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MANAGEMENT OF INFORMATION TECHNOLOGY FOR COMPETITIVE ADVANTAGE: A SAVVY CASE STUDY

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ABSTRACT
This paper investigates the linkages between information and communication technology and firm performance. The findings show that information and communication technologies alone cannot produce sustainable advantages, but that firms must organize and manage information and communication technologies in such a way as to leverage the complementary human and business resources. The results also suggest that adopting information technology has positive effects on innovative practices, which increases the competitive advantage of firms.

INTRODUCTION
Due to the emergence and widespread use of information and communication technologies (ICTs), organizations have faced many challenges that have led to several changes in their business practices in recent times, particularly in the last two decades. In this time period, organizations have invested large amount of time and money to the adoption of ICTs. This study therefore seeks to discuss how such investments in information technology can help an organization achieve a competitive advantage. The resource based view (RBV) is an appropriate framework to guide this research due to its focus on resources and capabilities and also because of its emphasis on sustainability of competitive advantage. The RBV argues that a firm's source of competitive advantage lies with the resources and capabilities it owns and controls and the unique way in which a firm bundles them together (Barney, 1991).

The notion of differential benefits accruing from ICT investments has generated lots of controversy. Recently, even more controversy, has been created by the assertions of Carr (2003). He argues that ICT is pervasive, increasingly inexpensive, and accessible to all firms. As such, it cannot provide differential advantage to anyone, because it is scarcity (not pervasiveness) that creates the ability to generate supernormal rents. He notes that ICT is following the pattern of railroads and telegraphs, where, as a mainly replicable, standardized infrastructural technology, its benefits are accessible to all and cannot create competitive advantage.

The implication of this position is dangerous, because it suggests that companies should reduce their ICT investment and innovation, which in turn could have profound implications for ICT governance. By not distinguishing between undifferentiated ICT assets like the infrastructure, and the ability to manage these assets, Carr (2003) comes to the conclusion that firms cannot gain competitive advantage and should therefore assume a defensive and utilitarian posture with respect to ICT.

Recently, some researchers (Bhatt & Grover, 2005; Chen & Tsou, 2007) have framed the discussion in terms of ICT capabilities, and argue that managing ICT is a capability that can create uniqueness and provide organizations a competitive advantage. This research concurs with this

view and uses it to systematically frame a model of ICT capabilities and competitive advantage. The research objective is therefore simple: to study how management of ICT can create competitive advantage for a firm. In other words, this paper attempts to find ways that information technology can be used to create competitive advantage for a firm.

THE VALUE OF INFORMATION TECHNOLOGY

A resource is valuable if it helps firm implement strategies that reduce costs or increase sales turn-over (Barney, 1991). In dividing capabilities, it is important to distinguish between those that have value and those that can be a source of competitive advantage. The first condition (value) is necessary for the second (competitive advantage) to occur. There has been significant research on ICT value—with numerous studies examining and finding a relationship between ICT investments and business performance. ICT infrastructure has been described as an important organizational capability that can be an effective source of value. In today's environment, a quality ICT infrastructure can provide firms with the ability to share information across different platforms innovate and exploit business opportunities, and the flexibility to respond to changes in business strategy. However, the existence of open architectures and standardized enterprise packages suggest that this capability might not be heterogeneously distributed across firms—or, even if it is, that access to infrastructure is not restrictive. Therefore, ICT infrastructure is argued to be valuable but not a source of competitive advantage.

There is an emerging stream of research which recognizes that ICTs have limited value when used in isolation. As such, value is significantly enhanced when resources are combined with other organizational resources and capabilities (Mata et al., 1995; Powell & Dent-Micallef, 1997).

As said earlier, a resource is valuable if it helps firm implement strategies that reduce costs or increase sales turn-over (Barney, 1991). Furthermore, researches have shown that ICTs have limited value when used in isolation. Let's examine the case at CHAMS Plc by analyzing the tables below;

Table 1: Showing relationship between ICT, cost structure, revenue and other resources at CHAMS Plc.

Do your technologies help to reduce cost structure and increase revenue?		
	Frequency	Percentage (%)
No	0	0
May be	0	0
Definitely	7	100
Has the presence of ICT influenced the effectiveness of other firm resources?		
No	0	0
May be	3	42.85
Certainly	4	57.14

Source: [Field survey, 2010]

According to Powell & Dent-Micallef (1997), value is enhanced when resources are combined with other organizational resources and capabilities, thus, it is clear that the information technology resources of CHAMS city have a significantly high value since it is not being used in isolation. Majority of the managers are certain that ICT leverages other organizational resources. Also, the information technology at CHAMS Plc has helped to

reduce cost structures and increase revenues as seen in Table 1 above.

ICT, STRATEGY AND INNOVATION

There is a large body of theories on ICT and strategy, but not such a large one on ICT and sustained competitive advantage. A fundamental assumption among ICT and RBV researchers is that ICT only produces sustained competitive advantage when it supports or is embedded with other valuable or unique firm resources. (Mata et al., 1995; Powell & Dent-Micallef, 1997). A number of studies have shown that aligning information technology and business strategies is critical for successful information technology adoption and positively associated with effective organizational performance. This process is known as strategic alignment. Strategic alignment suggests that the effect of information technology on performance will depend on how well the information technology strategy and corporate strategy coincide. According to Chen & Tsou (2007), companies can be successful in aligning their information technology and business strategies by balancing internal and external factors as well as business and information technology domains.

Contemporary firms are making significant investments in information technology to align business strategies, enable innovative functional operations and provide extended enterprise networks. Firms implement information technology to enhance and/or enlarge the scope of their products and services. As many innovation activities involve adding new services, expanding existing ones and/or improving the service delivery process, the success of an organization hinges on how well it implements its service innovation to create new markets. Therefore, good innovation practices help enhance a firm's competitive advantage. At CHAMS Plc, innovative practices are the order of the day. These can be further proved from the data analysis below. The data shows the effect of information technology on CHAMS Plc's innovation practices.

Table 2: Data showing the effect of information technology on innovation practices at CHAMS Plc.

Does information technology enable the firm to enter new markets and provide significant service quality?

	Frequency	Percentage (%)
No	0	0
May be	0	0
Definitely	7	100

Source: [Field survey, 2010]

As shown in Table 2, it is obvious that the innovative practices of CHAMS Plc have enabled the company to enter new markets**.** Also, the company's affinity for innovation has helped it to improve its service delivery processes thereby providing significant service quality.

THE MANAGEMENT DIFFERENCE

The ability to achieve effective organizational performance rests on management's difference. Technical skills are not the only skills required to build and use ICT applications. A second broad set of skills are managerial skills. In the case of ICT, managerial skills include management's ability to conceive of, develop, and exploit ICT applications to support and enhance other business functions. According to Mata et al., (1995), examples of important ICT management skills include: (1) the ability of ICT managers to understand and appreciate the business needs of other

functional managers, suppliers, and customers; (2) the ability to work with these functional managers, suppliers, and customers to develop appropriate ICT applications; (3) the ability to coordinate ICT activities in ways that support other functional managers, suppliers, and customers; and (4) the ability to anticipate the future ICT needs of functional managers, suppliers, and customers. Managerial ICT skills enable firms to manage the market risks associated with investing in ICT. Firms can acquire technical ICT skills by hiring programmers and analysts. They then use their managerial ICT skills to help programmers and analysts fit into an organization's culture, understand its policies and procedures, and learn to work with other business functional areas on ICT-related projects.

That these managerial skills are valuable is almost self-evident. Without them, the full potential of ICT for a firm will almost certainly not be realized. The development and use of many of these managerial skills depends on close interpersonal relationships between ICT managers and those working in the ICT function, between ICT managers and managers in other business functions, and between ICT managers and customers. Thus, the development of these skills is often a social complex process. Therefore, echoing the view of Mata et al. (1995), one can say that if managerial ICT skills are valuable and heterogeneously distributed across firms, then they usually will be a source of sustained competitive advantage, since these relationships are developed over time; and they are socially complex and thus not subject to low-cost imitation. Below is a table that displays responses from managers at CHAMS Plc.

Table 3: Managers' opinions about management of ICT in CHAMS Plc

Management of ICT, not the ICT itself, is the only consistent source of competitive advantage

	Frequency	Percentages (%)
Strongly disagree	0	0
Disagree	0	0
Unsure	2	28.57
Agree	4	57.14
Strongly agree	1	14.28

Source: [Field survey, 2010]

From the table above, majority of the managers agreed that it is only management of ICT, not the ICT itself, that can produce sustainable competitive advantages for a firm.

RESEARCH FRAMEWORK

Information and communication technology (ICT) adoption has elements including strategic integration of ICT with business resources, information technology competence as well as management capability etc. Innovation is commonly defined as "*the initiation, adoption and implementation of ideas or activity that are new to the adopting organization"*" and entails identifying and using opportunities to create new products, services and work practices. Innovation practices can be categorized into product innovation and process innovation (Chen & Tsou, 2007). Competitive advantage is achieved by fully deploying and using idiosyncratic, valuable and inimitable resources and capabilities (Bhatt & Grover 2005) and can be viewed externally as outcome performance and internally as organizational capabilities. Thus, in this

study, based on the above assertion, competitive advantage is categorized as external and internal. The measure of internal competitive advantage has items including job satisfaction and domain knowledge (Chen & Tsou, 2007). External advantage is measured with three items; how a company uses its resources to reduce cost and increase revenue, provide superior service quality than competitors, and enter new markets. The study developed a framework that parallels the resource based view (RBV) of the firm. The figure below shows the relationship that is assumed to exist between information technology adoption, innovative practices and competitive advantage. The research framework is designed thus;

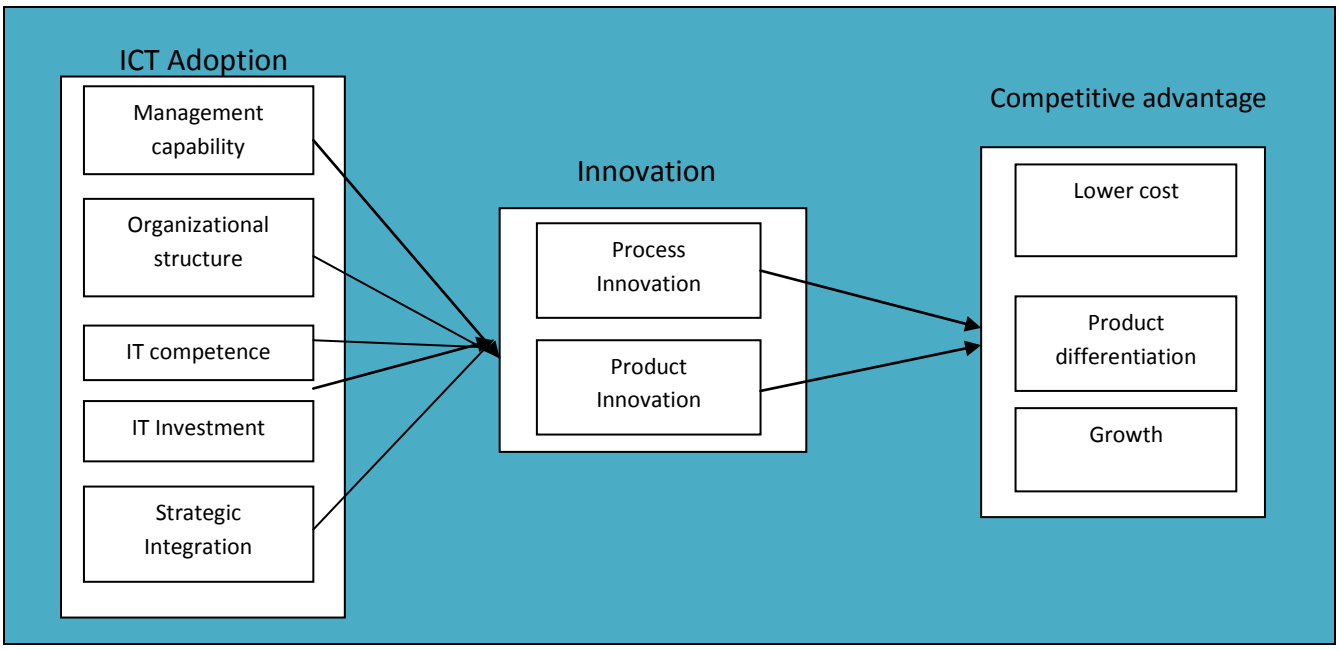

Fig 1.5: Research Framework

DATA ANALYSIS

Data was gathered through questionnaires and interview. Thirty-five (35) questionnaires were distributed at CHAMS Plc Abuja, but despite constant visits to the firm, only nineteen respondents, representing seven (7) managers and twelve (12) non-managers completed the questionnaires. Also, an interview was conducted with a middle manager of the same company, but whose office is at the company's headquarters in Lagos. In other to give the researcher additional insights and exposure to carry out the study, an attempt was made to obtain previously collected data. To this end, data from a study of a New Zealand company, identified by the researchers as ABC, was taken. Below is a table known as phenomena table. The researchers (i.e. Rastrick & Corner, 2010) used the phenomena table (counts of phenomena, concepts, and categories that occurred in the raw data) to turn the qualitative data into a more quantitative form. They extracted the phenomena from the transcript of interviews using the grounded theory analysis method.

Analysis from the data shows that information technology was seen to have facilitated innovation, leadership, collaboration, and good relationship in general. Information technology has also helped the case study to capture and share

knowledge, increase understanding, and increase their overall business processes thereby enhancing success. The phenomena table is displayed in the next page.

Table 4: Phenomena Table

Category	Concept	Phenomena	ICT occurrences +	Business Occurrences ^	Total Occurrences
Strategic Advantage	Group Strategy	Vision/planning	6	1	7
		Alignment	5	4	9
	Divisional Strategy	Vision/Planning	24	2	26
		Awareness	4	0	4
HR advantage	Culture	Pride	6	1	7
		Low turnover	6	4	10
		Engaged	5	2	7
		Open	5	5	10
		Balance	5	9	14
		Passion	4	1	5
		Trust/respect	3	1	4
		Setup for success	3	3	6
		Belief	2	2	4
		Motivated	2	1	3
		Teamwork	1	4	5
		Understanding	1	1	2
		Shared vision	0	4	4
		Supportive/caring	0	1	1
	Staff Development	Aware of needs	1	2	3
		Relationship management	1	0	1
		Continuously develop	0	3	3
		Training	0	1	1
		Talent spotting	0	1	1
		Mentoring/encouragement	4	0	4
	Change Management	Embrace change	7	3	10
IT Advantage	Leadership and vision	Awareness	15	7	22
		Personal traits	9	0	9
		Vision/goals	9	13	22
		Managing resources	7	0	7
	Innovation and continuous development	Process	28	7	35
		Strive for	18	9	27
		Risks	7	0	7
	Relationships	Collaboration	13	0	13
		Good rapport	7	0	7
		Cross functional teams	3	0	3
		Strong internal links	0	1	1

	Shared understanding	Business/ICT work interactivity	3	0	3
		Internal transfer	3	1	4
		Roles and process understanding	2	0	2
	Knowledge management	Longevity of staff	4	0	4
		Capability index	1	0	1
		Knowledge sharing	0	11	11
		Lesson sharing	2	0	2
		Learning from experience	0	6	6
		External partners	5	1	6
	Development astute	Mask complexities	4	0	4
		Agility	3	0	3
		Rapid development	3	0	3
	Implementa-tion advantage	Test processes	1	0	1
		Business awareness	1	0	1
		Review/debrief	16	8	24
		Delivery	12	23	35
		Communication	9	31	40
		Engaged	7	2	9
	Functionality	Specialist knowledge groups	4	0	4
		Alignment	4	7	11
	Perception	Awareness	3	17	20
	Success	User involvement	2	2	4
		Product	8	5	13
		Result of product	7	7	14
		Volume advantage	5	0	5
		ICT and good people	7	0	7
		Ahead	8	1	9
		First mover	1	0	1
		External	22	16	38

Source: Rastrick, K. & Corner, J. (2010). Understanding ICT based advantages: a techno savvy case study.

N.B: ICT occurrences represent the number of phenomena identified from interviews where interviewee was based in an information technology role within ABC while Business occurrences represent interviewees based in a business oriented role within ABC

The findings from both the secondary and primary data provides supporting evidence to the fact that the way in which resources are managed in an organization determines whether or not a company would have a sustained competitive advantage**.** If ICTs per se can only produce temporary advantages, then firms must use ICT to leverage or exploit firm-specific, intangible resources in order to produce sustainable advantages.

SUMMARY

As regards Carr's assertions, it is obvious that ICT management skills are often heterogeneously distributed across firms as against Carr's opinion. And because ICT managerial skills are heterogeneously distributed, it can be said that ICT managerial skills are a likely source of sustained competitive advantage. This parallels the view of Mata et al., (1995) that when considering all the attributes of ICT, only ICT managerial skills are likely to be a source of sustained competitive advantage. Furthermore, proprietary ICT and access to capital can be said to be sources of competitive advantage. But as researchers have shown, it is becoming increasingly difficult to keep information technology proprietary, thus, proprietary ICT is not likely to be a source of sustained competitive advantage. Finally, while technical ICT skills are absolutely essential for a firm to at least gain a competitive parity in ICT, they are by themselves, not likely to be a source of sustained competitive advantage.

This analysis has important implications for both researchers and managers. For researchers, the resource-based view of the firm suggests that the search for ICT-based sources of sustained competitive advantage must focus less on ICT, per se, and more on the process of organizing and managing ICT within a firm. By identifying "management" as the most likely feasible path to a sustainable ICT-based competitive advantage, we suggest that future researches be directed into the processes that develop these advantages.

CONCLUSION

This research suggests that the resource-based view (RBV) provides a powerful framework for assessing Carr's assertions of ICT and competitive advantage. The RBV emphasizes the importance of building unique, inimitable, and heterogeneously distributed capabilities as the source of competitive advantage, Whereas Carr asserts that there is no uniqueness, inimitability, or heterogeneity possible with regard to ICT assets. This paper argues that the ability of ICT to complement other resources and leverage these assets is indeed a strategic differentiator. This can be seen in the way CHAMS Plc and ABC have done. At ABC, while resources were individually valuable, the total value of the resources working together is seen to be more valuable than the sum of the parts.

The result should alert managers to the fact that there are some ICT capabilities, such as ICT infrastructure, that are valuable and can form the platform upon which new applications can be developed and integrated. However, while it is important to invest in quality ICT infrastructure, firms should not neglect other capabilities that are important to create sustainable competitive advantages by concentrating or spending too much on ICT infrastructure alone.

Finally, integrating information technology with overall corporate strategy is not an easy task. It is a function that requires a high managerial capability. This paper argues that the way in which resources are managed in an organization determines to a large extent whether the company would have a sustained competitive advantage or not. Therefore if ICTs cannot by themselves be a source of sustained competitive advantages, then

firms must use ICT to influence the effectiveness of other firm resources in order to produce sustainable advantages.

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