

**THE MODERATING EFFECT OF ORGANIZATIONAL LEARNING FLOWS  
CAPABILITY ON THE RELATIONSHIP BETWEEN BUSINESS PROCESS  
REENGINEERING AND EFFICIENCY OF ORGANIZATIONAL PERFORMANCE:  
(EMPIRICAL STUDY OF SERVICES FIRMS)**

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*Abstract*

*This research aim to evaluate the effect of Organizational Learning flows Capability (OLC) on relationship between Businesses Process Re-engineering (BPR) on Efficiency of organizational performance in services firms in the Sudan. Theoretical frame of research consist of The BPR factors as independent variable (change management systems and culture, organizational change, top management commitment, information technology infrastructure, and management competence). As well as the organizational performance as dependent variable (efficiency). Add to Organizational Learning flows Capability as moderator variable. To obtain objectives of research; developed conceptual model and employed the quantitative research method, where convenience sampling and self-administrated survey questionnaires were sent to 221 Varity services firms worked in Sudan of Varity field (Finance, Communication and Education), with response rate (96%). Multi regression analysis used to test hypotheses. The findings and contributions of research showed that BPR dimensions; change management systems and culture, organizational change, information technology infrastructure, and management competence have positive effect on efficiency of organizational performance efficiency. It offers a valid and reliable instrument to operationalize the model and develop empirical support for the derived model.*

*Keywords: Organizational Learning flows Capability, Business Process Reengineering, Organizational Performance, Efficiency, Sudan, and Services Firms.*

## **I. INTRODUCTION**

Ongoing globalization over the world, business organizations are increasingly confronted with complex competition and rapid environment change. In order to build and sustain their competitive advantage and survive the business, organizations needs to change their strategies through modern and contemporary management methodologies such as rethinking and redesign of their process to improve and enhance their organizational performance. (Abdolvand, 2008; Attran, 2003). One of famous management methodology is business process reengineering (BPR) which became last decade one of the popular management solutions in dealing business in extremely fast technological advancement, and any changes or transformation among firms because it helps to improve the performance of organizations (Hammer & Champy, 1993). Therefore, in variety industries and services organizations are inspired to get its benefits for business success (Evren & Ayşegül, 2015).

## **II. STATEMENT OF THE PROBLEM**

Having, current business environment is facing complex and unpredictable changes as a result of rapid development of information communication technology, the service organizations try to change their essential operational capabilities as result of the effect of digital revolution. Hence the digital revelation has improve and assistant the service firms to create and develop innovative services and products. A world business firms has adopt new and improved types of information technology based communications such as virtual office in which all management operation based on technology. There for, the international economics has embarked major steps to adopt the information technology in business to achieve high organizational performance (Nzewi, 2015; (Wongsansukcharoen, 2015). In addition, numerous studies show that learning flows capability is one of an essential factors and key mechanism for adapting to changes in the business environment. Further sharing knowledge and experiences, and for providing innovative solutions (Nonaka & Takeuchi, 1995) based on the channels of learning. Add to that and based on RBV view the Learning flows capability is one of an extension of organizations intangible resources, to survive and develop in increasingly uncertain and changing markets. This research try to explore all these variables in one conceptual model linking them together.

Refer to the decline in organizational performance of Sudanese services firms in terms of return on assets, equity and operating cost requires attention of stockholder to re-searching for process performance improvement. Furthermore, the services sector in Sudan not only complete locally, but will also set up defensive strategies against global competitors from abroad. Furthermore, the local financial industry was opened to new foreign competitions that will lead liberalization and globalization of banking industry (Lee, 2000).

## **III. Questions of research**

Based on the underlying problem presented above, the research attempts to answer the following research questions:

Does learning capabilities moderate the relationship between business process reengineering factors and efficiency of performance?

#### **IV. OBJECTIVES OF RESEARCH**

The research seeks to achieve the following

Objectives:

- Develop a conceptual framework linking BPR, efficiency of organizational performance and organizational learning flows in Sudanese services firms
- To determine the potential moderating role of organizational learning flows in relationship between BPR and efficiency of organizational performance in Sudanese services firms.
- Empirically test the conceptual framework based on data collected from a Sudanese services firms.

#### **V. SIGNIFICANT OF RESEARCH**

- This study will attempt to provide an operational framework for the relationship of BPR, efficiency of organizational performance, and moderating effects of organizational learning flows capability in services firm's works in Sudan context.
- Current study provide empirical evidence based on large samples and validated measurement model explains the moderating effects of organizational learning flows capability in the relationship between the BPR and efficiency of organizational performance a study of services firm's works in Sudan context.

#### **VI. LITERATURE REVIEW**

##### **A. BPR Concept**

Many of researchers and scholars argue that the original concept of BPR can be traced back to the management theories of the nineteenth century. Frederick Taylor suggested in the 1880's that managers use process reengineering methods to discover the best processes for performing work, and that these processes be reengineered to optimize productivity. BPR is known by many names, such as 'core process redesign', 'new industrial engineering' or 'working smarter'. All of them imply the same concept which focuses on integrating both BPR and deploying information technology to support the reengineering work.

The book "Reengineering the Corporation": A Manifesto for Business Revolution by Hammer and Champy (1993) is widely referenced by most of BPR researchers and is regarded as one of the starting points of business process reengineering. The following is their definition of BPR:

The definition of business process reengineering: the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed. (p. 32).

In general, the majority of studies on BPR have focused on the critical success factors for successful implementation in private business, whereas are few studies have been conducted in services firms.

## **B. Organizational Performance Concept**

A variety of definitions exist concerning organizational performance: Organizational performance is a result of the effectiveness and efficiency of the actions that an organization undertakes (Neely, 1999). Venkatraman & Ramanujam (1986) argue that organizational performance is an indicator which can measure how well an organization achieves their own objectives. Organizational performance could be linked with market orientation, organization learning, human resource productivity, quality improvement or any other component (Banker & Sinkula, 1999; Ahamd, 2010).

In non-sustainable environment, Managers are continually face common issue which is how improve their firm's performance. Resource-based view was used in variety of researches and studies to explain the variance in organizational performance (Wernerfelt, 1984; Barney, 1991; Hamel & Prahalad, 1990). Organizational performance could be linked with market orientation, organization learning, human resource productivity, quality improvement or any other component (Day, 1994; Ahamd, 2010). Financial indicators, such as return on investment (ROI), earnings per share (EPS) and return on equity (ROE) are used by the number of organizations to measure their progress. Return on investment is used to reflect the profitability while corporate performance was measured by operating cash flows and return.

## **C. BPR and Organizational Performance**

In the begging of current century several empirical studies and researches have been conducted to establish the associate between BPR and organizational performance such as (Ahmed et al., 2007), (Abdolvand et al., 2008), (Khong & Richardson, 2003). The findings of these studies and researches indicated that most organizations that have undertaken BPR achieved numerous benefits, including cost reduce, improved customer focus, better integration across the organization, quality, speed, flexibility, innovation and improve competitive advantage.

## **D. Resource Base View (RBV)**

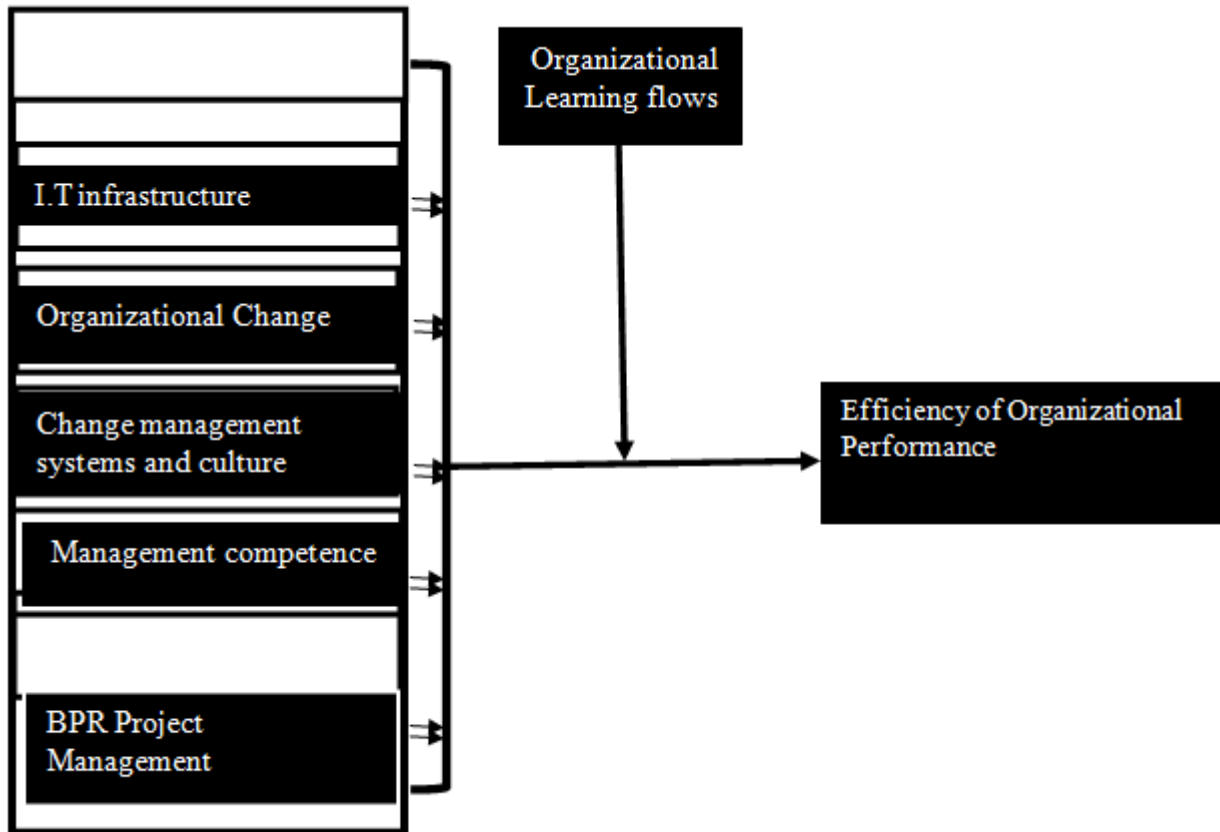
The conceptual foundation of this research is mainly drawn from the resource-based view theory (RBV). The RBV is one of the major views in strategic management and attributes superior organizational performance to internal resources (Wernerfelt 1984; Barney 1991).

In recently studies, resource-based view became useful theory to investigate the relationship between the business process reengineering and organizational performance (Wade & Hulland, 2004). Thus the resource based view theory lays the foundation for the conceptual framework of this research, as it provides the essential concepts to frame the conceptual linkage between resources, learning capabilities, business processes reengineering and organizational performance. The RBV provides a right guide to identifying the research constructs, developing the research model and developing the research hypothesis, beside it provides a theoretical framework to evaluate the link between BPR and organizational performance.

## **VII. THEORETICAL FRAME WORK**

Following the theoretical based of the research, the conceptual framework for this research as

shown in figure (1)



*Fig. 1. Theoretical Framework of the Research*

## VIII. HYPOTHESES DEVELOPMENT

Main hypothesis: the effect of BPR on organizational performance is stronger when learning capabilities are higher.

- The effect of organizational structure on efficiency is stronger when learning capabilities are higher.
- The effect of IT infra-structure on efficiency of performance is stronger when learning capabilities are higher.
- The effect of organizational culture on efficiency of performance is stronger when learning capabilities are higher.
- The effect of reengineering project management on efficiency of performance is stronger when learning capabilities are higher.
- The effect of management competence on efficiency of performance is stronger when learning capabilities are higher.

## IX. CONTROL VARIABLES

A total of four control variables were included: service type, ownership status, firm size and business age are common control variables (McWilliams & Siegel, 2000). Firm size was measured with a scale that asked the respondents to report the number of employees in the firm.

## X. RESEARCH METHODOLOGY

### A. Survey Administration:

#### Methodological Choice

The choice of a research methodology depends on the ontological and epistemological choices and the objectives of a particular research (Hall and Howard, 2008). The current research was conducted based on the positivism paradigm. It tests hypotheses derived from a theoretical model, developed based on both previous studies and pilot research. As such, the main purpose of the research is essentially theory validation/verification following the hypothetic-deductive approach (Kassahun, 2012). Whenever the purpose of a research is hypothesis testing using statistical methods and generalization to a larger population from the sample based on numerical data, quantitative survey research is the preferred option (Creswell, 2009).

### B. Development of the Survey Instrument

The questionnaire for this research consisted of three main sections, namely the profile of the firm and BPR factors and specific questions designed to measure organizational performance (efficiency and effectiveness).

- **BPR dimensions:** BPR measured by: top management commitment, organizational change, change management commitment, information technology infrastructure and management competence. Each of these variables was measured by a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A neutral response - "neither disagree nor agree" - was adopted to reduce uninformed responses. Whenever possible, established scales were utilized. When the items had to be modified, the items were derived from the literature.
- **The organizational performance dimensions:** measured by efficiency and financial factor. The respondents were asked to evaluate the efficiency (ROA, ROI, market share, quality, speeds, etc.) efficiency of organizational performance of the firm within the past three years on a scale of 1 (much worse) to 4 (excellent).
- **Control Variables:** A total of four control variables were suggested: three control variable were adopted firm size (measured by number of employees in the firm), owner form (government and private and age of business (less than 10 years and over the 10 years)).

### C. Sample and Data Collection

#### Response Rate

Pilot research was conducted for ensure initially of some statistical measures such as validity and reliability of research instrument.

**TABLE I. Response Rate**

	Number	Rate of percent
Questionnaires Posted to The Firms	221	100%
Blank Questionnaires Returned Without Participation	10	4.5%
Completed Questionnaire Received	211	95.5%
Returned Questionnaires (Partially Answered)	5	2%
Questionnaires Not Returned	10	4.5%
Overall Response Rate	211	95.5%
Usable Questionnaires	196	88.5%

#### Validity and Reliability of the Measures

Validity and reliability were used to ensure the goodness of instrument consistency. Cronbach's alpha coefficient is widely used as a measure the reliability of the research dimensions. Factor analysis was conducted to measures the construct validity. Factor analysis was conducted on research items, Table (0) show the summary of results of factor analysis on research variables constructs; BPR, efficiency of organizational performance. All research variables components/factors loaded with eigenvalues exceeding 1.0. All the remaining items also had the factor loading values above the minimum values of 0.50, with value of cross loading less than .50.

#### Validity of BPR Factors

The table (II) shows that the items for BPR factors loaded on five components/factors with eigenvalues exceeding 1.0. These three factors explain 69.9% of variance in the data (above the recommended level of 0.60). All the remaining items also had the factor loading values above the minimum values of 0.50, with value of cross loading less than .40. The first factor of BPR variables organizational change (8) items. Thus, the name original name of this factor was retained as it is, and factor two information technology infrastructure (5) items. Concern to the third factor is change management systems and culture

(6) Items. Further, the name original name of this factor was retained as it is. And then the factor four management competence (3 items). Also this factor was retained as it is. Whereas process reengineering project management (4 items). Was renamed to top management commitment based on literature review.

As shown in table (II), factor loading of BPR variables items on the five factors ranged from 0.559 to 0.810. Thus, this research found that BPR in Sudanese services firms consists of five factors, namely; Organizational change, Information Technology Infrastructure, top management commitment, change management systems and culture and management competence.

**TABLE II. Rotated Factor Analysis for BPR Factors**

Rotated Component Matrix <sup>a</sup>					
	Component				
	1	2	3	4	5
F4_our firm try to merage the mgt stratigic process change	.830	.117	.209	.165	.077
E5_flexibile organizional strucure	.826	.113	.216	.164	.063
E4_clear organizional strucure	.798	.151	-.063	.238	.152
F3_our firm has BPR constlatants	.796	.154	-.052	.210	.148
F1_our firm has aclear change plan aliging to stratic plan	.752	.133	.086	.091	.129
F2_our firm has clear viston to process change	.679	.266	.225	.244	.111
E1_top mgt support team work	.577	.342	.244	.081	.139
E3_clear task and work	.568	.417	.090	.297	.002
d4_IT support the work development	.271	.792	.134	.142	.225
d1_deasly useage of IT	.249	.775	.182	.096	-.056
d3_IT support doing the work	.107	.771	.229	.057	.208
d2_easly access to info.	.258	.729	.184	-.023	.061
d6_modern IT	.147	.728	.218	.143	.039
c4team work	.067	.168	.822	.082	.114
c3_innivation and creatives	.227	.151	.802	.085	.090
c2_more autherities	.091	.245	.740	-.028	.041
c5_share in decition made	.191	.034	.717	.127	.174
c6_proads change culure	-.056	.424	.609	.298	-.010
c1_motovate	.132	.409	.538	.250	.150
c7_training plan	.045	.357	.517	.458	.070



F5_in our firm the process change aligning to stratigic plan	.228	.153	.025	.880	.082
E6_adminstartion based on top mgt	.228	.150	.093	.867	.144
F6_our firm has clear objectives from process redisgn	.373	.023	.264	.732	.160
E7_accordaion among depts	.397	.041	.254	.730	.176
G2_top mgt in our firm has agood belevies to process change through BPR	.072	.126	.093	.154	.876
G1_firm leaders has agood visitions to change mgt.	.191	.096	.132	.195	.860
G3_top mgt in our firm has agood process change program	.364	.129	.240	.061	.617

<b>Eigenvalues</b>	<b>10.58</b>	<b>3.03</b>	<b>2.11</b>	<b>1.63</b>	<b>1.54</b>
<b>Percentage of variance</b>	<b>39.18</b>	<b>11.24</b>	<b>7.83</b>	<b>6.03</b>	<b>5.69</b>
<b>Total Variance Explained (%)</b>	<b>69.98</b>				
<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</b>	<b>0.859</b>				
<b>Bartlett's Test of Sphericity</b>	<b>4402.022**</b>				

Note: NO. = 181, \*\* $p < 0.01$ , Variables loaded significantly on factor with Coefficient of at least 0.4,

\* Some items deleted due to high cross loading.

**Validity of Efficiency of Organizational Performance**

The TABLE (III) shows that the items for efficiency of organizational performance variables loaded on one components/factors with eigenvalues exceeding 1.0. That explain 68.24% of variance in the data (above the recommended level of 0.60). All the remaining items also had the factor loading values above the minimum values of 0.50, with value of cross loading less than .40. The first factor of efficiency of organizational performance variables is efficiency (4) items. Thus, the name original name of this factor was retained as it is. However, the name original name of this factor was retained as it is efficiency of organizational performance.

Table III. Rotated Factor Analysis for Efficiency of Organizational Performance

Efficiency of Organizational performance <i>in last three years our firm has achieved:</i>	Component	
	1	
PI2_Return on sales (ROS).	.913	
PI3_Return on investment (ROI)	.903	
PI1_Profit margin (EPS).	.893	
PJ1 _ Good market position.	.854	
Eigenvalues	5.46	1.16
Percentage of Variance Explain	68.24	14.51
Total Variance Explained (%)	82.75	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.897	
Bartlett's Test of Sphericity Approx. Chi-Square	1426.289**	

Note: NO. = 181, \*\*p< 0.01 Variables loaded significantly on factor with Coefficient of at least 0.5.

**Correlation Analysis:**

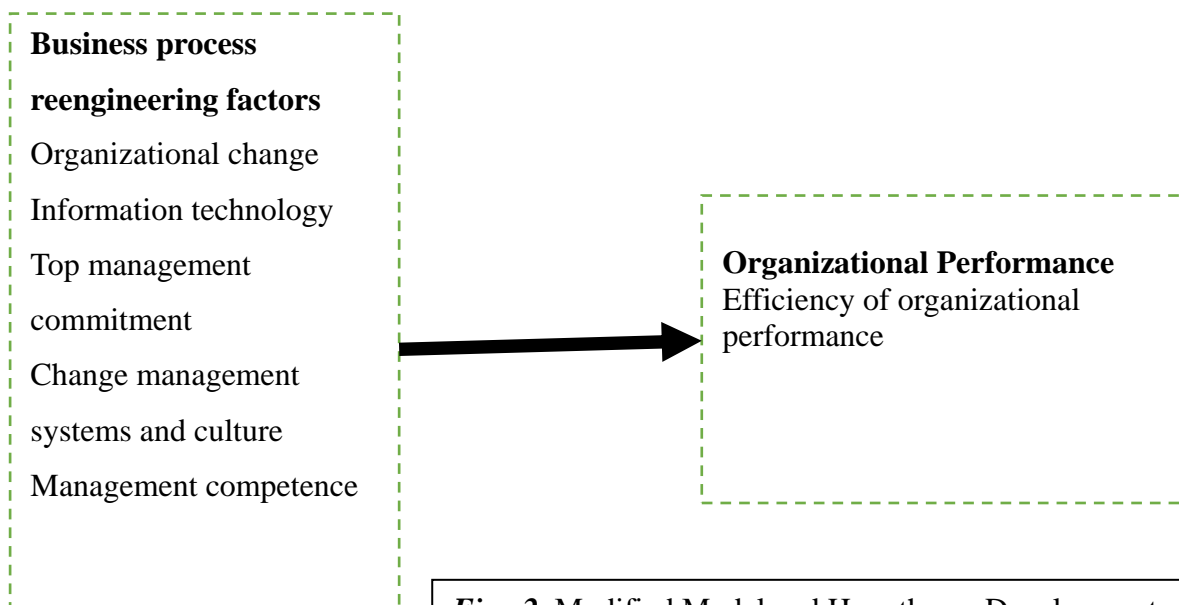
**Table (IV)**

**Person's Correlation Coefficient and Descriptive Analysis for All Variables**

variables	Mean	Standard Deviation	IT	OC	TMC	SC	MC	EFF
Information Technology(IT)	2.90	1.07	1					
Organizational Change(OC)	3.06	0.86	.548* *	1				
Top Mg. commitment(TMC)	2.93	0.97	.345* *	.667**	1			
change mgt systems and culture (SC)	2.77	0.93	.570* *	.422**	.420* *	1		
Mgt. competence(MC)	2.74	0.900	.345* *	.459**	.411* *	.365* *	1	

Efficiency(EFF)	2.74	1.29	.0477 **	0.523**	0.493 **	0.602 **	0.415 **	1
**. Correlation is significant at the 0.01 level (2-tailed).								

## XI. MODIFIED MODEL AND HYPOTHESES DEVELOPMENT



*Fig. 2. Modified Model and Hypotheses Development*

### Hypotheses Testing

There are many hypotheses in this research after run the factor analysis to dimensions reduction.

The Relationship between BPR factors and organizational Performance

- The first main hypotheses in the research which predicts that five business process reengineering factors (organizational change, information technology infrastructure, top management commitment, change management systems and culture and management competence) have positive relationship with the main dimension of organizational performance; efficiency.

### The Relationship between BPR factors and Efficiency

Table (V) presents the result of two-step regression analysis of three control variables and five components of BPR factors on efficiency of performance. In the first step, two control variables have significant effect on organizational performance.

The three control variables together explain about (35%) of the total variation in organizational performance. The additions of the five BPR factors in step two explain additional (19%) of organizational performance variance. This means that control variables and BPR factors cumulatively explain (54%) of the variance in efficiency of performance. Also the results

disclosed the two regression models were significant ( $F= 32.657, p<0.01$ ;  $F= 27.381, p<0.01$ ). Therefore, we do not accept null hypothesis that there is no significant relationship between BPR and efficiency of performance.

TABLE V. The hierarchical regression equation analysis: The Relationships between BPR Factors and Efficiency of performance.

Variables	DV: Efficiency	
	Step1 Std. Beta	Step2 Std. Beta
<i>Control variables:</i>		
Owner form	.303***	.157**
Number of employees	-.458***	-.234***
Business age	-.110*	-.084
<i>Model variables:</i>		
Organizational change		0.107
Information technology infrastructure		0.042
Top management commitment		0.147*
Change management systems and culture		0.273**
Management competence		0.121
F value	33.089***	25.832***
R <sup>2</sup>	0.359	0.546
Adjusted R <sup>2</sup>	0.348	0.525
R <sup>2</sup> change	0.359	0.186
F change	33.089***	14.120***

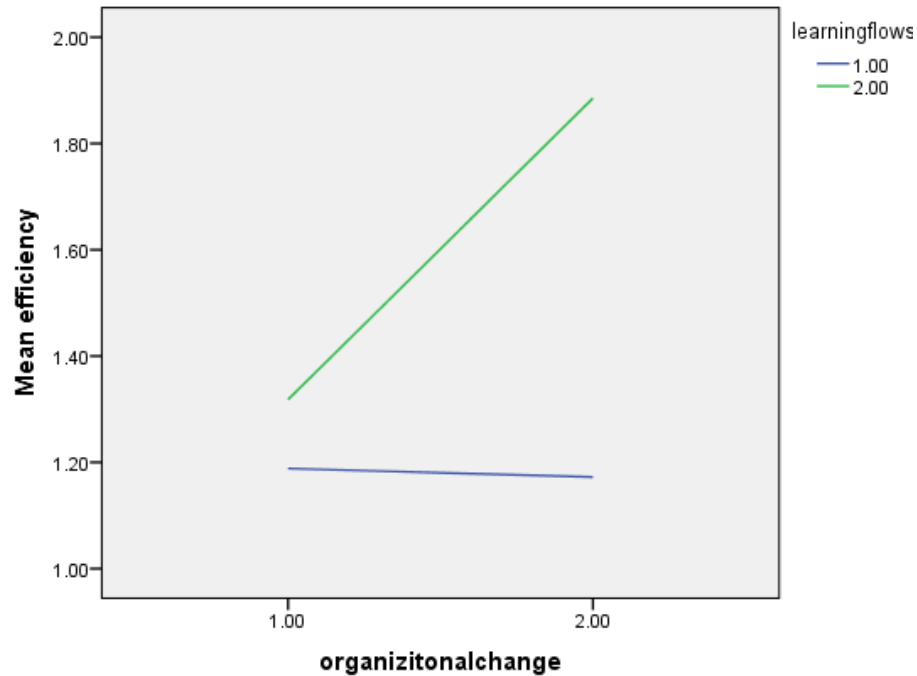
**Note:** Level of significant: \* $p<0.10$ , \*\* $p<0.01$ .

Furthermore, the results showed that the hypothesis was supported, i.e. *there is a positive relationships between BPR and efficiency of performance.*

These results give support to hypotheses:

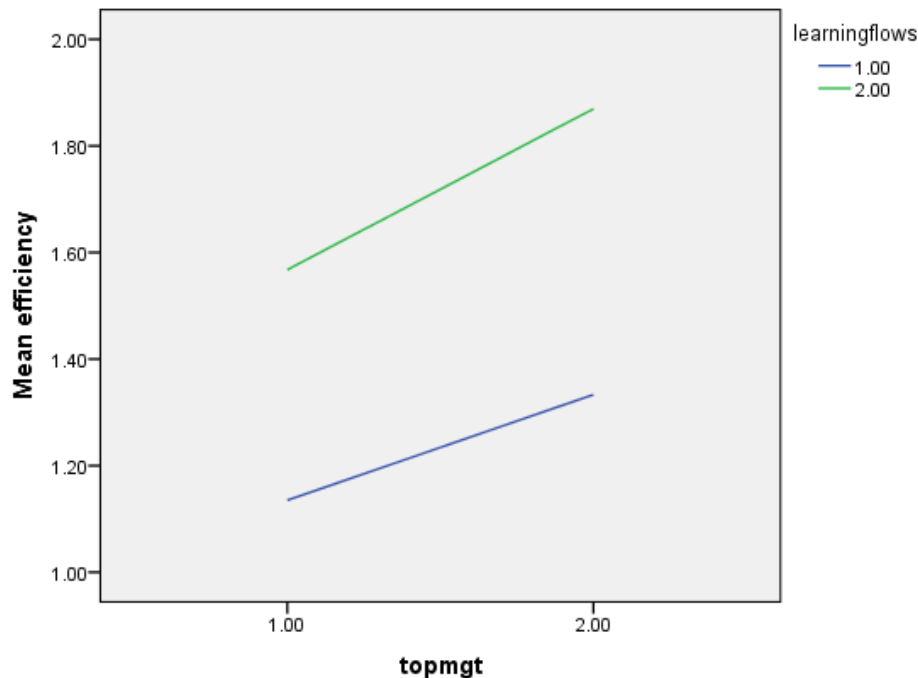
- *(There is a positive relationship between top management commitment and efficiency of performance).*
- *(There is a positive relationship between change management systems and efficiency of performance).*

In terms of the moderating effect of learning flows on the relationship between BPR factors and efficiency of performance. **Fig. 3.** showed the moderating effect of learning flows on the relationship between BPR factors and efficiency of performance. This result indicates that firms which have high level of learning flows has positive impact of organizational change on efficiency of performance at a high level of organizational change. Furthermore, the results reveals that firms which has low level of learning flows has clearly low positive effect on relationship between organizational change and efficiency of performance, if comparing between the two effects of learning flows level. These indicate that there is a lower limit and higher limit to what organizational change can improve and enhance the efficiency of performance for firms that has high level of learning flows.



**Fig. 3.** The moderating effect of learning flows on the relationship between BPR factors and efficiency of performance.

Regarding to moderating effect of learning flows on the relationship between top management commitment and efficiency of performance. **Fig. 4** revealed the moderating effect of learning flows on the relationship between top management commitment and efficiency of performance. This result indicates that firms which have high level of learning flows has positive impact of top management commitment on efficiency of performance at a high level of organizational change. Furthermore, the results shows that firms which also has low of learning flows has positive effect on relationship between top management commitment and efficiency of performance if comparing between the two effects of knowledge stocks level. Further, top management commitment was found to influence continuously efficiency of performance at a low levels of organizational change.



**Fig. 4.** Moderating effect of learning flows on the relationship between top management commitment and efficiency of performance.

## XII. DISCUSSION

### The Relationship between BPR Factors and Efficiency of Performance

The first research's objective was to look into the relationship between the relationship between BPR factors and organizational performance. The results revealed that BPR factors have strong positive and significant association with organizational performance.

- **BPR Factors and Efficiency Organizational Performance.**

The results showed that two factors of BPR Factors namely; top management and change management systems and culture have positive relationship with organizational performance (efficiency).

The results revealed that the coefficient of top management commitment is positive and statistically significant and had a positive significant relationship with organizational efficiency. This indicates that management commitment has a significant influence on the redeployment, and distribution organizational resources, and integration of IT within the organization (Smaltz & et al., 2006). This finding consistent with the result of Yonnedi, (2010). The key finding of his research is cross-sectional analysis shows that there had been a statistical significant relationship between organizational change and organizational efficiency.

- **The Moderating Effects of learning flows on the Relationship Between BPR and efficiency of Organizational Performance**

The results showed that the learning flows a quasi-moderating the relationship between one

components of business process reengineering; organizational change and change management systems and culture. Key challenges for successful BPR implementation are changing attitudes and culture, ensuring extensive communications and dealing with resistance to change from middle management. This study finding in line with (Terziovski and Others, 2003; Dennis et al, (2003); James and He, (2005).

### **XIII. LIMITATION AND FUTURE RESEARCH AND CONCLUSIONS**

- The perceived biasness may occur if a person with a high reputation strongly believes that their management practices are more advanced compared to other organizations. This point constituted one of the main challenges to present research.
- This research depends on a questionnaire survey at one point time.
- This research focuses only on an effect of BPR on organizational performance
- Using only one respondent per firm, which might be a cause of possible response bias, caution should be taken in results interpreting.

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