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The Relationship between Dynamic ICT Capabilities and Competitive Advantage of Technical, Vocational and Entrepreneurship Training Institutions in Western Kenya Region

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Abstract

Dynamic capability has been defined as "the capacity of an organization to purposefully create, extend or modify its resource base", Helfat *et al*. (2007). This study sought to establish the relationship between dynamic capabilities and competitive advantage of TVET Institutions in western Kenya Region. Specifically, the study sought to: establish the relationship between Information Communication Technology capabilities and competitive advantage of TVET Institutions in western Kenya region. The study adopted a descriptive survey design. The target population included the principals and heads of sections and/or departments of the TVET Institutions in the western Kenya region that are state owned. A census of all the Principals and head of sections/ departments was conducted. Primary data was collected by structured questionnaires. Secondary data was collected from institutional documents, Ministry of Education publications and relevant publications in referred journals. The collected data was edited, coded and entered into SPSS software for analysis. Data was

analyzed using descriptive and inferential statistics. In particular, Regression Analysis was used to investigate the relationships between hypothesized variables. Analysis of Variance (ANOVA) was also used to investigate whether independent variables had combined effect on the dependent variable. The findings were presented using figures and tables. The study found out that TVET Institutions in the western Kenya region has weak capabilities in ICT and this position work against their struggle to position themselves in the modern industry-institutional dynamics. The study however, established a positive relationship between Dynamic ICT Capabilities and Competitive Advantage of the TVET Institutions in western Kenya region. This study is envisaged to aid in the development of policy documents to grow the TVET sector in Kenya.
Keywords: Dynamic Capabilities; Competitive Advantage; TVET Institutions; ICT Capabilities; Western Kenya Region

1.0 Introduction

Dynamic capabilities have been defined as "the capacity to renew competencies so as to achieve congruence with the changing business environment" by "adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competencies" (Teece *et al*., 1997). More recently, Helfat *et al*. (2007) have defined a dynamic capability as "the capacity of an organization to purposefully create, extend or modify its resource base".

Helfat and Peteraf (2003) emphasise that to qualify as a dynamic capability, a capability not only needs to change the resource base, but it also needs to be embedded in the firm, and ultimately be repeatable. Dynamic capabilities are argued to comprise of four main processes: reconfiguration, leveraging, learning and integration (Bowman and Ambrosini, 2003 based on Teece *et al*., 1997). Reconfiguration refers to the transformation and recombination of assets and resources, such as. the consolidation of manufacturing resources that often occurs as a result of an acquisition. Leveraging refers to the replication of a process or system that is operating in one area of a firm into another area, or extending a resource by deploying it into a new domain, for instance applying an existing brand to a new set of products. As a dynamic capability, learning allows tasks to be performed more effectively and efficiently, often as an outcome of experimentation, and permits reflection on failure and success. Finally, integration refers to the ability of the firm to integrate and coordinate its assets and resources, resulting in the emergence of a new resource base.

Dynamic Capability Perspective (DCP) of ICT and competitive advantage captures the ability to utilise IT to enable firms to adapt faster to changes in the external environment than their competitors, hence, providing them with a Sustained Competitive Advantage (SCA) (Teece et al., 1997).

Competitive advantage is related to the competitive position of an organization within its industry and reflects firms' ability to achieve a performance greater than the average of that industry (Barney, 1991; Porter, 1985a). In the contemporary global environment, the literature about firm performance and competitive advantage becomes increasingly important owing to the compression of time and distance and with managerial attention focusing more on multiple external and internal factors (Thomas *et al.,* 1999).

The role of Technical, Vocational and Entrepreneurship Training (TVET) on human resource development and the consequent growth and prosperity of society is an established fact. This is because TVET furnishes skills required to improve productivity, raise income levels and improve access to employment opportunities for people (Kerre, 2009). Therefore, TVET is a

part of the education system that makes an individual more employable as well as active participant and relevant in the socio-economic system of a country (UNEVOC, 2010). That is why countries are consistently striving to improve their education system in general and their TVET systems in particular (Kerre, 2009).

1.1 Statement of the Problem

The demand for a workforce that is multiskilled and capable of learning new skills more rapidly has changed the traditional purpose of vocational education (Kerre, 2009). The Republic of Kenya (RoK) policy states that the main objective of TVET is "the provision, promotion and co-ordination of lifelong education, training and research for Kenya's sustainable development" (RoK, 2003). Despite such elaborate and sound policies, implementation has been inadequate and often uncoordinated, leading to unrealized objectives (RoK, 2007). A number of constraints continue to prohibit the effective provision of technical and vocational education training in Kenya. Among these are: limited institutional budgets for up-to date equipments; lack of qualified instructors; lack of training equipments compared to the facilities in the workplace, (Farstad, 2002; Nyerere, 2009; Kerre, 2009; UNESCO-UNEVOC, 2010). The status of TVET suggests that there is a need to carry out internal survey on the strategic orientation of these Institutes. This study sought to establish the relationship between Dynamic ICT Capabilities and Competitive Advantage of TVET Institutions in western Kenya Region.

1.2 Objectives of study

1. To determine the ICT Capabilities of TVET Institutions in the western Kenya region.
2. To find out the relationship between ICT Capabilities and competitive advantage of TVET Institutes in the Western Kenya Region.

1.3 Research Hypothesis

H_0: There is no significant relationship between ICT Capabilities and competitive advantage of TVET Institutions in Western Kenya Region.

1.4. Justification of study

Dynamic capabilities have lent value to the RBV arguments as they transform what is essentially a static view into one that can encompass competitive advantage in a dynamic context (Barney, 2001). Dynamic capabilities are "the capacity of an organization to purposefully create, extend or modify its resource base" (Helfat *et al*., 2007) and over the last few years the concept has received much attention in the form of publications (. Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003; Teece *et al*., 1997; Zollo and Winter, 2002) and conference presentations (Academy of Management meeting 2004-2006; Strategic Management conference 2004-2006). However, as highlighted in the *British Journal of Management* Special Call for Papers on "The Practice of Dynamic Capabilities: Theory Development and Research" and by Helfat *et al*. (2007) the concept is still in need of theoretical and empirical development. In this study we aim to develop the notion empirically. Specifically we build on the work of Teece *et al*. (1997), Eisenhardt and Martin (2000) and Helfat *et al*. (2007) concerning what constitutes a dynamic capability in a TVET Institution and propose ICT capability as one.

1.5 Scope of study

The study focused on the relationship between dynamic ICT capabilities and competitive advantage of TVET Institutions in western Kenya region. In order to measure competitive advantage, the study focused on indicators of relevance to the labour market in terms of skills and knowledge; access to training with respect to admission criteria and funding for the

system; and quality in terms of standardization, inclusion of soft skills and quality of delivery. The survey was done in the context of Government owned TVET Institutes established earlier than January 2012 and located in the western Kenya region .This was done between the months of October 2014 and January 2015.

1.6 Limitations of study

First, the measurement scales of several constructs within ICT variables of dynamic capability construct was reduced to increase the level of model fit and this may have limited the accuracy of the measures of these construct.

Finally, data of this study were collected from state owned TVET institutions in western Kenya region. Institutional environments might differ across the country. Hence, the ability to generalise the findings of this study depends on the limitations of comparable environmental backgrounds of western Kenya region. A replication of this study within different institutional environments will help to shed light on the question if the research environments of Dynamic ICT Capability and Competitive Advantage of TVET Institutions differ across Kenya.

2.0 Literature Review

The Dynamic Capability perspective (DCP) on ICT and competitive advantage covers a very broad field. In general, the DCP of ICT and competitive advantage captures the ability to utilise IT to enable firms to adapt faster to changes in the external environment than their competitors, hence, providing them with a SCA (Teece *et al.,* 1997). Despite the fact that most IT researchers have not explicitly drawn from the strategic management literature and thus have not referred to the DCP, some have contributed to an understanding of dynamic capabilities (Fink & Neumann, 2007; Overby *et al.,* 2006; Sambamurthy *et al.,* 2003). The DCP is an enhancement of the Resource Based View (RBV). Hence, the conceptualisation of IT resources, IT capabilities and IT support for core competences is similar in each.

Pavlou and Sawy (2006) found that the influence of IT on competitive advantage was mediated by a specific organisational dynamic capability—resource configurability (coordination competence, absorptive capacity, collective mind and market orientation). All four constructs of resource re-configurability are enhanced by digital options (Pavlou, 2004). Digital options refer to digitised enterprise work processes and knowledge systems which enable a business infrastructure that shapes a company's capacity to launch varied and frequent competitive actions (Sambamurthy et al., 2003). Digital options are exhibited within organisations through digitised process reach, digitised process richness, digitised knowledge reach and digitised knowledge richness. Digitised knowledge reach and range support the sensing of external change, whereas digitised process reach and range can be the foundation for response activities (Overby *et al*., 2006).

Sambamurthy *et al.(*2003) model was conceptual and provided new insights into the value-adding role of IT in terms of enabling a business infrastructure that has the capacity to launch frequent and varied competitive actions, and contributed to our understanding of the interplay of the three dynamic capabilities—digital options, agility and entrepreneurial alertness. Their conceptual work also provided a benchmarking framework to assess the value of IT in three ways. Firstly, firms can assess the value of IT by the quality of the digital options (IT supports for organisational processes and knowledge systems). Secondly, their notion of an agility construct suggests a measurement of the degree of (IT enabled) agility in organisations. Lastly, the frequency and variety of competitive actions can be measured (Sambamurthy *et al.,* 2003). Furthermore, their work contributes to IT research by

highlighting three strategic processes: capability building, entrepreneurial action and co-evolutionary adaptation.

While the literature states that digital options can strengthen firms' ability to deal with change and emphasizes the importance of strategic processes, it does not explicitly address how digital options or IT support for core competence can change in order for the business to keep up with changing requirements. Possessing a broad variety of digital options does enable a broader variety of competitive actions, but digital options have to adapt themselves to changes in the environment to be able to offer innovative competitive action moves. The notion of competitive action moves as a dependent variable gives IT research a good insight into the strategic value of agile IT, but it does not elucidate the effect of IT-enabled organisational agility on competitive advantage.

Research into how IT can support organisational ability to react to environmental change was conceptualised differently by Fink and Neumann (2007). Their concept of IT-enabled organisational agility consists of three constructs: *IT-dependent information agility, IT dependent strategic agility*, and *IT-dependent system agility*. Using Structural Equation Modelling (SEM) techniques Fink and Neumann (2007) were able to assess several alternative models in parallel, and hence further validate their findings. The best fitting and most valid model in their research was the one that revealed the positive effects of IT personnel capabilities on IT infrastructure capabilities as well as the positive impacts of IT infrastructure capabilities on three constructs of IT-dependent organisational agility: IT-dependent information agility, IT-dependent system agility, and IT dependent strategic agility.

Using the capacity of SEM to investigate the relationships among several latent variables, Fink and Neumann (2007) found that the three constructs of IT-dependent organisational agility were related to each other. IT-dependent system agility has positive effects on IT-dependent information agility. The ability to adjust IT quickly and efficiently seems to impose a technical constraint on the quality of the information itself. Furthermore, both IT-dependent system agility and IT-dependent information agility demonstrate a positive effect on IT-dependent strategic agility. This reveals that when changes in the business environment occur, enterprises require the ability to adapt their information systems and their utilisation of information resources in accordance with the new information needs (Fink & Neumann, 2007).

Furthermore, with the exception of a few studies, the DCP on IT and competitive advantage is silent on the subject of the resources, capabilities and competences that are required to enable IT to enhance organisational dynamic capabilities (Piccoli & Ives, 2005). Existing frameworks at the organisational level suggest relationships between capabilities, competences and organisational dynamic capabilities (Wang & Ahmed, 2007). In addition, IT researchers have found relationships between concepts of IT capabilities and one organisational dynamic capability: resource configurability (coordination competence, absorptive capacity, collective mind and market orientation).

3.0 Methodology

A survey was carried out to identify the relationships that exist between dynamic ICT capabilities and competitive advantage of TVET Institutions in western region of Kenya. The target population consisted of the Principals and Heads of sections and/or departments of the TVET Institutions in the Western Region of Kenya, totaling 14 Institutes. The study population was 140, an average of 10 respondents per Institution. The population targeted is responsible for the development, implementation and evaluation of various policies and

strategies within these Institutions. A census of all the principals and head of sections and/or departments from the fourteen TVET Institutes was adopted. Primary and secondary data was collected. Structured questionnaires were used to collect primary data and were administered by face-to-face and telephone interviews. Secondary data came from Institutional Publications, Ministry of Education Publications, and referred journals. Data collected was analyzed by descriptive and inferential statistics. Descriptive statistics was used to summarize the survey data and provide immediate summary statistics for the various objectives. These included measures of central tendency and measures of relationships. In particular, Regression Analysis was used to investigate the relationship(s) that had been hypothesized amongst the variables of study. Analysis of variance (ANOVA) was also used to investigate whether independent variables had combined effect on the dependent variable. Content analysis was also conducted on the data that are of qualitative nature. Results were presented on frequency tables, charts and graphs.

4.0 Findings

Table 4. 1:
ICT Capability-digital option

Statement	SD	D	N	A	SA
Our institution has a high degree of system interconnectivity	5.9%	28.7%	24.8%	33.7%	6.9%
Our system is sufficiently flexible to incorporate electronic links to external parties	5.0%	27.7%	23.8%	38.6%	5.0%
Our organizational data is available to everyone in the institution in real time	7.9%	41.6%	20.8%	25.7%	4.0%
Our user interface provide transparent access to all platforms and applications	5.0%	33.7%	30.7%	27.7%	3.0%
Our institution makes intensive use of middleware to integrate key enterprise applications	9.9%	24.8%	38.6%	23.8%	3.0%
Our legacy systems within the institution incorporates the development of new IT applications	7.9%	21.8%	28.7%	38.6%	3.0%
Our IT functionality can be quickly added to critical applications	7.9%	25.7%	24.8%	38.6%	3.0%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

Results in table 4.1 indicates that majority of respondents 40.6% agreed that their institutions has a high degree of system interconnectivity (34.6% disagreed, 24.8% neutral), 43.6% agreed that their system is sufficiently flexible to incorporate electronic links to external parties, 49.5% disagreed that their organizational data is available to everyone in the institution in real time, 38.7% disagreed that their user interface provide transparent access to all platforms and applications, 38.6% were neutral on whether their institutions make intensive use of middleware to integrate key enterprise applications (34.7% disagreeing and 26.8% agreeing), 41.6% agreed that their legacy systems within the institution incorporates the development of new IT applications, and 41.6% agreeing that their IT functionality can be quickly added to critical applications. The findings gives impetus to the works of Byrd & Turner (2001), that IT

infrastructure supports and enables the fast design, development and implementation of heterogeneous IT applications, as well as the ability to distribute any type of information (data, text, voice, image or video) across the organisation and beyond. IT infrastructure is the building block for enterprise-wide ICT services and applications.

Table 4.2:
ICT capability- digital agility (personnel capability)

Statement	SD	D	N	A	SA
Our institution can easily handle variations in data formats and standards	5.9%	21.8%	28.7%	38.6%	5.0%
Our IT personnel are cross-trained to support other IT services outside their domain	6.9%	12.9%	22.8%	49.5%	7.9%
Our IT personnel are skilled in multiple programming languages	5.0%	9.9%	39.6%	33.7%	11.9%
Our IT personnel are skilled in multiple operating systems	5.9%	11.9%	31.7%	40.6%	9.9%
Our IT personnel are knowledgeable about our IT projects	4.0%	10.9%	27.7%	45.5%	11.9%
Our IT personnel are knowledgeable about the key success factors in our institution	5.9%	10.9%	25.7%	47.5%	9.9%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

The results from table 4.2 indicates that cumulatively the majority of respondents 43.6% agreed that their institutions can easily handle variations in data formats and standards, 57.4% agreed that their IT personnel are cross-trained to support other IT services outside their domain, 45.6% agreed that their IT personnel are skilled in multiple programming languages, 50.6% agreed that their IT personnel are skilled in multiple operating systems, 57.4% agreed that their IT personnel are knowledgeable about out IT projects, 57.4% agreeing that their IT personnel are knowledgeable about the key success factors in their institutions. This finding is in agreement with those of Byrd *et al.* (2004), that the IT skills of the personnel working in the IT department are an intangible capability. On the one hand, highly specialised IT personnel are needed to solve today's complex IT problems, and on the other, IT personnel need general knowledge to cope with changing demands from the business side.

Table 4.3:
ICT capability- digital agility (management capability)

Statement	SD	D	N	A	SA
Our IT management understand the business environments they support	5.9%	13.9%	28.7%	48.5%	3.0%
Our IT management is up to date with the emerging business development	6.9%	17.8%	32.7%	38.6%	4.0%
Our IT management evaluates opportunities and risks from emerging technologies	6.9%	16.8%	43.6%	29.7%	3.0%
Our IT management contributes to our institutional strategy	6.9%	15.8%	23.8%	47.5%	5.9%
Our institution manages IT strategically	5.9%	20.8%	27.7%	42.6%	3.0%
There is a high degree of trust between our IT department and other departments/sections	6.9%	23.8%	25.7%	37.6%	5.9%
Critical information and knowledge that affect IT projects are shared freely between departments and IT department	7.9%	25.7%	29.7%	34.7%	2.0%
Our IT department and other departments understand the working environments of each other	5.9%	22.8%	26.7%	40.6%	4.0%
The goals and plans for IT projects are jointly developed by both the IT department and other departments	10.9%	31.7%	20.8%	32.7%	4.0%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

The cumulative majority respondent's view on ICT Digital Agility-Management capability was summarized in table 4.3. 51.5% of respondents agreed that their ICT management understands the business environment they support, 42.6% agreed that their ICT management is up to date with the emerging business development, 43.6% of respondents were however neutral that their ICT management evaluates opportunities and risks from emerging technologies, 53.4% agreed that their ICT management contributes to their institutional strategy, 45.6% agreed that their institutions manages ICT strategically, 43.5% agreed that there is a high degree of trust between their IT department and other departments/sections, 36.7% agreed that critical information and knowledge that affect ICT projects are shared freely between departments and IT department, 44.6% agreed that their IT department and other departments understand the working environment of each other, and 42.6% of respondents disagreed that the goals and plans for ICT projects are jointly developed by both the IT department and other departments. This position is supported by the earlier works of Hines (2006), that says IT management has to ensure continuous business support from top management in order to enable alignment of business and IT strategies. IT that is managed by the senior management level has a higher chance of receiving ongoing support from management, and thus is better able to implement effective IT support for business processes, products, services and information sharing (Ravichandran & Lertwongsatien 2005).

Table 4.4:
ICT capability- IT support for market and operational competence

Statement	SD	D	N	A	SA
Our IT management is able to interpret industry problems and develop solutions	10.9%	25.7%	26.7%	36.6%	.0%
Our IT is utilized to redefine the scope of our business	7.9%	21.8%	27.7%	41.6%	1.0%
Our IT supports analyzing customer needs (i.e. products/services, preferences, costing and quality)	8.9%	22.8%	21.8%	40.6%	5.9%
Our IT is utilized to produce quality products/services	7.9%	18.8%	24.8%	43.6%	5.0%
Our IT is improving our operational efficiency	7.9%	12.9%	19.8%	48.5%	10.9%
Our IT supports our innovation processes	6.9%	17.8%	26.7%	44.6%	4.0%
Our IT supports our product development	6.9%	13.9%	33.7%	40.6%	5.0%
Our IT supports knowledge-sharing in the institution	6.9%	11.9%	25.7%	48.5%	6.9%
Our IT supports cross-functional integration in the institution	6.9%	14.9%	28.7%	42.6%	6.9%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

The respondents view on ICT capability-competitive action for market and operational competence are summarized in table 4.4. 36.6% of respondents agreed and an equal number disagreed to the position that their IT management is able to interpret industry problems and develop solutions, 42.6% agreed that their ICT is utilized to redefine the scope of their business, 46.5% agreeing that IT supports analyzing customer needs, 48.6% agreed that their IT is utilized to produce quality products/services, 59.4% agreed that their ICT is improving their operational efficiency, 48.6% agreed that their ICT supports their innovation processes, 45.6% agreed that their ICT supports their product development, 55.4% agreed that their ICT supports knowledge sharing in the institution, and 49.5% agreed that their ICT supports cross-functional integration in the institution. This finding lends credence to those of Sambamurthy, Bharadwaj & Groover (2003), that new business environments often require new IT support for core competences, that is, a continual scanning of business environment and the ability to evaluate the impact of changing business environments on firm's IT systems improve IT systems' ability to support and, if necessary, adapt products, services and business processes.

Table 4.5:
ICT capability –Adaptive IT

Statement	SD	D	N	A	SA
Our IT is able to adapt quickly to changes in the market and customer demands	7.9%	23.8%	29.7%	33.7%	5.0%
Our IT is able to adapt quickly to changes in the institution's products or services	7.9%	21.8%	31.7%	36.6%	2.0%
Our IT is able to develop new Institutional products and services	7.9%	20.8%	34.7%	31.7%	5.0%
Our IT is able to adapt quickly to changes which can become necessary because of competition	5.0%	20.8%	32.7%	35.6%	5.9%
Our IT is utilised to increase the speed of responding to institutional opportunities/ threats	6.9%	20.8%	33.7%	35.6%	3.0%
Our IT is able to adapt quickly to changes in business processes and organisational structures	5.9%	21.8%	33.7%	36.6%	2.0%
Our IT is able to adapt quickly to changes in knowledge-sharing in the institution	7.9%	20.8%	27.7%	40.6%	3.0%
Our IT is able to adapt quickly to changes in product development	5.9%	18.8%	38.6%	33.7%	3.0%
Our IT is able to adapt quickly to changes in the cross-functional Integration of our Institution	8.9%	18.8%	33.7%	35.6%	3.0%
Our IT is able to enhance strategic business process flexibility	6.9%	18.8%	35.6%	35.6%	3.0%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

The cumulative majority respondent's view on ICT capability- competitive action for adaptive IT capability are summarized in table 4.5. 38.7% of the respondents agreed that their IT is able to adapt quickly to changes in the market and customer demands, 38.6% agreed that their IT is able to adapt quickly to changes in the institution's products or services, 36.7% agreed that their IT is able to develop new institutional products and services, 41.5% agreed that their IT is able to adapt quickly to changes which can become necessary due to competition, 38.6% agreed that their IT is utilized to increase the speed of responding to institutional opportunities/threats, 38.6% agreed that their IT is able to adapt quickly to changes in business processes and organizational structures, 43.6% agreed that their IT is able to adapt quickly to changes in knowledge sharing in the institution, 38.6% were neutral that their IT is able to adapt quickly to changes in product development, 38.6% agreed that their IT is able to adapt quickly to changes in the cross-functional integration of our institution, and 38.6% agreed that their IT is able to enhance strategic business process flexibility. This is in support of Ravichandran & Lertwongsatien (2005) that firms not only need the static support of IT for their competences, but also the ability to renew and adapt their IT support to march new environmental settings.

Table 4.6:
ICT capability and competitive advantage

Statement	SD	D	N	A	SA
Our IT related innovations have increased the quality of training and quality of our products	5.0%	23.8%	21.8%	45.5%	4.0%
Our IT systems have been seamless and increased access to training	6.9%	24.8%	28.7%	38.6%	1.0%
Our graduates have been widely accepted in the Industries because they posses industry-relevant IT skills.	5.9%	20.8%	31.7%	39.6%	2.0%
Our IT system has led to standardized training acceptable globally	6.9%	17.8%	35.6%	34.7%	5.0%

SD= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree

Results in table 4.6 indicates that 49.5% of respondents were in agreement that their ICT innovations have increased the quality of training and quality of their products, 39.6% agreed that their ICT systems have been seamless and increased access to training, 41.6% agreed that their graduates has been widely accepted in the job market because the poses industry relevant IT skills, 39.7% agreed that their ICT system has led to standardized training acceptable globally. These findings strengthen the arguments of Eisenhardt & Martin (2000) that IT can be a source of competitive advantage by providing firms with the ability to adapt themselves more quickly than their competitors to environmental changes.

Regression Analysis

Objective: To Determine the Relationship between Information Communication Technology Capability and Competitive Advantage of TVET Institutions in the Western Kenya Region

Figure 4.1 shows the distribution of the scatter plot Information Communication Technology Capability on Competitive Advantage. The line of best fit along the scatter plot in figure 4.1 passes through the origin. There is no skewness to either side indicating there is a constant variance. Thus, the line suggested that there was a linear relationship between ICT Capability and Competitive Advantage in the form: $Y = \beta_0 + \beta_2 X_1 + \varepsilon$.

The goodness of fit model presented in table 4.7 involves ICT Capability (X_1) as the only independent variable. The coefficient of determination (R square) of 0.543 indicated that the model explained 54.3% of the variation or change in the dependent variable, with the remainder of 45.7% being explained by other factors other than ICT Capability. Adjustment of the R square did not change the results substantially, having reduced the explanatory behaviour of the predictor to 53.8%%. Table 4.8 presents the regression results of ICT Capability on Competitive Advantage of TVET Institutions in Western Kenya Region. With a constant (p-value = 0.000) of 4.762, the study concluded that even without ICT Capability, the TVET Institutions seemed to display some form of Competitive Advantage. The gradient coefficient of 0.247 indicated the extent to which a unit change in ICT Capability causes a change in CA. In this case, a unit change in ICT Capability leads to 0.247 units of positive change in CA of the TVET Institutions. This means that ICT Capability was significant (p-value

= 0.000) in positively influencing the CA of TVET Institutions in western Kenya region. Therefore, the ICT Capability and Competitive Advantage model can now be presented as follows: $Y = 4.762 + 0.247X_1 + \varepsilon$,

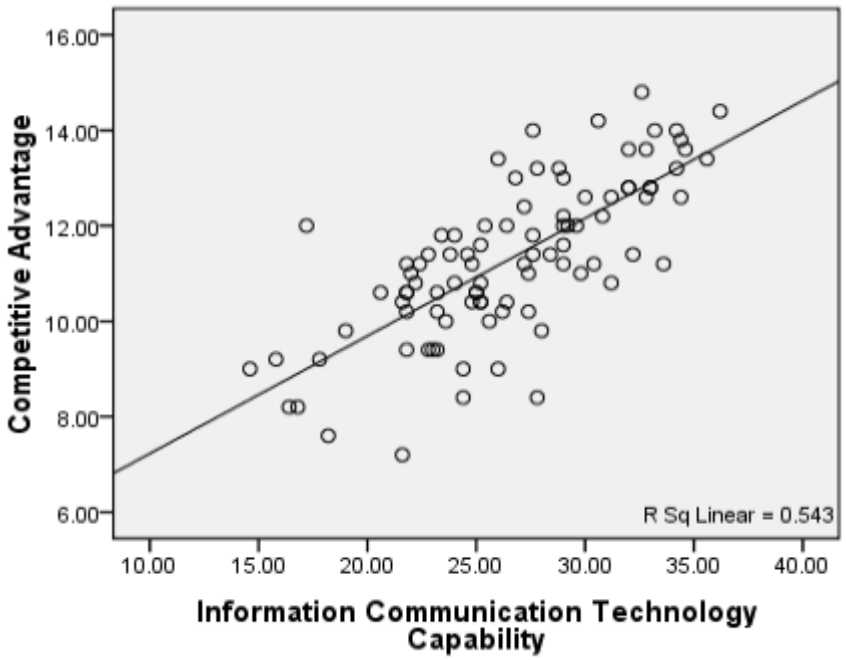

Figure 4. 1: Regression analysis scatter plot for ICTC and CA

Table 4. 7:
Goodness of fit model summary-ICT Capability and CA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1 (Without Moderator)	.737[a]	.543	.538	1.11833
2 (With Moderator)	.730[a]	.533	.527	1.12142

a. Predictors: (Constant), ICTC
b. Predictors: (Constant), x2z

Table 4.8: Coefficients- ICT Capability and CA

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1 (Without Moderator)	(Constant)	4.762	.640		7.439	.000
	ICTC	.247	.024	.737	10.394	.000
1 (With Moderator)	(Constant)	6.774	.463		14.628	.000
	x2z	.014	.001	.730	10.016	.000

a. Dependent Variable: CA

ANOVA Analysis- ICT Capability and Competitive Advantage of TVET Institutions in Western Kenya Region

The Analysis of Variance (ANOVA) of the relationship between ICT Capability and Competitive Advantage of TVET Institutions in Western Kenya Region is presented in table 4.9. The results with a p-value of 0.000 being less than 0.05 indicates that the models are statistically significant in explaining the relationship between ICT Capability and CA of TVET Institutions in western Kenya region. In this regard, we reject the null hypothesis that there is no significant relationship between Information Communication Technology Capability and Competitive Advantage of TVET Institutions in Western Kenya Region. Therefore, we conclude that there is significant positive relationship between ICT Capability and CA of TVET Institutions in Western Kenya Region.

Table 4.9:
ANOVA analysis- ICT Capability and CA

Model		Sum of Squares	df	Mean Square	F	Sig.
1 (Without Moderator)	Regression	135.118	1	135.118	108.037	.000[a]
	Residual	113.810	91	1.251		
	Total	248.927	92			
2 (With Moderator)	Regression	126.153	1	126.153	100.314	.000[a]
	Residual	110.667	88	1.258		
	Total	236.820	89			

a. **Predictors: (Constant), ICTC**
b. **Predictors: (Constant), x2z**
c. **Dependent Variable: CA**

5.0 Discussions

The findings of descriptive statistics showed that majority of the respondents,63.7%, were neutral on whether or not TVET institutions in western Kenya region had IT infrastructure capability; 52% indicated that they agreed there was digital agility in terms of IT personnel capability, 45% indicated there was digital agility in terms of management capability; 48% indicated there was IT support for market and operational competence; while 35% indicated existence of adaptive IT capability. The response agreed with the earlier information gleaned from literature that indicated that poor IT infrastructure coupled with low management capability are barriers to sustainability of a firm's competitive advantage.

The Pearson's product moment correlation statistic was used to test the relationship between ICT capability and competitive advantage of TVET Institutions in western Kenya Region. The R square value showed that 0.543 (54.3%) of TVET's competitive advantage in the western Kenya region was explained by ICT capability. This finding was further corroborated by the results of Analysis of Variance (ANOVA). The value was 0.00 which is less than 0.05. Statistically it means there is a significant relationship between ICT capability and competitive advantage of TVET institutions in western Kenya region. The regression coefficient was further proof that the predictor variable had a significant influence on the dependent variable with a p- value of 0.000, which is less than 0.05, significance level.

6.0 Conclusions

The model for the study explicates the strategic role of ICT in attaining competitive advantage through IT's potential to enhance firms' ability to deal with change. The results of this study indicate that IT can improve market-based performance in relation to institutional mandate. The developed model explains 24.7% of the variance in competitive advantage of the surveyed institutions. This adds to the body of knowledge on the relationship between ICT and competitive advantage.

Secondly, it has synthesised previous fragmented work on various IT-based constructs and competitive advantage from the DCP of strategic management. This study has enhanced the understanding of how IT can contribute to firms' dynamic capabilities through introducing and examining the higher order resource of adaptive IT capability, its impact on competitive advantage.

Finally, this study provides an indication of the extent to which organisations are poised to exploit the value generation potential of IT and, in particular, the adaptive capability of their IT. Practitioners can use the exploratory results of this study to benchmark the status of their own IT capabilities particularly TVET managers.

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