The Role of Shared Information Systems Knowledge, Information Systems Resources, and Information System Function Performance

Joseph Kimani Muchina[1], James Njihia[1] and Agnes Wausi[2]
[1]Faculty of Business and Management Sciences, University of Nairobi, Kenya
[2]Department of Computing and Informatics, University of Nairobi, Kenya

muchina@uonbi.ac.ke
njihia@uonbi.ac.ke
wausi@uonbi.ac.ke

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Abstract: Understanding the role of moderating variables is important. Researchers, academicians, and practitioners can see what is happening between two variables and find ways of addressing the changes. Promoters of the resource-based view theory assert that organizations possess heterogeneous resources with unique strategic characteristics that make them competitive. A shared understanding is required for organizations to control the resources. This paper seeks to establish the moderating role of information systems resources on the relationship between shared information systems knowledge and information system function performance. The study used interdisciplinary theories and adopted descriptive, exploratory, and cross-sectional research designs. We used data from 42 public and private universities in Kenya. Members of each university's Top management team and the IT head took part in the study. The data was modeled and analyzed using the partial least squares structural equation modeling technique. The findings of the study revealed that information system resources have a direct and significant effect on information system function performance (β= 0.820), (t=13.904), and p-value (0.000). However, shared IS knowledge has an insignificant effect on information system function performance (β= 0.025), (t = 0.336), and p-value (0.369). The findings suggest that there may be other factors influencing the relationship between shared IS knowledge and IS function performance, as IS resources do not show a moderating effect. The study had limitations. First, the study sample included only a few university strategic leaders. A higher number of strategic leaders in the sample may provide a better representative sample of university leaders. Second, other factors, like culture, can influence the level of information sharing. Finally, the study suggests future longitudinal research to test if there are other factors and mechanisms that combine with shared IS knowledge to affect IS function performance in organizations. The findings of the study provide useful information about shared IS knowledge, IS resources and how they interact to impact IS function performance. Understanding the moderating effect of IS resources towards IS function performance and how it can help university IS strategic leaders improve the overall performance of information systems is important. Also, these findings may be useful for information technology or systems service managers and industry practitioners in appreciating practices that bring positive contributions to their information systems. The research findings are useful to policymakers and practitioners in helping them to gain better insights and understanding of the factors and changes to better exploit organizational IS resources. The findings will also help them understand what structures and mechanisms to use for a better understanding of shared IS knowledge to fully exploit resources for Optimal IS function performance. The study's findings will provide organizational leaders with the opportunity to share knowledge and understanding, as well as to develop cultural change structures for better utilization of IS resources to enhance performance.

Keywords: IS function performance, IS resources, Top management team, IS executive, IS leadership, Shared IS knowledge, Moderation

1. Introduction

In the contemporary fast-moving and vibrant business environment, Information Systems (IS) and Information Technology (IT) are indispensable components for organizational development and existence (Kamariotou & Kitsios, 2019). The promoters of the resource base view (RBV) theory assert that organizations possess heterogeneous resources that they can use to conceive, choose, and implement organizational strategies. The adopted strategies contribute to and account for differences in an organization's performance. To sustain competitiveness, organizations need to gain capabilities and competencies to redesign resources that are valuable, rare, inimitable, non-substitutable, durable, appropriable, and mobile (Amit & Schoemaker, 1993). As such, organizations have continued to make enormous investments in information systems (IS) (Karahanna, 2006). However, these investments do not necessarily lead to sustained advantage (Piccoli, 2005). The way organizations manage their investments to develop unique IS resources and skill sets ultimately determines an organization's overall success performance. The literature has indicated that most upper-echelon leaders lack

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business and technology skills (Fang Ding, 2014). This has prompted universities' strategic leadership to seek good business and technology knowledge and understanding to effectively and strategically exploit IS resources. Research has also shown that Information Technology (IT) capabilities are important factors that differentiate successful organizations from their competitors (Jude, 2022). The purpose of this paper, therefore, is to establish whether IS resources have a moderation relationship between shared information systems knowledge and IS function performance.

Broadbent (2005) categorized IS resources in terms of human, technological, and relationships. Resources are existing stocks that are possessed or controlled by the organization and include physical and intangible assets like knowledge, experience, and culture, which are rooted in the organization (Anggraeni, 2014). Therefore, systems and technologies held or existing in the university are essential sets of resources, including the IT infrastructure, knowledge, and skills residing in employees. These are the resources available for exploitation by the management of organizations to plan, control, budget, prioritize, and innovatively use to have a positive IS function performance (Anggraeni, 2014). Therefore, universities can use their existing IS resources and capabilities to compete and enhance IS function performance (Bhatt, 2009). This calls for the university's management to gain a shared understanding of how to exploit and align their resources for competitiveness and sustained performance. The study argues that knowledge sharing results in a better understanding of how to exploit an organization's resources, determine their requirements, and also identify potential limitations. This could encourage executives to transfer resources to other business areas that are deficient or likely to experience change (Talion & Pinsonneault, 2011).

Despite the belief that information technology (IT) is necessary for an organization's survival and growth, scholars are still struggling to unravel the factors that connect IT with organizational performance. Anecdotal evidence and case studies have shown that effective use of IS resources significantly discriminates successful organizations from less successful ones (Jude, 2022). The study argues that having a shared understanding will enable the university's strategic team to understand, utilize, and exploit IS resources, which will eventually lead to superior IS function performance. The study found a positive and significant relationship between IS resources and IS function performance, which is consistent with prior findings. While Bharadwaj (2000) claims a positive relationship between IS resources and organizational performance, others have doubted the relationship, arguing that IS resources only affect performance when they are designed to build distinctive complementarities with other organizational resources. The perspectives outlined above call for continual debate and research. Shared IS knowledge as an intangible asset needs to be developed in universities. Such knowledge is postulated to strengthen and complement strategic team IS skills and capabilities, giving the team a strategic mindset to know how and what mechanisms to adopt to exploit IS resources productively. How IS resources and other complementaries interact to affect IS function performance still calls for further empirical work. Therefore the study highlights the importance of organizations' senior leaders having an understanding of IS resources, practices, and culture, and how they can adopt a social approach to exploit shared IS knowledge. This is deemed to give them extra intelligence on how to exploit IS resources. The study envisions that when organizations' senior leadership attains high levels of shared IS knowledge, they comprehend how to use, re-engineer, reconfigure, and remix their IS resources and systems to drive superior IS function performance (Talion & Pinsonneault, 2011).

2. Literature Review

2.1 Theories Underpinning the Study

The reinforcing theories of this study include: Resource-Based View (RBV), Dynamic Capabilities Theory (DCT), and the Social Capital Theory. Resource-based theory is an influential theory in IS stemming from the works of Edith Penrose's (1959) theory of organizational growth. The theory postulates that organizations possess resources that are heterogeneous resources that they can use to plan, select, and implement organizations' strategies. The strategies contribute to and explain why there are differences in organizational performance. Therefore, organizational performance is based on its ability to exploit internal and external resources. DCT advanced by Bourdieu (1983) posits that an organization's competitiveness is linked to its ability to demolish existing IS resources and build a fresh remix of new operational capabilities to attain high performance in volatile business environments, focusing on its capabilities (Gizawi, 2014). The study places prominence on building management IS capabilities and difficult to duplicate blends of organizational resources such as culture, functional and technological skills, among others (Helfat & Martin, 2015). Universities need to apply existing dynamic capabilities through mechanisms and structures that support collaborations, partnerships and relationships to rebuild IS resources, skills, and re-engineer processes to enhance their performance outputs. In

the same realm, SCT theory claims that social capital has existed ever since small societies existed and people intermingled with expectations to exchange and trust one another (Larsen, 2014). Therefore, social capital occurs in associations among the actors and is fruitful, just like physical and human capital in facilitating productivity. In this study, social capital exists between the university strategic team, signifying that one's connections can help them (Minh, 2020) through existing culture and the sharing of knowledge. When explicit knowledge exchange happens as a resource, knowledge integration occurs within the university's strategic teams, which strengthens understanding and exploitation of resources. Strategic leadership needs to be given a chance to interact formally or informally in events or forums, such as training, workshops, and seminars (Kwon, 2002).

2.2 Information Systems Resources

Organizations continue to make investments in information systems, which are strategic resources and deemed enablers for sustainability and performance. However, these investments do not automatically provide any sustained advantage, but how organizations control their investments to create unique IS resources and skill sets that determine an organization's overall performance. Research has also shown that Information Technology (IT) capability is an important factor that differentiates successful organizations from their competitors (Jude, 2022). However, investments in IT resources are easy to duplicate. Broadbent (2005) categorizes these resources in terms of human, technological, and relationship resources. Resources are existing stocks that are possessed or controlled by the organization and include physical and intangible assets like knowledge, experience, and culture, which are rooted in an organization (Anggraeni, 2014). Systems and technologies held or existing in the university are essential sets of resources and include the IT infrastructure and the knowledge and skills residing in employees. These are the resources available for exploitation. Further, the literature stresses the importance of intangible resources where IS human capital, IT infrastructure, and relationship aspects acknowledge a positive association between resources and IS function (Anggraeni, 2014). Therefore, universities can use their existing IS resources and capabilities to compete and enhance IS performance (Bhatt, 2009). Resource-based view theory argues the existence of a positive relationship between resource alignment and performance. Key resources in organizations must be obtained, retooled and deployed in order to implement changes in IS to employ business strategies strategically.

2.3 Shared Information Systems Knowledge

In IS, knowledge is the "awareness and understanding of a set of information and the ways it supports specific tasks or reaches a decision" (Stair & Reynolds, 2006, p.6). It involves structures that exist to facilitate the sharing and exchange of knowledge. IS literature identifies TMT meetings, team interactions, and CEO-ISE distance as key for knowledge sharing (Feeny et al., 1992, Watson 2005). High levels of business and IS knowledge in ISE and TMT foster a shared understanding that boosts organizational capabilities (Armstrong & Sambamurthy 1999). The Upper Echelon theory (UET) provides theoretical viewpoints relating to TMT and the strategic choices made in terms of business and IS strategies as a likeness of their intellectual bases.

Formal and informal meetings, seminars, workshops, and other forums facilitate knowledge integration and understanding between the strategic teams (Anggraeni, 2014). Empirical evidence by (Boynton et al., 1994) confirms that a high frequency of interactions between strategic teams positively contributes to IS integration, appreciation, and understanding. Therefore, when strategic teams attain high levels of IS strategic knowledge, they support and associate with IS initiatives and appreciate their contribution towards IS value creation and organizational performance.

2.4 Information System Function Performance

The IS function is the all individuals, groups, or departments in an organization with daily responsibility for IS-related activities (Rajesri, 2008). Performance is the result of all the organization's work processes and activities and how well the goals or capabilities are achieved to meet stakeholders' needs and continued existence (Abong'o, 2015). The importance of measuring IS performance is demonstrated by the references to various IS "issue" studies and approval by yearly popular magazines such as "ComputerWorld Premier 100", among others, that utilize proxy metrics to measure the IS function performance (Niederman, 1991). Chang, (2005) argues that though there exists ways and instruments to measure definite information aspects, such as data center, efficiency, and data quality, characteristically these measures cannot be used in any express way as a basis for determining information system function (ISF) overall performance. Initial performance evaluation models aimed at achieving efficiency and addressing operational problems. Quantitative measures such as turnaround time, and cost-saving, among others, fail to evaluate the 'soft' benefits such as service performance, and

improved decision-making among others (Chang & William, 2005). Because of its criticality and lack of pragmatic measures, multiple and diverse perspectives from stakeholders exist, making performance assessment difficult (Weiss, 2011).

Researchers have developed and used various models, such as Pitt and Watson (1995), Seddon (1997), and Heo & Han (2003) to measure IS performance (Chang & King 2005). Though the constructs used are significant, they fail to represent the overall performance of the IS function (Chang & King, 2005). To guarantee the suitability of the model at the IS functional level, this study used guidelines developed by Cameron and Whetton (Cameron, 1983). Several IS researchers have used the procedures to explain conceptual developments to examine IS functional effectiveness (Benbasat Moore, 1991). In this study, IS function performance is assessed by following Cameron's guidelines by taking the universities' top-level IS users' perceptions as the primary users and their ability to apply IS products and services.

2.5 IS Resources, Shared IS Knowledge, and IS Function Performance

IT assets of an organization are its core infrastructure and form a shared information delivery base (Bharadwaj, 2000). This defines the business functionality in terms of its reach and range (Keen, 1991). Usually, having a non-integrated IT infrastructure characterized by system incompatibilities may restrict an organization's business choices. However, creating an integrated IT infrastructure requires considerable time and expertise. As organizations create and develop IT infrastructure that links users, suppliers, and customers, expertise is required. The expertise develops skills, knowledge, and procedures that define the use, distribution, and management of IT facilities and support services (Ross et al. 1996). However, even though the infrastructure components are commodity-like, integrating them to develop and tailoring them to the organization's strategic needs is complex and poorly understood (Weill and Broadbent, 1998).

Organizations must learn how to redesign their products and services in a manner that exploits their infrastructure capabilities. The study argues that management teams with shared understanding, IT knowledge, and good relationships significantly reduce the time and costs to build and deploy resources and systems (Weill and Broadbent, 1998). The theory proposes that resources and capabilities possessed by an organization positively contribute to its organizational performance. It argues that an organization's explicit resources and abilities that are uncommon and difficult to emulate or substitute are linked to performance (Barney, 1991). The resources have synergistic benefits that may accrue when integrated with technology (Keen, 1991). Intangible resources, such as knowledge, organizational culture, reputation, and environmental orientations, are key drivers to superior performance (Winter, 1987). They enable an organization to achieve superior capability benefits such as better customer services, improved product quality, and market responsiveness, among others, which are used in evaluating information systems (Brynjolfsson, 1997). Therefore, strategic information systems leadership needs to identify resources or competencies and assemble teams that work together to achieve organizational effectiveness and performance. Therefore, the study makes a proposition that IS resources have no significant moderating effects between shared IS knowledge and IS function performance.

3. Model Conceptualization

The study model was conceptualized and guided by research works from various scholars. From the literature, the study variable items were identified. Information systems (IS) leadership is viewed as a continuum that spans from IS project teams to global IS management (Karahanna and Watson, 2006), where the project team leadership approach is the driving instrument of IS success. Research findings by Worthen (2007) found that eighty-seven (87%) business leaders acknowledge the importance of IS resources to attain business strategies. However, organizations experience insufficient coordination of work, knowledge sharing, and IS use due to the business-IT gap (Mojca, 2011), where on average, only one in three senior managers has enough knowledge about the operations of IT/IS in their organizations (Mojca, 2011). Reich & Benbasat (2000) noted that intellectual and social aspects are the two dimensions used to explain business-IS alignment. Intellectual alignment results when business and IS plans exist that are superior and related, while social alignment arises when the IS and business executives understand each other's mission, objectives, and plans. Several studies have focused on the intellectual dimension, leaving the social dimension (Tan & Gallupe, 2006). The social dimension focuses on the relationships and shared understanding between businesses and IS executives who form part of the TMT.

Shared understanding is proposed as one of the significant factors needed to establish the social dimension (Reich & Benbasat, 2000). While the existing literature has emphasized the importance of good relationships between ISE and the TMT as a key driver for organizational performance, plenty of the research has been

subjective, failing to provide a strong theoretical foundation (Tan & Gallupe, 2006; Benbasat, 2000). The social mechanisms and how they nurture relationships have received little attention (Tan & Gallupe, 2006). This study takes the social dimension approach, and the items addressing each variable are discussed.

3.1 Shared IS Knowledge

Shared IS knowledge is the awareness and understanding of a set of information and how it can be used to support specific tasks or reach a decision (Stair, 2006, p.6). It involves structures that exist in an organization to facilitate the sharing and exchange of IS knowledge. The IS literature identifies structures such as shared language, involvement in TMT meetings, number of interactions between teams, the structural distance between the CEO and IS executive (Feeny et al., 1992, Watson, 2005), as well as formal and informal meetings (Anggraeni, 2014) as indicators that can facilitate the sharing of IS knowledge. These elements (IS shared language, ISE-TMT shared knowledge, and interaction structures, whether formal or informal) were conceptualized to form the shared IS knowledge construct. Several researchers acknowledge that the lack of a common vision and understanding between the TMT and information systems executives (ISE) regarding IS creates a barrier to strategic leadership and strategy alignment (Armstrong & Sambamurthy, 1999; Chan, 2002; Tan & Gallupe, 2006). Formal and informal meetings, seminars, workshops, and other forums facilitate knowledge integration and understanding between the strategic teams (Anggraeni, 2014). Other researchers have recommended collaborations, partnerships, and frequent interactions as some of the solutions to address such IS-business gaps, as they develop trusting relationships, improve organizational agility, and create synergistic relations between the strategic partners (Hickman & Akdere, 2017; Nevo & Wade, 2010).

3.2 IS Resources

Organizations continue to make huge investments in IS which are deemed to be enablers for sustainability and performance. However, these investments fail to automatically guarantee any continued advantage, but organizations control their investments to create unique IS resources and skill sets that define an organization's overall performance (Watson, 2005). Research has also revealed that information technology (IT) is a vital component that distinguishes successful organizations from their competitors (Jude, 2022). IS resources are categorized in terms of human, technological, and relationship resources (Broadbent, 2005). According to Anggraeni (2014), resources are the existing stocks that are possessed or controlled by the organization and include physical and intangible assets like knowledge, experience, and culture, which are rooted in the organization. Therefore, IS systems and technologies held or existing in the university are essential sets of resources available for exploitation. The study conceptualized the IT infrastructure, human resources, intangible resources such as synergy between the teams or employees, customer orientation (customer-centric), and quality as the items making the IS resources construct.

Further, the Resource Base View (RBV) notes that resources are existing stocks that are possessed or controlled by the organization and include physical and intangible assets like knowledge, experience, and culture, which are rooted in the organization (Anggraeni, 2014). From these perspectives, universities use their existing IS resources and capabilities to compete and enhance their IS performance (Bhatt, 2009), noting that knowledge sharing allows a better understanding of the organization's resource use, requirements, or potential limitations, and could encourage executives to transfer resources to other business areas that are deficient or are likely to experience change (Tailon and Pinsonneault, 2011).

3.3 IS Function Performance

The IS function is all individuals, groups, or departments in an organization responsible for daily IS-associated operations (Chang & King, 2005, Rajesri, 2008). The importance of measuring IS performance is evidenced by references to various IS "issue" studies and approval by many IS magazines such as "Insights and Computer World Premier 100 among others (Niederman, 1991). Performance is the final result of an organization's work processes and activities, and how well the goals or capabilities are achieved to meet stakeholders' needs and ensure their continued existence (Everlyin, 2015). Chang (2005) argues that though there exist ways and instruments to evaluate aspects of IS, such as data centers, efficiency, and quality, the measures cannot be used in any express way as a basis for determining the sources of overall performance. Due to its criticality and lack of pragmatic measures, multiple and diverse perspectives from stakeholders exist, making performance assessment difficult (Weiss, 2011). Several models for example, Pitt and Watson (1995), Seddon (1997), and Heo and Han (2003). The study adopted the input-output logic model suggested by Chang and William (2005) to evaluate IS performance in universities. The model shows that IS function uses resources such as hardware, software, and humans combined with managerial and technical capabilities to enhance IS function performance,

which further impacts business process effectiveness and organizational performance. The study, therefore, adopted the model developed by Chang and King 2005 to measure IS function performance and adopted the model instrument. The study adopted the instrument which identified the following three items, Service performance, Systems performance, and Effectiveness of information as the key indicators to measure IS function performance. In addition, the study was guided by guidelines developed by Cameron and Whetton (1983). These guidelines have been used by IS researchers to explain conceptual developments and examine IS functional effectiveness (Benbasat Moore, 1991). The indicators, of system performance assessed the quality characteristics of the systems experienced in the university, such as reliability, response time, and ease of use, among other characteristics, and the impact the systems have on the user's work. Information effectiveness evaluates the quality of information about the design, operation, use, and value it provides, and the information effects it has on the user's job, and service performance is assessed through the user's experience with the services provided by the University's IS function. IS knowledge gaps, limitations, and understanding are postulated to contribute to universities' inability to reap the benefits of IS poorly impacting their performance.

4. Methodology

4.1 Research Design

This study adopted a descriptive, exploratory, and cross-sectional research design. The motivation for using this design includes the ability to help researchers overcome shortcomings associated with a single strategy and makes it possible to combine the strengths associated with qualitative and quantitative approaches (Mingers, 2003). Further, as Johnson & Onwuegbuzie (2007) note mixed-method approach helps one to address a wide range of research questions in a more comprehensive way, as well as helps to boost the generalizability of the study findings (Venkatesh & Bala, 2013). One is also able to triangulate the findings to reach convergence and corroboration of the results (Agerfalk, 2013). The population for this study was public and private universities operating in Kenya.

4.1.1 Data collection process

The study used a survey method to collect both quantitative and qualitative data. An online structured questionnaire with a five-point Likert scale with items ranging from 1= "Strongly Disagree", 2= "Disagree", 3=Neutral", 4="Agree", 5 = "Strongly Agree" was prepared and used to collect the data. The questionnaires were administered using an online Google Form using official emails to the university's top management team. The study was undertaken for three months from September to December 2022. A pilot study with two universities (public and private) was carried out in August 2022. This ensured the accuracy of the questionnaires and also two experts in the area of information systems confirmed content validity, with minimal amendments done to address sequencing of the questions, clarity, and grammar. In addition, the respondents were able to express and give their views using open-ended questions about the strategic team's information systems capabilities, information system resources, and the performance of information system functions in universities. Questionnaires were administered to all public and private chartered universities in Kenya. Out of 76 chartered universities, 42 returned usable questionnaires, representing a 55.3% response rate, while 32 universities, representing 42.2%, did not respond, and all efforts to reach the key informants were fruitless. A sample of 42 respondents was considered appropriate for structural equation modeling (Hair et al., 2017) and a good representative of the population (Krejcie & Morgan, 1970).

4.1.2 Data preparation and processing

The study used MS Excel software to prepare and code the data. The data was later exported into Smart-PLS software version 4.0. The coded data file was prepared to ensure its structure and format conformed to PLS-SEM software data requirements before analysis. Data screening was also done to inspect data properties and normality (Byrne, 2013). To address missing data, the online survey questionnaire was designed in a way that made it impossible for the respondents to skip any question when filling in or to enter values outside the set scale range.

As a control measure, the questions were made mandatory to ensure the respondents answered all the questions. For those questionnaires that were delivered physically, through the drop-and-pick-up method, the researcher cross-checked for completeness to ensure they were filled out. In addition, PLS-SEM automatically checks for any missing data when the data file is loaded into Smart PLS software. Further, the study adhered to ethical considerations in social science research. Measures were taken and implemented to ensure the confidentiality and anonymity of both the respondents and the participating universities. Before administering

the questionnaires, an ethical clearance certificate was obtained from the University ethics committee. On the cover page of the research instrument, a section was included for the respondents to consent before continuing with the study.

4.1.3 Data description

The study data was prepared using Microsoft Excel, capturing the responses. The data was then converted into a CSV file and later imported into Smart PLS software. The dataset contained raw data for the specific latent variables (strategic information systems leaders, information system culture, shared IS knowledge, Information system resources, and information system function performance). A new project was created in SmartPLS and then the data was imported. The in-built features in SmartPLS software checked for essential data properties to ensure conformity. Data was collected from 76 chartered universities operating in Kenya. Structural Equation Modelling (SEM) using the partial least squares (PLS) method was later used to test the theoretical model, assess the structural model, and understand the direct and indirect effects of the variables.

4.1.4 Data characteristics

The study achieved a response rate of 55.27%, 64.30% of which were public universities, and 35.7% of which were private universities. About 78.6% of universities had fewer than 1000 employees, while 52.4% had fewer than 10000 student enrolments. Only 4.8% of the universities had over 40000 student enrolment. 76.2% of the universities had an IS strategic plan, and 71.4% had ICT steering or management boards to steer and manage IS initiatives. 35.7% of the respondents indicated they play the role of IS executive, and 64.3% play the role of TMT. In terms of IS executive gender, 79.7% were male and 20.3% were female, 79.7% of the university IS strategic team were in the age bracket between 30-49 years, while only 3.8% were above 61 years of age, with a majority of them (84.8%) having a masters degree and above in their education. 26.6% of the IS strategic team had worked for over 14 years. 87.3% of the IS strategic teams in universities have computer-related specializations, 44.3% had IT Director as their job title, and only 2.5% had CIO or IT head job titles respectively. 59.5% of the respondents were formal members of their university IS strategic team, while only 40.5% were informal members.

4.1.5 Data analysis process

The study used the Partial Least Squares structural equation modeling (PLS-SEM) method to analyze the data and to assess the research model. The technique was deemed flexible in handling the data requirements and relationship specifications, and can handle complex models (Sarstedt, 2019). Due to its emerging popularity, many researchers have acknowledged the technique, and it is being applied more frequently (Hair et al., 2019a; Hair et al., 2022a; Ringle et al., 2015; Sarstedt et al., 2020). PLS-SEM was chosen primarily in this research because of data characteristics, such as its ability to handle small sample sizes and its capability to handle non-normal data. (Hair et al., 2017; Hair et al., 2014a). In addition, the constructs in the study were reflectively modeled with direct and mediation hypothesized relationships (Richter et al., 2016). A two-step approach was used to assess the model, where the measurement and the structural models were evaluated. Measurement models with reflective indicators need to be assessed for construct reliability and validity, including convergent and discriminant validity as proposed by Hair et al. (2017). To assess the structural model, the key criteria used are the size, sign, and significance of the path coefficient, the R^2 values, and the effect size f^2 (Hair et al., 2017; Ali et al., 2018). The significance of the path coefficients was assessed using the bootstrapping technique with 10,000 subsamples with replacement as recommended by Hair et al. (2017). SmartPLS version 4.0 software was used for quantitative data analysis. The inbuilt procedure for Smart PLS was used to calculate mean values, standard deviations, skewness, and kurtosis, and to explore statistical relationships between the measurement items of each construct and among the constructs as recommended by (Ringle et al. 2015).

5. Results and Discussion

Findings

The sections that follow outline the findings of the study.

5.1 Moderation

Moderation defines a situation in which the relationship between two constructs is not constant but depends on the values of a third variable (moderator variable). The moderator variable can strengthen or weaken and even change the direction of the relationship among constructs in a model. Effects of the relationship between the two variables, nature of the impact of the predictor on the criterion vary according to the level or value of

the moderator (Holmbeck, 1997). The moderator specifies the conditions under which given effects occur and the conditions under which the direction or strength of the effect varies Baron and Kenny, 1986, pp. 1174. Figure 1 below presents the moderation effect conceptualization in the research.

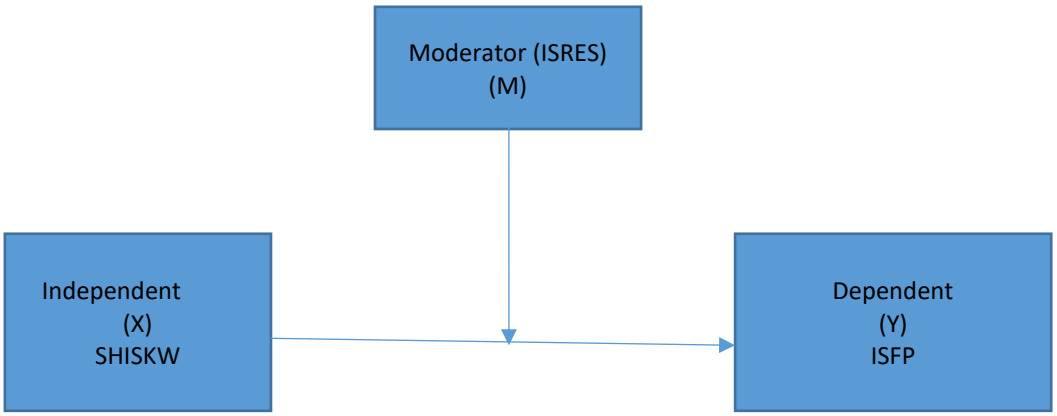

Figure 1: Moderation Model

Statistically, the visualization of the model differs from how it is conceptualized in the model graphically as an interaction term as depicted by X*M (Z) is included with an arrow point to the dependent variable. Figure 2 depicts how the model was represented with the interaction term.

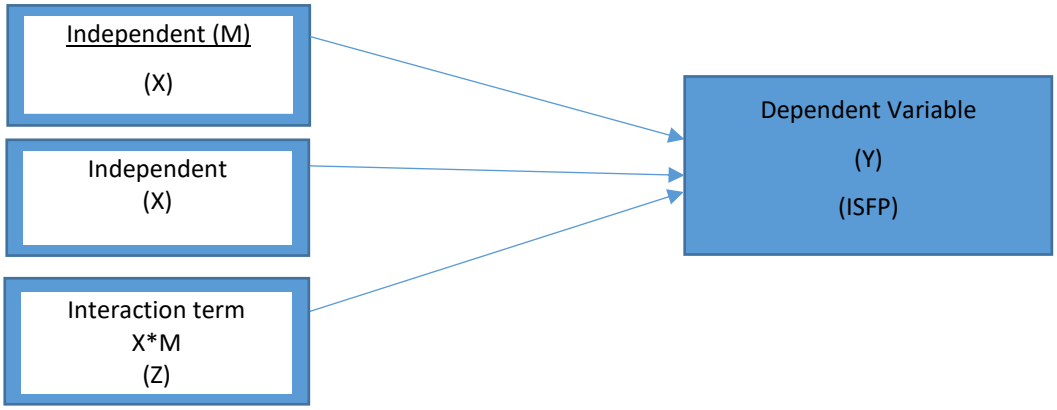

Figure 2: Depicts a statistical model representation-Interaction Term

5.2 Approaches of Models Assessment

There are many approaches that researchers employ to examine the interaction effect of the moderating variable. Common approaches include; Product-Indicator Approach as advocated by (Chin, Marcolin & Newsted, 1996; 2003), Two-Stage Approach by (Henseler et al. 2012, Chin et al., 2003) and orthogonalizing Approach by (Henseler & Chin, 2010). The study hypothesized one model relationship ($H0_n$), that information system resources (ISRES) have no moderating effects on the relationship between the independent variable (SHISKW) and the dependent variable (ISFP). The researchers used the two-stage approach as guided by (Henseler et al. 2012; Chin et al., 2003) to moderate the effect of ISRES on the relationship between SHISKW and ISFP. In stage one, main effect model was run to get the latent variable scores for Y1, Y2 and M i.e. VLS (Y1), VLS (Y2) and LVS (M). The Latent variable scores of Y1 and M were then multiplied to form the single item which is used to measure the interaction term (Y1.M) in stage two. The latent variables Y1, Y2 and M are each then measured using the single item of the latent score obtained in stage one. One advantage of using a two-stage approach is that it has a higher power and is able to detect a significant interaction. In addition, it supports small sample sizes. Figure 3 shows a basic moderation model as conceptualized in the study. The main effects model was drawn using smart PLS-SEM software, as depicted in Figure 3 below.

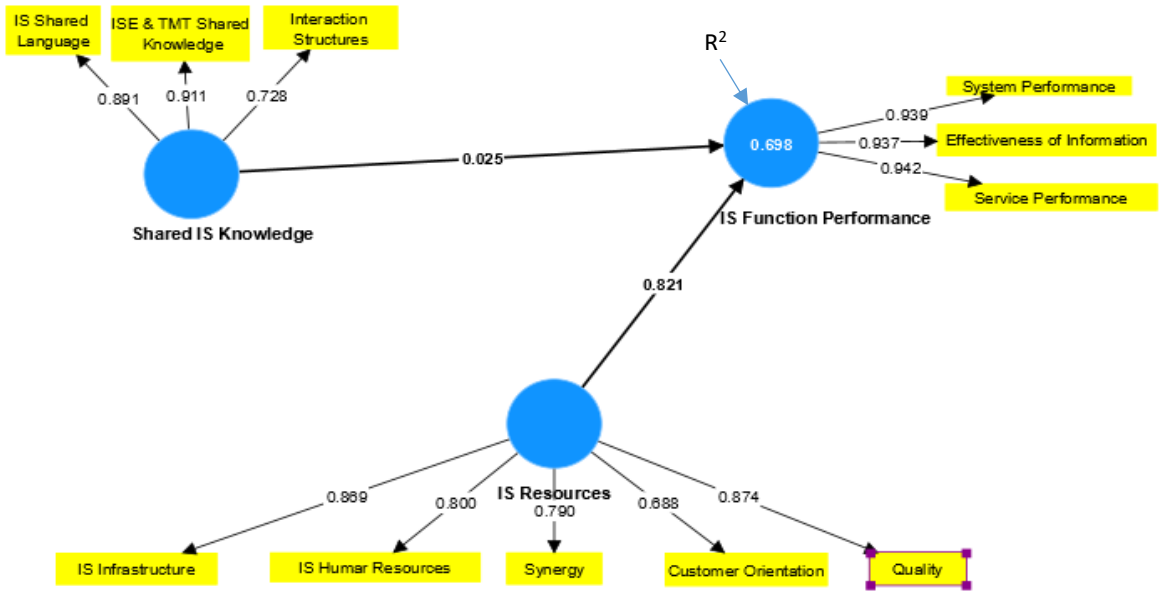

Figure 3: Main effect Model

5.3 Assessment of the Measurement Model

We used the (PLS-SEM) two-step approach to assess the model, evaluating both the measurement and structural models. Measurement models with reflective indicators need to be assessed for construct reliability and validity, including convergent and discriminant validity, as proposed by Hair et al. (2017). Indicator/item reliability, Internal Consistency reliability, convergent validity, and discriminant validity were used to evaluate the reflective measurement model. From the results of the analysis, all were above the recommended threshold of 0.7, showing good reliability. The internal consistency was based on Cronbach's alpha score, which estimates observed correlations among and within variables (Hair et al., 2017). Hair et al. (2017) recommend the use of composite reliability as the alpha score reacts to the number of items in the scale and often underestimates the internal consistency reliability. The reliability based on composite scores in the study was as follows: IS resources 0.813, shared IS knowledge 0.801, and IS function performance 0.933. All surpassed the minimum criteria of 0.7 as shown in Table 1.

Table 1: Construct internal consistency and reliability

Constructs	Alpha	CR	AVE
IS Resources	0.813	0.877	0.642
Shared IS knowledge	0.801	0.883	0.718
IS Function Performance	0.933	0.957	0.882

5.4 Convergent Validity

Convergent validity is the degree to which observed variables correlate within a construct (Wong, 2013). The Average Variance Extracted (AVE) of each latent variable was assessed to verify convergent validity. Convergent Validity is confirmed when AVE values are greater than the acceptable threshold of 0.5 (Wong, 2013; Fornell & Larcker, 1981). Average Variance Extracted (AVE) was used to assess convergent validity. When AVE values are greater than the acceptable threshold of 0.5 (Fornell & Larcker, 1981), convergence is usually confirmed. The results of the analysis showed that constructs' AVE values ranged from 0.642 to 0.882, pointing to good acceptable levels compared to the minimum acceptable threshold value of 0.50.

5.5 Discriminant Validity

Discriminant validity measures the extent to which a construct is empirically distinct from other constructs in the structural model. There are three common methods used to assess discriminant validity. This includes the Fornell & Larcker criterion (1981), Heterotrait-monotrait (HTMT) ratio, and cross-loadings.

This study adopted the Fornell & Larcker criterion (1981) to assess discriminant validity. The method compares the square root of the average variance extracted (AVE) with the correlation of latent constructs. In this approach, a latent construct should explain the variance of its indicators better rather than the variance of other latent constructs' indicators. Therefore, the square root of each construct's AVE should have a greater value than the correlations with other latent constructs. For example, the correlation value for IS resources is 0.642, therefore, its AVE value (0.801) should be higher than it correlates with other constructs. Table 2 presents the results. However, the AVE value of IS resources (0.801) is lower than it correlates with IS function performance (0.822). This signals issues of insufficient discriminant validity. From the study, IS function performance latent variables explain more variance in observed variables than IS resource latent variables. This could result from high correlations between the items, and the items could be measuring the same construct. As a result, one is not sure whether the observed variables are good measures of IS resources, and this reduces the researcher's confidence in the model (Bove, 2009). Further, this may weaken the findings of the research, and more research needs to be done.

Although Fornell and Larcker criterion (1981) is one of the common methods used to assess discriminant validity, recent research has shown that this metric is not suitable for assessing discriminant validity (Henseler, Ringle, and Sarstedt (2015) especially when the indicator loadings differ only slightly ie when indicator loadings are between 0.65 and 0.85, meaning there is a little distinction between the indicator loadings. Further, Farrell (2010) noted that Radomir & Mousescu (2019) reported that in empirical applications, the Fornell & Larcker criterion (1981) often fails to identify discriminant validity problems reliably and should be avoided. In addition, the conclusions made regarding relationships between constructs under investigation may be incorrect. For example, the strength of a relationship could be overestimated, or a relationship may be confirmed when in fact there is no real relationship (Farrell, 2010).

Researchers have suggested using different methods to address issues of lack of discriminant validity. One of the latest approaches recommended to address issues of discriminant validity with much higher levels of specificity is the HTMT criteria (Jörg Henseler, 2014). Other suggested approaches include: using a common method factor as it may help reduce variance inflation and reduce shared variance estimates between latent constructs and observed variables. One can also conduct further analysis using residual terms, partialling out shared variance (e.g., Little, Bovaird, and Widaman, 2006), or use other techniques such as tolerance analysis (Nunnally and Bernstein, 1994). One can also check the number of items representing each construct. In this case, IS resources had more than four items as per the minimum number recommended. Further, one can check for item statements to ensure they are easy to understand and have no overlaps to ensure they measure the same construct. Checking and removing items with cross-loadings less than 0.40 (Hair et al. 2014), however, care should be taken during item removal. Researchers need to be aware of the trade-off between the number of scale items (for face validity or construct coverage) and measurement scales that perform well and discriminate. To further confirm discriminant validity in the model, the cross-loadings were used.

Table 2: Discriminant Validity (Fornell & Larcker) Criterion

Constructs	IS Function Performance	IS Resources	Shared IS knowledge
IS Function Performance	0.939		
IS Resources	0.822	0.801	
Shared IS knowledge	0.513	0.617	0.847

5.6 Cross Loadings

A cross loading is simply the items that load on two (or more) factors, rather than they were supposed to load on the main factor. In this study, cross-loadings were assessed, and each measurement item indicator loadings were expected to load higher with its associated construct (Hair et al., 2017). The results confirmed that the cross-loading of each measurement item loaded higher on its construct than it loads on other constructs, and therefore, we concluded that discriminant validity was established. Table 3 represents the results.

Table 3: Cross Loadings

CONSTRUCT	ITEMS	ISFP	ISRES	SHISKW
IS Function Performance	SERPER	0.944	0.778	0.536
	SYSPER	0.939	0.741	0.465
	EFF-INFOR	0.935	0.796	0.443
IS Resources	ISINFR	0.788	0.883	0.447
	ISSYN	0.674	0.806	0.646
	ISHR	0.618	0.797	0.477
	CUSTORIN	0.515	0.709	0.410
Shared IS Knowledge	ISSHLAG	0.509	0.667	0.891
	ISETMTSHKW	0.424	0.513	0.911
	INTERSTRUCT	0.352	0.339	0.729

6. Structural Model Assessment

After assessing the measurement model to confirm its reliability and validity, the anticipated structural model was assessed. Potential issues of collinearity need to be tested in the structural model between the exogenous constructs (Hair et al., 2017). Variance Inflation Factor (VIF), which measures the strength of the correlation between the independent variables in the regression model, was also tested. Variance Inflation Factor (VIF) values obtained ranged from 1.426 to 4.056. The values were less than 5, as the recommended threshold by (Hair Jr et al., 2014) among others, for each of the exogenous constructs. The results of the model assessment showed that the model was reliable and valid. After confirming the validity and reliability of the moderation model, the interaction effect was created by drawing a linking line from the moderator (ISRES) to the line linking SHISHW and ISFP and then running the PLS-SEM Algorithm. Figure 4 represents the interaction effect of the model.

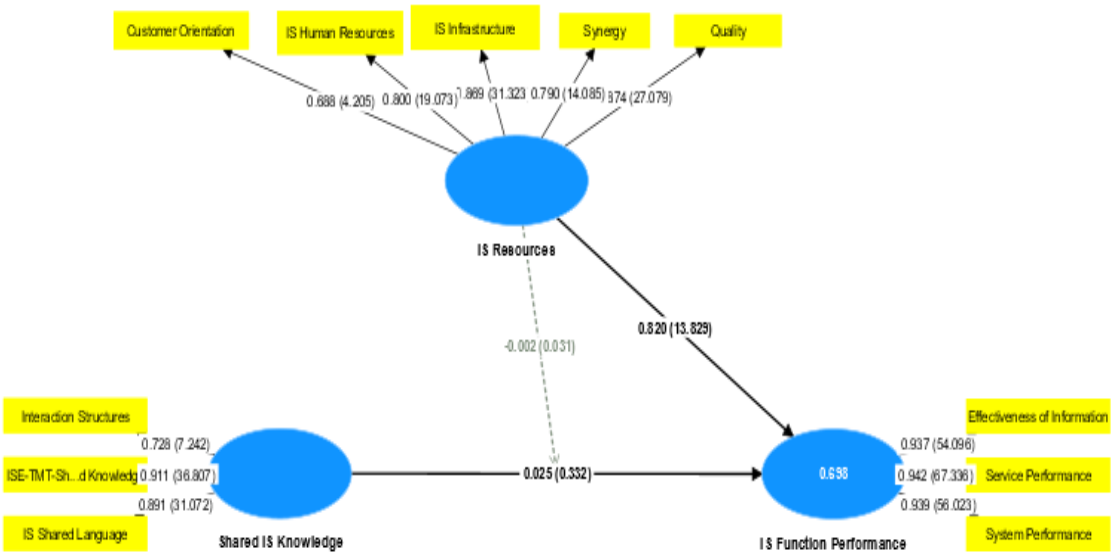

Figure 4: Interaction Effect Model

From the results of the analysis, R^2 remained the same. The initial R^2 for the main effect model was 0.698, signifying that 68.9% of the dependent variable (ISFP) can be explained by the independent variable. After introducing the interaction effect, R^2 remained the same (0.698), meaning the addition of the interaction term (SHISKW*ISRES) did not introduce any additional variance. The next step involved calculating the f^2 value.

According to Chin et al. (2003), a low effect size f^2 does not imply that the underlying moderator effect is negligible. Small interaction effects can be meaningful under certain conditions, and it is important to account for these conditions" (Wynne W. Chin, 2003).

6.1 Hypothesis Testing

The results of the beta coefficient for the interaction term SHISKW * ISRES were negative (-0.002) and small. It is important to confirm if the beta value is statistically significant or not. Thus, the bootstrapping procedure was used to get the t-values to find if the effect was significant. Table four presents the results.

Table 4: Bootstrap Results

Relationship	Beta	Mean	Std Dev	T values	P values
IS Resources -> IS Function Performance	0.820	0.831	0.059	13.904	0.000
Shared IS Knowledge -> IS Function Performance	0.025	0.024	0.074	0.336	0.369
ISRES x SHISKW -> ISFP	**-0.002**	**0.002**	**0.078**	**0.031**	**0.488**

From the results of the analysis, ISRES negatively moderates the relationship between SHISKW and ISFP. It weakens the relationship between shared IS knowledge and information system function performance. Thus, we failed to reject the hypothesis**.** Table 6 shows the results of the moderation analysis; ISRES (β = - 0.002, t-value 0.031, and p-value 0.488) has a negative moderation effect on the relationship between SHISKW and ISFP. Table 5 shows the results of the full model after creating an interaction effect.

Table 5: Results of ISRES Interaction Effect

	Path Coefficient	Standard deviation	T statistics	P values
ISRES -> ISFP	0.820	0.059	13.904	0.000
SHISKW -> ISFP	0.025	0.074	0.336	0.369
ISRES x SHISKW -> ISFP	-0.002	0.078	0.031	0.488

Table 6: Summary Results from Moderation Analysis

Hypothesis	β	SE	T	P	Results
SHISKW->ISRES->ISFP	-0.002	0.078	0.031	0.448	Failed to Reject

NB: β=Beta Coefficient, SE=Standard Error, T-Value=T statistics, P-Value=Probability Value *0.000, Relationships are significant at P<0.001, SHISKW= Shared information system knowledge, ISFP= Information system function performance, ISRES=Information system Resources

From the results of Table 6 above, the interaction between SHISKW * ISRES is negative and statistically insignificant (β = - 0.002, t-value 0.031 and p-value 0.488). Therefore, the study failed to reject the Null hypothesis (**$H0_n$**) that IS resources have no significant moderating effect on the relationship between shared IS knowledge and IS function performance. This shows there could be other factors that moderate the relationship.

7. Discussion of Findings

Moderation occurs when the relationship between two variables depends on a third variable (moderator). The moderating variable specifies the conditions under which a predictor variable relates to an outcome. Moderation implies an interaction effect, where introducing a moderating variable changes the direction or magnitude of the relationship between the dependent and independent variables. The moderation effect could be enhanced, where the moderator would increase the effect of the predictor variable on the outcome-dependent variable. It could also buffer up, where increasing the moderator would decrease the impact of the predictor on the outcome and vice versa. Therefore, moderation is where the relationship between an independent variable and a dependent variable changes according to the value of a moderator variable (Dawson, 2014). Several ways, such as theoretical grounding and detailed literature review, discussion with experts and key informants, literature review, and meta-analysis (Frazier, et al., 2004), are used to identify a moderation variable. In this study, theoretical grounding and literature review were used, where resource-based theory (RBV), an influential theory in information systems, was reviewed. RBV, proposes that the resources possessed by the organization

are the primary determinants of its performance and contribute to a sustainable competitive advantage of the firm (Ranjan & Read, 2016). Resources are the existing stocks that are possessed or controlled by the organization and include physical and intangible assets like knowledge, experience, and culture, rooted in organizations (Anggraeni, 2014).

According to Broadbent (2005), IS resources in organizations can be classified as human, technological, and relationship resources. The theory postulates that organizations possess resources that are heterogeneous and are used to plan, select, and implement organizational strategies, which are likely to be different, and the strategies contribute to and explain why there are differences in organizational performance, suggesting that organizational performance is related to its resources. Entrenched in management strategy literature, the theory suggests that organizations compete at the heart of "unique" valuable, rare, difficult to imitate, and non-substitutable corporate resources (Lertwongsatien & Ravichandran, 2014). The study adopted a two-stage approach as recommended when both the independent variable (X) and the moderator (M) are formatively modeled (Henseler et al., 2009). The latent construct scores were first calculated and saved, building the interaction term Z (X*M) as the element-wise product of the construct scores of X (Shared IS knowledge and M (IS resources). This interaction term together with the latent variable scores of X and M were thus used as independent variables in a multiple regression on the latent variable scores of Y (Information system function performance) (Fassott et al., 2016, p. 1891).

As advocated by the RBV theory, the results showed that ISRES (Moderator) has a positive and significant effect on (Y) IS function performance, supporting proponents of RBV and dynamic capability theories. The results revealed that the path coefficient (0.820), t-statistic at (13.904**),** and p-value (0.000), which support Bharadwaj (2000), that there is a positive relationship between IS resources and organizational performance. This shows that IS resources have a moderating effect on IS function performance. Further, the findings also showed that shared IS knowledge has a positive and insignificant effect on IS function performance (**β** = 0.025, t-value 0.336, and p-value 0.369). The findings showed the value of R^2 as 0.689, signifying that 68.9% variance can be explained. However, the findings showed that the effect size of ISRES on IS function performance is large (**β** =0.820) while shared IS knowledge showed a moderate effect size (0.025). The bootstrapping procedure was used to confirm the significance of the effects, which showed the effect size (ISRES*SHISKW) on IS function performance is very low (-0.002), signifying that it has a very low moderation effect on IS function performance. The study proposed that increasing IS shared knowledge (predictor) of IS executives and the TMT could result in a better IS understanding, appreciation of IS value, frequent interactions between the strategic teams, better support of IS projects, allocation resources as well as a positive IS culture change resulting to improved IS function performance. The findings did not support Hambrick (2005) and Veiga (2006), who found that team efforts often yield direct positive effects on performance. Further, the upper echelon theory argues that the multiplicity of skills in TMT brings improved information understanding and decision-making, eventually increasing team performance and organizational performance. This opens an opportunity for further research.

From the study findings, challenges in IS shared understanding between the university strategic teams, limited time to share information between TMT and ISE, limited CEOs engagements with IS executives, inadequate training to bring synergy between institutional management, and lack of understanding of business processes could have contributed to inefficient use of IS resources and low exploitation of resources. Further non-supportive cultures and inadequate communication mechanisms reported in the findings may contribute to reducing IS function performance, and universities must look for ways to address such challenges.

8. Conclusions

Understanding the role of moderating variables is important for managers and academicians. Researchers, academicians, and practitioners can see and explain beyond what is happening between the two variables, why it is happening or why not happening, and devise ways to address the changes, and also where to lay more emphasis. Such an understanding may provide insights to researchers and policy makers to make changes and to strengthen the relationship between the independent and the dependent variables. Further, it could provide an opportunity for researchers, decision makers to challenge prior research findings and provide new evidence that may need further investigation.

The findings of the study provide useful information about IS resources, the importance of shared IS knowledge, and how they affect IS function performance. The contributions further underscore why TMT and IS executives need to work together to improve information systems' functional performance. Also, these findings may be useful for information technology or systems managers and industry practitioners in appreciating practices that bring positive contributions to their information systems performance. The research findings can also provide

valuable insights to IS and management literature. Scholars can gain an understanding of how shared IS knowledge can contribute to how organizations can benefit from shared interactions and valuable use of IS resources.

The study had limitations. One, the study only utilized a small sample, as only a few university strategic leaders in universities were involved. Many leaders could have provided a better representative sample. Two, the researcher had a short time to collect and analyze the data. Third, the communication culture existing in universities hindered the sharing of information, resulting in low responses. Finally, future empirical work can be carried out to find out and evaluate what other factors could work with IS resources to moderate the relationship between shared IS knowledge and IS function to bring enhanced IS function performance in organizations.

AI statement: The authors declare that this research work did not use any generative artificial intelligence tools.

Ethical Statement: All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the University of Nairobi, Approval No. KNH-UON ERC P178/03/2022 and the National Commission for Science, Technology & Innovation, License No: NACOSTI/P/21/14920.

References

Ababneh, H.T. and Shrafat, F.D., 2014. Analyzing the role of culture in IS studies. International Business Research, 7(11), p.165.

Abong'o Everlyn Beatrice, D.P. and Ojera, D.I.O., Determining Strategy Orientation Adopted by Public Universities in Western Kenya.

Ågerfalk, P.J., 2013. Embracing Diversity through Mixed Methods Research. European Journal of Information Systems, 22(3), pp.251-256.

Alalfy, H.R., 2014. Strategic Leadership and Its Application in Egyptian Universities. Journal of Education and Learning (EduLearn), 8(4), pp.317-326.

Alavi, M., Marakas, G.M. and Yoo, Y., 2002. A Comparative Study of Distributed Learning Environments on Learning Outcomes. Information Systems Research, 13(4), pp.404-415.

Albertin, A.L., Yoshikuni, A.C., and 2018. Effects of Strategic Information Systems on Competitive Strategy and Performance. International Journal of Productivity and Performance Management, 67(9), pp.2018-2045.

Amit, R., and Schoemaker, P. J., 1993. Strategic Assets and Organizational Rent. Strategic Management Journal, pp. 33-46.

Ambrosini, V., Bowman, C. and Collier, N., 2009. Dynamic Capabilities: An Exploration of how Firms Renew their Resource base. British Journal of Management, 20, pp.S9-S24.

Anggraeni, E., 2014. The Impact of Internal and External Resources, and Strategic Actions in Business Networks on Firm Performance in the Software Industry.

Barney, J., 1991. Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), pp.99-120.

Barua, A., Brooks, L., Gillon, K., Hodgkinson, R., Kohli, R., Worthington, S. and Zukis, B., 2010. Creating, Capturing and Measuring Value from IT Investments: could we do better?. Communications of the Association for Information Systems, 27(1), p.2.

Benaroch, M., 2002. Managing Information Technology Investment Risk: A real options perspective. Journal of Management Information Systems, 19(2), pp.43-84.

Beynon-Davies, P., 2021. Business Analysis and Design: Understanding Innovation in Organization. Springer Nature.

Bhatt, G. D., 2009. The Role of Dynamic Organizational Capabilities in Creating, Renewing, and Leveraging Information Systems Competencies.

Broadbent, R., and Kitzis, E., 2005. The New CIO Leader. Harvard Business School.

Brynjolfsson, E. H., 1997. "Breaking Boundaries,". Information Week, Special Issue, Pg. 34-36.

Cameron, K.S. and Whetten, D.A., 1983. Some Conclusions about Organizational Effectiveness. In Organizational Effectiveness (pp. 261-277). Academic Press.

Carpenter, M.A., Geletkanycz, M.A. and Sanders, W.G., 2004. Upper Echelons Research Revisited: Antecedents, Elements and Consequences of Top Management Team Composition. Journal of Management, 30(6), Pp.749-778.

Caruth, G.D., 2013. Demystifying Mixed Methods Research Design: A Review of the Literature. Online Submission, 3(2), pp.112-122.

Castro, I. and Roldán, J.L., 2013. A Mediation Model between Dimensions of Social Capital. International Business Review, 22(6), pp.1034-1050.

Claridge, T., 2018. Criticisms of social capital theory: and lessons for improving practice. Social Capital Research, 4(2), pp.1-13.

Chin, W.W., Marcolin, B.L. and Newsted, P.R., 2003. A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. Information Systems Research, 14(2), pp.189-217.

Christian Nitzl, Carrión, Gabriel Cepeda, and José L. Roldán. "Mediation analysis in partial least squares structural equation modeling: Guidelines and empirical examples." Partial least squares path modeling: Basic concepts, methodological issues and applications (2017): 173-195.

Chang, J.C.J. and King, W.R., 2005. Measuring the performance of information systems: A functional scorecard. Journal of Management Information Systems, 22(1), pp.85-115.

Chatterjee, D., Richardson, V.J. and Zmud, R.W., 2001. Examining the Shareholder Wealth Effects of Announcements of Newly Created CIO Positions. MIS Quarterly, pp.43-70.

Chircu, A.M. and Kauffman, R.J., 2000. Limits to value in electronic commerce-related IT investments. Journal of Management Information Systems, 17(2), pp.59-80.

Claridge, T., 2018. Criticisms of social capital theory: and lessons for improving practice. Social capital research, 4(2), pp.1-8.

Collins, C.J. and Smith, K.G., 2006. Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. Academy of Management Journal, 49(3), pp.544-560.

Dawson, J. F., 2014. Moderation in Management Research: What, Why, When, and How.. J*ournal of Business and Psychology,* 29(1), pp. 1-19.

Doherty, N.F. and Terry, M., 2009. The role of IS capabilities in delivering sustainable improvements to competitive positioning. The Journal of Strategic Information Systems, 18(2), pp.100-116.

El Gizawi, N., 2014. The Dynamic Capabilities Theory: assessment and evaluation as a contributing theory for supply chain management (Bachelor's thesis, University of Twente).

El-Masri, Alshare, K.A., M. and Lane, P.L., 2015. The determinants of student effort at learning ERP: A cultural perspective.

El Shafeey, T. and Trott, P., 2014. Resource-based competition: three schools of thought and thirteen criticisms. European Business Review, 26(2), pp.122-148.

Fang Ding, D. L., 2014. Investigating the effects of IS strategic leadership on organizational benefits from the perspective of CIO strategic roles. Information and Management, pp 865-879.

Feeny, D. F., and Earl, M. J., 1994. Is your CIO adding value? Sloan Manage, 35(3), pp 11–20.

Farrell, A. M., 2010. Insufficient discriminant validity: A comment on Bove, Pervan, Beatty, and Shiu (2009). *Journal of Business Research,* 63(3), pp. Pg. 324-327.

Gable, G., 2010. Strategic information systems research: An archival analysis. The Journal of Strategic Information Systems, 19(1), pp.3-16.

Gallén, T., 2009. Top management team composition and views of viable strategies. Team Performance Management: An International Journal, 15(7/8), pp.326-342.

Galvin, P., Rice, J. and Liao, T.S., 2014. Applying a Darwinian model to the dynamic capabilities view: Insights and issues1. Journal of Management & Organization, 20(2), pp.250-263.

Gupta, G., Tan, and Phang, C., 2018. Resource-based view of information systems: Sustainable and transient competitive advantage perspectives. Australasian Journal of Information Systems.

Gianpaolo, C., Abatecola, G., and Cristofaro, M., 2018. Hambrick and Mason's "Upper Echelons Theory": evolution and open avenues. Journal of Management History, 26(1), pp.116-136.

Henseler, J., Ringle, C.M. and Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based on structural equation modeling. Journal of the Academy of Marketing Science, 43, pp.115-135.

Holmbeck, G.N., 1997. Of mediators and moderators: examples from the Child-Clinical and Pediatric Psychology Literature.

Hu, Q., Yayla, A.A. and Lei, Y., 2014, January. Does the inclusion of CIO in the top management team impact firm performance? Evidence from a long-term event analysis. In 2014 47th Hawaii International Conference on System Sciences (pp. 4346-4355).

Jiang, J.J., Klein, G. and Carr, C.L., 2002. Measuring information system service quality: SERVQUAL from the other side. MIS Quarterly, pp.145-166.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A., 2007. Toward a definition of mixed methods research. Journal of Mixed Methods Research, 1(2), pp.112-133.

Jude, O., Waiganjo, I.N., Tarzoor, T., Iyawa, G. and Ujakpa, M., 2022, May. Determinants of Information Systems Resources for Business Organizations' Competitive Advantage: A Resource-Based View Approach. In 2022 IST-Africa Conference (IST-Africa) (pp. 1-8). IEEE.

Kamariotou, M. and Kitsios, F., 2019, July. Strategic planning and information systems success: Evaluation in Greek SMEs. In 2019 IEEE 21st Conference on Business Informatics (CBI) (Vol. 1, pp. 204-211). IEEE.

Kande, N., 2017. The Role of Strategic Management Practices on Growth of Private Universities in Kenya. The International Journal of Business and Management, Pg. 17-28.

Karahanna and Richard, W., 2006. Information Systems Leadership. IEEE Transactions on Engineering Management, pp.170-176.

Karahanna, E. and Preston, D.S., 2013. The Effect of Social Capital on the Relationship between the CIO and Top Management Team on Firm Performance. Journal of Management Information Systems, 30(1), pp.15-56.

Keen, P.G., 1991. Shaping the future: Business design through information technology. Harvard Business School Press.

Kezar, A.J. and Holcombe, E.M., 2017. Shared leadership in higher education. Washington, DC: American Council on Education, pp.1-36.

Lagsten, J., 2011. Evaluating information systems according to stakeholders: A pragmatic perspective and method. Electronic Journal of Information Systems Evaluation, 14(1), pp73-88.

Liulliyah, L. and Subriadi, A.P., 2020. Performance measurement of academic information systems using performance prism and ISO/IEC 25010. The Winners, 21(2), pp.75-83.
López-Muñoz, J.F. and Escribá-Esteve, A., 2017. An upper echelons perspective on information technology business value. European Research on Management and Business Economics, 23(3), pp.173-181.
Luftman, J., Papp, R. and Brier, T., 1999. Enablers and inhibitors of business-IT alignment. Communications of theAssociation for Information Systems, 1(1), p.11.
Lu, Y. and K.(Ram) Ramamurthy, 2011. Understanding the link between information technology capability and organizational agility: An empirical examination. MIS Quarterly, pp.931-954.
Mabert, V.A., Soni, A. and Venkataramanan, M.A., 2003. Enterprise resource planning: Managing the implementation process. European Journal of Operational Research, 146(2), pp.302-314.
Mehdi, A., M., 2016. What is strategic leadership? Developing a framework for future research. The Leadership Quarterly, pp. 1- 22.
Minh, H., T., 2020. Social capital and firm performance: A study on manufacturing and services firms in Vietnam. Management Science Letters, pp-2571–2582.
Mojca, A., A., 2011. Achieving top management support with business knowledge and the role of IT/IS personnel. International Journal of Information Management, pp.428– 436.
Naranjo-Gil, D., 2009. Management information systems and strategic performances: The role of top team composition. International Journal of Information Management, 29(2), pp.104-110.
Nelson, K.M. and Cooprider, J.G., 1996. The contribution of shared knowledge to IS group performance. MIS Quarterly, pp.409-432.
Niederman, F., Brancheau, J.C. and Wetherbe, J.C., 1991. Information systems management issues for the 1990s. MIS Quarterly, pp.475-500.
Nielsen, S., 2010. Top management team internationalization and firm performance: The mediating role of foreign market entry. Management International Review, 50, pp.185-206.
Norris, S.E., 2017. Strategic Leadership in Higher Education: Embracing Challenge, Change, and Paradox. In Encyclopedia of Strategic Leadership and Management (pp. 1546-1555). IGI Global.
Oppong, S., 2014. Upper echelons theory revisited: The need for a change from causal description to causal explanation. Management: Journal of Contemporary Management Issues, 19(2), pp.169-183.
Paré, G., Guillemette, M.G. and Raymond, L., 2020. IT centrality, IT management model, and contribution of the IT function to organizational performance: A study in Canadian hospitals. Information & Management, 57(3), pp.103198.
Piccoli, G. and Ives, B., 2005. IT-dependent strategic initiatives and sustained competitive advantage: a review and synthesis of the literature. MIS Quarterly, pp.747-776
Quttainah, M.A., 2015. Upper echelon theory: Role of community and strategy. Expert Journal of Business and Management, 3(2), pp.171-181.
Rainey, D.L., 2010. Enterprise-wide strategic management: achieving sustainable success through leadership, strategies, and value creation. Cambridge University Press.
Rajesri, U., 2008. Measuring the Performance of Information System Function. Journal of Information Systems, pp.1-10.
Rodríguez-Entrena, M., Schuberth, F. and Gelhard, C., 2018. Assessing statistical differences between parameter estimates in Partial Least Squares path modeling. Quality & Quantity, 52, pp.57-69.
Ryan, S.D. and Harrison, D.A., 2000. Considering social subsystem costs and benefits in information technology investment decisions: a view from the field on anticipated payoffs. Journal of Management Information Systems, 16(4), pp.11-40.
Ravichandran, T., Lertwongsatien, C. and Lertwongsatien, C., 2005. Effect of information systems resources and capabilities on firm performance: A resource-based perspective. Journal of Management Information Systems, 21(4), pp.237-276.
Sarstedt, M. and Cheah, J.H., 2019. Partial Least Squares Structural Equation Modeling Using SmartPLS: A Software Review.
Seddon, P.B., Graeser, V. and Willcocks, L., 2000. Measuring sistem infstrauundpormasi Effectiveness: Senior IT Management Perspectives,–Research Paper. Oxford Institute of Information Management.
Sethi, V. and King, W.R., 1994. Development of measures to assess the extent to which an information technology application provides a competitive advantage. Management Science, 40(12), pp.1601-1627.
Shmueli, G. and Koppius, O.R., 2011. Predictive analytics in information systems research. MIS quarterly, pp.553-572.
Soares, L., Steele, P. and Wayt, L., 2016. Evolving higher education business models: Leading with data to deliver results. American Council on Education.
Stair, R., and Reynolds, G., 2006. Fundamentals of information systems (3rd ed.). Boston: Thomson Course Technology.pp 6
Stogdill, R.M., 1974. Handbook of leadership: A survey of theory and research.
Tallon, P.P. and Pinsonneault, A., 2011. Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model. MIS Quarterly, pp.463-486.
Tallon, P.P., Kraemer, K.L. and Gurbaxani, V., 2000. Executives' perceptions of the business value of information technology: a process-oriented approach. Journal of Management Information Systems, 16(4), pp.145-173.
Tan, F.B. and Gallupe, R.B., 2006. Aligning business and information systems thinking: A cognitive approach. IEEE transactions on Engineering Management, 53(2), pp.223-237.
Uhl-Bien, M., Marion, R. and McKelvey, B., 2007. Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era. The Leadership Quarterly, 18(4), pp.298-318.
Varghese, N.V., 2004. Private higher education in Africa. International Institute

Venkatesh, V., Brown, S.A. and Bala, H., 2013. Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. MIS Quarterly, pp.21-54.

Venkatraman, N. and Raghunathan, T.S., 1986. Strategic management of the information systems function: changing roles and planning linkages.

Wallin, D.L. ed., 2010. Leadership in an era of change: New directions for community colleges (Vol. 208). John Wiley & Sons.

Walsh, N., and Sarandy, S. D., 2023. The Practice of Collaborative Leadership: Across Health Care Services. The Kings Fund, Pg. 1-45.

Wamba, S.F., Gunasekaran, A., Akter, S., Ren, S.J.F., Dubey, R. and Childe, S.J., 2017. Big data analytics and firm performance: Effects of Dynamic Capabilities. Journal of Business Research, 70, pp.356-365.

Weill, P. and Ross, J.W., 2005. A matrixed approach to designing IT governance. MIT Sloan Management Review.

Winter, S.G., 1987. Knowledge and competence as strategic assets. DJ Teece, ed. The Competitive Challenge: Strategies for Industrial Innovation and Renewal. Cambridge, MA: Ballinger, pp.1-13.

Worthen, B., 2007. Business Technology: The IT Factor: Tech Staff's Bigger Role; Increased Input Helps Products Debut Faster, Deals Become Successful. Wall Street Journal.

Yang, J., Leung, N.K. and Young, B., 2020. The relationship between strategic information systems planning (SISP) and facilitators to achieve successful business outcomes in South Korean organizations. Electronic Journal of Information Systems Evaluation, 23(1), pp. 126- 149.

Yukl, G., 2002. Leadership in Organizations (5th ed., Vol. XIX). Upper Sanddle River: Prentice-Hall.

Zeleza, P., T., 2021. Higher Education in a Post-COVID-19 World: Challenges and Opportunities for African Universities. Retrieved from United States International University Africa: https://www.usiu.ac.ke/2154/higher-education-in-post-covid-19-world-challenges-opportunities-for-african-universities/

Zott, C., 2003. Dynamic capabilities and the emergence of Intra-industry differential firm performance: Insights from a simulation study. Strategic Management Journal, 24(2), pp.97-125.