Journal of Global Information Management
Volume 29 • Issue 6

An Empirical Assessment of the Relationship Between Information Intensity and IT Leaders' Role and Structural Power

Moyassar Zuhair Al-Taie, University of Sharjah, UAE*
https://orcid.org/0000-0002-6817-0941

Mohamed Abdalla Nour, University of Sharjah, UAE
https://orcid.org/0000-0001-7252-3546

Aileen Cater-Steel, University of Southern Queensland, Australia

ABSTRACT

Using the theoretical lens of the contingency approach to leadership, this study explores the relationship between the information intensity of the organization's value chains and IT leaders' role and structural power. Based on data obtained from a sample of 174 Australian IT senior executives, a multiple analysis of variance (MANOVA) is used to empirically test for differences between the IT leader's role and structural power in high and low information intensive organizations. Findings suggest that value chain information intensity significantly influences the importance of individual CIO roles as well as the combined operational (supply) and strategic (demand) groups of roles. However, the IT leaders' structural power was found to be unrelated to the level of information intensity of the organization. Implications and future research directions are discussed.

KEYWORDS

CIO Roles, Demand-Side Roles, Information Intensity of the Value Chain, Role Configuration, Structural Power, Supply-Side Roles

INTRODUCTION

The growing pervasiveness of Information and Communication Technologies (ICT), over the past few decades, and their gradual but widespread assimilation and integration in the fabric of most organizations has made these organizations heavily dependent on these technologies not only for their daily business routines, but also for their competitive survival. Moreover, the continuous developments in these technologies, such as big data and pervasive analytics, context aware computing, smart machines and devices, cloud computing and the Internet of Things (IoT), have all rendered IT a strategic resource and competitive imperative for all but the smallest business organizations. Likewise, these continuing advancements in IT capabilities have engendered an increasing pressure on the IT/IS function to deliver more significant results, and a corresponding demand on the IT/IS leadership to translate IT investments into competitive advantage (Joia and Correia, 2018; Klee et

DOI: 10.4018/JGIM.294579 *Corresponding Author

al., 2021; Babin and Grant, 2019; Chen *et al.,* 2010; Saldanha and Krishnan, 2011; Grant and Yeo, 2019; Strickland and Theodoulidis, 2019).

The contemporary executive IT/IS leader is the chief information officer (CIO) whose role, historically, has evolved in tandem with the remarkable evolution of information technology (IT) (Bouaynaya 2020, Ross and Feeny, 1999; Strickland and Theodoulidis, 2019), reflecting a seemingly symbiotic relationship between them. This continuous IT revolution and globalization have now been generally recognized in the literature as the underlying cause of the evolutionary change in the roles and responsibilities of the chief information officer (CIO) (Barens et al., 2021; Adams and Weiss 2011; Hodgson and Lane 2010; Weiss and Adams 2010). That evolution has, partially at least, led to a confusion in the nature of the role of the CIO, rendering it somewhat ambiguous and largely ill-defined (Gerth and Peppard 2016, 2020; Hunter 2010; Peppard *et al.,* 2011; Peppard 2010). Consequently, numerous CIO roles have been suggested in the information systems (IS) research literature over the past few years (George and Howard 2020; Chen *et al*., 2010; Smaltz *et al.*, 2006). Indeed, much of the contemporary IS research has largely focused on the evolving roles of the CIO and their personal attributes and competencies (Peppard, 2010; Peppard *et al.*, 2011), with undue emphasis being placed on the individual per se, prompting some researchers to suggest that "perhaps research has been progressing down the wrong path" (Peppard, 2010, p.75). More research is thus needed to shift the focus and direct enquiry into the innumerable factors and contextual variables theorized to bear on the IT/IS function in general, and its executive leader (i.e. CIO) in particular. This is echoed by Ghawe and Gonzalez (2019) who called upon IS scholars to investigate more contextual factors that might influence the IT leaders' behavior and effectiveness.

The continuing advancement in the various information technologies has only heightened the level and pace of globalization, making it increasingly easier and more economical for even smaller firms to operate on a global scale, and creating virtual linkages between organizations across the globe (Morrar *et al.* 2019). For example, enterprise information systems, such as ERP systems, are bridging different organizations and creating virtual enterprises. This naturally results in extended value chains that involve more and more organizations, as they cross more geographic boundaries. In addition, the social media and Web 3.0 technologies have created a "global" culture and customer base that cross geographic boundaries. All of this creates immense opportunities and challenges for modern business organizations, including growth opportunities, and cybersecurity threats, customer relationship imperatives, and competitive threats. These globalization challenges place new demands on the CIOs to play several critical roles for optimally leveraging the IT resources of the organization to effectively address these challenges. Moreover, the global nature of information and communication technologies can arguably render the study of CIO roles more complicated but equally relevant in a global context (Lal and Bharadwaj, 2020).

However, this paper argues that the primary reason for the ambiguity surrounding the CIO's role is the fact that prior research has largely ignored the organizational context or contingencies that might more precisely shape that role (Peppard *et al.*, 2011; Preston *et al.*, 2008; Smaltz *et al.,* 2006). Based on contingency theory, which states that contingent leaders must effectively apply their configuration of roles to the right situation, the CIO has to play a variety of roles that are influenced by the organizational context. One such important contextual factor is information intensity (Grover *et al.,* 1993; Smaltz *et al.,* 2006). Prior research studies have examined information intensity as a contextual independent variable with a variety of IS constructs such as participation of the CIO in business planning or the participation of the CEO in IT planning (Kearns and Lederer 2003, 2004), business dependence on IT (Kearns and Lederer 2004), the integration between business planning and information systems planning (Kearns and Lederer 2004; Teo and King 1997), the use of outsourcing (Lacity *et al*., 2010; Lacity *et al.,* 2017).Table 1 provides a summary of an extensive review of extant research focusing on information intensity as a contextual organizational variable. As Table 1 indicates, the findings are somewhat mixed. While most of the studies reported positive findings, quite a few show the lack of significant relationships between information intensity and the focal variables.

There is a dearth of studies that directly investigate the relationship between the organizational information intensity and the IT/IS leader's role in an organization. As Chen *et al.* (2010) put it, "... the current research literature provides little insight into the key individual and organizational factors that affect CIO supply and demand-side leadership" (p.233). Similarly, and to our best knowledge, no study has directly investigated the influence of information intensity on the CIO structural power, which in turn influences the CIO's level of decision-making authority (Preston *et al.,* 2008). The current study attempts to fill this void by addressing the impact of the value chain information intensity (Porter and Millar, 1985) on the CIO's managerial role and structural power. More specifically, this study investigates whether the configuration of the CIO role and structural power are influenced by the level of organization's value chain information intensity. In doing so, this article seeks to advance our understanding regarding the impact of value chain information intensity on the effectiveness of the IT/IS leader, and the roles, or combinations thereof, that are more appropriate under a given information intensity environment. We draw on the contingency and upper echelons managerial theories to ground and derive our research hypotheses.

The rest of this paper is organized as follows. First, we present a theoretical background and relevant literature regarding information intensity and the role of the CIO. Second, we present and discuss our research model and hypotheses. Next, the research methodology is presented, followed by research results and analysis. Then we provide a discussion and research implications, followed by a concluding section.

THEORATICAL BACKGROUND

The Contingency Approach to Leadership

Since the 1950s, a great deal of empirical studies have shown that a leader is required to act in a flexible manner in an organization, and to adopt an appropriate leadership style that fits with the situation (Hersey and Blanchard 1969; Fiedler 1967). This is the thrust of the contingency model of leadership (also known as the situational approach), a dynamic approach proposing that the organizational context plays a vital role in shaping the leader's style, priorities, roles, responsibilities, and competencies (Fiedler 1967; Rice and Kastenbaum 1983). This theory refutes the notion of "one size fits all" as there is no optimal leadership style appropriate for all situations.

The contingency leadership model (Fiedler 1967) has engendered considerable research activity over the last five decades focusing on leadership in a broader sense, and a wide range of environments and contexts. Of particular interest to the current research is the application of the contingency theory to the managerial roles in the traditional business context. However, the emphasis from previous research has invariably been on the general line managers of the classical managerial hierarchy. Porter and McLaughlin (2006) have classified the components of the organizational context that influence the leaders' behavior and effectiveness into seven categories: culture and climate, goals and purposes, people and composition, processes, state and condition, structure, and time. By definition, information intensity is embedded in the value chain activities and processes used to generate distinctive value attributable to the organization. Accordingly, information intensity could be classified within the processes dimension.

Rockart *et al.*, (1982) are among a few of the early researchers who recognized the importance of studying the organizational contingencies that shape the CIO role in an organization. They stated that "There is undoubtedly a very lengthy list of organization-specific 'contingencies' which do, and will, affect the exact shape of the CIO's role in each organization" (p.11). Li *et al.,* (2021); Varajão *et al.,* (2008) and Smaltz *et al.,* (2006) highlighted the dynamic nature of the CIO role and its dependence upon organizational contextual factors. Moreover, practitioners and consultants (e.g., Curran 2009; Davis 2013; PWC 2009) have suggested the potential impact of organizational contingencies on the CIO role. More importantly, a stream of IS research has investigated a variety of contextual factors and their influence on the CIO role (Li *et al.,* 2021; Banker *et al.,* 2011; Chen *et al.* 2010; Li and

Tan 2013; Peppard *et al.* 2011; Weill and Woerner 2013, Al-Taie 2014a;2014b). It is believed that studying the CIO role without considering the organizational context can result in misunderstanding that crucial role.

The Role of Chief Information Officer (CIO)

Over the last four decades, the role of the chief information officer (CIO) has received intense scrutiny from many scholars and practitioners alike. The role-based approach has been identified as an effective framework to capture the behaviors of all managers. Robbins and Judge (2013) defined the role as "a set of expected behavior patterns attributed to someone occupying a given position in a social unit".

An extensive review of the CIO literature revealed that the role-based approach has been employed in two different research perspectives. Researchers in the first perspective have applied the general managerial roles developed by Mintzberg (1973) to the CIO position (Locoro and Ravarini 2019; Carter *et al.,* 2011; Gottschalk 2002; Wunderlich and Beck 2017), whereas the second group of researchers has suggested distinctive sets of roles designed specifically for the CIO (Hütter and Riedl 2017; Dahlberg *et al.,* 2016; Chun & Mooney 2009; Peppard *et al.* 2011; Smaltz *et al.* 2006; Weill and Woerner 2013; Weiss and Adams 2010).

The current study adopts the Smaltz *et al.*'s (2006) CIO role configuration as a dependent variable for several reasons. First, this CIO role configuration was developed from a comprehensive inventory of CIO roles identified from previous literature and empirical data obtained from in-depth interviews with CIOs and top management members. Second, it represents a comprehensive configuration that accommodates all other empirical CIO role configurations mentioned above. Additionally, and despite the fact that this CIO role configuration was developed within the healthcare sector, the roles that emerged are similar to the ones that have been identified in the literature to date (Strickland 2011). Furthermore, Agarwal and Beath (2007) found that all these roles included in this configuration were important in "grooming" the future CIOs, regardless of their industry. Moreover, this configuration has been proved to be a valid typology within the Australian context (Seddon *et al.* 2008). Additionally, Smaltz *et al.* (2006) have classified the following six roles into two groups: supply side role (utility provider, information steward, and educator) and demand side role (integrator, relationship architect, and strategist), following the modern classification of the CIO roles proposed by Broadbent and Kitzis (2005). The supply side role refers to the traditional role for the CIO as a technician who focuses on the operational side of IT only to support business needs, while the demand side role refers to the business side of the CIO role as a strategist or a visionary leader who focuses on creating new IT-enabled business initiatives that add value to the organization (Smaltz *et al.* 2006). Thirdly, this CIO roles configuration has been measured by a survey instrument that demonstrated high validity and reliability (Chen *et al*. 2010; Chen and Wu 2011; Li *et al.,* 2012; Wu *et al.,* 2008). Finally, the survey instrument for this CIO configuration is concise. This is crucial as the targeted survey respondent is the most senior IT executive in the organization who is extremely busy and is unlikely to fill out a lengthy survey.

Organizational Information Intensity

Porter and Millar (1985) were the first to examine the concept of information intensity and highlight its effects on the role of IT in organizations. According to Porter and Millar (1985), the information intensity for a given firm can be identified via two main dimensions, the first is the extent to which the information contributes in transforming the firm's value chain, and second is the information content of the firm's products and services. The contribution in the transformation of the value chain is demonstrated by the level of accuracy, frequency of updates, and the magnitude and extent of information employed in operations (Busch *et al.,* 1991; Kearns and Lederer 2003; Teo and King 1997). These two dimensions underpin the information intensity matrix used by Porter and Millar (1985) as a framework to classify firms or industries according to their information intensity. The level of information intensity of an organization is, therefore, a function of the information content of both

products or services and the value chain activities (Porter and Millar 1985; Thong and Yap 1995). Wynne (1989) considers information intensity as an important aspect of IT measurements that applies to all of the following three levels of information technology application: efficiency as in automation, effectiveness as in productivity, and innovation as in strategic management. In general, therefore, information intensity can be defined at the industry level; organization level; or product, service, and value chain levels. This article focusses on the information intensity of the firm's value chains.

CIO's Structural Power

Managerial power has been the subject of extensive research in the management literature over the last several decades. Several forms and bases of managerial power have been suggested in the literature, including legitimate, coercive, referend, expert, and reward power (Mallin and Ragland 2017). Specifically, legitimate power relates to the manager's right to assert rules and expect compliance due to formal positional or hierarchical status (Finkelstein 1992) and is thus the most obvious form of managerial power.

Structural power is derived from the formal organizational structure and hierarchical authority and is generally associated with an executive's overall power level (Chen *et al.* 2010; Daily and Johnson 1997; Finkelstein 1992). Chen *et al.* (2010, p. 245) define the CIO's structural power as the "CIO's level of legitimate power due to his or her formal position within the hierarchy of the organization". The structural power of the CIO can influence the decision-making authority and, consequently, the value the organization may achieve from its IT investments. For example, Saldanha and Krishnan (2011) found that IT-enabled business innovation is more likely when there is a direct CIO-CEO reporting structure, consonant with a higher structural power.

The CIO's structural power is manifested in both the CIO reporting structure and their job title. The CIO can report to different chief executives, including the chief executive officer (CEO), the chief operating officer (COO), and the chief financial officer (CFO), among others (Saldanha and Krishnan 2011). Prior research suggests that a direct reporting structure, i.e., reporting to the CEO, contributes the most to the CIO's structural power (Karanja *et al.,* 2021; Chen *et al.* 2010; Saldanha and Krishnan 2011). This is supported, to a large extent, by the upper echelons (UE) theory (Hambrick and Mason, 1984), which maintains that organizational outcomes are a reflection of the characteristics of a firm's top managers (Hambrick and Mason, 1984; López-Muñoza and Escribá-Esteveb, 2017). This suggests that occupying a seat in the C-level suite (i.e., being a member of the top management team (TMT)) endows the CIO with the potential capacity to influence organizational outcomes, including strategic choices and performance. As reported by Colony (2017), CIOs are no longer just technical managers, but they are now general, and increasingly senior, managers. López-Muñoza and Escribá-Esteveb (2017) further contend that when the TMT is well entwined (interlocked) with IT, the organization's IT outcomes will be more valuable. We extend López-Muñoza and Escribá-Esteveb's (2017) argument that having the CIO in the TMT by reporting directly to the CEO, and thus having a holistic and global IT view for the entire organization, not only increases the TMT heterogeneity, but also accentuates the IT focus of the organization, and increases the CIO's decision making authority, which have all been suggested to drive organizational performance (Abatecola and Cristofaro, 2020; Kearns and Lederer, 2004; Preston *et al.,* 2008).

The job title of the IS leader varies across industries and organizations. Whereas in large mature organizations "CIO" may be the preferred title, other titles used include chief technology officer (CTO), vice president for IT (VP IT), and EDP/MIS manager, among others. The combination of the job title and reporting structure provides the overall structural power commanded by the IT/IS leader.

RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

Our thorough review of the existing literature revealed that the information intensity construct has been widely investigated by IS scholars either as a direct predictor or as a moderator. As a direct

predictor, information intensity has been the subject of extensive scholarly investigation involving myriad organizational variables (Thong and Yap, 1995; Dehning *et al.,* 2003; Chandra and Calderon, 2009; Al-Qirim 2007; Ghobakhloo *et al.,* 2011; Lacity *et al.,* 2017; Hung *et al.,* 2016; ; Palmer and Griffith 1998; Ranganathan *et al.,* 2011; Shams Eldin, 2018). Table 1 provides a summary of prior research results on the role of information intensity in an organization.

The present paper focuses on investigating whether the IT leader's roles and structural power are influenced by the organization's value chain information intensity. As organizations continue to face increasingly dynamic and complex technological and competitive environments, CIOs are expected to be called upon to take on and be effective in multiple roles, as dictated by myriad contextual factors. As presented earlier, numerous CIO roles have been proposed in the previous research studies to describe the increasingly widening responsibilities of the IT/IS executive. We adopt in this research the roles identified by Smaltz *et al.* (2006) that include six salient roles: information steward, educator, utility provider, strategist, integrator, and relationship architect.

Chen *et al.* (2010) argued that both the supply-side (operational) (i.e., information steward, educator, utility provide) and the demand-side (strategic) (i.e., strategist, integrator, and relationship architect) leadership roles are important to the CIO's effectiveness, without indicating under what conditions each of the two sets of roles might be more important. Similarly, McLean and Smits (2014) suggested that IS leaders be required to engage simultaneously in transactional (supply-side) and transformational (demand-side) leadership to be effective in meeting organizational goals. Smaltz (1999) argued that the relative importance of each CIO role might be influenced by the organizational contextual factors, and Smaltz *et al.* (2006) suggested that the importance of the roles is linked with context, reflecting country, industry, or firm-level factors. For example, Chen *et al.* (2010) studied the antecedent role of the CIO's structural power on the progressive leadership role from the supply-side to the demand-side.

The value chain information intensity, as publicized by Porter and Millar (1985), reflects a measure of the amount of information needed to execute the activities in the entire organizational value chain, representing the extent to which the organization requires information to acquire, manufacture, distribute, sell, and maintain its products and services (Porter and Millar, 1985). Porter and Millar (1985) described the organization with potentially high information intensity in the value chain with the following characteristics: a large number of suppliers or customers with whom the company deals directly; a product requiring a large quantity of information in selling; a product line with many distinct product varieties; a product composed of many parts; a large number of steps in a company's manufacturing process; and a long cycle time from the initial order to the delivered product. These distinct characteristics, as literature suggests (e.g. Porter and Millar,1985; Hu and Quan 2003; Sabherwal and King 1991) require the IT leader to pay more attention to improve the efficiency of information processing due to the high demand on the processed information caused by the extreme complexity of inbound logistics, operations, outbound logistic and internal material flow and control. Thus, we argue that IT leaders in a high value chain information intensity organization still in need to pay attention to supply-side roles in comparison to their peers in an organization with low information of the value chain to ensure the operational and the information processing efficiency.

While there is very little research focusing on the effect of information intensity on the CIO roles, Kearns and Lederer (1999, 2003, 2004) examined such effect on the CIO's participation in business planning—a construct indicative of a demand-side role. They found a significant positive relationship between the information intensity of the firm's value chain and the participation of the CIO in business planning. Similarly, Teo and King (1997) theorized that the higher the information intensity, the greater the IT potential, and the greater the need for integration of business planning and IT planning, suggesting again a more strategic role for the CIO. Hence, we propose the following hypothesis:

H1: IT leaders in high information intensity of the value chain organizations would perceive both the combined supply (operational) side roles and the combined demand (business) side roles significantly higher than their counterparts in organizations with low information intensity of the value chain

To determine which IT leader's roles are significantly different across the two types of organization, we posit that:

H2: There are significant differences between organizations with high and low information intensity of the value chain regarding the perceived importance of each CIO role (strategist, integrator, relationship architect, educator, utility provider, and information steward).
H2a: There are significant differences between high and low information intensity organizaions regarding the perceived importance of the IT leader's Strategist role.
H2b: There are significant differences between high and low information intensity organizations regarding the perceived importance of the IT leader's Integrator role.
H2c: There are significant differences between high and low information intensity organizations regarding the perceived importance of the IT leader's Relationship Architect role.
H2d: There are significant differences between high and low information intensity organizations regarding the perceived importance of the IT leader's Educator role.
H2e: There are significant differences between high and low information intensity organizations regarding the perceived importance of the IT leader's Utility Provider role.
H2f: There are significant differences between high and low information intensity organizations regarding the perceived importance of the IT leader's Information Steward role.

As discussed earlier, a CIO's structural power, derived from the formal hierarchical position in the organization and the official job title, contributes to the CIO's decision-making authority and, consequently, their ability to influence IT's contribution to strategic goals. Chen *et al*. (2010) contends that "for the CIO to be able to act as both a supply- and demand-side leader, he or she must have appropriate levels of structural power within the organization" (p.15), and Preston *et al.* (2008) found evidence that the CIO's structural power directly influences the CIO's level of strategic decision-making authority within the organization. Gerow *et al.,* (2012) found that the CIOs' structural power was significantly related to executive team commitment to strategic and technical IT initiatives. Karanja et al., 2021 found that firms seeking an innovation, growth or differentiation strategy have their CIOs reporting to the CEO. One of the primary research questions of the current study is whether there is any significant variance between the structural power of CIOs in high and low information intensity organizations. This is stated in the following hypothesis:

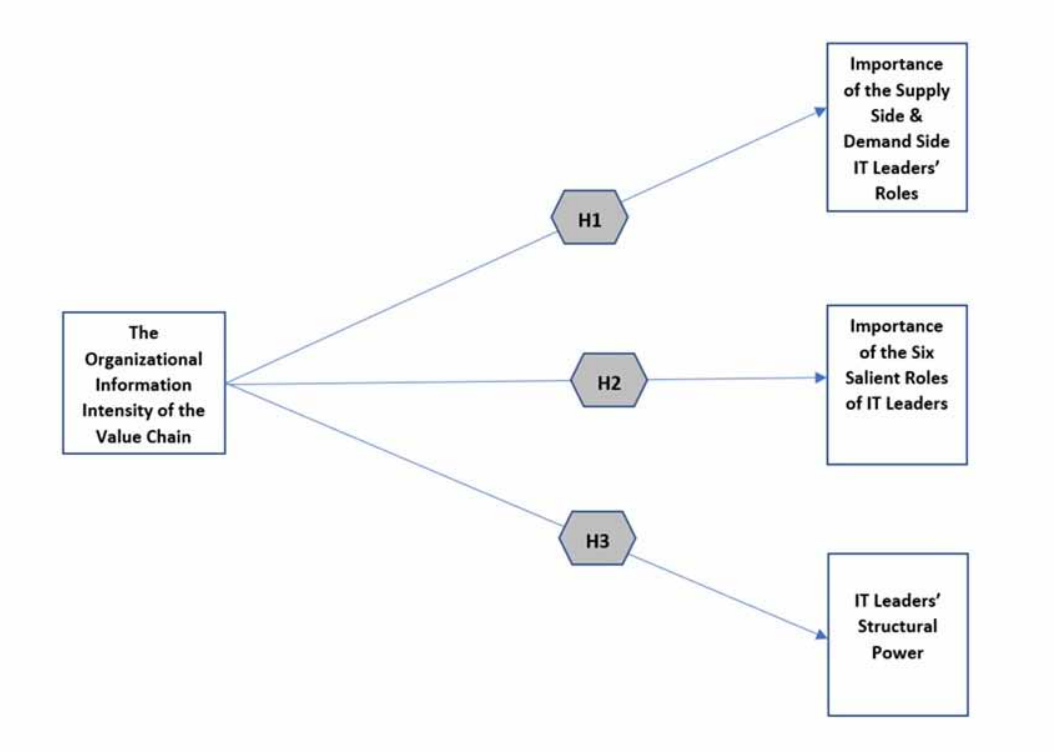
H3: There are significant differences between the CIO's structural power in firms with high and low information intensity.

Figure 1 presents the research model and related hypotheses.

METHODOLOGY

This study utilized a cross-sectional survey design based on the quantitative positivist paradigm to assess the causal relationship between the organizational information intensity of the value chain and the CIO roles and structural power. The survey sample was drawn from Australian IT leaders. Analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) techniques, using IBM SPSS 26, were used to analyse the data and test the research hypotheses.

Figure 1. Research model



Measures

The constructs in the research model were measured using multiple item measures previously developed, validated, and used in the IS literature. These measures and their sources are listed in Appendix A. All constructs were modelled as reflective, and the survey used a seven-point Likert scale anchored at strongly disagree (1) and strongly agree (7) points.

Sample and Procedures

Data for this research were collected through a large-scale mail survey carried out in Australia. A list of postal addresses of 954 senior IT/IS executives in Australian private sector firms was purchased from Dun & Bradstreet Australia and provided the basis for the survey sample for this study. The mail survey was administrated through two postal mail outs followed by an online mail out for those who were willing to participate after the follow up calls done with them. Table 2 presents some statistics regarding the survey administration that provides the basis to calculate the overall response rate for this study.

A total of 113 questionnaires were returned to the sender (RTS) as undeliverable due to invalid addresses, and emails were received from 19 firms indicating they were not willing to participate in the survey. With 174 complete and usable responses the response rate of this study was calculated at 20.68 per cent (174/ (954-113)) which is considered to be a reasonable response rate for survey research compared to similar studies involving CIOs as reported by Preston, Karahanna and Rowe (2006) where the response rates have ranged from 7 to 20 per cent. It is recognised that the targeted respondents were senior IT executives who are busy people and tend to be over-surveyed. The demographic profile of the respondents is shown in Table 3.

Table 1. Summary of the Results of Previous Research on Information Intensity

Study	Relationship	Findings
Shams Eldin (2018)	Information intensity → Superior organizational performance	Positively related
Lacity *et al.* (2017)	Information intensity → Information technology outsourcing (ITO) decision	**No relationship**
Hung *et al.* (2016)	Information intensity → Strategic information systems planning	Positively related
Hwa 2015	Information intensity → Internet of Things (IoT)	Positively related
Hartono and Mada (2012)	Information intensity → SMEs IT Adoption	Positively related
Mndzebele (2013); Al-Qirim (2007), Ghobakhloo *et al.* (2011)	Information intensity → Adoption of E-commerce	Positively related
Asatiani *et al*. (2014); Han *et al*. (2005); Bardhan *et al.,* 2007	Information intensity → Use of outsourcing or disaggregation.	Positively related
Ranganathan *et al.* (2011)	Information intensity → Web-enabled supply chain management	Positively related
Wang *et al.,* (2010)	Information intensity → Radio frequency identification (RFID) adoption	Positively related
Chandra and Calderon (2009)	Information intensity → Spending on IT and information security	Positively related
Mithas and Whitaker (2007)	Information intensity → Service disaggregation	Positively related
Liang *et al.* 2004	Information intensity → Organization performance	Significant impact
Kearns and Lederer (2004)	Information intensity → Business dependence on IT Information intensity → Two strategic IS planning (SISP) constructs (IT leader participation in business planning; the alignment of the IT plan with the business plan)	Positively related Positively related
Chen and Ching (2004)	Information Intensity → Customer Relationship Management Practices (market orientation and customer service)	Positively related
Kearns and Lederer (2003)	Information intensity → the participation of the CIO in business planning and the participation of the CEO in IT planning	Positively related
Andal-Ancion *et al.* (2003), Dehning *et al.* (2003)	Information intensity → Benefit from IT	Positively related
Xia and King (2002)	Information intensity → Organizational IT Infrastructure capabilities	Positively related
Bhatt (2001)	Information intensity → Business process improvement (BPI) factors	Positively related
Thong (1999)	Information intensity → Likelihood of IS adoption Information intensity → Extent of IS adoption	**No relationship** Positively related
Kearns and Lederer (1999)	Information intensity of products and services → CIO participation in business planning for electric utilities than for other industries. Information intensity of products and services ®CEO participation in IS planning for electric utilities than for other industries. Information intensity of products and services → alignment of the IS plan with the business plan for electric utilities than for other industries. Information intensity of products and services → alignment of the business Information intensity of products and services ® the use of IS resources for competitive advantage for electric utilities than for other industries.	Positively related Positively related **No relationship** Positively related **No relationship**
Palmer and Griffith (1998)	Information intensity of the value chain → Web Design and Content	Significant Influence
Teo and King (1997)	Information intensity → the level (type) of Business Planning-Information Systems Planning integration	**No relationship**
Teo et al. (1997)	Information intensity → Decision to adopt the Internet	**No relationship**
Lee and Kim (1997)	Information intensity → Selection of the Outsourcing Strategy	Positively related

continued on next page

Table 1. Continued

Study	Relationship	Findings
Thong and Yap (1995)	Information intensity → IT Adoption Information intensity → Attitude of CEO to adopt IT	**No relationship** Positively related
Vijayasarathy and Sabherwal 1994	Information → Internal Telecommunication Use	Positively related for the information intensity of the product **No relationship for the information intensity of the value chain**
Jarvenpaa and Ives (1991)	Information intensity → IT Use	Positively related
Busch *et al.* (1991)	Information intensity → CEO perception of IT importance	Positively related
Yap (1990)	Information intensity → IT Adoption	Positively related

Source: Developed by the authors for this study

Table 2. Survey Responses for 3 Phases of Data Collection

Round	Survey Type	# Sent	Received	Complete and usable	Incomplete	R.T.S.	Not willing to participate
First	Postal Mail	954	98	96	2	105	4
Second	Postal ail	950	65	65	-	-	1
Third	e-mail survey	77	13	13	-	8	14
Total		**1985**	**176**	**174**	**2**	**113**	**19**

Data Analysis and Results

The preliminary analysis included data screening and data cleansing for data entry errors, missing data and outliers. Since we collected our data using a self-reported survey, we checked the existence of common method bias and non-response bias prior to any further analysis. We checked for common method bias (CMB) in the measurement model for the research constructs used in this study. A full collinearity assessment was performed based on the guidelines provided by Kock (2015, p 7) using SmartPLS 3.2.9 software (Ringle *et al.,* 2015). All variance inflation factors (VIFs) for the latent variables resulting from this assessment were lower than the threshold of 3.3; thus, we could infer that common methods bias was not an issue in this study. Next, we assessed non-response bias following the guidelines presented in Armstrong and Overton (1977) and Sivo *et al.,* (2006). We compared early respondents (n = 21) and late respondents (n = 13) in terms of the research constructs. From the results of the Mann-Whitney U test on the 29 items of this instrument, we found statistically significant differences between early respondents and late respondents in only one item (ReAr1). Thus, we can conclude the early and late respondent CIOs had no major differences and that non-response bias did not appear to be an issue in this research.

In order to check the validity and reliability of the CIO role and the information intensity constructs, a confirmatory factors analysis was run using SmartPls. The composite reliability (CR) for both constructs exceed the satisfactory level of 0.7 proposed by Werts *et al.* (1974). Reliability at the indicator level checked by examining the items factor loadings for both constructs. The factor loadings of all of the (29) items exceed the standardized cut off of 0.7 except for three belong to the CIO role where their loading was over 0.6. A decision was made to keep these three items as long as the composite reliability for their respective constructs is still over the satisfactory level of 0.7 (Henseler et al. 2009) and the loadings of the other items in the same block were over 0.7 (Chin 1998, p. 325). The average variances extracted (AVEs) proposed by Fornell and Larcker (1981) for

Table 3. Profile of the respondents (N = 174)

Variable	Class	Frequency	Percent
Gender	Female Male	14 160	8.0% 92.0%
Age (Years)	30 and less 31 to 40 41 to 50 51 to 60 Over 60	6 32 62 69 5	3.4% 18.4% 35.6% 39.7% 2.9%
Level of Education	Secondary school Undergraduate degree Masters PhD/Doctorate	34 91 45 4	19.5% 523% 25.9% 2.3%
Industr	Communication Services Construction Electricity, Gas and Water Supply Finance & Insurance Health & Community Services Manufacturing Mining Property and Business Services Retail trade Transport & Storage Wholesale Trade Other	11 8 10 27 21 24 8 13 14 11 11 16	6.32% 4.60% 5.74% 15.51% 12.06% 13.79% 4.60% 7.47% 8.04% 6.32% 6.32% 9.19%
State	New South Wales (NW) Victoria (VIC) Queensland (QLD) Western Australia (WA) South Australia (SA) Australian Capital Territory (ACT) Tasmania (TAS) Northern Territory (NT)	75 49 28 17 4 1 0 0	43.1% 28.2% 16.1% 9.8% 2.3% 0.6% 0.0% 0.0%

Table 4: IT leader's structural power conversion from ordinal to continuous construct

IT leader's Structural Power	IT leader's Reporting Structure	To Other	To COO	To CFO	To CEO
	Points	1 Low	2 Moderate	3 High	4 Very High
	IT leader's Job Title	EDP/MIS Manager + Other	IS/IT Manager/ Director	CTO	CIO / Vice President IT
	Points	1 Low	2 Moderate	3 High	4 Very High

both constructs were exceeding the acceptable cut off of 0.5 which indicates sufficient convergent validity. All items were also strongly related (load) on the constructs they were intended to measure, and they do not have a stronger connection with another construct (cross load) and the AVE values of all constructs were also larger than the inter-correlation of the constructs in the model which indicates sufficient discriminant validity at the indicator and construct levels.

Due to the ordinal/categorical nature of the IT leader job title and IT leader reporting structure that reflect the IT leader structural power variable, the authors transformed these two ordinal variables into four-point Likert scale items as shown in Table 4 to facilitate further statistical analysis. The IT leader structural power construct was then treated as a continuous construct with these two Likert scale items.

Meyers *et al.* (2016) recommended conducting a series of Pearson correlations between all the dependent variables prior to performing the MANOVA in order to test the MANOVA assumption that the dependent variables would be correlated with each other in the moderate range. As can be seen in Table 5 there are low to moderate intercorrelations between the dependent variables, suggesting the appropriateness of a MANOVA.

Table 5. Dependent variables' descriptive statistics and correlation

Descriptive Statistics					Test for Correlation Among the Dependent Variables						
Dependent Variables	**Information Intensity**	**Mean**	**SD**	**N**	**Infrmation Steward**	**Utility Provider**	**Educator**	**Relationship Architect**	**Integrator**	**Strategist**	**Structural Power**
Information Steward	Low	5.83	0.649	86	0.8						
	High	6.11	0.717	88							
	Toal	5.97	.687	174							
UtilityProvider	Low	5.33	0.869	86	0.9	.79					
	High	5.81	0.897	88							
	Toal	5.57	.885	174							
Educato	Low	4.84	1.170	86	0.7	.20	0.87				
	High	4.84	1.200	88							
	Toal	4.84	.180	174							
Relatioship Architect	Low	5.54	0.751	86	0.2	.26	0.26	0.83			
	Hg	5.70	0.841	88							
	Toal	5.62	.798	174							
Integraor	Low	4.85	1.050	86	0.7	.42	0.40	0.29	0.80		
	High	5.15	0.944	88							
	Toal	5.00	.999	174							
Strategst	Low	5.28	1.030	86	0.6	.22	0.54	0.35	0.49	0.75	
	High	5.48	0.910	88							
	Toal	5.38	.980	174							
Structual Power	Low	2.75	1.160	86	0.3	.38	0.29	0.32	0.41	0.43	0.81
	High	2.78	1.150	88							
	Toal	2.765	1.160	174							

In order to test the research hypothesis two (H1), we created two second order variables by summing the values of the three CIO roles representing supply side (information steward, utility provider, and educator) and the three CIO roles representing demand side (strategist, integrator, relationship architect). Then, a one-way analysis of variance (ANOVA) was conducted to determine whether the means of the supply side roles and demand side roles differed across the two levels of information intensity of the value chain (High/Low). Following the common practice in splitting research data into high and low group, this study used the mean value for information intensity of the value chain (3.27) as a threshold to split the data into high and low information intensity. Accordingly, 86 organizations with the mean score equal or below 3.27 were put in low information intensity group and 88 organizations with higher mean scores than 3.27 put in the high information intensity group.

Results presented in Table 6 provide support for research hypothesis two (H1). The table indicates that there are significant differences at the $p < .008$ level between CIOs in high intensity organizations and CIOs in low intensity organizations in terms of the combined supply side roles (information steward, utility provider, and educator), and significant differences at the $p < .05$ level between CIOs in high intensity organizations and CIOs in low intensity organizations in terms of the combined demand side roles (strategist, integrator, and relationship architecture). The effect size calculated using eta squared was 0.04 for Supply side roles and 0.02 for Demand side roles. According to Cohen (1988), the effect size for both can be considered a small effect as only four percent of the variance in CIO supply role scores and two per cent of the variance in CIO demand role scores are explained by information intensity of the organization.

Next, and following the guidelines suggested by the literature (Field 2013; Hair *et al*. 2014; Meyers *et al*. 2016; Pallant 2010; Tabachnick and Fidell 2007), a one-way between-groups multivariate analysis of variance (MANOVA) was performed using the IBM SPSS 26 to investigate 14 differences in CIO roles and structural power. Seven dependent variables were used: Information Steward, Utility Provider, Educator, Relationship Architect, Integrator, Strategist, and Structural Power. The independent variable was the information intensity of the value chain.

The MANOVA results are presented in Tables 7 and 8. These results will be used first for checking MANOVA assumptions in terms of sample size, normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity. Then the same results will be used to test the research hypothesis two (H2).

The descriptive statistics presented in Table 5 show that we have more than the required number of cases per cell since the minimum required number of cases in each cell in our study is seven (the number of dependent variables). Having a larger sample confirms the appropriateness of a MANOVA in terms of sample size. It also provides support that our data confirm to another MANOVA assumption which is the normality (Pallant 2010). The results labelled Box's Test of Equality of Covariance Matrices presented in Table 7 provide support that our data have not violated the assumption of homogeneity of variance-covariance matrices since the Sig. value is larger than 0.05 for the common cut-off value of type I error. The Sig. column in Levine's test of equality of error variances presented in Table 7 indicates that our data did not violate the assumption of equality of variance for all of the research variables. As can be seen in Table 7, none of the variables recorded signiðcant values; therefore, we can assume equal variances.

The multivariate test depicted in Table 8 shows that there was a statistically significant difference between organizations with high information intensity of the value chain and low information intensity of the value chain, on the combined dependent variables (CIO roles and structural power), $F (3, 428) = 2.301$, $p = 0.029$; Wilks' Lambda = 0.912; partial eta squared = 0.088. When the results for the dependent variables were considered separately, the between-subjects' effects test shows that the only differences to reach statistical significance were utility provider ($F = 12.614$, $p = 0.000$; partial eta squared = 0.068); information steward ($F = 7.561$, $p = 0.007$; partial eta squared = 0.042); and integrator ($F = 3.726$, $p = 0.050$; partial eta squared = 0.021). Pallant (2010) suggested conducting an extra Bonferroni adjustment to obtain more stringent criteria by reducing the chance of a type I

Table 6. ANOVA Results: CIOs' Supply and Demand Sides Roles across Two Levels of Information Intesity

CIO Roles Category	Descriptive				Levine's Statistic	F(2,172)	Sig	Eta Squared (η^2)
	Information intensity							
	High N=88		Low N=86					
	M	SD	M	SD				
Supply/Operational Side Role	20.73	2.49	19.71	2.47	0.045 ^{ns}	7.274	**0.008*** **	0.04
Demand/Strategic Side Role	25.67	3.27	24.44	3.69	0.156 ^{ns}	3.527	0.05*	0.02

Significant at p < 0.05; **Significant at p < 0.01; *** Significant at p < 0.001; n.s = Not Significant

Table 7. MANOVA Results- Multivariate/Univariate Homoscedasticity

Multivariate Test of Homoscedasticity Box's Test of Equality of Covariance Matrices				
Box's	34.642			
F	1.184			
df1	28			
df	102972.45			
Sig.	0.230 $^{n.s}$			
Univariate Tests of Homoscedasticity Levine's Test of Equality of Error Variances				
Dependent Variables	Levine Statistic	df1	df2	**Sig.**
nformaion Steward	0.007	1	172	0.933*
UtilityProvider	0.360	1	172	0.549*
Educato	0.336	1	172	0.563*
Relatioship Architect	1.136	1	172	0.288*
Integraor	0.481	1	172	0.489*
Strategst	0.900	1	172	0.344*
Structual Power	0.025	1	172	0.876*
Signifcant at p < 0.05; n.s = Not Significant				

error across multiple tests. Pallant (2010) suggested a simple way to do that by dividing the normal alpha value (typically 0.05) by the number of dependent variables and then use this new value as a cut-off to check for the significant differences between groups. In our case the cut-off is 0.007 (0.05/7). Based on the cut off obtained, it was found that the only variables with statistical significance were information steward (F =7.561, p = 0.007; partial eta squared = 0.042) and utility provider (F = 12.614, p = 0.000; partial eta squared = 0.068). An inspection of the mean scores indicated that IT leaders in more information intensive organizations reported higher levels of use of both roles: information steward (M= 6.1, SD =0.717) and utility provider (M= 5.81, SD = 0.897). This result provides partial support for research hypothesis two (H2) as only three of its six sub hypotheses (H2b, H2e, and H2f) were supported. At the same time, our results provide no support for research

Table 8. MANOVA Results – Multivariate Test & Test of Between –Subject Effects

Multivariate Test				
Independent variable	Wilks' Lambda	*F*	*P*	Effect Size (partial eta squared η^2)
Information Intensity	0.912	2.301[b]	0.029**	0.088
Between-subjects effects				
Independent Variable	***Dependent Variables***	***F***	***P***	***Partial eta squared η^2***
Information Intensity	**Information Steward**	**7.561**	**0.007*** **	**0.042**
	UtilityProvider	**12.614**	**0.000*** **	**0.068**
	Educato	0.000	0.999 [ns]	0.000
	Relationship Architect	1.837	0.177 [n.s]	0.011
	Integrator	**3.726**	**0.050***	**0.021**
	Strategst	1.696	0.195 [n.s]	0.010
	Structural Power	0.026	0.871 [n.s]	0.000

Significant at p < 0.05; **Significant at p < 0.01; *** Significant at p < 0.001; n.s = Not Significant

hypothesis three (H3) as no significant difference was captured between the structural power for the IT leaders in organizations with high and low information intensity of the value chain.

DISCUSSION AND IMPLICATIONS

Discussion of Findings

The research findings of this study, which is exploratory in nature, provide new insights and important perspectives into the roles of the IT leaders in an organization. The findings of this study confirm that the IT leaders in organizations with high value chain information intensity perceived supply (operational) side and demand (strategic) side roles as significantly more important than their counterparts in an organization with low information intensity of the value chain. The importance of the supply side roles in an organization with high information intensity of the value chain can be justified by the distinct characteristics of these types of organizations as described by Porter and Millar (1985), Hu and Quan (2003), and Sabherwal and King (1991), which require the IT leader to pay more attention to improve the efficiency of information processing due to the high demand for the processed information caused by the extreme complexity of inbound logistics, operations, outbound logistic and internal material flow and control. At the same time, IT leaders in organizations with high value chain information intensity perceived demand (strategic) side roles as well as significantly more important than their counterparts in an organization with low information intensity of the value chain. This result is consistent with the results of Kearns and Lederer (1999, 2003,2004); Hung *et al.* (2016) and Alismaili *et al* (2020).

IT leaders in organizations with high value chain information intensity also perceived three out of the six salient roles as significantly more important than their counterparts in low information intensity organizations. The results of this study suggest that there is a significant effect of the information intensity of the value chain on the IT leader's roles as Utility Provider, Information Steward, and Integrator. Again, the distinct characteristics of the organizations with high value chain information intensity require more emphasis be placed on these three roles in particular in order to build solid, sustainable, dependable, and responsive IT infrastructure services as a utility provider; and secondly to be responsible for high quality data and operationally reliable systems as an information steward; and

thirdly to provide leadership in an enterprise-wide integration of processes, information, and decision-support as digital options for the business as an integrator. This conclusion is largely supportive of Chen *et al.*'s (2010) CIO leadership maturity process, which contends that IT leadership develops and advances from supply-side roles to demand-side roles. In this regard, the IT leadership in these organizations is still developing and set to progress from supply-side roles first, then to demand-side roles.

Our last finding is related to the structural power of the IT leader, which was not found to have a significant relationship with the organizational information intensity of the value chain. Although this is contrary to the commonly held belief, it is somewhat consistent with the findings of Kim (2020) who found that IT managers' structural power does not contribute to firms sustainability of their IT capability, and Sharma and Rai (2003) who found a negative relationship between the IT leaders' position or power and the organizational adoption of the IS innovation, and is also consistent with recent results of Jonesa *et al.* (2019) who found no significant differences in any of the analyses for reporting lines based on whether the CIO's background was technical or nontechnical.

The impact of information technology and globalization on the architecture of modern enterprises is undoubtedly significant (Rouibah *et al.* 2020).). Today's extended or virtual enterprise comprises increasingly global value chains where multiple participants exchange data, products, services, etc. as part of the value creation process. Our conclusions in this paper, and the insights drawn from Australia as the focus of the study, are therefore equally significant from a global perspective. Thus, we argue, the significant roles of the CIO as a function of the information intensity of the value chains should hold irrespective of the geographic characteristics of the focal organization.

Implications for Research

The role of information intensity has recently been the subject of increasing research attention, underscoring its growing significance in an increasingly dynamic and complex technological and competitive environment. Our research findings provide new insights about the role of information intensity that have not been revealed hitherto by previous research. They thus serve to inform the literature and extend it in the direction of building new theory that explains when, how, and why information intensity may be an important contextual factor enabling an organization to configure the roles of its IT leadership to achieve its set goals.

This study, to the best of the authors' knowledge, is the first of its kind to address the influence of information intensity on the broad roles of the IT leaders, including the operational (supply-side) and strategic (demand-side) roles, and their structural power. Our study was exploratory in nature; therefore, the results are consequential as they provide the initial research evidence that can subsequently be subjected to validation. Our findings call for a review of the underlying constructs that constitute both the demand-side and supply-side role orientations. The findings suggest that examining these underlying factors might improve our understanding of the broad CIO strategic (demand) and operations (supply) roles.

Implications for Practice

Business organizations are increasingly relying on the IT/IS function to enhance their performance and strategic positions. The role of the IT/IS function and its leadership are frequently questioned and challenged, in pursuit of the maximum contribution from the IS function. Contextual factors, such as information intensity, can play a pivotal role in helping organizations configure their IT/IS function to deliver its expected benefits.

The findings from the current research study may enlighten existing practice as to the extent of influence that information intensity could have on the role of the IT/IS function and its leadership. For example, the finding that information intensity has a significant effect on specific IT leaders' roles (i.e., Utility Provider, Information Steward, and Integrator) implies that the C-suite of organizations with potentially high value chain information intensity expects from their IT leader the functions implied by those roles, as presented on Appendix A.

The finding that information intensity has a significant relationship with both supply-side and demand-side roles implies that IT leaders in potentially high intensity value chain organizations required them to articulate not just the traditional or operational/technical roles, which were their highest priority as the results have shown, but also to be actively involved in aligning the IS strategy with the organizational business strategy, and have their seat within the top management team as well. However, our findings indicate that IT leaders' structural power is not related to or influenced by information intensity, which is often not an option that can be set or manipulated at will, as structural power arguably is, but rather an evolutionary realty. This implies that organizations can "design" structural power by the choice of the type of reporting structure and title as may be dictated by imperatives other than information intensity.

The key findings of this study can also provide guidance to top management for the recruitment of IT leaders who will have the capacity to play the identified roles that fit with the circumstances of the organization with high information intensive value chain. Moreover, the curriculums of the training programs of the specialist institutions responsible for preparing future IT leaders can be enhanced by the key findings of this study regarding the need to consider specific roles that fit with organizations with high information intensity value chains.

CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

Concluding Remarks

The current study was aimed at examining the relationship between the level of information intensity and the role and structural power of the IT leader. To the best of the authors' knowledge, this is the first study to investigate the association between the organization information intensity of the value chain and the IT leader's role and structural power. Our work indicated that: (1) IT leaders in organizations with potentially high intensity value chains have perceive Utility Provider, Information Steward, and Integrator roles as more important than their peers in low information intensity organizations; (2) IT leaders in organizations with potentially high intensity value chains perceive both supply-side (Technical) and demand side (Strategic) roles as more important than their peers in low information intensity organizations; (3) no significant differences were found in the influence of information intensity on the IT leader's structural power in both groups.

Limitations

Since this study was explorative in nature, caution should be used when drawing strong practical conclusions from its results due to several limitations. First, our sample size of 174 organizations is relatively small. A larger sample size would provide higher statistical power. Secondly, the findings of this study represent the perceptions of Australian CIOs which might not match the perceptions of CIOs in other countries. Furthermore, unlike longitudinal studies, this study is cross-sectional and assessed the CIOs' perceptions at a single point in time. Another limitation is the ordinal nature of some variables used in this study, including reporting structure and job title. Converting such data to rank-ordered sets as an approximation may lead to loss of accuracy in the results. Next, we suggest some research directions to exploit some of these limitations.

Future Research

As this study is based on a cross section and Australian data, there is an opportunity to repeat this study in geographically diverse companies to validate the results presented here. Additionally, the relationship between information intensity and industry type can be investigated, as this element has been given very limited focus in previous research until now. Furthermore, investigating the relationship between the IT leaders' personal power (e.g., referent power, expert power) is a worthy issue that might need to be addressed. Moreover, examining the relationship between the information intensity of the product, rather than the value chain, with other organizational variables is another potential research direction.

REFERENCES

Abatecola, G., & Cristofaro, M. (2018). Hambrick and Mason's "Upper Echelons Theory": Evolution and open avenues. *Journal of Management History*, *26*(1), 116–136. doi:10.1108/JMH-02-2018-0016

Adams, S. M., & Weiss, J. W. (2011). Gendered paths to technology leadership. *New Technology, Work and Employment*, *26*(3), 222–237. doi:10.1111/j.1468-005X.2011.00271.x

Agarwal, R., & Beath, C. (2007). *Grooming the 2010 CIO*. A Report for the Society for Information Management Advanced Practices Council. doi:10.4018/JGIM.2020040104

Al-Qirim, N. (2007). The adoption of eCommerce communications and applications technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, *6*(4), 462–473. doi:10.1016/j.elerap.2007.02.012

Al-Taie, M. (2014). Identifying the CIO role configurations across the organizational life cycle stages, PhD Dissertation, University of Southern Queensland, Australia.

Al-Taie, M., Lane, M., & Cater-Steel, A. (2014). The relationship between organizational strategic IT vision and CIO roles: One size does not fit all. *AJIS. Australian Journal of Information Systems*, *18*(2), 59–89.

Alismaili, S. Z., Li, M., Shen, J., Huang, P., He, Q., & Zhan, W. (2020). Organisational-Level Assessment of Cloud Computing Adoption: Evidence from the Australian SMEs. *Journal of Global Information Management*, *28*(2), 73–89. doi:10.4018/JGIM.2020040104

Andal-Ancion, A., Cartwright, P. A., & Yip, G. S. (2003). The digital transformation of traditional business. *MIT Sloan Management Review*, *44*(4), 34.

Armstrong, J. S., & Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys. *JMR, Journal of Marketing Research*, *14*(3), 396–402. doi:10.1177/002224377701400320

Asatiani, A., Apte, U., Penttinen, E., Rönkkö, M., & Saarinen, T. (2014). Outsourcing of disaggregated services in cloud-based enterprise information systems. *2014 47th Hawaii International Conference on System Sciences*.

Babin, R., & Grant, K. (2019). How Do CIOs Become CEOs? *Journal of Global Information Management*, *27*(4), 1–15. doi:10.4018/JGIM.2019100101

Banker, R., Hu, N., Pavlou, P., & Luftman, J. (2011). CIO reporting structure, strategic positioning, and firm performance. *Management Information Systems Quarterly*, *35*(2), 487–504. doi:10.2307/23044053

Bardhan, I., Mithas, S., & Lin, S. (2007). Performance impacts of strategy, information technology applications, and business process outsourcing in US manufacturing plants. *Production and Operations Management*, *16*(6), 747–762. doi:10.1111/j.1937-5956.2007.tb00293.x

Barnes, S., Rutter, R. N., La Paz, A. I., & Scornavacca, E. (2021). Empirical identification of skills gaps between chief information officer supply and demand: A resource-based view using machine learning. *Industrial Management & Data Systems*, *121*(8), 1749–1766. doi:10.1108/IMDS-01-2021-0015

Bhatt, G. D. (2001). Business process improvement through electronic data interchange (EDI) systems: An empirical study. *Supply Chain Management*, *6*(2), 60–74. doi:10.1108/13598540110387564

Bouaynaya, W. (2020). Cloud computing in SMEs: Towards delegation of the CIO role. *Information & Computer Security*, *28*(2), 199–213. doi:10.1108/ICS-01-2017-0001

Broadbent, M., & Kitzis, E. (2005). *The new CIO leader: setting the agenda and delivering results*. Harvard Business School Press.

Busch, E. A., Jarvenpaa, S. L., Tractinsky, N., & Glick, W. H. (1991). External versus internal perspectives in determining a firm's progressive use of information technology. *Proceedings of the twelfth international conference on Information systems*.

Carter, M., Grover, V., & Thatcher, J. (2011). The emerging CIO role of business technology strategist. *MIS Quarterly Executive*, *10*(1), 19–29.

Chandra, A., & Calderon, T. (2009). Information intensity, control deficiency risk, and materiality. *Managerial Auditing Journal*, *24*(3), 220–232. doi:10.1108/02686900910941113

Chen, D., Preston, D., & Xia, W. (2010). Antecedents and Effects of CIO Supply-Side and Demand-Side Leadership: A Staged Maturity Model. *Journal of Management Information Systems*, *27*(1), 231–271. doi:10.2753/MIS0742-1222270110

Chen, J.-S., & Russell, K. H. (2004). An Empirical Study of the Relationship of IT Intensity and Organizational Absorptive Capability on CRM Performance. *Journal of Global Information Management*, *12*(1), 1–17. doi:10.4018/jgim.2004010101

Chen, Y., & Wu, J. (2011). IT management capability and its impact on the performance of a CIO. *Information & Management*, *48*(4–5), 145–156. doi:10.1016/j.im.2011.04.001

Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), Modern Methods for Business Research (pp. 295–336). Academic Press.

Chun, M., & Mooney, J. (2009). CIO roles and responsibilities: Twenty-five years of evolution and change. *Information & Management*, *46*(6), 323–334. doi:10.1016/j.im.2009.05.005

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Lawrence Erlbaum.

Curran, C. (2009). *The Three Types of CIOs: Are You and Your Company a Match?* https://www.cio.com/article/2424640/the-three-types-of-cios--are-you-and-your-company-a-match-.html

Dahlberg, T., Hokkanen, P., & Newman, M. (2016). How business strategy and changes to business strategy impact the role and the tasks of CIOs: An evolutionary model. *2016 49th Hawaii International Conference on System Sciences (HICSS)*.

Daily, C. M., & Johnson, J. L. (1997). Sources of CEO power and firm financial performance: A longitudinal assessment. *Journal of Management*, *23*(2), 97–117. doi:10.1177/014920639702300201

Davis, M. (2013). *Do different business stages require different CIO types?* Martin Davis Blog. https://martindavis01.wordpress.com/2013/04/17/do-different-business-stages-require-different-cio-types/

Dehning, B., Richardson, V. J., & Zmud, R. W. (2003). The value relevance of announcements of transformational information technology investments. *Management Information Systems Quarterly*, *27*(4), 637–656. doi:10.2307/30036551

Fiedler, F. (1967). *A theory of leadership effectiveness*. McGraw-Hill.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.

Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, *35*(3), 505–538. PMID:10120413

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, *18*(February), 39–50. doi:10.1177/002224378101800104

Gerow, J., Grover, V., & Thatcher, J. (2012). *Power and Politics: Do CIOs Have What It Takes to Influence the Executive Team's Commitment to IT Initiatives?* Academic Press.

Gerth, A. B., & Peppard, J. (2016). The dynamics of CIO derailment: How CIOs come undone and how to avoid it. *Business Horizons*, *59*(1), 61–70.

Ghawe, A., & Gonzalez, P. (2019). *Context in Information Systems Leadership*. Twenty-fifth Americas Conference on Information Systems, Cancun, Mexico.

Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, *111*(8), 1238–1269. doi:10.1108/02635571111170785

Gottschalk, P. (2002). The chief information officer: a study of managerial roles in Norway. *Proceedings of the 35th Annual Hawaii International Conference on Systems Science*. doi:10.1109/HICSS.2002.994350

Grant, D., & Yeo, B. (2019). Are ICTs Really That Important in Driving Industry Performance? *Journal of Global Information Management*, *27*(3), 101–119. doi:10.4018/JGIM.2019070106

Grover, V., Jeong, S., Kettinger, W., & Lee, C. (1993). The chief information officer: A study of managerial roles. *Journal of Management Information Systems*, *10*(2), 107–130. doi:10.1080/07421222.1993.11518002

Hair, J., Black, W., Babin, B., & Anderson, R. (2014). Multivariate Data Analysis (new int. ed.). Pearson Education.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, *9*(2), 193–206. doi:10.2307/258434

Han, K., Kauffman, R. J., & Nault, B. R. (2005). Does IT outsourcing pay off? Evidence from industry-level data. *Proc. 10th Annual INFORMS Conf. Inform. Systems Tech*.

Hartono, J. (2012). Adoption of information technology on small businesses: The role of environment, organizational and leader determinant. *International Journal of Business, Humanities, and Technology*, *2*(4), 60–66.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modelling in international marketing. *Advances in International Marketing, 20*(1), 277-319.

Hersey, P., & Blanchard, K. H. (1969). *Management of Organizational Behavior*. Prentice-Hall.

Hodgson, L., & Lane, M. (2010). What Are the Key Job Functions and Critical Competencies Required for the Role of the CIO in Achieving Superior Organizational Performance? *Proceedings of Informing Science & IT Education Conference (InSITE) 2010*.

Hu, Q., & Quan, J. (2003). *Information intensity and the impact of IT investments on productivity: an industry level perspective.* Paper presented at the ECIS.

Hung, S.-Y., Huang, W.-M., Yen, D. C., Chang, S.-I., & Lu, C.-C. (2016). Effect of information service competence and contextual factors on the effectiveness of strategic information systems planning in Hospitals. *Journal of Global Information Management*, *24*(1), 14–36. doi:10.4018/JGIM.2016010102

Hutter, A., & Riedl, R. (2017). *Chief Information Officer Role Effectiveness: Literature Review and Implications for Research and Practice*. Springer International Publishing. doi:10.1007/978-3-319-54753-4

Hwa, L. J. (2015). *Antedecents and outcome of Internet of Things adoption: A perspective of public listed companies on main market board of Bursa Malaysia*. Academic Press.

Jarvenpaa, S. L., & Ives, B. (1991). Executive involvement and participation in the management of information technology. *Management Information Systems Quarterly*, *15*(2), 205–227. doi:10.2307/249382

Joia, L. A., & Correia, J. C. P. (2018). CIO competencies from the IT professional perspective: Insights from Brazil. *Journal of Global Information Management*, *26*(2), 74–103. doi:10.4018/JGIM.2018040104

Jones, M. C., Kappelman, L., Pavur, R., Nguyen, Q. N., & Johnson, V. L. (2020). Pathways to being CIO: The role of background revisited. *Information & Management*, *57*(5), 103234. doi:10.1016/j.im.2019.103234

Karanja, E., Grant, D., & Zaveri, J. S. (2021). CIO reporting structure and firm strategic orientation–a content analysis approach. *Journal of Systems and Information Technology*, *23*(1), 20–52. doi:10.1108/JSIT-02-2020-0022

Kearns, G. S., & Lederer, A. L. (1999). The influence of environmental uncertainty on the strategic use of information systems. *ACM SIGCPR Computer Personnel*, *20*(3), 40–68. doi:10.1145/568508.568511

Kearns, G. S., & Lederer, A. L. (2003). A Resource-Based View of Strategic IT Alignment: How Knowledge Sharing Creates Competitive Advantage. *Decision Sciences*, *34*(1), 1–29. doi:10.1111/1540-5915.02289

Kearns, G. S., & Lederer, A. L. (2004). The impact of industry contextual factors on IT focus and the use of IT for competitive advantage. *Information & Management*, *41*(7), 899–919. doi:10.1016/j.im.2003.08.018

Kim, J. H. (2020). *The Accumulation of IT Capability and Its Long-Term Effect on Financial Performance* [Old Dominion University]. Available from ProQuest One Academic. (2457946076). Retrieved from https://uoseresources.remotexs.xyz/user/login?dest=?url=https://www.proquest.com/dissertations-theses/accumulation-capability-long-term-effect-on/docview/2457946076/se-2?accountid=42604

Klee, S., Janson, A., & Leimeister, J. M. (2021). How Data Analytics Competencies Can Foster Business Value–A Systematic Review and Way Forward. *Information Systems Management*, *38*(3), 1–18. doi:10.1080/10580530.2021.1894515

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, *11*(4), 1–10. doi:10.4018/ijec.2015100101

Lacity, M. C., Khan, S., Yan, A., & Willcocks, L. P. (2010). A review of the IT outsourcing empirical literature and future research directions. *Journal of Information Technology*, *25*(4), 395–433. doi:10.1057/jit.2010.21

Lacity, M. C., Khan, S. A., & Yan, A. (2017). *Review of the empirical business services sourcing literature: an update and future directions Outsourcing and offshoring business services*. Springer.

Lal, P., & Bharadwaj, S. S. (2020). Understanding the Drivers of Cloud-Based Service Adoption and Their Impact on the Organizational Performance: An Indian Perspective. *Journal of Global Information Management*, *28*(1), 56–85. doi:10.4018/JGIM.2020010104

Lee, J.-N., & Kim, Y.-G. (1997). Information systems outsourcing strategies for affiliated firms of the Korean conglomerate groups. *The Journal of Strategic Information Systems*, *6*(3), 203–229. doi:10.1016/S0963-8687(97)00017-6

Li, D., Ding, F., & Wu, J. (2012). Innovative Usage Of Information Systems: Does CIO Role Effectiveness Matter? *PACIS 2012 Proceedings*, Paper 81.

Li, J., Li, M., Wang, X., & Thatcher, J. B. (2021). Strategic Directions for AI: The Role of CIOs and Boards of Directors. *Management Information Systems Quarterly*, *45*(3), 1603–1643. doi:10.25300/MISQ/2021/16523

Li, Y., & Tan, C.-H. (2013). Matching business strategy and CIO characteristics: The impact on organizational performance. *Journal of Business Research*, *66*(2), 248–259. doi:10.1016/j.jbusres.2012.07.017

Liang, T. P., Lin, C. Y., & Chen, D. N. (2004). Effects of electronic commerce models and industrial characteristics on firm performance. *Industrial Management & Data Systems*, *104*(7), 538–545. doi:10.1108/02635570410550205

Locoro, A., & Ravarini, A. (2019). The CIO and CDO socio-technical roles in the age of digital business transformation: an interpretive study. In *Organizing for the Digital World* (pp. 235–245). Springer. doi:10.1007/978-3-319-90503-7_18

López-Muñoz, J. F., & Escribá-Esteve, A. (2017). An upper echelons perspective on information technology business value. *European Research on Management and Business Economics*, *23*(3), 173–181. doi:10.1016/j.iedeen.2017.02.003

Mallin, M. L., & Ragland, C. B. (2017). Power-base effects on salesperson motivation and performance: A contingency view. *Journal of Business-To-Business Marketing*, *24*(2), 99–121. doi:10.1080/1051712X.2017.1313671

McLean, E. R., & Smits, S. J. (2014). Management, Leadership, and the Roles of the CIO. *International Leadership Journal, 6*(1).

Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied multivariate research: Design and interpretation*. Sage Publications.

Mintzberg, H. (1973). *The nature of managerial work*. Harper & Row.

Mithas, S., & Whitaker, J. (2007). Is the world flat or spiky? Information intensity, skills, and global service disaggregation. *Information Systems Research*, *18*(3), 237–259. doi:10.1287/isre.1070.0131

Mndzebele, N. (2013). Information intensity and its effects on EC adoption. *International Journal of Advancements in Computing Technology*, *2*(3), 105–108.

Morrar, R., Abdeljawad, I., Jabr, S., Kisa, A., & Younis, M. Z. (2019). The Role of Information and Communications Technology (ICT) in Enhancing Service Sector Productivity in Palestine: An International Perspective. *Journal of Global Information Management*, *27*(1), 47–65. doi:10.4018/JGIM.2019010103

Pallant, J. (2010). *SPSS Survival Manual: A step by step guide to data analysis using SPSS*. McGraw-Hill Education.

Palmer, J. W., & Griffith, D. A. (1998b). Information intensity: A paradigm for understanding web site design. *Journal of Marketing Theory and Practice*, *6*(3), 38–42. doi:10.1080/10696679.1998.11501803

Peppard, J. (2010). Unlocking the Performance of the Chief Information Officer (CIO). *California Management Review*, *52*(4), 73–99. doi:10.1525/cmr.2010.52.4.73

Peppard, J., Edwards, C., & Lambert, R. (2011). Clarifying the ambiguous role of the CIO. *MIS Quarterly Executive*, *10*(1), 31–44.

Porter, L. W., & McLaughlin, G. B. (2006). Leadership and the organizational context: Like the weather? *The Leadership Quarterly*, *17*(6), 559–576. doi:10.1016/j.leaqua.2006.10.002

Porter, M., & Millar, V. (1985). How information gives you competitive advantage. *Harvard Business Review*, *63*(4), 149–160.

Preston, D., Karahanna, E., & Rowe, F. (2006). Development of shared understanding between the Chief Information officer and top management team in U.S. and French Organizations: A cross-cultural comparison. *IEEE Transactions on Engineering Management*, *53*(2), 191–206. doi:10.1109/TEM.2006.872244

Preston, D. S., Chen, D., & Leidner, D. E. (2008). Examining the Antecedents and Consequences of CIO Strategic Decision-Making Authority: An Empirical Study*. *Decision Sciences*, *39*(4), 605–642. doi:10.1111/j.1540-5915.2008.00206.x

PWC. (2009). *The situational CIO: IT problem solver, cost cutter, strategist, PricewaterhouseCoopers LLC* Center for Technology and Innovation.

Ranganathan, C., Teo, T. S., & Dhaliwal, J. (2011). Web-enabled supply chain management: Key antecedents and performance impacts. *International Journal of Information Management*, *31*(6), 533–545. doi:10.1016/j.ijinfomgt.2011.02.004

Rice, R. W., & Kastenbaum, D. R. (1983). The contingency model of leadership: Some current issues. *Basic and Applied Social Psychology*, *4*(4), 373–392. doi:10.1207/s15324834basp0404_6

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. Bönningstedt: SmartPLS. Retrieved from https://www.smartpls.com

Robbins, S. P., & Judge, T. A. (2013). *Organizational Behavior*. Pearson/Prentice Hall.

Rockart, J., Ball, L., & Bullen, C. (1982). Future role of the information systems executive. *Management Information Systems Quarterly*, *6*(4), 1–14. doi:10.2307/248989

Ross, J., & Feeny, D. (1999). The Evolving Role of the CIO. In R. Zmud (Ed.), *Framing the Domains of IT Research: Glimpsing the Future Through the Past*. Pinnaflex Educational Resources Inc.

Rouibah, K., Dihani, A., & Al-Qirim, N. (2020). Critical Success Factors Affecting Information System Satisfaction in Public Sector Organizations: A Perspective on the Mediating Role of Information Quality. *Journal of Global Information Management*, *28*(3), 77–98. doi:10.4018/JGIM.2020070105

Sabherwal, R., & King, W. R. (1991). Towards a theory of strategic use of information resources: An inductive approach. *Information & Management*, *20*(3), 191–212. doi:10.1016/0378-7206(91)90055-7

Saldanha, T., & Krishnan, M. (2011). *Leveraging IT for business innovation: Does the role of the CIO matter?* Paper presented at the International Conference on Information Systems (ICIS), Shanghai, China.

Seddon, P., Walker, D., Reynolds, P., & Willcocks, L. (2008). A Case-Based Assessment of the Descriptiveness of Three CIO Typologies and Validity of Two CIO-Effectiveness Models. *ACIS 2008 Proceedings*, Paper 90. https://aisel.aisnet.org/acis2008/90

Shams Eldin, A. Y. S. (2018). A Resource Based Perspective: Impact of IT Capabilities on Superior Performance Considering the Role of Information Intensity. *Arab Journal of Administration, 38*(3).

Sharma, S., & Rai, A. (2003). An assessment of the relationship between ISD leadership characteristics and IS innovation adoption in organizations. *Information & Management*, *40*(5), 391–401. doi:10.1016/S0378-7206(02)00049-6

Sivo, S. A., Saunders, C., Chang, Q., & Jiang, J. J. (2006). How low should you go? Low response rates and the validity of inference in IS questionnaire research. *Journal of the Association for Information Systems*, *7*(6), 17. doi:10.17705/1jais.00093

Smaltz, D. (1999). *Antecedents of CIO effectiveness: A role-based perspective* [PhD Dissertation]. Florida State University, Tallahassee, FL.

Smaltz, D., Sambamurthy, V., & Agarwal, R. (2006). The antecedents of CIO role effectiveness in organizations: An empirical study in the healthcare sector. *IEEE Transactions on Engineering Management*, *53*(2), 207–222. doi:10.1109/TEM.2006.872248

Strickland, S. (2011). *How the role of the chief information officer contributes to the organization* [PhD Thesis]. University of Manchester, UK.

StricklandS.TheodoulidisB. (2011). Chief Information Officer: A Journey Through Time. Available at SSRN 1947997. https://pdfs.semanticscholar.org/2821/f208e077a54eeed0917e66a37da54f210fa4.pdf10.2139/ssrn.1947997

Tabachnick, B., & Fidell, L. (2007). Using Multivariate Statistics (5th ed.). Allyn and Bacon.

Teo, T., & King, W. (1997). Integration between Business Planning and Information Systems Planning: An Evolutionary-Contingency Perspective. *Journal of Management Information Systems*, *14*(1), 185–214. doi:10.1080/07421222.1997.11518158

Teo, T. S., Tan, M., & Buk, W. K. (1997). A contingency model of Internet adoption in Singapore. *International Journal of Electronic Commerce*, *2*(2), 95–118. doi:10.1080/10864415.1997.11518310

Thong, J., & Yap, C. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega*, *23*(4), 429–442. doi:10.1016/0305-0483(95)00017-I

Thong, J. Y. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems*, *15*(4), 187–214. doi:10.1080/07421222.1999.11518227

Varajão, J., Trigo, A., Bulas-Cruz, J., & Barroso, J. (2008). Biggest Barriers to Effectiveness in CIO Role in Large Portuguese Companies. Emerging Technologies and Information Systems for the Knowledge Society, 479-488. doi:10.1007/978-3-540-87781-3_52

Vijayasarathy, L., & Sabherwal, R. (1994). Organizational integration and the use of telecommunication technologies for internal links: An empirical investigation. *The Journal of High Technology Management Research*, *5*(1), 77–99. doi:10.1016/1047-8310(94)90015-9

Wang, Y.-M., Wang, Y.-S., & Yang, Y.-F. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change*, *77*(5), 803–815. doi:10.1016/j.techfore.2010.03.006

Weill, P., & Woerner, S. (2013). The Future of the CIO in a Digital Economy. *MIS Quarterly Executive*, *12*(2).

Weiss, J., & Adams, S. (2010). Changing Roles of Technology Leaders: Strategic Partners or High Level Mechanics? *Proceedings of the 43rd Hawaii International Conference on Systems Sciences*. doi:10.1109/HICSS.2010.102

Werts, C., Linn, R., & Jöreskog, K. (1974). Intraclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurement*, *34*(1), 25–33. doi:10.1177/001316447403400104

Wu, J., Chen, Y., & Sambamurthy, V. (2008). The Impacts of BTM Capability and CIO Role Effectiveness on Firms' Information Technology Assimilation: An Empirical Study. *ICIS 2008 Proceedings*, Paper 76. http://aosl.aisnet.org/icis2008/76

Wunderlich, N., & Beck, R. (2017). *25 Years of CIO and IT Leadership-Revisiting Managerial Roles in Information System Research.* Paper presented at the Pacific Asia Conference on Information Systems.

Wynne, B. (1989). Information intensity; let's make it more than an intuitive concept. *Proceedings of the Twenty-Second Annual Hawaii International Conference on IEEE*. doi:10.1109/HICSS.1989.49232

Xia, W., & King, W. R. (2002). *Determinants of Organizational IT Infrastructure Capabilities: An Empirical Study.* Management Information Systems Research Center Working Paper, 02-10.

Yap, C. S. (1990). Distinguishing characteristics of organizations using computers. *Information & Management*, *18*(2), 97–107. doi:10.1016/0378-7206(90)90056-N

APPENDIX A. STUDY CONSTRUCTS AND SURVEY QUESTIONS

Construct	Second Order	Third Order	Definition	Item Code	Item Statement	Source
Information Intenity **CIO Roles**	N.A	N.A	The signiðcance of the information component in value chain activities and is demonstrated by the level of accuracy, frequency of updates, and the magnitude and extent of information employed in operations.	InfoIntA	Information used in our production or service operations is usually accurate	(Busch et al. 1991; Teo & King 1997)
				InfoIntE	Information is used to a great extent in our production or service operations	
				InfoIntF	Information used in our production or service operations is frequently updated	
				InfoIntM	Many steps in our production or service operations require the frequent use of information	
	Supply Side Roles	Information Steward	The desirability of the CIO to be an organizational steward for high quality data and operationally reliable systems.	Info.S1	Keep key systems operational	(Smaltz et al. 2006)
				Info.S2	Build and maintain an IT staff with skill sets that match your current and planned technology base	
				Info.S3	Provide oversight for quality assurance of organizational data	
				Info.S4	Ensure confidentiality and security of organizational data	
		Educator	The role of the CIO as an IT missionary, who provides insight and understanding about key information technologies to raise top management savviness, awareness, and appreciation of IT and help them to make appropriate judgments about the business value of IT and wise IT investment decisions.	Edu1	Champion digital literacy throughout the organization	
				Edu2	Provide insight to the top management team /executives staff on new emerging technologies	
				Edu3	Assist top management team/executives staff in improving their digital literacy	
		Utility Provider	The role of the CIO as a builder of sustaining solid, dependable, and responsive IT infrastructure services.	UtPr1	Establish and maintain an IT department that is responsive to user requests/problems	
				UtPr2	Establish electronic linkages throughout the organization	
				UtPr3	Ensure the organization's users have adequate workstations (PCs/Laptops/Tablets) to accomplish their jobs	
				UtPr4	Establish electronic linkages to external entities (customers, suppliers, partners, etc.)	
	Demand Side Roles	Strategist	The organizational desire for the CIO to be an effective business partner and help their organization leverage valuable opportunities for IT-based innovation and business process redesign.	Stra1	Develop and implement a strategic IT plan that aligns with the organization's strategic business plan	
				Stra2	Develop/maintain metrics that measure the value of IT to the organization	
				Stra3	Direct IT-enabled business process restructuring reengineering	
				Stra4	Provide expertise on multidisciplinary business process improvement teams	
				Stra5	Be initially involved in shaping the mission/vision of the organization	
				Stra6	Be initially involved in business strategic planning and decisions	
		Integrator	The desirability of the CIO providing leadership in enterprise-wide integration of processes, information, and decision-support as digital options for the business.	Integ1	Direct efforts to build an integrated delivery system.	
				Integ2	Migrate organization from legacy, department applications to cross-department, integrated applications	
				Integ3	Develop/acquire an electronic document management capability throughout the organization	
				Integ4	Develop an understanding of the industry delivery process	
		Relationship Architect	The desirability of a CIO to build relationships both across the enterprise as well as outside the enterprise with key IT service providers.	ReAr1	Provide executive oversight for all IT contracts with external vendors	
				ReAr2	Negotiate with vendor IT organizations on new external contract proposals	
				ReAr3	Ensure IT contracts with external vendors remain within scope and budget	
				ReAr4	Interact often with non-IT managers throughout the organization	

Source: Developed by the authors for this study

Moyassar Al-Taie is an Assistant Professor at Sharjah University- Department of Management-UAE and former Adjunct Lecturer in the School of Management and Enterprise at the University of Southern Queensland in Australia. He received his PhD degree from the University of Southern Queensland- Australia in 2014. His research interests include leadership, Organizational Growth, Organizational Behaviour and Human Resources Management. His work has been published in a variety of peer reviewed international journals. Prior to his academic appointment, Moyassar worked in one of the leading R&D governmental canter where his career progressed from HR Assistant to head of HR department.

Mohamed A. Nour is an Associate professor and head of the department of information systems at the University of Sharjah, UAE, having previously held academic appointments at the University of Central Arkansas, USA, and the United Arab Emirate University, UAE. He holds an MBA from Miami University, Ohio (USA) and a Ph.D. in Information Systems from Kent State University, Ohio, USA. His current research interests include data warehousing and data mining, business analytics, recommender systems, and enterprise information systems. He has published in Government Information Quarterly, Information Systems Management, Information & Management, International Journal of Business Information Systems, International Journal of Enterprise Information Systems, and European Journal of Operational Research.

Aileen Cater-Steel is a Professor Emeritus of Information Systems and leads a USQ research group INVEST – Improving the Net Value of Enterprise Systems and Technology. Her research interests include IT Service Management (ITSM), IT Standards and Governance, e-Learning systems, and IT outsourcing. She was Lead Chief Investigator on two ITSM projects that achieved funding from the Australian Research Council. Since 2009, Aileen has facilitated USQ's Community of Practice for Research Supervisors. In 2010 she was awarded a citation for outstanding contribution to student learning from the Australian Learning & Teaching Council. In 2005 her PhD thesis was awarded the ACPHIS (Australian Council of Professors and Heads of Information Systems) prize. She has published more than 90 peer-reviewed articles and coedited five research books. Prior to her academic appointment, Aileen worked in the private sector and government organizations where her career progressed from programmer to IT Manager.