

Impact of IT Resources on IT Capabilities in Sudanese Insurance and Banking Sectors

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Abstract—The previous studies that applied the Resource Based View (RBV), to examine the impact of IT resource on IT (Information Technology) competencies, often show different results. This study intends to investigate the impact of IT resources (core communication technology, group collaboration enterprise competences “inter-organization system usage”) on IT capabilities (infrastructure, empowerment and functional capabilities) trying to discuss some empirical limitation of testing RBV such as able to disentangle the effects from a variety of sources, and how IT resources complement with other IT resources. Data were collected from 83 IT employees involved in Sudanese banking and insurance sector. A questionnaire was used to collect data. Reliability and factor analysis was conducted to ensure goodness of the data; regression analysis conducted to test the relationships between variables. The findings of this study do disentangle the effects on IT capabilities from a variety of sources. Moreover, it shows how IT resource complements each other in order to generate the outcome of capability.

Keywords—IT resource, IT capabilities; RBV; process level; banking sector; insurance sector; Sudan

I. INTRODUCTION

Decades of globalization have witnessed worldwide competition, which leads to a rapid consolidation of systems-Integrator firms and their supply chains [1]. Accordingly, IT is being an important resource that can facilitate growth and development in both the developed and developing economies [2]. Thus, many firms try to sustain their competitive advantage, which can be built through developing competitive strategies that based on IT.

However, the relationship between resources and capabilities (including both IT resources and capabilities) are considered key elements in electing a business strategy which necessary for achieving a sustainable competitive advantage [3]. Moreover, the mechanisms through which the resources and capabilities are configured and deployed can be a source of competitive advantage [4]. Many attempts have been made to understand resource and capabilities using RBV but, so many things remain unclear such as the microstructures of organizational capabilities and how they are established and developed. Moreover, the techniques of identifying, assessing, and developing resource and capability are underdeveloped [3].

Thus, there is a need of typologies that would classify resources/capabilities in order to recognize their contribution to the performance or sustainability of competitive advantage.

Besides, make an explanation of how RBV sustains competitive advantage or performance through a clear difference between the capacity building mechanisms (capabilities at different levels), acquiring and possessing mechanism (which includes both resources and capabilities) versus the processes of deploying that capacity [5]. Other limitations of RBV are concerning the mechanism through IT resource and capability is the RBV does not give clarification of how IT resource complements each other in order to generate capability [6].

RBV also suffers from some empirical limitations when used to distinguish the impact of IT resource on IT capabilities such as RBV fail to discriminate the impacts of various resource/capabilities in order to isolate the source of advantage [7, 8]. Thus, the results will not be verified [9].

Many studies were conducted to evaluate the effects of information systems on the organization’s performance in the Sudanese context. These studies do not pay enough attention to the mechanism through which IT resources affect IT capabilities [10, 11]. Accordingly, there is little known about the mechanism through which IT resources affect IT capabilities in Sudan as one of the developing countries. This paper attempts to fill the gap in the knowledge about the relationship between IT resources and capabilities based on RBV. The focus is in the relationships among IT usage of information systems, and some inter-organizations, system usage (such as enterprise computing technology and group collaboration technology) and the value creating from those resources in terms of their capability performance at the process level. The objective is to enable the managers to decide which specific constructs of the core IT resources should be taken into consideration in order to improve their current inter-organizational systems or to build a better future inter organization system that can improve the performance of the firm at the process level. Moreover, improve some implication of RBV.

Accordingly, this paper is organized as follows, the first section discusses some problems of RBV concerning capabilities and resources, and various classifications of resources and capabilities and their advantages and disadvantages aiming to select the suitable classifications to test the mechanism through which IT resource influence IT capabilities. The second section detailed the proposed research model based on RBV, which link the IT resources and IT

capabilities, which narrowly define of of IT resource and capabilities, thus enable to distinguish the impacts of each IT resources on IT capabilities. accordingly, make it easier for the decision maker to evaluate the effects of IT in the course of business functionality, and easier for a designer to grip the actual need of the organization. Moreover, enable to overcome the empirical limitation of testing RBV “ to disentangle the effects from a variety of sources, and how IT resources complement with other IT resources” The fourth section explain research methodology, while the fifth section presents the data analysis and the results obtained. The last section discussed the findings of the research, including theoretical and managerial implications and actions of research.

II. IT RESOURCE AND CAPABILITIES

A. RBV and IT resources and capabilities:

The central premise of RBV addresses the fundamental question of why firms differ in their performance and how they can achieve and sustain competitive advantage [12]. RBV theory has been applied to analyze the impact of information technology on business performance. This theory considered IT as of organizational resource that can enhance organizational capabilities and eventually lead to higher performance. This happens when IT capabilities/resource complement other constructs (including other resources or capabilities) that is a change in the level of one resource is offset by a change in the level of another resource [13].

However, there are some criticisms for RBV concerning resource and capability, for example the typologies of resources and capabilities are classified differently by different writers [14]. Moreover, some researchers do not distinguish between the concept of capability and the concept of resource [12]. Furthermore, the outcome of complement IT resources with organizational resources, is not shown in the present conceptualization of the RBV [6].

Many challenges in empirically testing the RBV constructs are also observed, for example, the RBV is unlikely to be able to disentangle the effects from a variety of sources such as industry, environment, and strategy [8]. Thus, they recommend using a detailed, field-based comparison of the selected firms to uncover sources of advantage. Ray, Barney, and Muhanna [15] highlight the problem that occurs when the validity of the RBV is tested by researching the effect of certain firm resources on overall firm performance. As firm performance is a highly aggregated variable, they suggest that research should instead be carried out on the effect of certain resources on business processes. However, Foss [16] views that the RBV needs not to restrict its domain of application to the firm and he recommends to add some more fine-grained analysis by directing attention to the resources that underlie barriers to mobility and entry. Thus, could help to understand how resources contribute to performance and how resources influence competitive dynamics.

Many researchers are investigating how IT resources relate to IT capabilities and performance. Some papers focus on the direct relationship between resources and performance; many recent papers also investigate the mediating of organizational capabilities between resources and performance [17]. Other

researchers examine the need for effective deployment of appropriate IT assets to create business value, through the intermediate stage such as better business competencies and processes, this in turn, affect firm performance [18]. Accordingly, the contribution of IT to firm performance, which is investigated by using RBV gives inconclusive findings. To highlight this problem a Meta analysis is conducted to investigate the results of previous research that based on RBV. The results suggest that mediation of organizational capabilities can better explain the relationship between organizational resources and firm performance than the direct relationship without organizational capabilities [17]. To sum up, the RBV has helped to improve the understanding of the usefulness of information technology and the importance of IT resources. However, the mechanism path leading IT resources to yield organizational benefits remains a “black box,” [19]. Some of the problems of this black box are concerned with IT resource and capabilities, therefore, the following section highlights the classifications of IT resources and capabilities and problems concerning them.

B. IT resources:

IT resources can be defined in term of assets (tangible or intangible) for examples information systems hardware, software and network infrastructure [20]. The organization consists of different level accordingly there is a need for different specialties, and different kinds of system usage (resource) on the organization; thereby there is impossible to satisfy those information needs through one system [21]. For example IT resources are classified into the following: The classification which is related specifically to organization level [21, 22]; the classification which focus on organizational activities [21, 23]; the classification of systems that are used in the whole organization [24]; the classifications according to the nature of interdependencies that exist in the different project's [25]; and The classification that related to some IT capabilities [26].

Understanding information system usage classification (resources) helps in visualizing the potential applicability of different approaches for applying IT and recognized strengths and weaknesses of approaches. IT resources classifications are overlapped, such as denoting some IT applications used in a specific functional area classification, and then used in management level classification. Thus, sometimes difficult to understand what someone else means by using the categories related terms [27]. Despite of that, this overlapping indicates that information systems provide information for a variety of managerial levels and business functions [23].

C. IT capabilities:

IT capabilities are referred to as a skill, for examples, technical, managerial skill and the ability that transform inputs to outputs [20]. There are different classifications of IT capabilities, the most important classifications are according to: the use in the value chain [3, 28]; the IT operational focus (internally or externally) [29, 30, 31]; their contributions to competitive advantage [32]; depending on the tangibility of organizational resources [33], and IT resources classifications [23].

IT capability classifications have some limitations such as the terminology used by authors which is widely varied. Moreover, the classifications are sometimes overlapping due to the objectives and perspectives of the authors. The overlaps in the classification of capabilities lead to none correspond of operational definition and conceptual definition, because it does not capture the essence of the multidimensional nature of the capability [34].

III. MODEL SPECIFICATION AND HYPOTHESES

The model is based on RBV as it can provide a valuable way to evaluate the strategic value of information systems resources. It also provides guidance to differentiate among various types of information system usage, including the important distinction between resources and capability. Furthermore, the theory can facilitate cross-functional research [13].

The model shown in figure 1 is unlike other previous framework that explores relationship between IT resources and IT capabilities which is narrowly defined to fit into a particular context. Such definition has the advantage over abstract, which may inappropriately combine distinct resources under a single label, thereby weakening the true relationship validity [13].

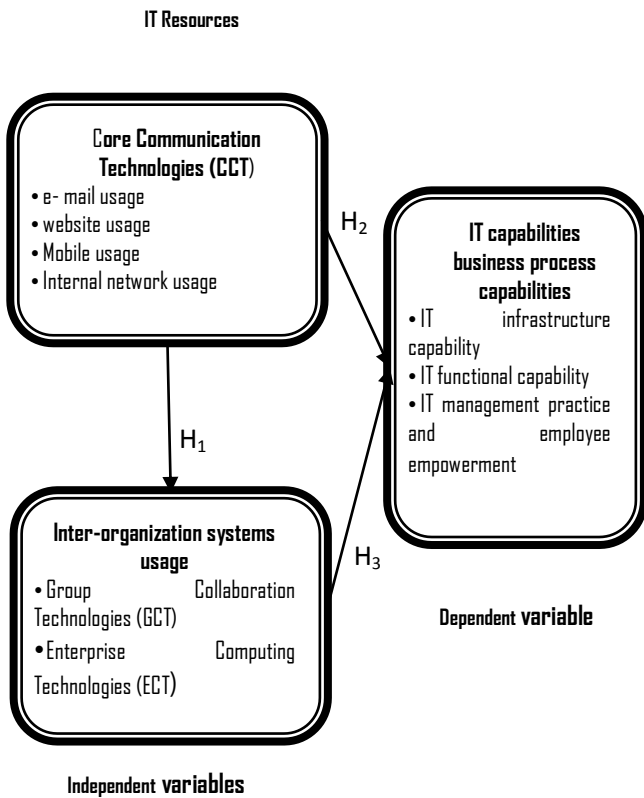


Fig. 1. The role of its resources on it capabilities framework

The main components of the framework are: IT resources which represent the independent factors; the capabilities of IT which represent the dependent variables. IT resources to construct is chosen through adapting Bardhan et al. [25] classification which depends on the nature of interdependencies that exist in different projects. IT according

to Bardhan et al. [25] is classified into core communications technology, group collaboration technology and enterprise computing technology. These classifications make it easier for the designer to decide what resource is needed in order to generate some capability.

Enterprise computing technology and grouped collaboration technology are termed as inter-organizational systems and put as separate IT construct. The objective is to enable the managers to decide which specific constructs of the core IT resources should be taken into consideration in order to improve their current inter-organizational systems or to build a better future inter-organizational systems that can improve the performance of the firm at the process level. Moreover, the separation of constructing into inter-organizational systems and core communication technology can describe details fine grain classifications of IT resources and capabilities to disentangle the effects on performance from a variety of sources. Moreover, it shows how IT resources complement each other in order to generate the outcome of capability. Thus, the research model discusses some limitations of RBV.

IT capability classifications are chosen through adapting Tallon and Kraemer [35] classification of IT business value capabilities at the process level and IT infrastructure flexibility and Iansiti and Sarnoff [28] classification across the value chain. These classifications are chosen because they are closely aligned with traditional business operations processes and IT systems, accordingly the decision maker find it easier to manage the intrinsic complexity of their businesses [28]. The combinations of the classifications of resources and capabilities that had chosen to make it easier for the designer to grip the actual need of the organization, as the decision maker can easily evaluate the effects of IT in the course of business functionality.

A. IT core resources and inter-organization system resource:

The Enterprise resource planning ERP software vendor generally certifies which hardware (and hardware configurations) must be used to run the ERP system. Accordingly, the availability of IT core resources in the organization can influence the usage of enterprise computing technology [36, 37]. Therefore, hypothesis, one can be stated as:

H_1 : core communication technologies usage has a positive impact on inter-organizational systems.

B. IT core resources and IT capabilities

Previous literature indicates organizational resources are the source of a firm's capabilities. Capabilities are often developed in specific functional areas or in a part of a functional area. Some scholars indicate to the direct relation between IT resources and IT capabilities such as Ravichandran and Lertwongsatit [38]. Hypothesis two can be stated as:

H_2 : core IT usage has a positive relation with IT capabilities.

C. Inter-organization system usage and IT capabilities:

ERP applications can create the capabilities of cooperation and communications with external partners accordingly it supports strategic flexibility [39, 40, 41, 42]. Moreover, McCredie and Updegrave [43] indicate that new application of

enterprise computing technology requires a great deal of regulations to meet performance expectations for user such as IT infrastructure can provide the level of performance users expect from a modern enterprise application. Moreover, customer relationship system usage can generate marketing capability to the organization [44, 45]. Hypothesis three can be stated as:

H₃: inter-organization system usage can effects on IT business process capability.

IV. METHODOLOGY

A. Measurement

This study is cross-section, descriptive, quantitative-correlation-explanatory study. All Variables are measured through questionnaires. Some questionnaire items were adapted from existing studies. The items are then modified to reflect the applicability within Sudanese context. Table 1 provides a summary of the variables utilized and supporting literature. All the items in the questionnaire are rated on a five-point Likert scale. The IT capabilities items are designed in a manner which has the ability to measure the impacts of IT on efficiency; effectiveness and competitiveness thereby enable to measure the impact of IT resources on IT capability performance at the process level.

TABLE I. SUMMARY OF THE VARIABLES UTILIZED AND SUPPORTING LITERATURE

Dimension	Description	Support reference
IT resources		
Core communication	Includes: e- mail usage, internal network usage, website usage and mobile communication technology.	Eraqi [46]; Bruque. et al [47]; Andam [48]; Merisavo [49]; Boadi and Shank [50]; Arunthari [51]
Enterprise computing technology	Institutionalize sequential interactions between work units and support structured sequential interactions between the users which enable them to access and exchange data in a structured format.	Bardhan, et al. [25]
Group collaboration technologies	Collaboration among individuals engaged in a common task using electronic technology.	Bardhan, et al. [25]
IT capabilities		
IT infrastructure capability	Includes: Connectivity and modularity of software, Compatibility integration capabilities) and adaptability (IT human skill).	Tallon and Kraemer [35]; Tallon [52]
IT management practice and employee empowerment	Includes: IT strategic capability, IT planning, IT coordination capability.	Zhang [40]; Tallon [52]; Kearns and Lederer [53]
IT functional capabilities	Includes: IT production capability, customer relationship and service enhancement capabilities, marketing management capabilities, supplier's partnership/collaboration, IT financial capabilities.	Zhang [40]; Kearns and Lederer [53]; Tallon and Kraemer [35]; Tallon [52]

B. Sampling

The population of this study is banking and insurance institutions that have worked for more than five years, because these institutions have the ability to evaluate their IT resources and capabilities more than the others. Moreover, it is one of the largest and oldest sectors and a successful company may pay attention to the benefits of information systems [54]. The whole population has chosen as a sample for this research. The unit of analysis is IT senior staff member who can evaluate the effects of IT on performance. A single respondent is used in each business unit, because only one or two members of the top management team had a complete picture in each department. A total number of 83 questionnaires are distributed to 84% of the total targeted institutions. The sample has the following characteristics: (1)77.7 % of the banking sector; (b) the average age of the respondents is 36.5 years; (c) 83.4% male more than 92% are graduated or postgraduate.

V. RESULTS

A. Factor analysis

The factor analysis in this paper is conducted in order to identify the underlying dimensions of IT resources and capabilities and also to determine if the dimensions could be summarized into smaller sets of factors, thereby allowing the formation and refinement of the theory. Besides, providing construct validity evidence of self-reporting scales.

Although the three types of IT resources constructs (core communication technology, group collaboration, and enterprise computing technology) are treated as one construct in some previous study such as Bardhan, et al. [25], in this study it is treated as a separate construct in order to add some more fine-grained analysis to the understanding firm level IT resources. In addition, it helps to test constructing convergence with maximally similar sets of variable as well as to avoid violating recommended minimal sample size to parameter estimate ratios suggested by Kerlinger and Lee [55].

Table 2 shows the results of factor analysis which is performed on 10 items of core communication technology statements. Four-factor solution was obtained which satisfactorily met the requirements (the items have factor loading greater than 0.65). Therefore only three factors will explain IT resources which can be explained as follows: The first factor includes only items of e-mail usage and website usage. The second factor consists of the items of mobile usage. The third factors consist of two factors from internal network usage. Accordingly, core communication technology is divided into three components the first one is labelled as internet usage, which includes both website usage and e-mail usage. The second components are the mobile usage, and the third one is an internal network usage. Cronbach's Alpha for the first component is 0.847, and for component to 0.611 and component three 0.593.

TABLE II. FACTOR ANALYSIS OF CORE COMMUNICATION TECHNOLOGY

Items	Factor loading		
	1	2	3
The use of e-mail for facilitating the delivery of services is high.	0.76		
The use of e-mail for receiving client complaints and inquiries is high.	0.773		
The use of e-mail for facilitating the business office such as call for meetings, inquiries, file transfer, etc. is high.	0.809		
Web site usage			
The use of website for facilitating the selling and buying process is high.	0.794		
Mobile usage			
The use of mobile for facilitating receiving client complaints and inquiries is high.		0.651	
The use of mobiles for facilitating sending periodic reports to clients such as balance sheet reports are high.		0.734	
The uses of mobiles for facilitating the business office works such as call for meetings, inquiries, etc. is high.		0.758	
Internal network			
The use of internal network interconnects the computers and the building of the institution is high.			0.853
The use of internal network interconnects the computers and the institution branches are high.			0.826
Eigenvalues	3.490	1.485	1.386
Percentage of Variance Explain	31.726	13.502	12.601

The result of factor analysis for group collaboration technology enterprise computing technology is shown in the table 3 suggested that all assumptions for factor analysis have been met. Cronbach's Alpha for group collaboration technology is 0.633 and for enterprise computing technology is 0.788.

TABLE III. FACTOR ANALYSIS OF GROUP COLLABORATION TECHNOLOGY AND ENTERPRISE COMPUTING TECHNOLOGY

Items	Factor loading
Group collaboration	
The use of Instant Messaging Software is high.	0.857
The use of Video-Conferencing Technologies is high.	0.857
Eigenvalues	1.468
Percentage of Variance Explain	73.393
Enterprise computing technology	
The use of Enterprise Application Software is high.	0.761
The use of Knowledge Management is high.	0.857
The use of Customer Relationship Management Software is high.	0.826
The use of Document management applications is high.	0.679
Eigenvalues	2.456
Percentage of Variance Explain	61.407

Factor analysis was done for three types of IT capability separately to test for constructing convergence with maximally similar sets of variable as well as to avoid violating recommended minimal sample size to parameter estimate ratios suggested by Kerlinger and Lee [55]. Table 4 shows the results of factor analysis of seven items of IT infrastructure capability. The results reveal that only five items explain IT infrastructure

capability. Cronbach's Alpha for IT infrastructure capability is 0.770.

TABLE IV. FACTOR ANALYSIS OF IT INFRASTRUCTURE CAPABILITY

Items	Factor loading
Our systems are sufficiently flexible to link with external parties.	0.816
Institution databases are accessed through many different protocols.	0.683
Legacy systems within our institution do not hamper the development of new IT applications	0.734
Software applications can be easily transported and used across multiple platforms.	0.673
Our IT personnel have the ability to understand the priorities and objectives of the organization	0.653
Eigenvalues	3.028
Percentage of Variance Explain	43.6

The factor analysis of eight items from IT management practice and employee empowerment is conducted as shown in table 5, the result of analysis suggested that only two factors will explain IT resources which can be explained as follows: The first factor includes two items of strategic planning capabilities and one item from strategic capabilities and website usage, all of which indicate improvement in performance, accordingly, it termed as improvement capabilities. The second factor consists of two items of strategic capability which it termed as IT strategic capability. Cronbach's Alpha for the first component is $\alpha = 0.657$ and for the second component is 0.740.

TABLE V. FACTOR ANALYSIS OF IT MANAGEMENT PRACTICE AND EMPLOYEE EMPOWERMENT

Items	Factor loading	
	1	2
IT improves managerial decision-making.	0.692	
IT provides the institutional advantages such as lower costs or product differentiation.	0.791	
IT enhances the effectiveness of our overall performance.	0.660	
IT creates barriers to keep competitors from entering our market.		0.860
IT influences the buyer's decision to switch to service.		0.844
Eigenvalues	3.390	1.342
Percentage of Variance Explain	37.664	52.576

Table 6 shows the results of factor analysis for IT functional capabilities. The results suggest that three-factor solution and only two factors will explain IT functional capability. Factor three which contain one item is deleted as recommended by Hinkin [56]. The first factor includes some items of IT production capability, financial capability. Thus, the first component is labelled as IT internal functionality. The second factor consists of some items of IT customer relationship and service enhancement capabilities, IT marketing capability. Thereby, this factor is termed as IT external functionality. Cronbach's Alpha for the first component is 0.887 and for the second component 0.850.

TABLE VI. FACTOR ANALYSIS OF IT FUNCTIONAL CAPABILITIES

Items	Factor loading		
	1	2	3
IT helps your institution to prepare different special financial reports.	0.918		
IT reduces the required time to prepare financial reports.	0.835		
IT helps reduce the costs of preparing financial reports.	0.799		
IT improves the quality of service.	0.712		
IT increases the number of clients who can be served per employee.	0.670		
IT enables sales people to increase sales per client.		0.904	
IT improves accuracy of sales forecasts.		0.889	
IT helps track market response to advertising campaigns.		0.723	
IT improves the institution's capability to reach clients at different geographic locations.		0.665	
IT helps track market response to pricing strategies.		0.662	
IT helps the institution get better services from their suppliers \partnership.		0.662	
IT enhances the capabilities of the institution to respond to the needs of different clients differently.		0.652	
IT allows economies of scale for the service.			0.687
Eigenvalues	6.657	2.238	1.115
Percentage of Variance Explain	44.378	14.922	7.432

Note that Cronbach's Alpha score of all dimensions is above or approaching 0.60, consequently we're able to meet Nunnally's [57] guideline that modest reliability in the range of 0.50 to 0.60 will suffice for exploratory research.

B. B. Hypotheses Testing:

Regression analysis is conducted in order to test the hypotheses state above. Hypothesis, one indicates to the relationship among core communications technology and group collaboration technology and enterprise computing technology. The result of regression analysis is shown in the table below.

TABLE VII. THE RELATIONSHIP BETWEEN IT CORE COMMUNICATIONS AND INTER- ORGANIZATIONAL SYSTEMS

Independent variables	Dependent variables	
	Group collaboration technology	Enterprise computing technology
	Beta	Beta
Internet usage	0.512***	0.511***
Mobile usage	0.121	0.184*
Internal network usage	0.215**	0.122
f value	17.629***	17.501***
r ²	0.401	0.399
Adjusted r ²	0.378	0.376
f change	17.629***	17.501***

Note: significant: *p<0.10, **p<0.05, ***p<0.01

Table 7 shows the results of regression analysis of core communication technology and enterprise computing technology indicate that the model that was significant (f=

17.501, p<0.01). Moreover, there is a positive relationship between internet usage and enterprise computing (β= 0.511, p<0.01), and positive relation between mobile usage and enterprise computing technology (β= 0.184, p<0.1). The results also reveal that, group collaboration technology has significant correlations with internet usage (β=0.512, p<0.01). Moreover, the internal network usage shows significant correlation with group collaboration technology (β=0.215, p<0.05).

Hypothesis two indicates the relationship between inter-organization resources and IT capabilities. Table 8 shows the results of the regression analysis of the relationship between inter-organizational resource and IT capabilities. The results of the analysis suggest that enterprise computing technology has significant correlations with IT infrastructure capability (β=0.331, p<0.05). Moreover, group collaboration technology has only significant relationship with IT external functionality (β= 0.360, p<0.01). In addition to that, enterprise computing technology has significant correlation with the IT external functionality (β=0.314, p<0.01).

TABLE VIII. THE RELATIONSHIP AMONG INTER- ORGANIZATIONAL SYSTEMS USAGE, IT INFRASTRUCTURE AND IT FUNCTIONAL CAPABILITIES

Independent variables	Dependent variables				
	IT infrastructure capability	IT functional capability		IT management practice and employee empowerment	
	IT infrastructure capability	IT external functionality	IT internal functionality	IT performance capability	IT strategic capability
	Beta	Beta	Beta	Beta	Beta
Group collaboration technology	0.102	0.360***	0.052	-0.042	0.164
Enterprise computing technology	0.331**	0.314***	.291**	0.432**	0.185
f value	7.875***	24.255***	4.799**	7.865***	4.484*
r ²	0.164	0.377	0.107	0.164	0.101
Adjusted r ²	0.144	0.362	0.085	0.143	0.078
f change	7.875***	24.255***	4.799**	7.865***	4.484*

Note: significant: *p<0.10, **p<0.05, ***p<0.01

The result also in table 8 shows that group collaboration technology has no significant correlation with IT internal functionality, while enterprise computing technology has significant correlation with IT internal functionality (β=0.291, p<0.05). Also, the result reveals that group collaboration technology has no significant correlation with IT performance capability, while enterprise computing technology shows significant relation with IT performance capability (β=0.432, p<0.05).

Hypothesis three indicates the relationship between core communications and other IT capabilities. Table 9 shows the results of regression analysis of core communications technology and IT capabilities. The internet usage (β=0.253, p<0.05) and internal net usage (β=0.204, p<0.1) have significant correlation with IT internal functionality, while mobile usage has no relation with IT internal functionality. Also, internet usage (β=0.353 p<0.01), mobile usage (β=0.239, p<0.05), and internal network (β=0.176, p<0.1) has a significant correlation with IT external functionality. The results also, reveal that mobile (β=0.478, p<0.01) usage has a

significant correlation with IT infrastructure capability, while internet usage and internal network usage have no significant correlation with IT infrastructure capability.

TABLE IX. THE RELATIONSHIP BETWEEN CORE COMMUNICATIONS AND OTHER IT CAPABILITIES

Independent variables	Dependent variables				
	IT functional capability		IT infrastructure capability	IT management practice and employee empowerment	
	IT internal functionality	IT external functionality	IT infrastructure	IT performance capability	IT strategic capability
	Beta	Beta	Beta	Beta	Beta
Internet usage	0.253**	0.353***	0.095	0.256*	0.167
Mobile usage	0.131	0.239**	0.478***	0.185*	0.178
Internal network usage	0.204*	0.176*	0.171	0.141	0.160
f value	5.218***	11.183***	12.367***	5.330**	3.56*
r ²	0.134	0.298	0.320	0.168	0.119
Adjusted r ²	0.165	0.271	0.294	0.137	0.086
f change	5.218***	11.183***	12.367***	5.330**	3.560*

Note: significant: *p<0.10, **p<0.05, ***p<0.01

The results also, reveals that internal network usage ($\beta=0.256$, $p<0.1$) and mobile usage ($\beta=0.185$, $p<0.1$) have significant correlation with IT performance capability, while internal network usage has no significant correlation with IT performance capability. Figure 10 shows that the three core communication technology has no significant correlation with IT strategic capability.

VI. DISCUSSION AND CONCLUSION

This paper used the RBV to examine the mechanisms through which IT resources affect IT capabilities, by using a detailed model, which enable to disentangle the effect of IT resource on IT capabilities at the process level, which is one of empirical limitations of testing RBV. This can provide a valuable way to evaluate the strategic value of information systems resources. Thus, enabling both decision maker and IT designer to evaluate the effects of IT in the course of business functionality

The results of study indicate that some cores of communication technology do affect enter-organization systems, such as internet usage, which affects both group collaboration technology and enterprise computing technology. Moreover, mobile usage affects enterprise computing technology and internal network usage affects group collaboration technology. This converges with Al-Mashari, [36] who indicates that IT core resource availability in the organization can influence the usage of enterprise computing technology.

The results of the study also indicate that some core communication technology affects IT capabilities such as the internet affects IT internal and external functionality, IT infrastructure capability and IT performance capability. Moreover, mobile technology affects IT external functionality, IT infrastructure capability and IT performance capability. This may be due to the fact that using mobile in financial services required high network connectivity and modularity of software capability [58]. Besides internal network usage affects both IT

external and internal functionality. This may be due to the fact that information plays a role in building superior market capability because it is needed in satisfying latent needs, which exist and are satisfied [59] and the internal network can facilitate this process.

The results also partially support hypotheses three because inter organizational system usage affects some IT capabilities. For example group collaboration technology affects IT external functionality. While enterprise computing technology affects all IT capabilities except IT strategic capability.

It is worth mentioning that IT resources do not affect IT strategic capability. The result does not confirm with Laudon and Laudon [60] who indicates that networking facilitates strategic capabilities of information systems. This may be due to the fact “Sudan in the stage of capacity-building phases that may create change” as described by the NCT report [61]. However, to build such capability in modern application of strategic information system it needs to be based on internet connectivity with supplier and customer [62].

A. Theoretical and managerial implication:

The research framework provides a comprehensive snapshot of IT studies on organizational performance at the process level.

The research model defines the relationship between IT resources and IT capabilities which is narrowly defined to fit into a particular context. Such definition has the advantage of avoiding the more actionable managerial implications of the general RBV based framework, such as the narrow definitions helps to fine-tune the understanding of “resource specificity” and its impact on performance in a given setting [63].

The study bridges the existing gaps between theory and practice by overcoming some limitations of previous studies: for example the use of a single major IT capability or IT usage to explain the mechanism through which IT resources affects IT capabilities. Moreover, try to avoid some limitation of testing RBV as the findings of this study do disentangle the effects on IT capabilities from a variety of sources. Moreover, shows how IT resource complements each other in order to generate the outcome of capability.

Furthermore, the use of regression analysis enables testing a combination of resources and capabilities. These tests according to Barney [64] ‘gaining and preserving superiority in competitive markets depends on the set of core resources and capabilities that a firm has developed, acquired, and deployed in the competition arena’.

The study also, offers a detailed framework for measuring the level of IT usage and IT capabilities that support business functions and infrastructure, as well as IT management. This can be useful for both the internal assessment and for the evaluation of IT service providers. In addition to that, the study also offers a tool for the Sudanese decision makers in insurances and banking to evaluate IT capabilities in order to enable them prioritize among their companies’ gaps in IT capability compared to competitors. Thus, they can create a strategic plan that generates a greater return on IT investment.

B. Limitation:

This research suffers from the following limitations: The findings are difficult to generalize to new contexts due to using resources with particular forms of capabilities that are overly narrow and potential implication might become lengthy for practical research use [63].

The second limitation of this study is that it takes a static cross-sectional picture of the capabilities and business value which makes it difficult to address the issue of how capabilities are created over a run of several years [65].

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