DBA AFRICA MANAGEMENT REVIEW

THE MODERATING EFFECT OF INFORMATION TECHNOLOGY INFRASTRUCTURE ON THE RELATIONSHIP BETWEEN BUSINESS PROCESS RE-ENGINEERING STRATEGY AND PERFORMANCE OF FOOD MANUFACTURING COMPANIES IN KENYA

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Abstract

The main objective of the study was to evaluate the moderating effect of information technology infrastructure on the relationship between business process re-engineering strategy and performance of companies manufacturing food in Kenya. A descriptive cross-sectional survey design was adopted in data collection and analysis. Primary data was collected from respondents using a structured questionnaire, while secondary data was collected from published firm's reports. Out of the 75 respondents targeted by the study, 44 responded forming 56.67% response rate, which was considered adequate for analysis with good representation from all the subsectors. On hypotheses testing, it was established that 64.6% of variations in the overall firm performance are explained by variations in the BPR strategy, information technology infrastructure and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype). The alternate research hypothesis was therefore supported. In conclusion, the study established that information technology infrastructure positively and significantly moderates the relationship between BPR and performance of companies manufacturing food in Kenya.The results therefore support the anchoring resource advantage and resource based theories. This study has contributed in different areas including implications to theory, policy, management practice and methodological contributions. The managers should pay attention to information technology infrastructure in implementing BPR strategy for improved overall firm performance and service delivery. Lastly key methodological contribution is the use of a quantitative composite index in computing the firm performance index, the use an integrated empirical model to test the relation between BPR strategies, IT infrastructure and performance.

Key Words: Business Process Re-Engineering Strategy, Information Technology Infrastructure, Firm Performance, Food Manufacturing Companies and Kenya

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71 |

Introduction

The key benefits of implementing breakthrough initiatives and projects are to transform radically the firm's operations to achieve improvement in cost containment, improve on quality, which will eventually improve service delivery. Subsequently, the redesign of business processes leads to prevention of errors, process upgrades and joint problem solving (Bhatt & Trout, 2005). Over the past decade business process re-engineering (BPR) has emerged as a popular approach used by organizations seeking improvements in their business performance. Organizations redesign their work processes to reflect better the circumstances of modern business. Organizations have failed to achieve the significant cost improvements championed for so long by IT (Gunasekaran et al., 2004). BPR should therefore precede major investments in technology. BPR is management's response to the organizational change that IT has been driving with the introduction of new technology (Stuart & Patrick, 1996).

The common pervasive tools used to transform and achieve competitive advantage include business process redesign and most organizations around the business world are employing business process re-engineering as the most instrumental methodology to drum up growth in profits, enhance service delivery, realize good performance and attain competitiveness (Smith, Meade, Wolf, & Song, 2013).

Business process re-engineering manages expanding efficiency, limit, and gainfulness. Empirically, business process re-engineering strategy empowers firms to enhance their performance and productivity by encouraging firms to limit the time taken to support customers through service delivery (Gunasekaran et al., 2004; Slack et al., 2007). Business process re-engineering strategy therefore empowers organizations to improve their delivery speed. It has been recommended that a clearly cost-diminishing concentration for business process re-engineering is less inclined to succeed (Heizer & Render, 2011; Oberoi, 2016). This study not only assessed the immediate link of business process re-engineering strategy to performance of food manufacturing companies in Kenya but also the impact of information technology infrastructure onto the connection between business process re-engineering strategy and the performance of companies manufacturing food. There are a number of theoretical underpinnings on the relationship between the three study variables but Resource Based View was the most suitable theory to study the constructs of business process re-engineering strategy, information technology infrastructure and performance of a firm in one integrated conceptual model.

Broadbent et al. (1999) contended that IT infrastructure comprises of a portfolio of IT resources of both technical and organizational capabilities to give chances to share IT assets inside and over the organizations (Chang, 2012; Bharadwaj, 2000). In view of these past studies, De Boer, Muller, and Canten (2015) and Ganesh (2000) proposed the accompanying four elements of IT infrastructure: degree of infrastructure adaptability which alludes to the degree to which existing perfect principles and conventions can permit heterogeneous equipment and

72 |

programming to impart and meet present and future business computing needs; extent of interfirm infrastructure which refers to the scope of communication networks beyond an individual organization; extent of intra firm infrastructure which refers to the scope of communication networks within an individual organization: and extent of data integration alludes to the degree to which an organization's units and their particular databases are made available inside and remotely through electronic linkages.

Research Problem

In view of the developments in information technology and data innovation, consumers are exposed to food value chain shocks especially food handling, quality, naming issues, corruption and falsifying causing nourishment items in the market to be reviewed or removed the rack consistently from papers and online sources (Mensah & Julien, 2011). There is a clear need for an extended study on IT infrastructure beyond adoption for some conceptual theory development on its moderating role on the relationship between BPR strategies on performance of companies manufacturing food in Kenya. This requires a radical overhaul of business processes to sustain the increased marginal operations costs while ensuring conformity to local and international standards on food safety and management; such cost increment stifles business benefits (Hanak, Boutrif, & Pineiro, 2000).

There are conflicting results on the role of IT infrastructure on the influence of business process re-engineering strategy on firm performance (McIntosh, 2003; Santos-Vijande et al., 2013) who showed business process re-engineering improves firm

performance. The concept of business process re-engineering strategy in enhancing firm performance isn't sufficiently understood and comprehended as most studies indicate (Oberoi, 2016; Chris, 2018). These two conflicting concepts call for a conceptual model through a study to reconcile them through an investigation to accommodate them (Cooper & Kaplan, 1988; Chang, 2012; Kuwaiti & John, 2000). Thus, need to determine the effect of IT infrastructure on then connection between BPR and firm performance.

Recent developments in e-commerce across all industries have brought up an issue whether the relationship between information technology infrastructure and business process re-engineering still holds after persistent changes in information technology remain unanswered; henceforth needs to investigate the suggestion and proposition that information technology Infrastructure moderates the relationship between business process re-engineering strategy and performance. In spite of some doubt and skepticism about the immediate direct effect of information technology on performance (Carr, 2003), many IS analysts accept the unrivaled proposition that superior information technology infrastructure can render a firm a significant competitive edge over the market competition.

Several studies conducted to test the link between information technology infrastructure and performance research by Bharadwaj (2000), cited by and others provide convincing evidence for the study to establish the relationship between information technology infrastructure and

73 |

firm performance. On contextual gaps, there are numerous issues faced by food manufacturers especially the regulatory requirements, food safety and ingredients. Identified with a 'characteristic item' which is normally inferred although it is constrained with a pool of fixings to use in the new items. To get a reformulated item that appears to be identical and carries similar features takes a lot of work and experimentation (World Bank, 2017). As indicated by several past studies, BPR has turned into a valuable weapon when seeking improvement in firm performance (Forster, 2006; Attong & Metz, 2012; Bryson, Crosby, & Bloomberg, 2014; Fragoso, 2015).

The present study consequently sought to determine the influence of information technology infrastructure on the relationship between business process re-engineering strategy and performance of food processing companies in Kenya. In this way, the accompanying research question guided this investigation: Does information technology infrastructure moderate the relationship between business process re-engineering strategy and performance of companies manufacturing food in Kenya? The objective of the study was to evaluate the moderating effect of information technology infrastructure on the relationship between business process re-engineering strategy and performance of companies manufacturing food in Kenya.

Literature Review And Hypotheses Development

The section reviewed both theoretical and empirical literature relevant to the study. The relation of the study's main variables were then be summarized in a conceptual framework.

Theoretical Review
The study was anchored on the resource-advantage theory that focuses on those mistakes made on organizational strategies while pursuing organizational advantage, which will eventually lead to the development of leaderships to deliver distinct product that competitors are unable to imitate through service development strategy. The advantage and improvement of organizational performance relies upon the company's capacity to execute certain strategies aimed at improving service delivery (Ferdinand, Widiyanto, & Sugiarto, 2012; Peranginangin, 2015). In the implementation of BPR, resource-advantage theory guides the improvements meant to enhance performance of any organization.

Resource-advantage theory attests that organizations accomplish prevalent money related execution and competitive advantage in the market place positions by neutralizing their competitors using information technology to complement other major process innovations (Verganti & Buganza, 2005; Ja-Shen, Hung, & Astrid, 2009). Resource-advantage theory gives a superior comprehension on the many-sided connections among BPR strategy, information technology infrastructure and the performance of companies manufacturing food in Kenya.

Resource-based view is the basic theory to clarify the effect of organizational resources on supporting an upper hand for superior firm performance than their rivals (Barney, 1991; Fahy, 2000). MacLean et al. (2004) recommended that firms need to focus on

resource competence as opposed to product market in the global turbulent business environment. RBV in business process re-engineering strategy implementation requires the firm to create and deploy strategic resources (assets and capabilities) for the realization of unrivaled competitive advantage. These strategic resources should be identified, categorized and prioritized in pursuant of enhanced competitive edge (Gottschalg & Zollo, 2007). Resource-based view provides a better understanding on the interaction between business process re-engineering strategy, information technology infrastructure and firm performance particularly those that manufacture food in Kenya.

Empirical Literature Review on BPR Strategy, IT Infrastructure and Firm Performance

Organizations have been changing every now and then because of changes in innovation and clients' requests (Hammer & Champy, 1993; Banham, 2010). The implementation of innovations and business process re-engineering among the partners in the food value chain aimed at modernizing their procedures, consequently leading to better competitive advantage (Laudon & Laudon, 2006). Likewise, the customer's requests are key factors that can make firms to implement radical change. Organizational inability to satisfy its customer needs and wants might prompt the customers to switch their loyalty to other products or organizations offering better products (Heizer & Render, 2011). Along these lines, firms have been endeavoring to re-invent and improve their operations in order to enhance or keep up their services for holding as well as drawing in more

customers.

Dess and Robinson (1984) argued that in any investigative research which consolidates any radical change, there is need to address two fundamental issues: a reasonable structure from which to characterize authoritative execution and recognizable proof of precise accessible estimates that operationalize authoritative presentation. Kirby (2005) sets that the meaning of organizational performance is a shockingly open inquiry with not many studies utilizing predictable definitions and measures. Schendel and Hatten (1972) recommend that the achievement of an enterprise seldom relies on a solitary factor while Kirby (2005) contends empirical studies specific parts of this expansive issue of dealing with numerous conditions. None of these studies have integrated these critical aspects in a logical way to develop a framework for understanding and explaining organizational performance.

Information systems, supported by the plethora of information and communication technologies, sustain the core business processes in most of today's organisations. The main benefits of information technology have moved beyond the efficiency and effectiveness gains of the 1960's and 1970's and towards strategic advantage which will transform the organisation of the future. Therefore, if real benefits are to be realized from business process change it will often involve redesigning the information systems and information technologies (IS/IT) that support the processes. A wide variety of IT resources and capabilities are relevant to the execution of the customer service process. Understanding the economic impact of

information technologyis a critical issue to information systems researchers, and there is a rich body of literature about IT value (Chan2000; Dehning and Richardson 2002; Kohli and Devaraj2003; Mahmood and Mann 2000; Melville et al. 2004; Wadeand Hulland 2004). There are limited studies that have empirically demonstrated that IT infrastructure is a significant moderator on the link between BPR strategy and firm performance.

Bergman (1994) emphasizes the importance of the need to couple IT development with re-engineered business processes, citing service sectors as examples that failed to achieve the potential benefit from BPR. According to Allender (1994), unlike the incremental improvements in process suggested by TQM, BPR calls for the radical redesign of those processes. However like TQM, the majority of implementations of BPR seem to have failed (Stuart & Patrick, 1996). Business process redesign is one area where business strategy and IT have played a crucial role (Davenport, 1993; Davenport and Short, 1990; Grover et al., 1995; Hammer, 1990; Irani et al., 2000). Some firms have reported significant productivity gains by integrating IT into their core business processes.

Conceptual framework and Hypotheses Development

It is apparent from the literature that a lot more needs to be done than has already been done with regard to cementing the conceptual framework for establishing the causal link between BPR strategy, IT infrastructure and firm performance. This study through the conceptual model develops analysis and synthesis of the current literature as an attempt at filling this gap.
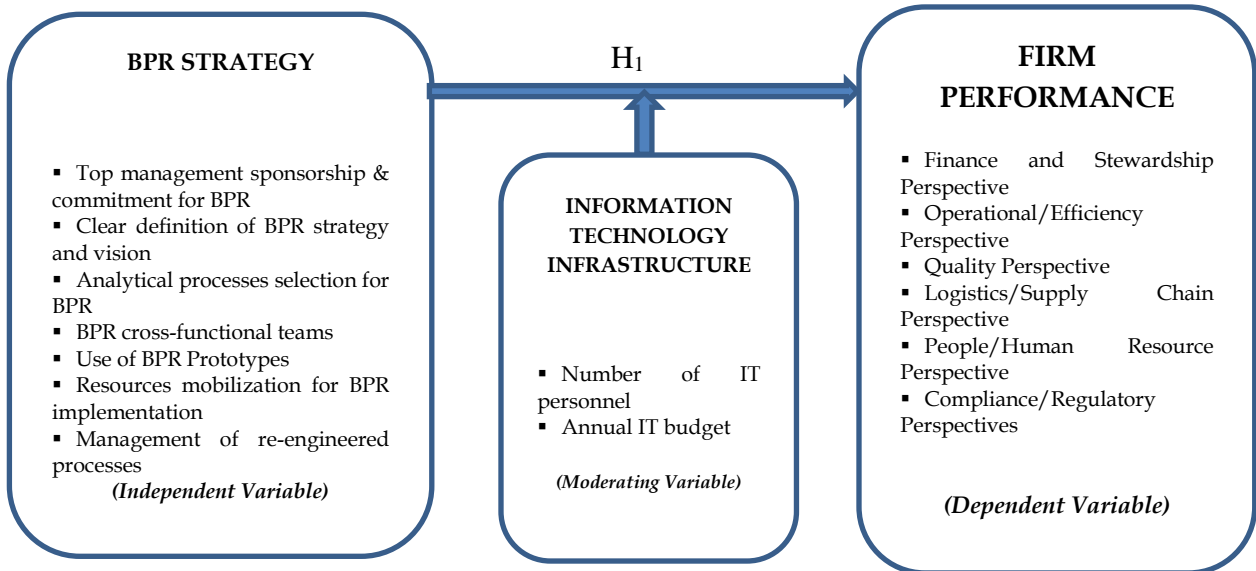

BPR STRATEGY

- Top management sponsorship & commitment for BPR
- Clear definition of BPR strategy and vision
- Analytical processes selection for BPR
- BPR cross-functional teams
- Use of BPR Prototypes
- Resources mobilization for BPR implementation
- Management of re-engineered processes
    (Independent Variable)

H_1

INFORMATION TECHNOLOGY INFRASTRUCTURE

- Number of IT personnel
- Annual IT budget

(Moderating Variable)

FIRM PERFORMANCE

- Finance and Stewardship Perspective
- Operational/Efficiency Perspective
- Quality Perspective
- Logistics/Supply Chain Perspective
- People/Human Resource Perspective
- Compliance/Regulatory Perspectives

(Dependent Variable)

Figure 1 Conceptual Model

"Source: Researcher", 2020"

H$_A$= "Information technology infrastructure significantly moderates the relationship between BPR and performance of companies manufacturing food in Kenya.

Research Methodology

A positivist philosophy was used guide this study. This is based on observations made by Babbie (2010) and Ravitch and Riggan (2012) who noted that a positivism philosophy is quantitative as opposed to phenomenology which is basically a qualitative approach and also the positivist orientation is guided on the realism existing thought as a result of limitations of humanity it may be known imperfectly and the realism within the context of probability can be discovered by researchers.

The study adopted a descriptive cross sectional design. Emmel, (2014) posit that cross-sectional studies empowers the research analyst to establish if critical association and connection among variables exist and the quality of these relationships The research design was guided by the purpose of the study, the type of investigation, the extent of researcher involvement, the stage of knowledge in the field and the type of analysis This design has been used successfully by Magutu, Mbeche, Njihia and Nyaoga (2016) and Ongore and Kusa (2013) to test hypothesis and draw conclusions. In view of the breath of the study through the utilization of cross-sectional survey, the researcher was afforded the opportunity to capture data on BPR strategy, IT infrastructure and performance of companies manufacturing food in Kenya.

The study population" was seventy-five (75) companies manufacturing food in Kenya. The unit of analysis was the companies manufacturing food in Kenya. These food manufacturing companies were classified into companies offering: cereals manufacturing, food manufacturing consultancy, food flavours manufacturing, food hygiene, sugar craft supplies, food preparation, food processing and food packaging. The target respondents and informants were the chief executive officer (CEOs) and with their permission, the production or operations managers depending on the structure of the particular company. The respondents were picked to represent all the stratas of 75 food manufacturing firms

Through a methodological triangulation, both primary and secondary data, were gathered by utilizing a poll and survey questionnaire strategy with open-ended and closed questions well aligned with the study objectives and hypothesis based on the literature reviewed as well as theories anchoring the study (Emmel, 2014; Saunders et al., 2007). Sekaran and Bougie, (2013) who applauded it because of its ability to maximize the benefit of standard and descriptive data that the interviews generate used this approach. Firm performance was collected from secondary sources specifically from annual performance reports of 2012/13, 2013/14, 2014/15 and 2015/16, 2016/17.

To compute firm performance index, weighted scores (adopted from GoK, 2018) with an average of five years will be computed as follows:

Step 1: Determine the Actual

Achievement for each firm performance *indicators*, $X_{year\ 1-5}$

Step 2: Find the ***average Score*** of the five-year Actual Achievement for each firm performance *indicators*, ***Average Score*** = $(X_{year\ 1} + X_{year\ 2} + X_{year\ 3} + X_{year\ 4} + X_{year\ 5})/5$

Step 3: Compute the Weighted Score by Multiplying the weight (assigned to the indicator as a percentage) by the ***Average Score*** to obtain the Weighted Score, i.e. **Weighted Score** = Indicator ***Weight*** as a percentage * ***Average Score***

Step 4: Compute the ***Composite Score*** of each food manufacturing company by ***summation of weighted scores*** for indicators to obtain the ***firm performance index.***

After the computation of firm performance index, the researcher used multiple regression analysis to test the research hypothesis. See table 2 on summary of objective, hypothesis and analytical model.

Table 2: Summary of Objectives, Hypotheses and Analytical Model

Objective	Hypothesis	Analytical model	Test Statistics	Analytical method	Interpretation
"To determine the effect of Information technology infrastructure on the relationship between BPR and firm performance of companies manufacturing food in Kenya;"	**H$_A$=** ""Information technology Infrastructure moderates the relationship between BPR and firm performance";"	$Y_1 = \alpha + \beta_1 X + \beta_2 Z + \beta_3 X.Z + \varepsilon$ α =constant (intercept), β_1, β_2, β_3 = coefficients Y_2, Y_3 and Y_4 = Firm Performance; X= BPR Strategy, Z= Information technology Infrastructure ε= Error term; X.Z=BPR Strategy and Information technology Infrastructure	Mean, t-value, Pearson's correlation, R, R² F-Ratio, P-values.	Stepwise multiple regression analysis	"R^2 for goodness-of fit"; "F-test for overall significance"; "t-test for individual significance"; and "Marginal changes" R^2 depicts model fitness and explains the changes in dependent variable. P-value, F-ratio and t-statistic explains the significance of the model constructs

Source: Author, 2020

Data Analysis, Findings And Discussions

Introduction

This section presents the fundamental study findings and interpretations based on field-data collected from the target study participants. The presented findings constitute a basis towards drawing the study conclusions and recommendations.

Out of the targeted 75 respondents, the researcher received response from 44 respondents forming 56.67% response rate, which was considered adequate for analysis. All subsectors of the food-manufacturing manufacturing companies in Kenya were all proportionately represented in this study, avoiding any chances of bias or misrepresentation.

The study found out that majority (53%) of the food manufacturing companies have been in operation for more than fifty (50) years while there are new entrants which are between 1- 10 years old. This confirms that food processing in Kenya is more than 50 years old and majority of these firms are highly likely to re-engineer in order to deliver value to their customers.

Diagnostic Tests

Firm performance had the highest reliability coefficient of 0.923 (Cronbach's Alpha (α) = 0.923) followed by information technology infrastructure with $\alpha = 0.895$ while business process re-engineering strategy had $\alpha = 0.759$. The study adopted a cut-off point of 0.5 as indicators for reliable data. Normality was tested using the Shapiro-Wilk test and the results showed that all the variables were above 0.05 ($p > 0.05$) hence confirming data normality for further descriptive analysis. The p-values for the Sharipo-Wilk tests were 0.22 for BPR strategy, 0.28 for IT infrastructure delivery and 0.20 for firm performance.

The variables of the study indicated VIF values of between 1.53 and 9.73 which is less than the 10 (a figure recommended by the rule of thumb). This indicated that the data set displayed no multicollinearity.

Hypothesis Testing

The research hypothesis was tested at 95% ($\alpha=0.05$) confidence level using multiple regression analysis, hence decision points to reject or fail to reject hypothesis were based on the p-values. Where $p<0.05$, the study failed to reject the hypotheses, and where $p>0.05$, the study rejected the hypotheses". The hypothesis was:

H_A=*Information technology infrastructure moderates the relationship between BPR and performance of companies manufacturing food in Kenya.*

Table 3:   Variables Entered/Removed on the Effect of Information Technology Infrastructure on the Relationship between BPR Strategy and Firm Performance

Model	Variables Entered	Variables Removed	Method
1	Resources Mobilization for BPR	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Resources Mobilization for BPR, IT Budget*BPR Prototype, Sponsorship and Commitment, Number of IT Personnel, BPR Cross functional Teams, Analytical Processes Selection, Annual IT budget , Management of Re-engineered Processes, BPR Prototypes, Clear BPR Definition and Vision[b]	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Firm Performance Index
Source: Research Data (2020)

From the findings on Table 3, in the second stepwise regression model; all the seven indicators of BPR strategy (resources mobilization for BPR, sponsorship and commitment, BPR cross functional teams, analytical processes selection, BPR prototypes, management of re-engineered processes, clear BPR definition and vision), two indicators of information technology infrastructure (number of IT personnel and annual IT budget)and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype) were included in the second stepwise regression analysis testing the moderating effect of information technology infrastructure on the effective relationship of BPR strategy on performance of food manufacturers in Kenya. Further the model goodness of fit using the adjusted R2 (coefficient of determinations) is done in Table 4.

Table 4:   Model Goodness of Fit on the Effect of Information Technology Infrastructure on the Relationship between BPR Strategy and Firm Performance

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.770a	.592	.583	18.14714
2	.853a	.728	.646	16.71847

a. Predictors: (Constant), Resources Mobilization for BPR
a. Predictors: (Constant), Resources Mobilization for BPR, IT Budget*BPR Prototype, Sponsorship and Commitment, Number of IT Personnel, BPR Cross functional Teams, Analytical Processes Selection, Annual IT budget , Management of Re-engineered Processes, BPR Prototypes, Clear BPR Definition and Vision
Source: Research Data (2020)

80 |

From the results in Table 4, the adjusted R^2 also keeps on improving from 0.583 to 0.646. Although all models are significant, the stepwise model number two is a good predictor of the significant moderating effect of information technology infrastructure on the relational effect of BPR strategy on performance of food manufacturers in Kenya.

From the results in Table 4 and table 5, it can be observed that as one moves from stepwise model number one to two, the standard error of the estimate keeps decreasing from 18.14714 to 16.71847 as so does the F values from 61.011 to 8.837. As presented in Table 4, in stepwise regression model number two (2); 64.6% (Adjusted R^2 = 0.646) of variations in the overall firm performance is explained by variations in the BPR strategy, information technology infrastructure and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype).

A moderation or interaction effect states that the effect of BPR strategy on firm performance (Y_1) depends on the magnitude of information technology infrastructure. The most significant indicators of (X*Z) were *IT Budget*BPR Prototype (*new dummy variable for *information technology infrastructure and BPR strategy)*. Hence, the need to test whether the interaction effect exists where this variable gives a significant value for firm performance. The BPR strategy and information technology infrastructure explain 64.6% of the changes in overall firm performance. Although the BPR strategy alone explains 63.9% of the variance in the overall firm performance, when combined with the information technology infrastructure they explain 64.6% of the variations in the overall firm performance. The magnitude of information technology infrastructure's moderating effect on the relationship between BPR strategy and overall firm performance is 0.7% (64.6% - 63.9%).

Table 5 presents that the model is statistically significant in explaining the effect of information technology infrastructure on the relationship between BPR strategy and firm performance, $F_{(10, 33)} = 8.837$, $P > 0.000$.

Table 5:   Model Overall Significance on the Effect of Information Technology Infrastructure on the Relationship between BPR Strategy and Firm Performance

ANOVAa						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig./P-Value**
1	Regression	20092.220	1	20092.220	61.011	.000[b]
	Residual	13831.385	42	329.319		
	Total	33923.605	43			
2	Regression	24699.871	10	2469.987	8.837	.000[c]
	Residual	9223.734	33	279.507		
	Total	33923.605	43			

a. Dependent Variable: Firm Performance Index

b. Predictors: (Constant), Resources Mobilization for BPR

c. Predictors: (Constant), Resources Mobilization for BPR, IT Budget*BPR Prototype, Sponsorship and Commitment, Number of IT Personnel, BPR Cross functional Teams, Analytical Processes Selection, Annual IT budget , Management of Re-engineered Processes, BPR Prototypes, Clear BPR Definition and Vision

Source: Research Data (2020)

The coefficients of this predicative model aimed at addressing the effect of information technology infrastructure on the relationship between BPR strategy and firm performance are given in Table 6.

Table 6:   Regression Coefficients of the Effect of Information Technology Infrastructure on the Relationship between BPR Strategy and Firm Performance Model

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig./P-Value**
1	(Constant)	101.823	8.667		11.748	.000
	Resources Mobilization for BPR	-19.780	2.532	-.770	-7.811	.000
2	(Constant)	103.868	40.998		2.534	.016
	Resources Mobilization for BPR	-29.154	5.218	-1.134	-5.587	.000
	IT Budget*BPR Prototype	1.486	1.521	.317	.977	.336
	Clear BPR Definition and Vision	33.559	25.438	.556	1.319	.196
	BPR Prototypes	5.363	11.075	.197	.484	.631
	Number of IT Personnel	2.840	3.067	.140	.926	.361
	Management of Re-engineered Processes	-2.042	15.311	-.031	-.133	.895
	Annual IT budget	-1.333	3.813	-.096	-.350	.729
	Sponsorship and Commitment	-6.455	5.665	-.161	-1.139	.263
	Analytical Processes Selection	-12.402	27.753	-.195	-.447	.658
	BPR Cross functional Teams	-15.005	9.614	-.348	-1.561	.128

82 |

a. Dependent Variable: Firm Performance Index
Source: Research Data (2020)

As presented in Table 6, using standardized coefficients: the clear BPR definition and vision has a very strong positive effect on firm performance (β= 0.556, t= 1.319, P=0.196); IT budget*BPR prototype has a strong positive moderating effect on firm performance (β= 0.317, t= 0.977, P=0.336); BPR prototypes has a weak positive effect on firm performance (β= 0.197, t= 0.484, P=0.631); number of IT personnel has a weak positive effect on firm performance (β= 0.140, t= 0.926, P=0.361).

The management of re-engineered processes has a weak negative effect on firm performance (β = -0.031, t = -0.133, P = 0.895); annual IT budget has a weak negative effect on firm performance (β = -0.096, t = -0.350, P = 0.729); sponsorship and commitment has a weak negative effect on firm performance (β = -0.161, t = -1.139, P = 0.263).

The analytical processes selection has a weak negative effect on firm performance (β= -0.195, t= -0.447, P>0.658); BPR cross functional teams has a strong negative effect on firm performance (β = -0.348, t = -1.561, P = 0.128); and resources mobilization for BPR has a very strong negative effect on firm performance (β= -1.134, t= -5.587, P = 0.000).

The relationship derived on the effect of information technology infrastructure on the relationship between BPR strategy and firm performance is statistically significant.

The regression equation derived was thus as follows:

Y_1 = 0.556 BPRDV + 0.317 ITB*BPRP + 0.197 BPRP + 0.140 NITP - 0.031 MREP - 0.096 AITB - 0.161 BPRSC - 0.195 BPRAPS - 0.348 BPRCFT - 1.134 RMFBPR

Where:

Y_1	= Firm Performance
BPRDV	= Clear BPR Definition and Vision
ITB*BPRP	= IT Budget*BPR Prototype
BPRP	= BPR Prototypes
NITP	= Number of IT Personnel
MREP	= Management of Re-engineered Processes
AITB	= Annual IT budget
BPRSC	= Sponsorship and Commitment
BPRAPS	= Analytical Processes Selection
BPRCFT	=BPR Cross functional Teams
RMFBPR	= Resources Mobilization for BPR

The product variable of *IT Budget*BPR Prototype (*new dummy variable for *information technology infrastructure and BPR strategy)* is the measure of whether information technology infrastructure has any moderating effect on the relationship between BPR strategy and overall firm performance. Given that the dummy product variable of *IT Budget*BPR Prototype* is included in the model which has the net positive magnitude (β= 0.317, t= 0.977, P>0.336) of 0.7%, then study therefore accepts the alternate (H_A) that

information technology infrastructure moderates the relationship between BPR and performance of companies manufacturing food in Kenya. H$_A$ is therefore supported.

Discussion of the Research Results and Findings

This section discusses the results of this study in line with the research objective and the hypothesis formulated based on existing literature, both conceptual and empirical. The results from the test of hypotheses are compared on how they fit into the existing body of knowledge and previous studies. Further, this section discusses the implications of the current research findings' provision of new insights and support of existing theory on which the study was founded.

The study sought to determined how information technology infrastructure conceptualized as a moderating variable affects the relationship between BPR strategy and firm performance of companies manufacturing food in Kenya. In order to test for this influence, a corresponding hypothesis H$_{A1}$ that states that information technology infrastructure moderates the relationship between BPR and performance of companies manufacturing food in Kenya was formulated.

A moderation or interaction effect states that the effect of BPR strategy on firm performance (Y1) depends on the magnitude of IT infrastructure. The most significant indicators of (X*Z) were IT Budget*BPR Prototype (new dummy variable for information technology infrastructure and BPR strategy). The study

finding established that IT infrastructure significantly moderate the relationship between BPR strategy and firm performance and thus the hypothesis that IT infrastructure moderates the relationship between BPR strategy and performance was supported. The relationship of the interaction term of BPR strategy and IT infrastructure on one hand and firm performance on the other hand are statistically significant. The results confirmed that although the BPR strategy alone explains 63.9% of the variance in the overall firm performance, when combined with the IT infrastructure they explain 64.6% of the variations in the overall firm performance hence the magnitude of information technology infrastructure's moderating effect on the relationship between BPR strategy and overall firm performance is 0.7% (64.6% -63.9%). Repetition. These findings are supported by Bharadwaj, (2000) and Mmereki and Kgomotso, (2013).

These results are consistent with earlier conceptual and empirical evidence by Bhatt and Grover (2005) and Tippins and Sohi (2003) effective IT infrastructure utilization enables the smooth implementation of the organization's strategy especially the BPR strategy for improved overall firm performance. The improved performance as by Clark (1997) can range from reliable and cost effective innovative techniques to enhance performance. Further consistence was in support of Laudon and laudon (2006) empirical conclusion that the advancement in new technology forces organizations to modernize their processes, thereby fostering their firm performance for competitive advantages.

84 |

The finding have further provided new insights on the role of information technology infrastructure on the implementation of BPR strategy through IT personnel and budgetary allocations which will be blended as IT Budget*BPR Prototype for improved firm performance. BPR is costly hence the need for budgetary allocation while there is need for tangible and realistic prototypes as opposed to abstract idea during the implementation of the BPR strategy for the realization of improved firm performance. The new insight of IT Budget*BPR Prototype advanced the ideas of Broadbent et al. (1999); Bharadwaj (2000); Mekonnen (2011) that IT infrastructure should provide flexibility to meet the future business demands in workstations, processing types, and applications by employing the right strategies and resource allocation (budgets) to support the firm competitiveness.

Conceptually, the empirical relationship testing how the relationship between BPR strategy and overall firm performance is moderated by IT infrastructure confirms the conceptual model that information technology infrastructure significantly moderates the relationship between BPR and performance of companies manufacturing food in Kenya. The empirical relationship is based on BPR strategy constructs of using tangible realistic prototypes and the IT infrastructure construct of IT budget as advanced by De Boer, Muller, and Canten (2015) and Chang (2012) that IT budget is one of the four key dimensions of IT infrastructure that support any strategic implementation hence the resource based view is confirmed to support the moderating effect of IT infrastructure on the relationship between BPR strategy and firm performance. The empirical model has therefore indeed advanced the concept of IT infrastructure beyond adoption in building an empirical framework and theory on its moderating role on the relational effect of BPR strategy on performance of food manufacturers in Kenya.

Summary, Conclusions And Recommendations

This section presents the study's summary of findings on thematic areas, conclusions, recommendations, limitations and suggestions for further studies. The summary of findings is based on each and every indicator used in the study while the conclusions and recommendations are based on the generalized views under each objective area.

Summary of Findings

Primarily, the discussions laid focus on the results and whether they were consistent or contradicted other empirical studies. It also covered suggestions on areas of keen interest. On hypotheses testing, it was established that 64.6% of variations in the overall firm performance is explained by variations in the BPR strategy, information technology infrastructure and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype).The magnitude of IT infrastructure's moderating effect on the relationship between BPR strategy and overall firm performance is 0.7% (64.6% - 63.9%); then study therefore accepts the alternate hypothesis (H_{A1}) that IT infrastructure moderates the relationship between BPR and performance of companies manufacturing food in Kenya.$H_{A1}$is therefore supported. The table below provides the summary of results,

summary of hypotheses testing and decision.

Table 7: Summary of the Results of the Hypothesis

Objective	Hypothesis	R	R^2	Adj. R^2	F	Sig./P-Value	Decision
To determine the effect of IT infrastructure on the relationship between BPR and firm performance of companies manufacturing food in Kenya;	H_{A1} : Information technology Infrastructure moderates the relationship between BPR and firm performance;	.853a	.728	.646	8.837	.000c	Accept

Source: Researcher (2020)

Conclusion

In conclusion, the study confirmed that information technology infrastructure positively and significantly moderates the relationship between BPR and performance of companies manufacturing food in Kenya, whereby 64.6% of variations in the overall firm performance is explained by variations in the BPR strategy, information technology infrastructure and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype).The results therefore support the anchoring theory of resource advantage and resource based view theories.

Contributions of the Research Findings
This study has contributed in different areas including implications to theory, policy, management practice and methodological contributions as discussed in the subsequent paragraphs.
First, this study has advanced frontiers of

knowledge from the study findings; recent developments in e-commerce across all industries have raised a question whether the relationship between information technology infrastructure and BPR still hold after persistence changes in IT. Despite some skepticism about the direct IT effect of IT on firm performance (Carr 2003), many IS researchers believe that superior IT Infrastructure can render a firm a significant competitive advantage over its competitors. This study confirms that the magnitude of information technology infrastructure's moderating effect on the relationship between BPR strategy and overall firm performance is positive and statistically significant.

Secondly, this research makes several noteworthy contributions to the existing theory: the empirical relationship testing how the relationship between BPR strategy and overall firm performance is moderated by IT infrastructure confirms the conceptual model that information technology

86 |

infrastructure significantly moderates the relationship between BPR and performance of companies manufacturing food in Kenya. The empirical relationship is based on BPR strategy constructs of using tangible realistic prototypes and the IT infrastructure construct of IT budget as advanced by De Boer, Muller &Canten, (2015) and Chang, (2012) that IT budget is one of the four key dimensions of IT infrastructure that support any strategic implementation hence the Resource Based View theory is confirmed to support the moderating effect of IT infrastructure on the relationship between BPR strategy and firm performance. The empirical model has therefore indeed advanced the concept of IT infrastructure beyond adoption in building an empirical framework and theory on its moderating role on the relational effect of BPR strategy on performance of food manufacturers in Kenya.

Thirdly on the study's policy contributions: the results of this study will assist policy makers to ensure that food-manufacturing firms in Kenya give clear focus to effective IT infrastructure utilization, which enables the smooth implementation of the organization's strategy, especially the BPR strategy for improved overall firm performance. This will lead to improved performance ranging range from reliable and cost effective innovative techniques to enhance performance. By so doing, the advancement in new technology forces organizations to modernize their processes, thereby fostering their firm performance for competitive advantages. These results will serve as guide to document that the effective IT infrastructure utilization enables the smooth implementation of the BPR strategy for improved service delivery

of food manufacturing firms since information technology (IT) infrastructure plays a very critical role in BPR strategy.

Fourth, the study contributed to management practice: the findings that information technology infrastructure positively and significantly moderates the relationship between BPR strategy and firm performance of companies manufacturing food in Kenya, is useful in making key managerial. The managers should pay much attention to seven indicators of BPR strategy (resources mobilization for BPR, sponsorship and commitment, BPR cross functional teams, analytical processes selection, BPR prototypes, management of re-engineered processes, clear BPR definition and vision), two indicators of information technology infrastructure (number of IT personnel and annual IT budget) and product variable between BPR strategy and information technology infrastructure (IT Budget*BPR Prototype) for improved overall firm performance and service delivery.

Lastly on the methodological contributions: key methodological contribution is the use of a quantitative composite index in computing the firm performance index, the use an integrated empirical model to test the relation between BPR strategies, IT infrastructure and performance. Consequently, the use of simple, multiple and hierarchical analytical tools and technique more especially on moderating and joint effect gave various statistical reports that guided this study on statistical significance to support or not support the various hypotheses. It allows drawing of conclusions based on verifiable empirical evidence. If another choice of analytical

87 |

tool was to be used, the statistically significant results may change to be statistically insignificant.

Limitations of the study

The study had a number of limitations. The use of aggregated statistics for measures of the conceptualized variables on service delivery and firm performance was with the assumption that those measures had not changed and that performance reflected the outcome of BPR strategy adopted. However, the dynamics surrounding regulations in food processing keep changing and are different given that the way they respond to the changes in the environment is also different. This study didn't stretch out past the food manufacturing companies' boundaries henceforth came up short on a dyadic methodology. A single respondent was used in data collection, which may bias or determine the nature of responses.

This study drew its sample from companies manufacturing food in Kenya, and further research should include a broader perspective of all manufacturing firms or large scale manufacturing firms. The same can be applied to the service firms and industry. The information that was sought from the companies manufacturing food in Kenya were voluntary, but out the fifty questionnaires that were returned, there were some outliers hence only forty four (44) questionnaires were used in the correlation and regression analysis of this study.

The study had another challenge to do with covering all companies manufacturing food in Kenya with geographically dispersed towns requiring a lot resources and time.

The analytical limitations arose from the multiple measures that were used to measure BPR strategies, IT infrastructure and firm performance. These called for the use of both quantitative and qualitative measures, which were restricted to a period of five years requiring a lot to be done before the actual report writing.

Suggestions for Further Research

This study used BPR strategy as an independent variable, IT infrastructure as a moderating variable and firm performance as a dependent variable. The study cleared the contradiction in the moderating role of IT infrastructure on the relationship between BPR strategy and firm performance. Future research should therefore focus on other variables like risk management strategies as a moderator on the relationship between BPR strategy and firm performance. Further, the moderating role of computer aided business process reengineering (CABPR) as a moderator on the relationship between BPR strategy and firm service delivery can be explored.

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