology and knowledge management to competitiveness in a hospitality context. This is in support of my Master's in Commerce Degree. Before taking part in this survey, please read the consent form that follows hereafter, tick the blocks where appropriate and then click on the "submit" button at the bottom of this page. This signifies to me that you understand this page and freely consent to participate in this survey.

This study involves a web-based survey in eight parts, as follows:

- Knowledge acquisition, consisting of 14 questions
- Knowledge conversion, consisting of 7 questions
- Knowledge sharing, consisting of 4 questions
- Knowledge protection, consisting of 6 questions
- Knowledge application, consisting of 9 questions
- Knowledge content, consisting of 20 questions
- IT resources, consisting of 35 questions
- IT applications portfolio, consisting of 28 questions
- Competitiveness, consisting of 12 questions
- Demographic information, consisting of 12 questions

If you choose to do so, kindly answer the questions, working through the survey one page at a time. As you complete each page, please click on the "submit" button at the bottom of the page. Completing the entire survey should not take you longer then twenty minutes.

Through your participation I hope to understand the impact of various factors on the competitive position of hotels across South Africa. All data will be pooled and only aggregate results will be presented in the final research report.

The research does not require you to put personal information such as company name or your name, thus there are no risks and no costs if you decide to participate. I guarantee that your responses will not be identified with you personally or with your company. While your participation is important to me, it is also completely voluntary and you may withdraw from the survey at any stage.

This study has been unconditionally approved by the Witwatersrand University's Ethics Committee (non-medical), protocol number H100631. If you have any questions or concerns about the questionnaire or about being a participant of this study, or if you wish to obtain a copy of the research results, please contact me on 072-313-5585 or email me at inward@global.co.za.

Appendix B: Online Survey Questionnaire

Information Technology, Knowledge Management and Competitiveness

SCHOOL OF
Economic & Business Sciences

INFORMATION

Thank you for considering participation in this study on the impacts of knowledge management and information technology practices on the competiveness of hospitality organisations in South Africa. This study is in support of my Master's in Commerce Degree at the University of the Witwatersrand, Johannesburg.

This study is conducted amongst hospitality establishments across South Africa. One single survey response is solicited per establishment. This response should be completed by a senior person fulfilling a managerial role in the organisation (typically the general manager or the owner of the hotel).

If you choose to participate, kindly answer the questions, working through the survey one page at a time. Please answer each of the questions as they relate to knowledge management practices within your organisation. Please answer to the best of your ability and remember there are no "right" or "wrong" answers. The survey consists of approximately 100 multiple choice questions. Completing the entire survey should not take you longer than thirty minutes.

The research does not require you to input personal information such as hotel name or your name, thus there are no risks and no costs if you decide to participate. Anonymity is guaranteed as responses will not be identified with you personally or with your organisation. All data will be pooled and only aggregate results will be presented in the final research report. While your participation is important to me, it is also completely voluntary and you may withdraw from the survey at any stage.

This study has been unconditionally approved by the University of the Witwatersrand's Ethics Committee (non-medical), protocol number H100631. If you have any questions or concerns about the questionnaire or about being a participant of this study, or if you wish to obtain a copy of the research results, please contact me on 072-313-5585 or email me at Karen.olsen@students.wits.ac.za or my supervisor Prof J Cohen at Jason.cohen@wits.ac.za.

1. I agree to take part in this research project, with the understanding that my participation is limited to completing this questionnaire

◯ Yes

2. I understand that I will receive no remuneration for completing this questionnaire

◯ Yes

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason

◯ Yes

Page 1

4. Knowledge Acquisition

Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to acquire knowledge.

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
Our organisation has processes for acquiring knowledge about our customers	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for generating new knowledge from existing knowledge	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for acquiring knowledge about our suppliers	◯	◯	◯	◯	◯	◯	◯
Our organisation uses feedback from projects to improve subsequent projects	◯	◯	◯	◯	◯	◯	◯
Our organisation generates new knowledge through collaboration with business partners	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for acquiring knowledge about new products and services within our industry	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for acquiring knowledge about competitors within our industry	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for benchmarking performance	◯	◯	◯	◯	◯	◯	◯
Our organisation has teams devoted to identifying best practice	◯	◯	◯	◯	◯	◯	◯
We regularly carry out environmental scanning for the purpose of acquiring knowledge	◯	◯	◯	◯	◯	◯	◯
We encourage employees to document their experiences	◯	◯	◯	◯	◯	◯	◯
We routinely benchmark ourselves against our competitors	◯	◯	◯	◯	◯	◯	◯

5. Knowledge Conversion

Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective conversion of knowledge.

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
In our organisation, the knowledge of individuals is recorded in a structured way, so that others in the organisation may benefit from it	◯	◯	◯	◯	◯	◯	◯
In our organisation, knowledge is presented in a standard way	◯	◯	◯	◯	◯	◯	◯
In our organisation, knowledge is catalogued for ease of retrieval	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for integrating knowledge from different sources	◯	◯	◯	◯	◯	◯	◯
In our organisation, knowledge is organised in a useful way	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for replacing outdated knowledge	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for filtering knowledge (i.e. extracting out only the most useful knowledge)	◯	◯	◯	◯	◯	◯	◯

6. Knowledge Sharing

Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective sharing of knowledge.

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
Our organisation has systems and venues for people to share their knowledge with others in the company	◯	◯	◯	◯	◯	◯	◯
Our employees regularly share knowledge with their superiors	◯	◯	◯	◯	◯	◯	◯
Our employees regularly share knowledge with their subordinates	◯	◯	◯	◯	◯	◯	◯
Our employees regularly share ideas with other employees even if they are based in different departments	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for distributing knowledge throughout the organisation	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for exchanging knowledge between individuals	◯	◯	◯	◯	◯	◯	◯
Our organisation makes knowledge accessible to those who need it	◯	◯	◯	◯	◯	◯	◯
Our organisation promotes sharing of knowledge between work groups / teams	◯	◯	◯	◯	◯	◯	◯

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7. Knowledge Protection

Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective protection of knowledge.

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
Our organisation has processes to protect knowledge from inappropriate use	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes to protect knowledge from theft	◯	◯	◯	◯	◯	◯	◯
Our organisation has technology that restricts access to some repositories of knowledge	◯	◯	◯	◯	◯	◯	◯
Our organisation has incentives that encourage the protection of knowledge	◯	◯	◯	◯	◯	◯	◯
Our organisation values and protects knowledge embedded in individuals	◯	◯	◯	◯	◯	◯	◯
In our organisation, knowledge that is restricted is clearly identified	◯	◯	◯	◯	◯	◯	◯
The importance of protecting knowledge is clearly communicated to employees in our organisation	◯	◯	◯	◯	◯	◯	◯

8. Knowledge Application / Utilisation

Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective application / utilization of knowledge.

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
Our organisation has processes for applying knowledge learned from experiences	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for using knowledge to solve new problems	◯	◯	◯	◯	◯	◯	◯
Our organisation matches sources of knowledge to problems and challenges	◯	◯	◯	◯	◯	◯	◯
In our organisation, knowledge is used to improve efficiency	◯	◯	◯	◯	◯	◯	◯
Our organisation effectively applies knowledge to deal with changing competitive conditions	◯	◯	◯	◯	◯	◯	◯
Our organisation quickly applies knowledge to critical competitive needs	◯	◯	◯	◯	◯	◯	◯
We use our knowledge assets to solve problems quickly	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for using knowledge in the development of new products and services	◯	◯	◯	◯	◯	◯	◯
Our organisation has processes for converting knowledge into action plans	◯	◯	◯	◯	◯	◯	◯

9. Knowledge Content

Please rate your organisation's level of knowledge of each of the following:

	Very poor	Poor	Below average	Average	Above average	Good	Very good
Characteristics of our customers	○	○	○	○	○	○	○
Customers' tastes and preferences	○	○	○	○	○	○	○
General business and industry conditions	○	○	○	○	○	○	○
Customer segments	○	○	○	○	○	○	○
Demand patterns for our region	○	○	○	○	○	○	○
Customer perceptions of our organisation	○	○	○	○	○	○	○
Channels used by our customer segments for accessing our products / services (e.g. direct, online, travel agent, call centre etc)	○	○	○	○	○	○	○
Products and services we offer	○	○	○	○	○	○	○
Market trends affecting our products and services	○	○	○	○	○	○	○
Our customers' current and/or future requirements for product and service offerings	○	○	○	○	○	○	○
Standard operating procedures	○	○	○	○	○	○	○
Current employees' skills and capabilities	○	○	○	○	○	○	○
The performance of our operations	○	○	○	○	○	○	○
Products and services our competitors offer	○	○	○	○	○	○	○
Channels used by our competitors to make their products available to their customers	○	○	○	○	○	○	○
Strengths and/or weaknesses of our competitors	○	○	○	○	○	○	○
Competitors' actions	○	○	○	○	○	○	○
Alternative sources of food, beverage and operating suppliers	○	○	○	○	○	○	○
Value-added services (e.g. sightseeing tours) offered by external providers	○	○	○	○	○	○	○
Services offered by sale intermediaries	○	○	○	○	○	○	○
Labour market trends and	○	○	○	○	○	○	○

conditions

10. Information Technology

The following statements relate to the Information Technology capabilities of your organisation. Using scale below, please indicate the extent to which you agree / disagree with the following statements:

	Strongly Disagree	Disagree	Tend to Disagree	Neutral	Tend to Agree	Agree	Strongly Agree
Our IT systems are modular	○	○	○	○	○	○	○
Our IT systems are scalable, i.e. after adding new hardware, their performance increases proportionally to the capacity added	○	○	○	○	○	○	○
Our IT systems can handle multiple applications	○	○	○	○	○	○	○
Out IT systems use commonly agreed IT standards	○	○	○	○	○	○	○
We have a high degree of integration amongst our IT applications	○	○	○	○	○	○	○
Technical IT skills (programming, systems analysis and design, network configuration etc.) are available within our organisation	○	○	○	○	○	○	○
Managerial IT skills (abilities of effective management of information systems functions, coordination and interaction, project management and leadership skills) are available within our organisation	○	○	○	○	○	○	○
In our organisation, IT facilitates the acquisition of knowledge about our customers, suppliers and/or competitors	○	○	○	○	○	○	○
Our IT systems prompt us to take action and recommend solutions to problems	○	○	○	○	○	○	○
Knowledge is embedded in our databases and decision support systems	○	○	○	○	○	○	○
We developed information systems like Intranet and electronic bulletin boards to share information and knowledge	○	○	○	○	○	○	○

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Our IT systems enable knowledge to be protected from unauthorised access	○	○	○	○	○	○	○
We have a formalised methodology for IS (Information Systems) planning	○	○	○	○	○	○	○
We have a mature, well defined systems development process	○	○	○	○	○	○	○
We have well defined service quality criteria for all IS (Information Systems) support tasks	○	○	○	○	○	○	○
We continuously monitor the performance of our computer systems	○	○	○	○	○	○	○

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11. Inventory of IT Applications

How do you evaluate the support provided by each of the below listed applications to your operational or decision making activities?

	Extremely Poor	Very Poor	Poor	Average	Good	Very Good	Excellent
Customer Relationship Management (CRM)	◯	◯	◯	◯	◯	◯	◯
Property Management System (PMS) - Reservations, check-in/check-out, guest accounting and invoicing	◯	◯	◯	◯	◯	◯	◯
Central Reservation System (CRS)	◯	◯	◯	◯	◯	◯	◯
Hotel website	◯	◯	◯	◯	◯	◯	◯
Global Distribution System (GDS)	◯	◯	◯	◯	◯	◯	◯
Yield Management	◯	◯	◯	◯	◯	◯	◯
Room status and housekeeping management	◯	◯	◯	◯	◯	◯	◯
Check-in/check-out kiosks	◯	◯	◯	◯	◯	◯	◯
Personnel	◯	◯	◯	◯	◯	◯	◯
Purchasing	◯	◯	◯	◯	◯	◯	◯
Finance and accounting (accounts receivable, accounts payable, general ledger, payroll)	◯	◯	◯	◯	◯	◯	◯
Sales and catering	◯	◯	◯	◯	◯	◯	◯
Reports and statistics	◯	◯	◯	◯	◯	◯	◯
Premises monitoring and security	◯	◯	◯	◯	◯	◯	◯
Intranet	◯	◯	◯	◯	◯	◯	◯
Point Of Sale	◯	◯	◯	◯	◯	◯	◯
Menu management / recipe management	◯	◯	◯	◯	◯	◯	◯
Event management	◯	◯	◯	◯	◯	◯	◯
Stock and inventory	◯	◯	◯	◯	◯	◯	◯
Sales analysis (sales forecasting, menu item pricing)	◯	◯	◯	◯	◯	◯	◯
Beverage control	◯	◯	◯	◯	◯	◯	◯
TV based services	◯	◯	◯	◯	◯	◯	◯
In-room internet and email access	◯	◯	◯	◯	◯	◯	◯
Telephone call accounting systems	◯	◯	◯	◯	◯	◯	◯
Electronic locking system	◯	◯	◯	◯	◯	◯	◯
Energy management	◯	◯	◯	◯	◯	◯	◯

systems							
Guest operated devices (e.g. automated mini-bar)	○	○	○	○	○	○	○
Auxiliary guest services (e.g. automated wake-up call, voicemail)	○	○	○	○	○	○	○

12. Competitiveness

Using the scale below, please rate your organisation's performance relative to your key competitors.

	Much worse than competitors	Considerably worse than competitors	Slightly worse than competitors	On par with competitors	Slightly better than competitors	Considerably better than competitors	Much better than competitors
Increasing room occupancy rates	○	○	○	○	○	○	○
Opening new markets	○	○	○	○	○	○	○
Growing market share	○	○	○	○	○	○	○
Profitability of hotel services in the last three years	○	○	○	○	○	○	○
Sales growth of hotel services in the last three years	○	○	○	○	○	○	○
Revenue per available room (RevPAR)	○	○	○	○	○	○	○
Cost efficiencies	○	○	○	○	○	○	○
Wealth creation (accounting value of the firm with respect to its market value)	○	○	○	○	○	○	○
Capacity to generate profit in times of crisis	○	○	○	○	○	○	○
Employee satisfaction	○	○	○	○	○	○	○
Employee turnover	○	○	○	○	○	○	○
Competencies of employees	○	○	○	○	○	○	○
Customer satisfaction	○	○	○	○	○	○	○
Customer retention	○	○	○	○	○	○	○
Customer loyalty	○	○	○	○	○	○	○
Trust of our customers in our organisation	○	○	○	○	○	○	○

Demographic Information

13. Size (number of rooms)

14. Age of property (years)

15. Property type (select one)

- [ ] Hotel
- [ ] Motel
- [ ] All-suite
- [ ] Extended stay
- [ ] Limited service hotel
- [ ] Resort
- [ ] Other (Please specify)

16. Lodging Segment (select one)

- [ ] Budget
- [ ] Economy
- [ ] Mid-price
- [ ] Upscale
- [ ] Luxury

17. Location (select one)

- [ ] Inner-city
- [ ] Suburban
- [ ] Airport
- [ ] Highway
- [ ] Other (Please specify)

18. Market type (select one)

- [ ] Tourist
- [ ] Casino
- [ ] Corporate
- [ ] Convention
- [ ] Health and spa
- [ ] Other (Please specify)

19. Service Orientation?

- [ ] Service differentiation, i.e. meeting the needs of individual customers
- [ ] Service standardisation, i.e. providing a consistent and repeatable guest experience

20. Chain Affiliated?

- [ ] Yes
- [ ] No

21. Ownership (select one)

- [ ] Chain owned
- [ ] Franchise
- [ ] Independent
- [ ] Other (Please specify)

.

22. Managed by (select one)

- [ ] Owner
- [ ] Management contract
- [ ] Other (Please specify)

.

23. Star Rating

24. Town

25. Province / State

26. What is your title / designation within your organisation?

27. How long did it take you to complete this questionnaire?

28. Would you like to receive a copy of the research report once compiled?

☐ Yes

☐ No

If yes, please specify the email address that the report should be mailed to

29. Do you have any comments that would help me to make this questionnaire more meaningful or relevant? Or any other comments?

Appendix C: Survey Questionnaire

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to acquire knowledge.					
Knowledge acquisition	KA1	Our organisation has processes for acquiring knowledge about our customers	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP1 in Gold et al. (2001). The wording is unaltered.
	KA2	Our organisation has processes for generating knowledge from existing knowledge	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP2 in Gold et al. (2001). The word "new" was dropped from "…has processes for generating new knowledge…"..
	KA3	Our organisation has processes for acquiring knowledge about our suppliers	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP3 in Gold et al. (2001). The wording is unaltered.
	KA4	Our organisation uses feedback from projects to improve subsequent projects	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP4 in Gold et al. (2001). The wording is unaltered.
	KA5	Our organisation generates new knowledge through collaboration with business partners	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP7 in Gold et al. (2001). The wording was changed from "our organisation has processes for inter-organizational collaboration".
	KA6	Our organisation has processes for acquiring knowledge about new products and services within our industry	Dropped due to kurtosis / skewness	Gold et al. (2001)	This item corresponds to item AP4 in Gold et al. (2001). The wording is unaltered.
	KA7	Our organisation has processes for acquiring knowledge about competitors within our industry	Retained	Gold et al. (2001)	This item corresponds to item AP9 in Gold et al. (2001). The wording is unaltered.
	KA8	Our organisation has processes for benchmarking performance	Retained	Gold et al. (2001)	This item corresponds to item AP10 in Gold et al. (2001). The wording is unaltered.
	KA9	Our organisation has teams devoted to identifying best practice	Retained	Gold et al. (2001)	This item corresponds to item AP11 in Gold et al. (2001). The wording is unaltered.
	KA10	We regularly carry out environmental scanning for the purpose of acquiring knowledge	Retained	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge acquisition" in

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
					Gold et al. (2001).
	KA11	We encourage employees to document their experiences	Dropped due to kurtosis / skewness	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge acquisition" in Gold et al. (2001).
	KA12	We routinely benchmark ourselves against our competitors	Retained	Gold et al. (2001)	This item corresponds to item AP10 in Gold et al. (2001). The original wording of this item reads as follows "Our organisation has processes for benchmarking performance".
Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective conversion of knowledge.					
Knowledge conversion	KV1	In our organisation, the knowledge of individuals is recorded in a structured way, so that others in the organisation may benefit from it	Retained	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge conversion" in Gold et al. (2001).
	KV2	In our organisation, knowledge is presented in a standard way	Retained	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge conversion" in Gold et al. (2001).
	KV3	In our organisation, knowledge is catalogued for ease of retrieval	Dropped during PCA	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge conversion" in Gold et al. (2001).
	KV4	Our organisation has processes for integrating knowledge from different sources	Dropped during PCA	Gold et al., 2001	This item corresponds to item CP8 in Gold et al. (2001). The wording was changed from "our organisation has processes for integrating different sources and types of knowledge".
	KV5	In our organisation, knowledge is presented in a useful way	Dropped during PCA	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge conversion" in Gold et al. (2001).
	KV6	Our organisation has processes for replacing outdated knowledge	Retained	Gold et al., 2001	This item corresponds to item CP10 in Gold et al. (2001). The wording is unaltered.

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
	KV7	Our organisation has processes for filtering knowledge (i.e. extracting out only the most useful knowledge)	Dropped during PCA	Gold et al., 2001	This item corresponds to item CP3 in Gold et al. (2001). The clarification in brackets (i.e. extracting only the most useful knowledge) was inserted.
Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective sharing of knowledge.					
Knowledge sharing	KS1	Our organisation has systems and venues for people to share their knowledge with others in the company	Retained	Wang et al. (2009)	This item corresponds to item KM11 from Wang et al. (2009). The wording is unchanged.
	KS2	Our employees regularly share knowledge with their superiors	Retained	Wang et al. (2009)	This item corresponds to item KM12 from Wang et al. (2009). The original wording was "…information and knowledge…".
	KS3	Our employees regularly share knowledge with their subordinates	Retained	Wang et al. (2009)	This item corresponds to item KM13 from Wang et al. (2009). The original wording was changed from "…information and kn0owledge…"..
	KS4	Our employees regularly share ideas with other employees even if they are based in different departments	Retained	Wang et al. (2009)	This item corresponds to item KM14 from Wang et al. (2009). The wording is unchanged.
	KS5	Our organisation has processes for distributing knowledge throughout the organisation	Dropped due to kurtosis / skewness	Gold et al., 2001	This item corresponds to item AP5 in Gold et al. (2001). The wording is unaltered.
	KS6	Our organisation has processes for exchanging knowledge between individuals	Retained	Gold et al., 2001	This item corresponds to item AP12 in Gold et al. (2001). The wording is unaltered.
	KS7	Our organisation makes knowledge accessible to those who need it	Retained	Gold et al., 2001	This item corresponds to item AP9 in Gold et al. (2001). The wording is unaltered.
	KS8	Our organisation promotes sharing of knowledge between work groups / teams	Retained	Lee, Lee & Kang (2005)	This item originates from Lee, Lee & Kang (2005). The wording was changed from "We promote sharing of information and knowledge".
Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation					

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
to enable the effective protection of knowledge.					
Knowledge protection	KP1	Our organisation has processes to protect knowledge from inappropriate use	Retained	Gold et al., 2001	This item was created by combining items PP1 ("Our organisation has processes to protect knowledge from inappropriate use inside the organisation") and PP2 ("Our organisation has processes to protect knowledge from inappropriate use outside the organisation") in Gold et al. (2001).
	KP2	Our organisation has processes to protect knowledge from theft	Retained	Gold et al., 2001	This item was created by combining items PP3 ("Our organisation has processes to protect knowledge from theft from within the organisation") and PP4 ("Our organisation has processes to protect knowledge from theft from outside the organisation") in Gold et al. (2001).
	KP3	Our organisation has technology that restricts access to some repositories of knowledge	Dropped due to kurtosis / skewness	Gold et al., 2001	This item corresponds to item PP6 in Gold et al. (2001). The words "sources of knowledge" were changed to "repositories of knowledge".
	KP4	Our organisation has incentives that encourage the protection of knowledge	Dropped during PCA	Gold et al., 2001	This item corresponds to item PP5 in Gold et al. (2001). The wording is unaltered.
	KP5	Our organisation values and protects knowledge embedded in individuals	Retained	Gold et al., 2001	This item corresponds to item PP8 in Gold et al. (2001). The wording is unaltered.
	KP6	In our organisation, knowledge that is restricted is clearly identified	Retained	Gold et al., 2001	This item corresponds to item PP9 from Gold et al. (2001). The wording is unaltered.
	KP7	The importance of protecting knowledge is clearly communicated to employees in our organisation	Retained	Gold et al., 2001	This item corresponds to item PP10 from Gold et al. (2001). The words "to employees in our organisation" were added for clarity.
Using the scale below, please indicate the extent to which you agree / disagree with the each of the following statements relating to the processes and mechanisms used in your organisation to enable the effective application / utilization of knowledge.					

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
Knowledge application / utilisation	KU1	Our organisation has processes for applying knowledge learned from experiences	Retained	Gold et al., 2001	This item corresponds to item AP2 from Gold et al. (2001). The wording is unaltered.
	KU2	Our organisation has processes for using knowledge to solve new problems	Retained	Gold et al., 2001	This item corresponds to item AP4 from Gold et al. (2001). The wording is unaltered.
	KU3	Our organisation matches sources of knowledge to problems and challenges	Retained	Gold et al., 2001	This item corresponds to item AP5 from Gold et al. (2001). The wording is unaltered.
	KU4	In our organisation, knowledge is used to improve efficiency	Dropped due to kurtosis / skewness	Gold et al., 2001	This item corresponds to item AP6 from Gold et al. (2001). The wording is unaltered.
	KU5	Our organisation effectively applies knowledge to deal with changing competitive conditions	Retained	Gold et al., 2001	This item corresponds to item AP8 from Gold et al. (2001). The wording was changed from "our organisation is able to locate and apply knowledge to changing competitive conditions"..
	KU6	Our organisation quickly applies knowledge to critical competitive needs	Retained	Gold et al., 2001	This item corresponds to item AP11 from Gold et al. (2001). The wording is unaltered.
	KU7	We use our knowledge assets to solve problems quickly	Retained	Gold et al., 2001	This item corresponds to item AP12 from Gold et al. (2001). The wording was changed from "our organisation quickly links sources of knowledge in solving problems".
	KU8	Our organisation has processes for using knowledge in the development of new products and services	Retained	Gold et al., 2001	This item corresponds to item AP3 from Gold et al. (2001). The wording is unaltered.
	KU9	Our organisation has processes for converting knowledge into action plans	Retained	Lee & Sukoco (2007)	This item corresponds to Conversion Process - Var2 from Lee & Sukoco (2007). The wording was changed from "Our company has processes for converting competitive intelligence into plans of

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
					action".
Please rate your organisation's level of knowledge of each of the following:					
Knowledge content	KC1	Characteristics of our customers	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC2	Customer's tastes and preferences	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC3	General business and industry conditions	Dropped during PCA	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC4	Customer segments	Dropped during PCA	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC5	Demand patterns for our region	Dropped during PCA	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC6	Customer perceptions of our organisation	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC7	Channels used by our customer segments for accessing our products / services (e.g. direct, online, travel agent, call centre etc.)	Dropped during PCA	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC8	Products and services we offer	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport &	New scale.

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
				Prusak (1998); Gold et al. (2001)	
	KC9	Market trends affecting our products and services	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC10	Our customers' current and/or future requirements for product and service offerings	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC11	Standard operating procedures	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC12	Current employee's skills and capabilities	Dropped during PCA	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC13	The performance of our operations	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC14	Products and services our competitors offer	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC15	Channels used by our competitors to make their products available to their customers	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC16	Strengths and/or weaknesses of our competitors	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
	KC17	Competitors' actions	Retained	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC18	Alternative sources of food, beverage and operating supplies	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC19	Value added services (e.g. sightseeing tours) offered by external providers	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC20	Services offered by sale intermediaries	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
	KC21	Labour market trends and conditions	Dropped due to kurtosis / skewness	Karaszewski (2008); Haggie & Kingston (2003); Davenport & Prusak (1998); Gold et al. (2001)	New scale.
The following statements relate to the Information Technology capabilities of your organisation. Using scale below, please indicate the extent to which you agree / disagree with the following statements:					
IT Infrastructure Quality	IQ1	Our IT systems are modular	Retained	Bhatt & Grover (2005)	The wording of this item is unaltered.
	IQ2	Our IT systems are scalable, i.e. after adding new hardware, their performance increases proportionally to the capacity added	Retained	Bhatt & Grover (2005)	The wording of this item is unaltered.
	IQ3	Our IT systems can handle multiple applications	Retained	Bhatt & Grover (2005)	The wording of this item is unaltered.
	IQ4	Our IT systems use commonly agreed IT standards	Retained	Bhatt & Grover (2005)	The wording of this item is unaltered.
	IQ5	We have a high degree of integration amongst our IT applications	Retained	Lee & Choi (2003)	This new item was introduced based on the discussion of "IT Support" in Lee & Choi

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
					(2003).
IT Human Capital	IH1	Technical IT skills (programming, systems analysis and design, network configuration etc.) are available within our organisation	Retained	Chen et al. (2009)	The wording of this item is unaltered.
	IH2	Managerial IT skills (abilities of effective management of information systems functions, coordination and interaction, project management and leadership skills) are available within our organisation	Retained	Chen et al. (2009)	The wording of this item is unaltered.
IT Support for Knowledge Management	IK1	In our organisation, IT facilitates the acquisition of knowledge about our customers, suppliers and/or competitors	Item dropped following PCA	Chen et al. (2009)	This item corresponds to item IEI1 from Chen et al. (2009). The wording was changed from "Our company invested in an IT system designed to improve its knowledge of customers across all business units (e.g. CRM system, call tracking)".
	IK2	Our IT systems prompt us to take action and recommend solutions to problems	Item dropped following PCA	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge application" in Gold et al. (2001).
	IK3	Knowledge is embedded in our databases and decision support systems	Dropped due to kurtosis / skewness	Chen et al. (2009)	This item corresponds to item IEI6 from Chen et al. (2009). The wording was changed from "Firm's knowledge embedded in systems enables its rapid transfer to novices and other new members".
	IK4	We developed information systems like Intranet and electronic bulletin boards to share information and knowledge	Item dropped following PCA	Lee et al. (2005)	The wording of this item is unaltered.
	IK5	Our IT systems enable knowledge to be protected from unauthorised access	Dropped due to kurtosis / skewness	Gold et al. (2001)	This new item was introduced based on the discussion of "knowledge protection" in Gold et al. (2001).
IT Capabilities	IC1	We have a formalised methodology for IS (Information Systems) planning	Retained	Ravichandran & Lertwongsatien (2005)	The wording of this item is unaltered.

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
	IC2	We have a mature, well defined systems development process	Retained	Ravichandran & Lertwongsatien (2005)	The wording of this item was changed from "We have a mature systems development process, the process is well-defined and documented".
	IC3	We have well defined service quality criteria for all IS (Information Systems) support tasks	Retained	Ravichandran & Lertwongsatien (2005)	The wording of this item is unchanged.
	IC4	We continuously monitor the performance of our computer systems	Retained	Ravichandran & Lertwongsatien (2005)	The wording of this item was changed from "We use automated tools to monitor and fine-tune the performance of our computer systems, networks, databases and telecommunications infrastructure".
How do you evaluate the support provided by each of the below listed applications to your operational or decision making activities?					
IT Applications Portfolio	IA1	Customer Relationship Management (CRM)	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA2	Property Management System (PMS) - reservations, check-in/check-out, guest accounting and invoicing	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA3	Central Reservation System (CRS)	Retained as aggregrate for IA items	Sigala (2003)	
	IA4	Hotel website	Retained as aggregrate for IA items	Sigala (2003)	
	IA5	Global Distribution System (GDS)	Retained as aggregrate for IA items	Sigala (2003)	
	IA6	Yield Management	Retained as aggregrate for IA items	Sigala (2003)	
	IA7	Room status and housekeeping management	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA8	Check-in.check-out kiosks	Retained as aggregrate for IA items	Sigala (2003)	
	IA9	Personnel	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA10	Purchasing	Retained as aggregrate	Ham et al. (2005)	

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
			for IA items		
	IA11	Finance and accounting (accounts receivable, accounts payable, general ledger, payroll)	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA12	Sales and catering	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA13	Reports and statistics	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA14	Premises monitoring and security	Retained as aggregrate for IA items	Sigala (2003) & Ham et al. (2005)	New item in "back office applications" discussed in Sigala (2003) and Ham et al. (2005)
	IA15	Intranet	Retained as aggregrate for IA items	Bouncken (2002)	New item
	IA16	Point of Sale	Retained as aggregrate for IA items	Sigala (2003) & Ham et al. (2005)	New item in "front office applications" discussed in Sigala (2003) and Ham et al. (2005)
	IA17	Menu management / recipe management	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA18	Event management	Retained as aggregrate for IA items	Sigala (2003)	
	IA19	Stock and inventory	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA20	Sales analysis (sales forecasting, menu item pricing)	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA21	Beverage control	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA22	TV Based services	Retained as aggregrate for IA items	Karadag & Dumanoglu (2009)	
	IA23	In-room internet and email access	Retained as aggregrate for IA items	Karadag & Dumanoglu (2009)	
	IA24	Telephone call accounting systems	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA25	Electronic locking system	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA26	Energy management systems	Retained as aggregrate	Ham et al. (2005)	

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
			for IA items		
	IA27	Guest operated devices (e.g. automated mini-bar)	Retained as aggregrate for IA items	Ham et al. (2005)	
	IA28	Auxiliary guest services (e.g. automated wake-up call, voicemail)	Retained as aggregrate for IA items	Ham et al. (2005)	
Using the scale below, please rate your organisation's performance relative to your key competitors.					
Competitiveness	CP1	Increasing room occupancy rates	Retained	Tari et al. (2010)	Item wording unchanged.
	CP2	Opening new markets	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP3	Growing market share	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP4	Profitability of hotel services in the last three years	Retained	Ottenbacher (2007)	Words "…of hotel services" added and item definition enhanced by specifying "in the last three years".
	CP5	Sales growth of hotel services in the last three years	Retained	Tari et al. (2010)	Adapted from "Average sales growth in the last five years".
	CP6	Revenue per available room (RevPAR)	Retained	Tari et al. (2010)	Items (4) "Income per room" and (6) "Gross profit per room" replaced with this item
	CP7	Cost efficiencies	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP8	Wealth creation (accounting value of the firm with respect to market value)	Retained	Tari et al. (2010)	Item wording unchanged.
	CP9	Capacity to generate profit in times of crisis	Retained	Tari et al. (2010)	Item wording unchanged.
	CP10	Employee satisfaction	Retained	Tarí et al. (2010)	Item wording unchanged.
	CP11	Employee turnover	Retained	Tari et al. (2010)	New item to reflect turnover of employee stakeholder.
	CP12	Competencies of employees	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP13	Customer satisfaction	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP14	Customer retention	Retained	Ottenbacher (2007)	New item to reflect retention of customer stakeholder.
	CP15	Customer loyalty	Retained	Ottenbacher (2007)	Item wording unchanged.
	CP16	Trust of our customers in our organisation	Retained	Examples: Eid, 2011; Dahiyat, Akroush & Abu-Lail, 2011; Yen	This new item was introduced based on the the research interest in trust in the context

Variable	No	Measure	Dropped or Retained	Source Reference	Note Regarding Item Wording
				& Horng, 2010; Kim, Ferrin & Rao, 2009	of organisational competitiveness.

Appendix D: Literature Regarding Knowledge Management – Firm Performance

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Zheng, Yang & McLean	2010	Analysis of 384 survey responses of managers of two HR organisations in the USA.	Organisational Effectiveness (comparative): – Overall success – Market share – Profitability – Growth – Innovativeness	Organisational structure – Centralisation Organisational culture – Adaptability – Consistency – Mission – Involvement Organisational strategy – Analysis – Defensiveness – Futurity – Proactiveness Knowledge management effectiveness (intermediate)	Knowledge management (including knowledge generation, sharing and utilisation), culture, structure and strategy all relate significantly to organisational effectiveness. Furthermore, knowledge management fully mediates organisational culture's influence on organisational effectiveness, and further knowledge management could be an intervening mechanism between organisational context (structure, culture and strategy) and organisational effectiveness.
Li, Huang & Tsai	2009	Analysis of 165 survey questionnaire responses of representatives of firms listed in the Taiwan Securities and Futures Institute.	Firm Performance	Knowledge creation process Entrepreneurial orientation	Knowledge creation and entrepreneurial orientation are positively related to firm performance. The knowledge creation process mediates the relationship between entrepreneurial orientation and firm performance.
Liao, Wu, Hu & Tsuei	2009	Analysis of 362 questionnaire responses of firms listed in Common Wealth Magazine's top 1000 manufacturers and top 100 financial firms of 2006.	Innovation Capability	Knowledge acquisition Absorptive capacity (mediator)	Knowledge acquisition is positively related to absorptive capability. Knowledge acquisition is positively related to innovation capability. Absorptive capacity is a mediator in the relationship between knowledge acquisition and innovation capability.
Liao & Wu	2009	Analysis of 327 survey questionnaire responses of	Organisational Performance	Knowledge management Organisational learning	Knowledge management affects organisational performance positively.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		knowledge intensive companies in Taiwan.			Knowledge management affects organisational learning positively. Organisational learning affects partnership performance, but not marketing performance not financial performance. Organisational learning is a mediator between knowledge management and organisational performance.
Ngah, Hoo & Ibrahim	2009	Analysis of 232 survey questionnaire responses of representatives of auditing firms in Malaysia.	Organisational Effectiveness	Knowledge management Trust	Knowledge management positively affects organisational effectiveness. Trust moderates the relationship between knowledge management and organisational effectiveness.
Nguyen, Neck & Nguyen	2009	Analysis of 148 survey questionnaire responses of senior managers of construction firms in Vietnam.	Competitive Advantage	Technical knowledge management capability Social knowledge management capability – Structure – Culture – People	Technical knowledge management capability positively and significantly influences competitive advantage. Cultural knowledge management capability makes a significant contribution to competitive advantage. No support was found for a positive association between knowledge management structure, people and competitive advantage.
Wang, Hult, Ketchen & Ahmed	2009	Analysis of 213 survey questionnaire responses of company directors and senior executives of companies in the United Kingdom	Performance	Knowledge management orientation: – Organizational memory – Knowledge sharing – Knowledge absorption – Knowledge receptivity Market Orientation (intermediate) Controls (age of firm, size of firm, industry, strategy type)	There is a significant relationship between knowledge management orientation and market orientation, and also between market orientation and performance. Market orientation fully mediates the relationship between knowledge management orientation and performance.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Wu & Shanley	2009	Analysis of observations related to patents from the COMPUSTAT database for 139 public firms and 854 firm-year of firms in the electromedical device industry between 1990 and 2000 in the USA.	Innovative Performance	– Exploration – Knowledge depth, knowledge breadth (moderators of relationship between exploration and innovative performance) – Controls (scope of application, firm size, firm R&D spending, firm diversification, firm performance, firm demand growth, year dummies)	Exploration has an inverted U-shaped relationship with innovative performance, i.e. as the intensity of innovation increases, the amount of newly created knowledge increases at first, then tapers off. Knowledge stock has a significant moderating effect on the relationship between exploration and innovative performance.
Yang	2009	Analysis of 615 survey questionnaire responses of employees of 60 international tourist hotels in Taiwan.	Knowledge Sharing Organisational Learning Organisational Effectiveness	Employees' attitude to sharing Employees' attitude to learning Leadership roles Organisational Support Controls (gender, age, tenure in the hospitality industry, organisational hierarchy, type of hotel, education, tenure in the current job, department)	Attitude to sharing, attitude to learning, organisational support and leadership roles are all positively associated with knowledge sharing. Organisational support and leadership roles are positively associated with organisational learning. Knowledge sharing is positively associated with organisational learning and with organisational effectiveness. Organisational learning is positively associated with organisational effectiveness.
Zack, McKeen & Singh	2009	Analysis of 88 survey questionnaire responses of executives who had recently attended once of the North American Business School executive programs.	Financial Performance – ROA/ROE – Profitability	Knowledge management practices – The ability to locate and share existing knowledge. – The ability to experiment and create new knowledge. – A culture that encourages knowledge creation and sharing. – A regard for the strategic value of knowledge and learning. Organizational performance (mediator) – Product leadership	Knowledge management practices are directly related to intermediate measures of strategic organisational performance and that those measures are in turn associated with financial performance. There is no significant direct relationship between knowledge management practices and financial performance.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				– Customer intimacy – Operational excellence	
Cheng, Hailin & Hongming	2008	Analysis of 208 questionnaire responses of manufacturing and service firms in China.	Firm Performance – Short performance – Long performance	Knowledge sharing Trust	Knowledge sharing mediates the relationship between trust and firm performance.
Choi, Poon & Davis	2008	Analysis of 115 survey questionnaire responses of middle managers working in firms listed in the Korea Stock Exchange.	Firm Performance – Overall success – Market share – Growth rate – Profitability – Innovativeness	KM Focus: – Tacit oriented – Explicit oriented KM Source: – External oriented – Internal oriented Controls: Industry type, total sales revenue, number of total employees.	There is a complementary relationship between internal-oriented and external-oriented strategies. Companies will gain benefits of KM by adopting either external-oriented or internal-oriented strategy. However, if companies implement both external-oriented and internal-oriented strategy together, they can achieve higher performance than if they adopted any one of them. Only high explicit-oriented strategy leads to improved performance. High tacit-oriented strategy does not contribute to better firm performance. Companies can achieve strategic benefits through focusing on both tacit-internal-oriented strategy and explicit-external-oriented strategy.
Holsapple & Wu	2008	Matched Sample Comparison Group (MSCG) methodology used with findings from an independent research company and COMPUSTAT data. Small sample size limitation noted, but actual sample size is not specified.	Return on Assets (ROA), Return on Sales (ROS), Operating Income to Assets (OI/A), Operating Income to Sales (OI/S), Total Operating Expenses to Sales (OEXP/S), Cost of Goods Sold to Sales (COGS/S)	Knowledge Management Performance	Firms with superior KM performance are likely to enjoy higher profitability ratios and lower cost ratios.
Hu & Deng	2008	Analysis of 171 questionnaire responses of single-informants from firms in China	Firm Performance	Knowledge Management Practices: – Acquisition – Dissemination	Knowledge management has a strong positive impact on performance. Market orientation positively moderates

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				– Responsiveness to Knowledge Market Orientation (Moderator) – Competitor Orientation – Customer Orientation – Inter Functional Coordination	the relationship between knowledge management and firm performance.
Song	2008	Analysis of 481 survey questionnaire responses of managers of 3 profit organisations in Korea.	Organisational Capability Improvement (this year versus last year), in terms of ROI, market share, time to market of products and services, knowledge based performance, customer satisfaction etc.	Knowledge creation practices – Knowledge sharing – Concept creating – Concept justifying – Archetype building	All four knowledge creation practices are statistically significant components to explain the covariance of organisational performance improvement.
Lee, Chang, Liu & Yang	2007	Analysis of 95 survey questionnaire responses of representatives of the top 5000 firms in Taiwan.	Alliance Performance – Satisfaction with accumulated knowledge – Creation of new opportunities – Satisfaction of initial alliance objectives	Knowledge protection Relational capital – Communication – Trust – Commitment Knowledge ambiguity – Tacitness – Complexity – Specificity Controls: Alliance structure, alliance duration	Knowledge protection exerts significant positive effect on knowledge ambiguity and relational capital. Relational capital mediates the relationship between knowledge ambiguity and alliance performance.
Lee & Sukoco	2007	Analysis of 152 survey questionnaire responses of managers of firms listed in the Top 1000 Firms in Taiwan.	Organizational Effectiveness – Financial – Non-Financial	Entrepreneurial Orientation – Risk taking – Pro-activeness – Autonomy – Competitive Knowledge Management Capability	There is a positive relationship between entrepreneurial orientation and: – Knowledge management capability. – Innovation. – Improvements in competence. – Organisational effectiveness. There is a positive relationship between

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				– Acquisition process – Conversion process – Application process – Protection process Social Capital (moderator) – Trust – Commitment – Interaction Innovation – Product innovation – Process innovation – Management innovation Competence Upgrading – Exploration competence – Exploitation competence	knowledge management capability and: – Innovation. – Organisational effectiveness. No support was found for the assertion that there is a positive relationship between knowledge management capability and improvement in competence. Conclusions regarding the effect of innovation, improvement in competence and social capital on organisational effectiveness are not mentioned here, since they fall outside the scope of this study.
Lin	2007	Analysis of 172 survey questionnaire responses of representatives of 50 firms listed in the Top 1000 firms in Taiwan.	Firm Innovation Capability	Individual factors – Enjoyment in helping others – Knowledge self-efficacy Organisational factors – Top management support – Organizational rewards Technology factors – ICT use Knowledge sharing processes (intermediate): – Knowledge donating – Knowledge collecting	Both individual factors and one organizational factor (top-management support) significantly influence knowledge sharing processes. Employee willingness to donate and collect knowledge help the firm improve its innovation capability.
Liu & Tsai	2007	Analysis of 560 questionnaire responses of managers working in Taiwanese high-tech companies	Operating Performance (using balanced scorecard) – Financial – Business – Organisation – Long-term advantage	KM Capability – Acquisition – Creation – Storing – Sharing Moderators: Enterprise characteristics	Operating performance (all four dimensions) increased significantly after knowledge management was introduced and implemented – to varying degrees – in the enterprises.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
			resource	and size	
Yang	2007	Analysis of 499 survey questionnaire responses of representatives of 9 international tourist hotels in Taiwan.	Organisational Effectiveness	Knowledge sharing Organisational learning	There is a positive association between knowledge sharing and organisational learning. Both knowledge sharing and organisational learning are significantly associated to organisational effectiveness.
Marqués & Simón	2006	Analysis of 257 questionnaire responses within telecommunications and biotechnology industries	Firm Performance	KM Practices: – Development, transfer & protection of knowledge – Continous learning – System orientation – Innovative culture – Approach based on individuals – Management based on competencies	There is a strong and positive relationship between the adoption of KM practices and firm performance
Darroch	2005	Analysis of 443 questionnaire responses of senior persons within New Zealand organizations with 50 or more employees	Firm Performance	– Knowledge Acquisition – Knowledge Dissimination – Responsiveness to Knowledge – Innovation (Mediator between KM variables and Firm Performance)	Knowledge acquisition positively affects knowledge dissemination and responsiveness to knowledge. Knowledge acquisition, dissemination and responsiveness are all three associated with innovation. Responsiveness to knowledge is positively associated with firm performance. However the relationship between knowledge acquisition and firm performance was not supported and the relationship between knowledge dissemination and firm performance was only partially supported.
Jantunen	2005	Analysis of 217 questionnaire responses of senior employees of Finnish companies.	Innovative performance	Environmental Dynamism Knowledge acquisition Knowledge dissimination	There is a positive relationship between environmental dynamism and innovative performance, and also between

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				Knowledge utilisation	knowledge utilization and innovative performance. No support was found for a relationship between knowledge acquisition / dissemination and environmental dynamism.
Lee, Lee & Kang	2005	Analysis of 101 survey questionnaire responses of senior executives of companies in the KOSDAQ market in Korea.	Stock price Price Earnings Ratio (PER) R&D Expenditure	Knowledge Management Performance Index (KMPI) – Knowledge creation – Knowledge accumulation – Knowledge sharing – Knowledge utilisation	There is a significant correlation between KMPI and all three financial performance indicators: stock price, PER and R&D expenditure.
Liu, Chen & Tsai	2005	Analysis of 105 survey questionnaire responses of representatives of high tech manufacturers in Taiwan.	New Product Development (NPD) Performance	Knowledge Management Method – Obtaining – Refining – Storing – Sharing NPD Strategy (mediator) – Orientation of new product development – Market characteristic orientation of new product – Technological characteristic and innovation level of new product development.	Knowledge management methods have a significant positive relationship with new product development performance. Knowledge management methods have a significant positive relationship with new product development strategy. New product development strategy has a significant positive relationship with new product development performance.
Sabherwal & Sabherwal	2005	Selection of 89 knowledge management press announcements in the USA for the period Jan 1, 1989 to Dec 31, 2002 and analysis of stock movements (from COMPUSTAT, Center for Research in Security Prices and other sources) following the announcement date.	Cumulative Abnormal Return (CAR) associated with a knowledge management announcement	Alignment between industry innovativeness and knowledge management process Alignment between firm efficiency and knowledge management process Firm Specific Instability Firm Diversification Related Experience Firm Size	CAR resulting from IT Based knowledge management announcements is greater under the following conditions: – Alignment between KM process and firm's efficiency – Stability – Diversification – Small size

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				Firm Profitability	– Lower profitability
Salojärvi, Furu & Sveiby	2005	Analysis of 108 questionnaire responses of employees of Finnish SME's. Semi-structured interviews with employees of 10 of the 108 responding companies	Sustainable growth, as measured by: – Annual Sales Growth – Age of Company	Knowledge Management Awareness Intangible Assets Aptitude KM Maturity Level Human capital Organisational capital External capital Degree of R&D Level of internationalisation Customer service personnel Control: Industry growth constant	Knowledge management maturity is positively correlated with sustainable growth. Firms with high knowledge management maturity exhibit the following characteristics relative to other firms: – The role of R&D is more important – They view the organisation in its global context – Focus on personnel, customers and networks rather than people and products – More international – Better collaborative climate
Chen, Feng & Liou	2004	Analysis of paired samples of financial data of firms with superior knowledge management capability over a two year period. Paired samples are from pre and post knowledge management adoption. The financial data is obtained from the COMPUSTAT database.	N/A – Descriptive statistics compiled	N/A – Descriptive statistics compiled	Firms with knowledge management capability show a significant decrease in sales, general and administrative expenses. Firms with knowledge management capability do not show a significant decrease in cost of sales.
Chuang	2004	Analysis of 26 survey questionnaire responses of R&D managers in Taiwan.	Competitive Advantage – Innovativeness – Market position – Mass customisation – Difficult to duplicate	Knowledge management resources: – Technical – Structural – Cultural – Human	Technical KM resource is not associated to competitive advantage. Structural, cultural and human KM resources are essential for competitive advantage.
Gloet &	2004	Analysis of 70 survey	Innovation Performance	IT focus on:	A KM model based on IT and HRM

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Terziovski		questionnaire responses of representatives of Australian and New Zealand manufacturing companies across a range of industries.		– Technological advancements – Quality and productivity HRM focus on product and process innovation HR and IT focus on organisational learning and knowledge management	focus is a reliable and valid instrument for measuring and predicting the relationship between KM practices and innovation performance. There is a significant and positive relationship between KM practices based on a combination of IT/HRM and innovation performance. There is a significant negative relationship between IT focus on technological advancement (e-commerce) and innovation performance.
Liu, Chen & Tsai	2004	Analysis of 102 survey questionnaire responses of representatives of high tech manufacturers in Taiwan.	Competitiveness – Enterprise forecasting ability – Renovation capability – Sales ability – Product and service quality – Enterprise image – Training capability – Information technology capability – Financial capability – International management capability	Knowledge management capability – Knowledge obtaining – Knowledge refining – Knowledge storing – Knowledge sharing Enterprise status – Enterprise characteristics – Technology advantages – Scale of the enterprise	All four KM capabilities are strongly associated with competitiveness.
Sher & Lee	2004	Analysis of 142 survey questionnaire responses of representatives of Taiwanese firms across manufacturing, finance and service sectors.	Enhancement of Dynamic Capabilities, i.e. learning effectiveness of new knowledge, decision quality, communication and coordination capability, responsiveness, integration in new product development, knowledge accumulation,	Knowledge management: – Management of endogenous knowledge – Management of exogenous knowledge IT Applications (moderator)	There is a significant influence of management of both endogenous and exogenous knowledge on dynamic capability enhancement.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
			resource deployment capabilities, customer relationships, vendor trust, un-imitability of strategic asset.		
Tsai & Shih	2004	Analysis of 110 survey questionnaire responses of marketing managers of large manufacturers of consumer goods and services in Taiwan.	Marketing Capabilities Business Performance	Marketing knowledge management – Knowledge generation – Knowledge dissemination – Knowledge storage	Marketing knowledge management is positively related to marketing capabilities. Marketing capabilities are positively related to business performance. No support was found for a direct significant association between knowledge management and business performance.
Un & Cuervo-Cazurra	2004	Analysis of survey questionnaire responses of representatives of 182 cross-functional project teams in 38 US and Japanese firms located in the USA.	Knowledge creation capability – Product innovation – Technological innovativeness of the product – Speed to market – Customer satisfaction – Efficiency	Organisation strategy – Organisation level integrative reward – Organisation level integrative socialisation – Organisation level integrative routine communication Project team strategy – Project team-level integrative reward – Project team-level integrative socialisation – Project team-level routine communication Controls: General controls are industry and country of origin. At project team level, controls are tenure diversity and functional diversity.	Organisation and project team strategies are both valid strategies for knowledge creation. The two strategies are substitute approaches towards knowledge creation.
Choi & Lee	2003	Analysis of 409 questionnaire responses of middle managers of 100 firms listed on the	Corporate Performance – Overall success – Market share	Knowledge management style: – Dynamic (high tacit & explicit KM styles)	Overall success, market share, growth rate, profitability and innovativeness were significantly different for the two

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		Korean Stock Exchange	– Growth rate – Profitability – Innovativeness – Business size Compared with important competitors	– System (high explicit KM style, low tacit KM style) – Human (high tacit KM style, low explicit KM style) – Passive (low tacit & explicit KM styles)	knowledge management styles. The dynamic KM style is most effective. The passive KM style results in significantly lower performance.
Darroch	2003	Analysis of 443 survey questionnaire responses of middle managers of firms in New Zealand with 50 or more employees.	Innovation Type Comparative Performance Internal Performance	Knowledge acquisition Knowledge dissemination Responsiveness to knowledge	There is a significant positive association between knowledge management practices and all types of innovation. There is a positive association between knowledge management practices and comparative performance.
Lee & Choi	2003	Analysis of 426 questionnaire responses of middle managers of 58 firms listed on the Korean Stock Exchange	Organizational Performance	Intermediate outcome: Organizational Creativity, affected by Knowledge Creation Process. Knowledge Creation Process (socialization, externalisation, combination, internalisation), affected by Knowledge Management Enablers: – Culture – Structure – People – Information Technology	Cultural factors are positively associated with knowledge creation. Combination is affected by IT and trust. There is no relationship between formalization and knowledge creation. Formalization may tend to inhibit socialization and externalisation whereasit facilitates combination and internalisation. IT is not significantly related with knowledge creation except combination. Organizational creativity affects organizational performance. The percentage of total variation of organizational performance explained by organizational creativity is relatively low.
Mohrman, Finegold & Mohrman Jr	2003	Analysis of 3596 survey questionnaire responses of scientists and engineers engaged in new product	Effectiveness – Change in performance – Overall performance (i.e. financial, technical, quality,	Direct non-HR organisational contextual element – Participation in boundary spanning structures	Knowledge and knowing capabilities of the firm translate into new product development effectiveness. IT, boundary spanning structures and

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		development at 10 new product development firms in the USA.	innovation, customer focus, cost, speed, productivity) Employee outcomes – Commitment to company – Willingness to turnover	– Direction and performance information – Information technology quality Direct HR practices – Pay for individual contributors – Pay for organisational performance – Developmental emphasis Knowledge work behaviours – Using systematic processes – Focusing on system performance – Knowledge linking – Trying new approaches Knowledge outcomes – Organisational clarity – Methods and processes improvements – Effective knowledge generation and use	rewards have weak paths through the knowledge system. Providing direction and performance information and emphasising development have strong paths to the effectiveness of the knowledge system. Organisational clarity, methods and processes improvements, developmental emphasis and trying new approaches are strongly associated with employee commitment to company.
Almashari, Zairi & Alathari	2002	Analysis of survey questionnaire responses of representatives of 82 companies in the UK and Kuwait.	N/A – Findings presented by means of percentages	N/A - Findings presented by means of percentages	This paper presents descriptive statistics related to employees' perceptions of knowledge management practices.
Gold, Malhotra & Segars	2001	Analysis of 323 questionnaire responses of executives within finance and manufacturing firms	Organizational Effectiveness	Knowledge Infrastructure Capability – Technology – Structure – Culture Knowledge Process Capability – Acquisition – Conversion – Application – Protection	There is a strong relationship between knowledge infrastructure capability & organizational effectiveness; similarly there is a strong relationship between knowledge process capability and organizational effectiveness
Schulz & Jobe	2001	Analysis of 98 questionnaire	Subunit Performance	Organisational knowledge domain:	Subunits with a focused approach to

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		responses of leaders of Danish subsidiaries of US firms and US subsidiaries of Danish firms.		– Knowledge of technologies – Knowledge of sales and marketing – Knowledge of government agencies, competitors and suppliers Extent of codification Codification forms Controls: Percentage of top managers born in host country, location, corporate size, competitive advantage of knowledge areas, innovative industry, local responsiveness, global integration, uncertainty measure)	knowledge management have higher performance than subunits with an unfocused approach. Subunits with a matched codification focus have higher performance than subunits with an unmatched codification focus. No support was found for a positive relationship between extent of codification and subunit performance, and also not for degree of tacitness and subunit performance.

Appendix E: Literature Regarding Information Technology – Firm Performance

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Chen, Tsou & Huang	2009	Analysis of paired responses from both IT and Marketing managers of 123 Taiwanese firms drawn from a list published by the Taiwan Joint Credit Information Center.	Firm Performance – Financial Performance (sales, profitability and market share) – Non-financial Performance (customer loyalty, new customers attracted, competitive advantage, image and reputation)	Operant Resources – Organisational: Innovation orientation – Relational: External partner collaboration – Informational: IT capabilities, which are IT infrastructure, Human IT resources and IT-enabled intangibles Innovation Practices: Service delivery innovation Competitive Advantage Controls: Age, capital and size	Innovation orientation and IT capability are the primary drivers that lead to service delivery innovation. Service delivery innovation leads to improved financial and non-financial performance. Non-financial performance leads to improved financial performance. Managers of the IT and Marketing departments within a single firm generally have consensus on matters of service delivery innovation.
Karadag & Dumanoglu	2009	Analysis of survey questionnaire responses of senior staff at 122 hotels in Turkey.	N/A Descriptive statistics	N/A Descriptive statistics	The majority of hotels had adopted many of the guest-related IT applications. Hotel managers view guest-related applications as highly productive and strongly believe that technology improves service quality and manager / employee productivity.
Salwani, Marthandan, Norzaidi & Chong	2009	Structural Equation Modelling (SEM) of survey questionnaire responses of representatives of 165 tourism establishments in Malaysia.	Business Performance	Technological Context – Technology Competence Organisational Context – Firm Size – Firm Scope – Web-technology Investments – Managerial Benefits	Business performance is closely linked with e-commerce usage and back-end integration. The relationship between e-commerce usage and business performance is significantly moderated by e-commerce experience.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				Environmental Context – Regulatory Support – Pressure Intensity E-Commerce Usage (intermediate) Front-end Integration Back-end Integration E-Commerce Experience (moderator)	
Scaglione, Schegg & Murphy	2009	Linear regression performed on data representing monthly revenue and overnights of 147 hotels in Valais, Switzerland for a ten year period.	Revenue per Available room (RevPAR)	Website age Star rating Extent of web presence (own domain, web presence in portal, no web presence)	There was a significant positive relationship between website adoption, for hotels with their own domain or in a portal, and RevPAR. Hotels with no web presence showed a negative trend in revenues.
Dibrell, Davis & Craig	2008	Analysis of survey questionnaire responses of owners / directors / chief executive officers of 375 SME's in the USA. The sample was selected from the Dun & Bradstreet mailing list.	Firm Performance – Return on assets – Return on sales – Sales growth – Market share growth	Product Innovation Process Innovation IT Investment – Total dollar value of IT assets – Total IT investment – Number of IT employees – Number of personal computers and terminals per employee Controls – Industry type – Age of firm – Number of employees	IT has a significant effect on current profitability and future growth. The impact of innovation (product and process) on performance (profitability and growth) is indirect and is fuelled through IT. Initiatives of IT and innovation are complementary. Investment in IT is optimised when IT initiatives are aligned with innovation. When competing with larger firms, SME's are more competitive when using IT.
Hu & Xiang	2008	Analysis of survey questionnaire responses of representatives of 232 companies in China.	Firm Performance – Process performance – Outcome performance	IS Human Capital IS Partnership IS Infrastructure Controls - Firm size, measured by sales	All three kinds of IS resources (IS Human Capital, IS Partnership and IS Infrastructure) have a significant positive effect on firm process performance.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				income - Industry type	Only IS Partnership has a significant positive effect on firm outcome performance.
Albadvi, Keramati & Razmi	2007	Analysis of survey questionnaire responses of 112 representatives of car part manufacturers.	Firm Performance – Customer results (sales and customer relationships) – People results (employee satisfaction and performance) – Operational results (flexibility, delivery, quality, cost, defectives, time cycles) – Growth results (sales growth, ROI)	IT Application (IT in communications, IT in planning, IT in operations, IT in quality control, IT as a support for decision making, IT in administrative or office work, IT in financial affairs) Organization Infrastructures (Moderator) (Delegation of power, Decentralization, Training, Group work, Process management, Relationship with customers and suppliers) Business Process Reengineering (Mediator)	Business Process Reengineering has a mediating effect in the relationship between IT and firm performance. Organizational infrastructures has a moderating effect in the relationship between IT and firm performance.
Coltman, Devinney & Midgley	2007	Analysis of survey questionnaire responses of 293 representatives of car part manufacturers.	Business Performance Outcomes	IT Organisational Capabilities External Pressures Managerial Beliefs (mediator) Feasibility Constraints – Financial – Organizational and political – Operational implementation issues	E-business performance increases when environmental pressures are high, when IT capability within the firm is at an advanced stage, and when managerial beliefs regarding the value of e-business are high. Feasibility constraints do not affect performance.
Zhang	2007	Analysis of a combination of: – Survey questionnaire responses of 148 senior IS executives of leading firms in the US. – Data from the COMPUSTAT database.	Firm Performance – Return on Assets – Return on Sales	IS, complemented by unique organisational structure and culture IS, complemented by unique vertical integration and related diversification IS, complemented by unique knowledge	There is a significant positive relationship between IS complemented by unique knowledge and information and firm performance, both in terms of return on assets and return on sales. There is a significant positive relationship between IS complemented

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
				and information Controls: - Sector of industry group - Firm size (total assets) - Technological resources (invested capital to sales) - Available slack (current assets to current liabilities) - Potential slack (debt to equity ratio)	by unique vertical integration and related diversification and firm performance, in terms of return on assets. No support was found for the assertion that IS complemented by unique organisational structure and culture leads to higher firm performance.
Bhatt & Grover	2005	Analysis of survey questionnaire responses of senior IT executives of 202 manufacturing firms .	Competitive Advantage	Intensity of Organisational Learning IT Capabilities – IT Infrastructure Quality – IT Business Experience – Relationship Infrastructure Size	No support was found for the assertion that higher quality of IT infrastructure has a significant positive effect on competitive advantage. Higher level of IT business experience has a weak positive effect on competitive advantage. Higher level of IT relationship infrastructure has a significant positive effect on competitive advantage. Higher levels of intensity of organisational learning has a strong positive effect on the quality of IT infrastructure, the level of IT business experience and the quality of relationship infrastructure. No support was found for the assertion that higher levels of learning intensity has a significant positive effect on competitive advantage.
Ham, Kim and Jeong	2005	Analysis of 648 survey questionnaire responses of employees of 13 five star and eight four-star hotels in Seoul,	Performance of lodging operation	Usage level of front-office IT applications Usage level of back-office IT applications	There is a positive association between the use of front-office, back-office and restaurant and banquet IT applications and firm performance.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		Korea.		Usage level of restaurant and banquet IT applications Usage level of guest related IT applications	No support was found for the assertion that guest related IT applications increase firm performance.
Mahmood & Mann	2005	Cluster analysis was performed on data obtained from Computerworld and Compact Disclosure for 239 publicly traded US firms.	Organizational productivity: – Sales by total assets – Sales by employees	IT Investment: – IT Budget as a percentage of revenue – Percentage of IT budget for staff – Percentage of IT budget for training – Market value of IT as percentage of revenue – Percentage of employees provided with PC's and terminals	The most effective organizations invested more in IT and experienced higher performance and productivity.
Mitra	2005	OLS regression was performed on data obtained from Computerworld and COMPUSTAT for 262 US firms excluding banks, financial institutions and utilities.	i) Free Cash Flow ii) Cost of Operations	i)IT Spending Growth rate (moderator) ii) IT Infrastructure Growth rate (moderator)	i) High growth firms increase their IT spending as their free cash flow increases. IT spending in low growth firms is relatively insensitive to the free cash available. ii) For high growth firms, a superior IT infrastructure built in previous periods leads to lower cost of output in subsequent periods. No such relationship exists for low growth firms.
Ravichandran & Lertwongsatien	2005	Analysis of survey questionnaire responses of senior IS executives of Fortune 1000 firms.	Firm Performance	IS Human capital IS Infrastructure IS Partnership Quality IS Capabilities (intermediate variable) IT Support for Core Competencies (mediator) Controls	Variation in firm performance is explained by the extent to which IT is used to support and enhance a firm's core competencies. An organization's ability to use IT to support its core competencies is dependent on IS functional capabilities, which is in turn dependent on the nature of human, technology and relationship resources of the IS department.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Tanriverdi	2005	Analysis of dataset obtained by merging: – Survey questionnaire responses of IT executives of Fortune 1000 firms. – Survey questionnaire responses of Business executives of the same Fortune 1000 firms. – Data related to firm performance obtained from the COMPUSTAT database.	i) Corporate Financial Performance of a multibusiness firm ii) Cross unit knowledge management capability of a multibusiness firm.	Complementarity of: – Product knowledge management capability, – Customer knowledge management capability and – Managerial knowledge management capability. ii) IT Relatedness – Relatedness of IT infrastructures. – Relatedness of IT strategy making processes. – Relatedness of IT Human resource management processes. – Relatedness of IT Vendor Management processes. Controls: Relatedness of firm's businesses, firm size, organisational structure, risk level, industry profitability.	Complementarity of product, customer and managerial knowledge management capabilities has a significant positive effect on corporate financial performance of a multibusiness firm. Complementarity of the four dimensions of IT relatedness is positively associated with the cross-unit knowledge management capability of a multi-business firm.
Zhang	2005	Analysis of a combination of: – Survey questionnaire responses of 153 senior IS executives of leading firms in the US. – Data from the COMPUSTAT database.	Firm Performance – Return on Sales – Sales Growth	IS Support for Strategic Flexibility – IS Support for product flexibility – IS Support for cross-functional coordination Unique, complementary knowledge and information (moderator of relationship between firm performance and IS support for strategic flexibility) Controls	There is a significant positive relationship between IS support for product flexibility and both return on sales and sales growth. There is no significant relationship between IS support for cross-functional coordination and return on sales as well as sales growth. Unique, complementary knowledge and information is a significant moderator of the relationship between firm performance and IS Support for strategic flexibility.

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Deveraj & Kohli	2003	Time-series analyses of data collected for a 36 month period from eight hospitals in the USA.	Hospital Performance – Mortality – Revenue per admission – Revenue per day	Technology usage – Reports – CPU Time – Number of records accessed Controls – Medicare, Medicaid, Casemix – Patient income – Number of employees – Age of hospital – Outpatients	There is a significant positive relationship between technology usage and revenue per admission, and also revenue per day.
Kearns & Lederer	2003	Analysis of 161 survey questionnaire responses of CIO's of companies in the USA with annual revenue of at least $75 million.	IT is used for Competitive Advantage	Information intensity of the value chain The CIO participates in business planning The CEO participates in IT planning The IT plan reflects the business plan (intermediate) The business plan reflects the IT plan (intermediate)	Information intensity of the value chain is positively associated with CIO participating in business planning and the CEO participating in IT planning. The CIO participating in business planning is positively associated with the IT plan reflecting the business plan. The CEO participating in IT planning is positively associated with the business plan reflecting the IT plan. The IT plan reflecting the business plan (but not the business plan reflecting the IT plan) is positively associated with IT used for competitive advantage.
Sigala	2003	Stepwise Data Envelopment Analysis (DEA) of 93 survey questionnaire responses of three star hotels in the UK.	ICT Productivity Impact	ICT Tools and Capabilities – Availability and type of ICT systems. – Integration of ICT applications. – Sophistication of use of critical success ICT, including Property Management System (PMS), Web site, email, Intranet, Extranet and customer data warehouse.	ICT integration is vital for realising productivity gains, and is more important than ICT availability. Hotels using PMS and customer databases for informational and transformational activities achieved significantly greater productivity than those using ICT for automation only. The impact of sophistication of newer ICT (email, Web site and Intranet) is

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
					negligible.
Tippins & Sohi	2003	Analysis of 271 responses by executives of manufacturing firms to mail surveys.	Firm Performance	IT Competency – IT Knowledge – IT Operations: methods, skills and processes – IT Objects: hardware, software and support personnel Organisational Learning – Information acquisition – Information dissemination – Shared interpretation – Declarative memory – Procedural memory Control: Market power	Organisational learning mediates the relationship between IT competency and firm performance.
Bharadwaj	2000	Analysis of data using the "matched sample comparison group" method across a treatment sample and a control sample over a four year period. The treatment sample consisted of 56 firms, selected from a list published by InformationWeek for their superior IT capability. The control sample was selected from the COMPUSTAT database. Performance data for both samples was obtained from COMPUSTAT.	Profit based measures: – Return on Assets – Return on Sales – Operating Income to Assets – Operating Income to Sales – Operating Income to Employees Cost related ratios: – Total operating expenses to sales – Cost of goods sold to sales – Selling and general administrative expenses to sales	IT Capability Sales Assets Related Entropy (diversification) Number of Employees	All profit ratios in each of the four years were significantly higher for IT leaders than for the control sample. Regarding cost ratios, total operating expenses to sales as well as cost of goods sold to sales were lower for IT leaders than for the control sample. However selling and general administrative expenses to sales was higher for the IT leaders than the control sample.
Siguaw, Enz & Namasivayam	2000	Analysis of 5,287 responses to survey of hotel properties listed in the American Hotel and Motel Association's 1998	Technology adoption	Stategic priorities – Guest service – Employee productivity – Revenue enhancing	Technologies to improve guest services are not given strategic priority in the US lodging industry. US hospitality industry has generally

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		Lodging Survey.		Lodging segment (budget, economy, midprice, upscale and luxury) Lodging type (all-suite, extended stay, convention hotel, casino, standard hotel, motel, bed-and-breakfast) Hotel size (number of rooms)	employed a strategy of first adopting technologies that address improved employee productivity and second those that enhance revenue generation. On the whole budget and economy segments invested in fewer IT technologies. Luxury hotels adopted more technologies and invested in technologies supporting all three strategic orientations.
Sircar, Turnbow & Bordoloi	2000	Canonical analysis was performed on data for a five year period obtained from IDC and COMPUSTAT for 1314 publicly traded US firms in various industries.	Sales – Sales – Net income before sales – Market share Asset – Assets – Equity Market – Closing price – Outstanding shares	Information Technology – MIS Budget: Staff, Staff training, Other – Computer capital – PC's per employee Corporate – Non-IS labour – Non computer capital	Computer capital and IS labour contribute significantly to firm performance. No support was found for assertion that expenditure on IT investments has greater impact than that of expenditure on non-computer capital, as per findings by Brynjolfsson & Hitt. Value of IS staff and training exceeded that of computer capital.
Li & Ye	1999	Interactive regression modelling was performed on data obtained from COMPUSTAT, Information Week and US Industrial Outlook for 216 firms in all major industries in the US economy.	Firm Economic Performance – Return on Assets (ROA) – Return on Sales (ROS)	IT investment Environmental Dynamism Firm Strategy CEO/CIO Arrangement Controls: – Debt to equity ratio (reflects firm's risk taking tendency) – Environmental munificence – Firm size (number of employees)	For firms operating in a more dynamic environment with an externally oriented strategy, greater IT investment leads to greater profitability. With a greater external orientation, a greater distance between CIO and CEO leads to poorer performance.
Bharadwaj, Bharadwaj &	1999	OLS regression modelling was performed on data for a five year	Tobin's q ratio measure of firm performance (capital	Information technology capabilities	There is a significant positive relationship between IT investment and

Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
Konsynski		period obtained from IW-500 and COMPUSTAT for 631 US firms from the manufacturing and services sector.	market value of the firm divided by replacement value of its assets)	Other firm specific factors not associated with IT – Market share – Firm diversification – Number of employees – Advertising expenditure ratio – R&D expenditure ratio Industry structure variables – Industry concentration – Industry q ratio – Industry capital intensity\ – Regulation	Tobin's q (the capital market value of the firm divided by its replacement value). There is also a significant positive relationship between advertising expenditure and Tobin's q . The coefficients for IT ratio are significant across all five years, but more so during earlier years.
Powell & Dent-Micallef	1997	Analysis of 65 survey questionnaire responses of CEO's of large retailers in the USA.	Firm Performance	Human resources complementary to IT – Open organisation – Open communications – Consensus – CEO Commitment – Flexibility – IT/Strategy integration Business resources complementary to IT – Supplier relationships – Supplier driven IT – IT training – Process redesign – Teams – Benchmarking – IT Planning Technology (IT) resources – Computer hardware, software and linkages	Human resources, business resources and technology resources are all significantly correlated with IT Performance. IT's do not, in and of themselves, explain significant variations in performance amongst firms. Human resources complementary to IT create embedded advantages that explain significant performance variance amongst firms. No support could be found for the assertion that business resources complementary to IT create embedded advantages that explain significant performance variance amongst firms.
Brynjolfsson & Hitt	1996	Analysis of results of IS spending survey conducted amongst US firms, excluding	Firm output	Computer capital Non-computer capital IS Staff	The output contributions of computer capital and IS staff labour are positive.

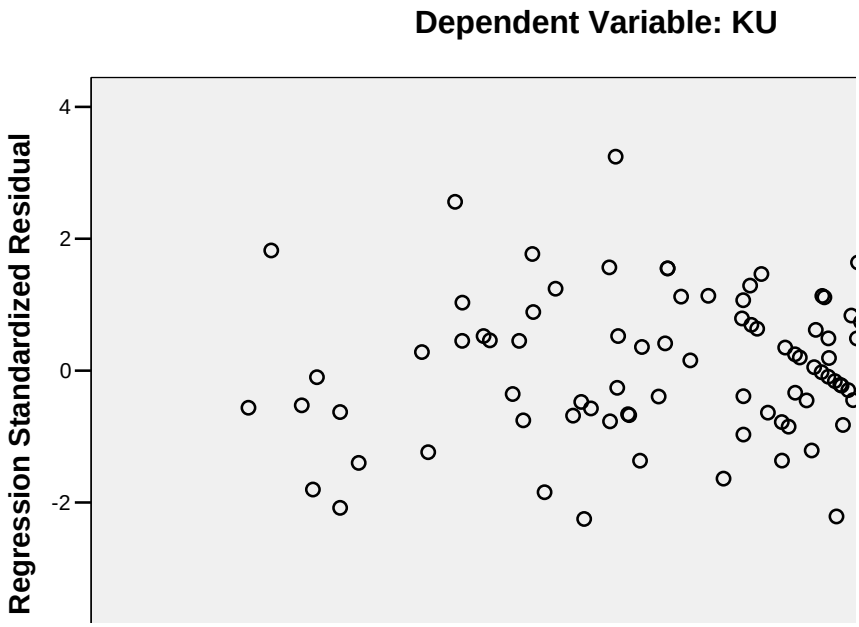
Author(s)	Year	Methodology	Dependent Variable	Independent Variables	Key Finding
		firms in financial and telecommunications industry sectors, by International Data Group (IDG). IS spending data was then enriched with firm output data from the COMPUSTAT database.		Non-IS labour and expenses	The net output contributions of computer capital and IS staff labour are positive after accounting for depreciation and labour expense.
Weill	1992	Analysis of survey questionnaire responses of CEO's, controllers and production managers of 33 firms in the valve manufacturing industry in the USA.	Firm Performance (year n)	Firm Performance (year-1) IT Investment (year n), which is in turn affected by firm performance in the previous year – Strategic – Informational – Transactional Conversion effectiveness (a moderator of the relationship between IT investment and firm performance) – Top management commitment to IT – Previous firm experience with IT – User satisfaction with systems – Turbulence of political environment within the firm	A single measure of IT investment is too broad and needs to be broken down into IT for different management purposes. All IT investment is not equally effective. – Transactional IT investment is positively associated with performance. – No performance effects were observed for informational IT. – In the short term strategic IT investment is negatively associated with performance. Conversion effectiveness moderates the relationship between IT investment and firm performance.

Appendix F: IT Applications and Mean Scores

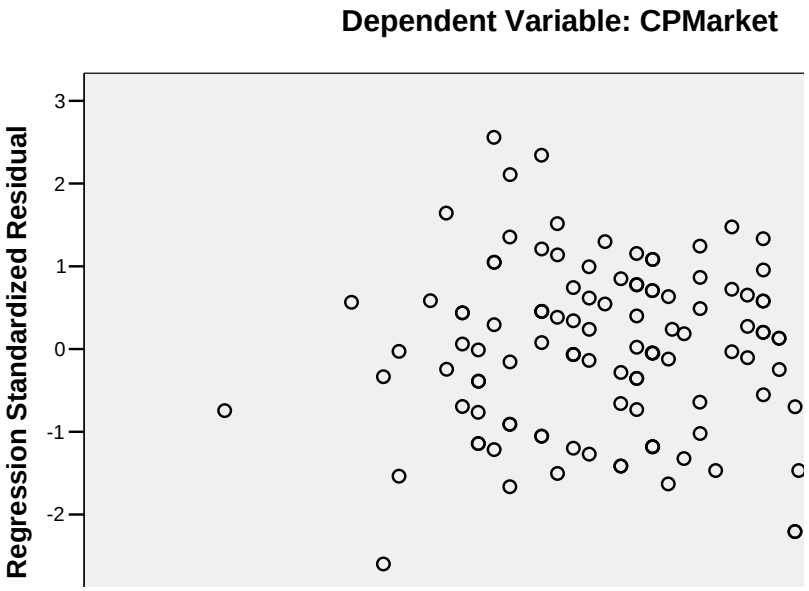
Application	Mean Score (out of 7)
Property Management System (PMS) - reservations, check-in/check-out, guest accounting and invoicing	5.96
Room status and housekeeping management	5.87
Hotel website	5.81
Finance and accounting (accounts receivable, accounts payable, general ledger, payroll)	5.75
Customer Relationship Management (CRM)	5.73
Reports and statistics	5.68
Central Reservation System (CRS)	5.68
Personnel	5.67
Check-in.check-out kiosks	5.66
Sales and catering	5.59
Purchasing	5.53
Beverage control	5.47
Global Distribution System (GDS)	5.46
Yield Management	5.42
Point of Sale	5.40
Stock and inventory	5.39
Telephone call accounting systems	5.35
Premises monitoring and security	5.33
Sales analysis (sales forecasting, menu item pricing)	5.31
Event management	5.23
Menu management / recipe management	5.14
In-room internet and email access	5.04
Intranet	5.02
Electronic locking system	4.98
Energy management systems	4.86
Auxiliary guest services (e.g. automated wake-up call, voicemail)	4.69
TV Based services	4.67
Guest operated devices (e.g. automated mini-bar)	4.02

Appendix G: Residual Plots

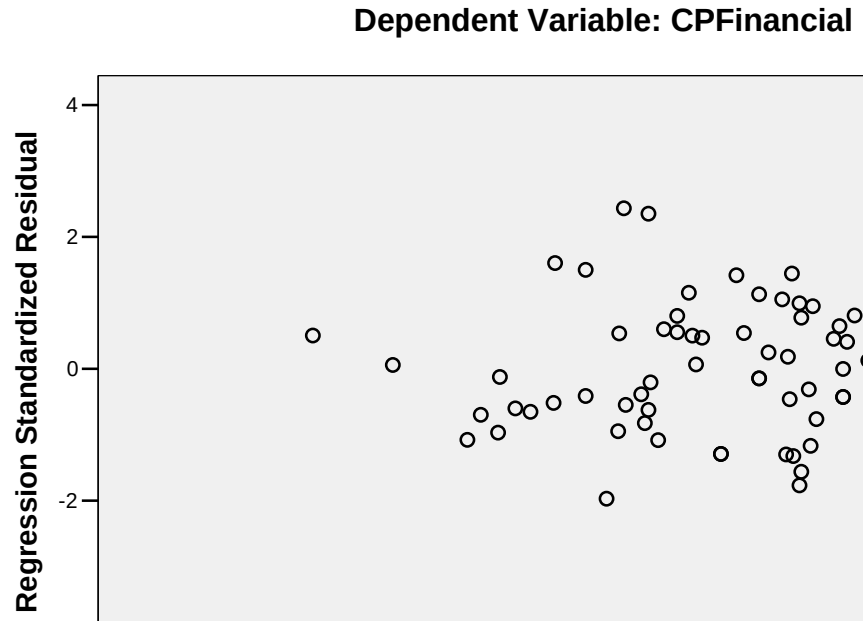
Residual Plot for Knowledge Application Regressed on Knowledge Process and Knowledge Content variables



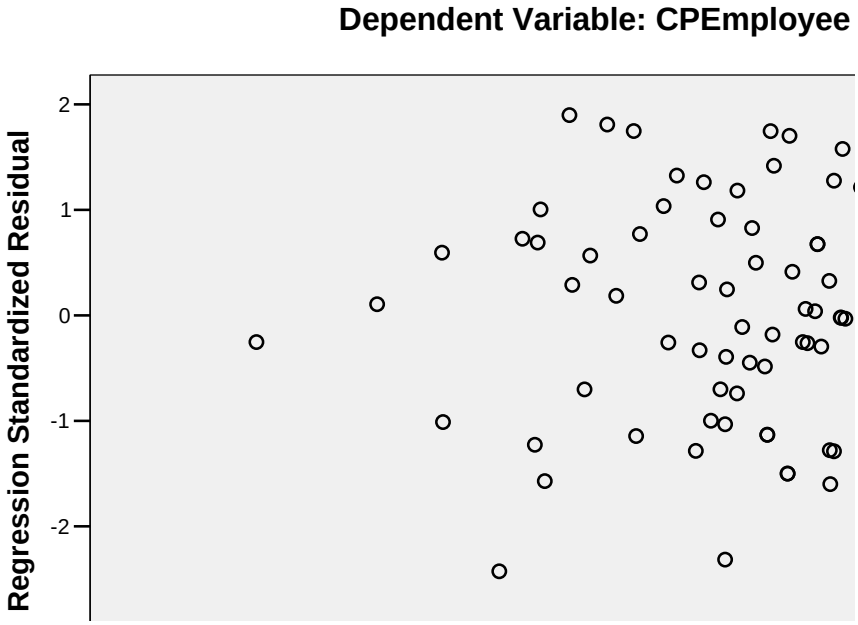
Residual Plot for Market Performance Regressed on Knowledge Application and IT Resources



Residual Plot for Financial Performance Regressed on Knowledge Application and IT Resources



Residual Plot for Employee Performance Regressed on Knowledge Application and IT Resources



Residual Plot for Regression Customer Performance Regressed on Knowledge Application and IT Resources