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Organisational Systems and Business Process Quality: Impact of Motivation

Abstract

In this research, we draw from organizational motivation and stakeholder theories, contingency theory, IT/Business alignment and IS success theories to develop and test a causal of organizational motivation impacts on systems and business process quality. Our findings indicate that organizational motivation type determines systems and process quality. Specifically, internal motivation has significant influence on both systems and process quality whereas external motivation has insignificant influence. Implications of the findings are discussed.

Keywords: IT Pay-Off, organizational motivation; business process quality; operational efficiency; firm performance

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Introduction

There is abundance of research that emphasises the importance of systems and business process quality on organisational benefits from IT investment. For example Kohli and Devraj (2003) mention that IT investment is not a one-effort but a process in which the initial action is that of investment in IT capital, followed by procurement of software and hardware which is then used to build the programs (systems) that provide information flows to deliver and monitor the quality of the services (business processes). IT/Business alignment, a concept advanced by Venkatraman in 1993 and which subsumes the co-presence of systems and business process quality, continues to be an area of research interest. For example, in a recent research, Yayla and Hu, 2012, mention that IT and business alignment leads to positive effect on firm perfomance, particularly in highly uncertain environments. However, what is not known is how systems and business process quality may be achieved.

We draw from contingency theory to justify that IT/business alignment may be viewed in terms of the co-presence of systems and business process quality. We also draw from the stakeholder theory to justify that organisational motivation types would influence the co-presence of systems and business process quality. We collected data from a sample of ISO firms for our study, the reason being ISO firms are certified for their product and service quality, and thus their IT systems

and business processes are expected to be of high quality – signifying their alignment. We next discuss the literature and theoretical model, the methodology and finally discuss the results of our statistical analysis.

Literature Review and Theoretical Model

IT/Business Alignment as co-presence of high systems and business quality

There is sufficient evidence that systems quality is an important determinant of organisational IS success. The DeLone and McLean, 2003 model has been tested by many researchers and it has been found that information and systems quality significantly determines organisational IS success through intervening variables of systems usage and user satisfaction. However, while there evidence of this influence primarily in the individual IS context, not much is known about their influence in the organisational IS context. Also, not much is known about the influence of the 'service quality' attribute of systems in the Delone and McLean (2003), on organisational IS success. However, what emerges from review of the model is that in the organisational context, attributes of systems quality play an important role in effective use and impact of IS.

However, ths 'systems only' perspective of Delone and McLean (2003) as a determinant of organisational IS success is debatable because theoretical justification for considering the process perspective in IT impact studies is present in prior studies. The concept of IT and business alignment advanced by Venkatraman 1993 is a case in point. This concept is predicated on the

contingency theory advanced by Fiedler, which states that organisational leadership and managemet styles are contingent on uncertainty in the environment and external factors that influence work. In the IT pay-off context, this means that with uncertainty arising from dynamism in the technology environment and industry competition, systems qualit initself may not be adequate to drive benefit from IT; it would determine on the appropriate organisational IT management style – specficially the IT governance mechanisms in terms of decision and input rights given to business and IT stakeholders and the consequent impact of such governance mechanism on business processes that can be structured with the IT systems and their alignment with organisational goals.

The contingency of IT systems and business processes alignment on organisational benefits from IT investment is further corroborated by quality management literature, which is particularly relevant to this study because we use ISO quality certified firms as our sample**.** Quality management literature indicates that quality of information systems helps to monitor and ensure that the process quality is maintained and improved. For example, the ISO 9001 quality management system (QMS) pre-supposes that system audits and reviews are performed regularly to identify and rectify process problems that are detrimental to quality of the product/services. Systems artifacts such as flow charts, planning matrix, tools such as statistical process control (SPC) provide information that helps to monitor process quality and to investigate critical areas where improvements are needed (Akdere, 2011; Ahire et al., 1996). Ollila, 2012 proposes that information systems that map processes and their interactions with systems must be included in the ISO 2008 specifications for optimal organizational benefits from ISO certifica-

tion. Banerjee and Ma (2010) show that a system with high quality may still be partially adopted and may not generate full organizational benefits and that such integration may come over a period of time (Banerjee and Ma, 2011).

Thus organisational benefits from IT investment is contingent on the co-presence of high quality of IT systems that aligns with and supports business processes that support organisational goals. This justifies the need to consider both- systems and business process quality in IT impact studies. Just as IT systems quality is determined by its ability to align and support appropriate business processes, the quality of business processes is determined by its ability to draw from the IT system through alignment with the potential of the available IT system. In this research we therefore view alignment as a quality attribute of IT systems and IT supported business processes that enables reciprocal adjustments of the two for realising organisational benefits.

We next discuss the theoretical justification for considering the antecedents of systems and process quality in organisational IT impact studies.

Determinants of systems and process quality – Internal and External Organisational Motivation

The importance of including organisational motivation in IT impact studies is justified by the tenets of the stakeholder theory. This theory argues that every legimate person or group associated with an organisation participates with a motive of deriving individual benefits while working for the organisational goals. Thus there may be differences in commitment of different stakeholders towards

different organisational goals. Masa'deh et al (2008) argue that organisational innovation and knowledge management approaches are crucial antecedents of alignment. Innovative approaches of using IT assets and creating business processes depend on the degree to which the IT and business stakeholders of the organization are motivated to share knowledge and behave in line with organizational goals (Gottschalg and Zollo, 2004). The stakeholder theory therefore provides important means to assess the impact of different types of employee motivation on organisational perfomance and the need to balance the different interests for achieving overall corporate performance (Donaldson and Preston, 1995).

Based on the stakeholder theory, Ngai et al (2013) refer to two types of organisational motivations for achieving corporate performance, one internal in nature (towards enhancing employee welfare and satisfaction with a view to increase operational efficiency and productivity) and the other external in nature (towards satisfying needs of consumers, suppliers, government, and the community for gaining profits and continued sustainability). Similarly, Zhu (2000) mentions that that different levels and types of motivation may be present in an organisation and they determine firm perfomance. Armalyte et al (2013) mention that lack of employee motivation is a major cause for failure of initiatives such as outsourcing aimed at IT quality infrastructure. In the same study, they also refer to the importance of employee motivation in understanding the specific business processes that can lead to better firm performance and benefits from outsourcing IT. Thompson and Mathys (2013) state that apart from internal organizational processes, workforce motivation should also be considered in determining firm per-

formance. Thus, motivation types are important antecedents of IT systems and process quality and warranty examination.

Specifically, two types of motivations are discussed in organizational literature, internal and external, with different objectives (Jang and Lin, 2008). Internal motivation is aimed at improving operational efficiency of the firm measured in terms of enhanced service/product performance, reduced customer's complaints, improved response to meet customer complaints and reduced product/service delivery time. External motivation on the other hand is aimed at firm performance measures such as building corporate image and improving other external aspects of firm performance such as increased customer base, increased orders, higher repeat sales volume, enhanced price bargaining position etc.. Management researchers mention that manager's must work towards maintaining a balance of the various interests of internal and external stakeholders of a firm (Freeman and Phillips, 2002, Ngai et al, 2013) for achieving firm performance

In quality certified firms such as ISO, which forms the sample in our study, two direct routes are likely determine the effect of quality on firm performance - the manufacturing route, synonymous with operational efficiency that produces quality products, and the market route, synonymous with marketing effectiveness that results in increased customer base, customer satisfaction, bargaining position etc. (Sousa and Voss, 2002). Thus internal motivation and commitment to implement and continually improve operational efficiency (Wiele van der et al., 2001) through high quality IT systems and business processess would co-exist with external motivation to exploit the ISO logo with marketing talent for

advertisement, customer relationship development, and financial talent to acquire and deploy more funds for expansion, manage finances, etc...

Martinez-Costa et al. (2008) investigated types of motivation in quality certified firms and found that internal motivation had greater impact on operational performance as compared to external motivation. Jang and Lin (2008) also state that internal motivation is directed at systems and processes (which lead to improved operational performance) while external motivation is directed at firm image, market share etc., indicators of firm performance from managerial efforts that are non-IT related.

Thus we hypothesize that internal motivation and external motrivation should both be tracked because of their different focus and possible differential impacts on systems and process quality. Specifically, we propose a research model (refer to figure 1) with the following hypothesis:

H1: High Internal Motivation would lead to high Systems Quality

H2: High Internal Motivation would lead to high Process Quality

H3: External Motivation would have low correlation with Systems Quality

H4: External Motivation would have low correlation with Process Quality

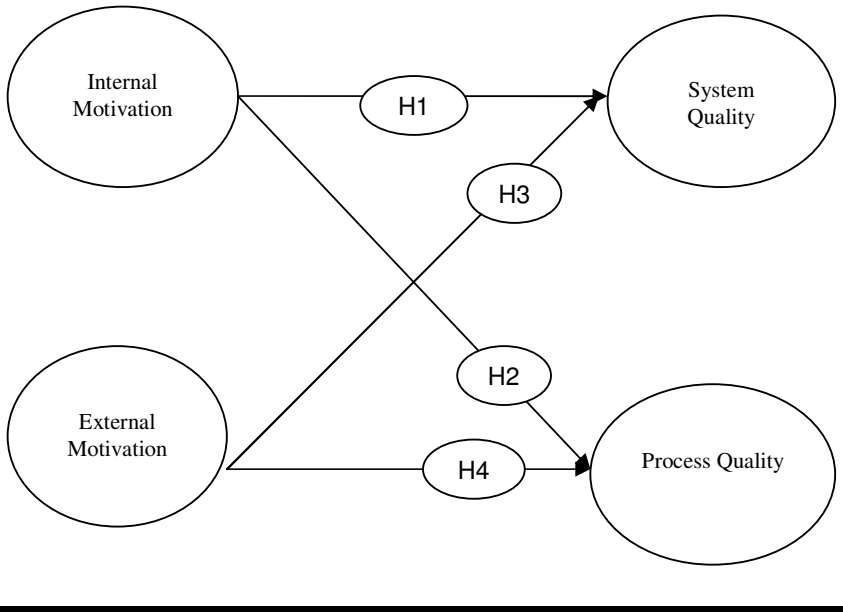

Figure 1: Research Model

Research Methodology:

Data Collection Procedure

250 questionnaires were distributed and 70 complete responses were available for the final statistical analysis. Initial draft of the questionnaire was refined following feedback from a pre-test with 4 academic staff. The structured questionnaires were then sent to targeted respondents. The sample included manufacturing (38%), service (52%) and other (10%) types of firms. Majority (82%) of the firms had ISO certification for more than 2 years while (42%) had been certified for more than 5 years. The respondents came from several functional areas including production, accounting, finance, sales and marketing departments. Most respondents (40%) had been in their current positions for more than 5 years and 28% had between 2 to 5 years of working experience. Thus, respondents were expected to have adequate knowledge of their companies'

activities including reporting requirements, management reporting and how information from IT systems helped them in performing their roles and to meet organizational goals.

The variables examined in this study and their measures are shown in Table 1.

Table 1: Variables and Measurements

Variables	Items	Measurements
Internal Motivation for Operational Efficiency (IM)	IM1	Improve corporate information flow
	IM2	Improve business process for better customer service
	IM3	Improve business process for faster service/product delivery time
External Motivation for Firm Performance (EM)	EM1	Promote corporate image
	EM2	Increase product/service offerings
	EM3	Manage competition
	EM4	Develop international markets
System Quality (IQ)	SQ1	Reports are provided on time and at desired intervals
	SQ2	Systems meet business process requirements
	SQ3	Systems are easy to use and available
	SQ4	Unusual process events are tracked by the systems and reported without delay
Process Quality (PQ)	PQ1	Reduced re-engineering work and wastage
	PQ2	Reduced percentage of defective products/service inadequacy
	PQ3	Improved systems supported quality control
	PQ4	Reduced manufacturing/service cost from supply chain efficiency

All the four variables were measured using a five-point Likert scale anchored from 1 (strongly agree) to 5 (strongly disagree). The measures for the variables were drawn from relevant literature and pre-tested with academics for face validity.

Data Analysis and Results

Table 2 shows the descriptive statistics of the variables used in this study. The means of the main variables indicate the respondents' perceptions were moderately high for all the variables. The highest mean was recorded for

motivation for operational efficiency (IM) while the lowest was for information quality (IQ).

Table 2: Descriptive Statistics for Main Variables (N=70)				
Variable	**Mean**	**SD**	**Min**	**Max**
IM	2.067	0.716	1.00	4.00
EM	2.180	0.657	1.00	4.00
SQ	2.280	0.669	1.00	3.80
PQ	2.135	0.641	1.00	4.00
IM: Motivation for Operational Efficiency; EM: Motivation for Firm Performance; SQ: Systems Quality; PQ: Process Quality; Scale: 1 (strongly agree) to 5 (strongly disagree).				

To measure reliability and validity of the measurements, individual item reliability, internal consistency and discriminant validity were assessed. Individual item reliability was assessed by examining the loadings of each item on its corresponding construct. While the loadings must exceed 0.7 threshold (Barclay et al., 1995; Hulland, 1999), loadings of 0.5 and 0.6 can also be accepted but must be interpreted with caution because it "can attenuate the estimated relationships between constructs" (Hulland, 1999, p.199). Loadings of less than 0.5 should be dropped from the analysis (Hulland, 1999). In this study, one item which had a loading below 0.5 (item IM1=0.389), and was dropped. The factor loadings are shown in Table 3

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Table 3: Factor Loadings from Final PLS Measurement Model						
	EM	**FP**	**IM**	**IQ**	**OE**	**PQ**
EM1	**0.612**	0.090	0.066	0.061	0.069	0.201
EM2	**0.833**	0.226	0.350	0.181	0.144	0.311
EM3	**0.646**	0.129	0.051	0.001	0.021	0.137
EM4	**0.881**	0.385	0.383	0.233	0.212	0.447
IM2	0.368	0.492	**0.862**	0.286	0.579	0.582
IM3	0.232	0.457	**0.831**	0.420	0.470	0.414
SQ1	0.295	0.565	0.388	**0.728**	0.410	0.374
SQ2	0.256	0.730	0.259	**0.818**	0.638	0.609
SQ3	0.078	0.611	0.325	**0.867**	0.519	0.413
SQ4	0.127	0.631	0.279	**0.844**	0.523	0.437
PQ1	0.362	0.595	0.384	0.518	0.608	**0.752**
PQ2	0.280	0.456	0.528	0.284	0.515	**0.722**
PQ3	0.294	0.542	0.498	0.352	0.601	**0.855**

PQ4	0.309	0.640	0.341	0.597	0.497	**0.630**

IM: Internal Motivation; EM: External Motivation; SQ: System Quality; PQ: Process Quality;

In terms of reliability, Table 4 shows each variable scores more than 0.8 for composite reliability and almost all variables exceed 0.7 for the Cronbach alpha.

Table 4: Reliability, Average Variance Extracted (AVE) and Correlations

	AVE	Composite Reliability	Cronbach Alpha	Correlations					
				IM	EM	IQ	PQ	OE	FP
IM	0.717	0.835	0.605	**0.847**					
EM	0.565	0.835	0.764	0.358	**0.752**				
SQ	0.620	0.890	0.844	0.413	0.206	**0.788**			
PQ	0.554	0.831	0.726	0.592	0.417	0.578	**0.744**		

Diagonal elements are the square roots of the AVE (bold).
IM: Internal Motivation; EM: External Motivation; SQ: Systems Quality; PQ: Process Quality;

The AVE of each variable exceeds 0.5, which signifies convergent validity. Table 4 also demonstrates that the variables have discriminant validity. The square roots of the AVE of most of the variables are more than the respective correlations between variables (Chin, 1988). It indicates that more variance is shared between each latent variable and its manifest variables than it shares with other latent variables in the same model (Fornell and Larcker, 1981). These results of the measurement model suggest that all constructs meet satisfactory reliability and validity requirements.

PLS Analysis

To analyze the data, Partial Least Squares (PLS) analysis was used. PLS was chosen because it allows the estimation of complex model which comprise of many independent and dependent variables (Chin, 1998). It has less stringent assumption on measurement scales and sample size (Chin, 1998, Henseler et al., 2009) and "can be used effectively in small sample studies" (Barclay et al., 1995, p.291).

Measurement Model

Figure 2 shows the path co-efficient and explanatory power of the independent variables.

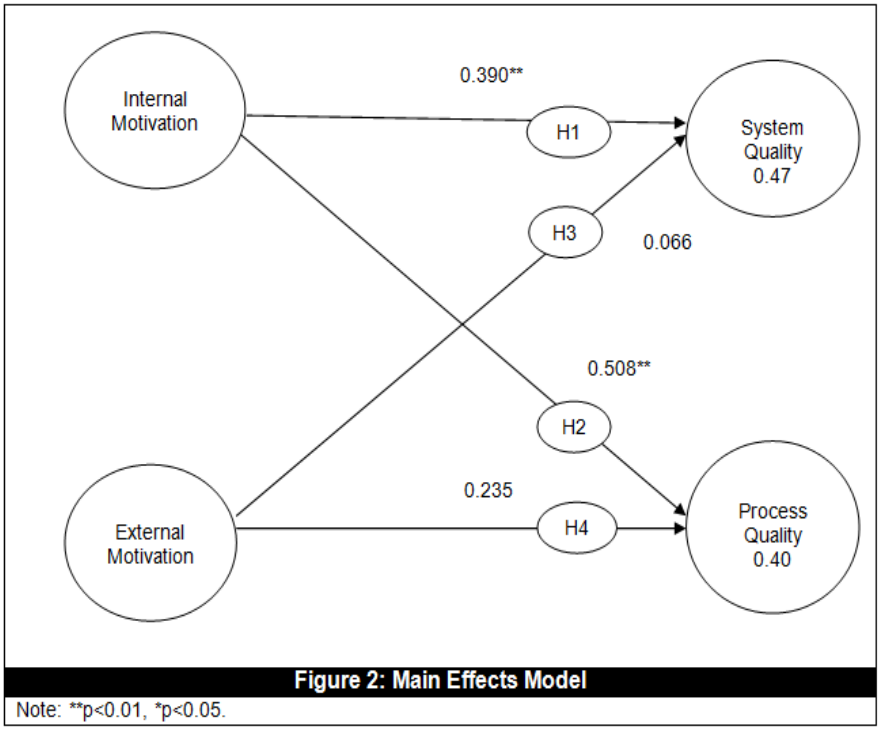

Figure 2: Main Effects Model

Note: **p<0.01, *p<0.05.

Figure 2 shows that while information and process quality have high correlation with internal motivation (β=0.39 and β=0.508 respectively with p<0.01), external motivation does not have significant correlation with information and process quality (β=0.066 and β=0.235; p>0.05). This supports hypotheses H1 thru H4. While 47% of the variance in process quality is explained by internal motivation, 40% of systems quality is explained by internal motivation. External Motivation has insignificant effect on IT systems and business process quality.

Discussion

Our findings indicate that firms with internal motivation are likely to have high quality of information and processes, in turn leading to high IT pay-off. To further understand the effects of internal and external motivation, we conducted a paired t-test for two groups of firms; (1) firms with high internal motivation and low external motivation, and (2) firms with low internal motivation and high external motivation. The t-test results (Table 5) are consistent with our expectation. Firms with high internal motivation but low external motivation have significantly higher mean process quality compared to firms with low internal motivation and high external motivation (t=1.902) at a significance level of 10%.

Table 5: T-test on Firm Performance

Group	Means	t-value (p)
High IM and Low EM (n=4)	3.125	1.902 (0.094)
Low IM and High EM (n=6)	2.250	
IM: Internal Motivation; EM: External Motivation		

Conclusion

In this research, we empirically demonstrate how types of motivation influence quality of systems and process. The findings are theoretically significant in that it demonstrates that the variables of quality of systems and processes signify extent of their alignments with each other. The findings are practically significant in that our proposed model helps to probe deeper into the link between organizational motivation types and systems and business process, thus providing a means for managers to focus on these crucial intermediate organizational variables to improve organizational benefits from IT investment.

Future research may be conducted to examine how other contextual factors such as organizational culture and leadership styles influence the systems and process alignment. Evidence exists that management style, i.e. whether employees are empowered or are under authoritarian control determines workplace resilience and motivation (Martin, 2004). Thus organisational leadership and management styles are likely to influence types of motivation and the quality of systems and processes, leading to variations in organisational performance impacts from IT. Findings from such research could provide insights on how managerial interventions may be structured to derive maximum benefits from IT investment. The impact of technology turbulence and technology expertise is also an interesting area for future research. Depending on the technological turbulence (characterized by rapidly changing technology) and the rate of technology obsolescence facing the firms, differences in alignment may be observed depending on technology expertise to dynamically transform new IT investments to appropriate systems and processes.

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