The Effects of Process Orientation on Customer Satisfaction, Product Quality and Time-Based Performance

Abstract

Does process orientation matter? Several organizations choose to be process-oriented. They focus on business processes instead of emphasizing functional structures. This paper empirically explores the relationship between process orientation (PO) and non-financial firm performance. Process orientation is measured by means of ten dimensions. Firm performance is measured by customer satisfaction, product quality, time to market, delivery time and delivery reliability. It is also examined if firm size and manufacturing process type moderate the investigated relationships. The paper uses a sample of Austrian firms operating in metal and machinery industry. Preliminary findings indicate that PO is related positively to all aforementioned performance dimensions.

1 Introduction

Several organizations choose to be process-oriented. Process orientation (PO) means focusing on business processes ranging from customer to customer instead of placing emphasis on functional and hierarchical structures (Reijers, 2006). A process-oriented organization is also often called "horizontal organization" (Ostroff, 1999), "process centered organization" (Hammer, 1996), "process enterprise" (Hammer and Stanton, 1999), "process focused organization" (Gardner, 2004) or simply "process organization" (Osterloh and Frost, 2006). A lot of the existing literature of the process-oriented organization has been in the popular press and lacks research or an empirical focus (Sussan and Johnson, 2003). Many case studies refer to a positive relationship between process orientation and organizational performance but a solid empirical verification of this central guideline has not happened yet (Vera and Kuntz, 2007). This work focuses on the question if there is a positive relationship between process orientation and customer satisfaction, product quality, time to market, delivery time and delivery reliability. While a few studies examined the effects of PO on financial performance, there is a clear lack of quantitative studies investigating the effects of PO on the aforementioned performance measures. The study uses a sample of 133 Austrian firms operating in metal and machinery industry. The quality of the collected data is considered to be very high since the researcher collected the data by conducting personal interviews. The paper will begin by reviewing existing studies exploring process orientation and its benefits. Next, research design is specified and operationalization of the variables process orientation and firm performance is carried out. Finally the preliminary results are discussed followed by a conclusion of this work.

2 Literature Review

Several authors argue that PO yields to a range of benefits.

"In virtually every industry, companies of all sizes have achieved extraordinary improvements in cost, quality, speed, profitability, and other key areas by focusing on, measuring and redesigning their customer-facing and internal processes" (Hammer, 2007b, p.111).

Schmelzer and Sesselmann (2006) argue that integrated business process management yields to higher customer satisfaction, lower cycle times, increase of process and product quality, reduction of costs, increase of sales, higher profits and higher company value. Frei et al. (1999) empirically explored the relation between branched-based processes and financial performance of U.S. retail banks. One of the findings of this study is that banks which perform better across those branch-based processes also tend to have a better financial performance. The empirical study of Gustaffson et al. (2003) analyzed quality practices in Swedish service organizations. The study shows direct impact of process orientation on customer satisfaction for large service organizations. The empirical study of Ittner and Larcker (1997) analyzed firms in the automotive and computer industry in Canada, Germany, Japan and the United States. They found that certain process management methods improved profitability while others had little effect on financial performance. The results of the empirical study of McCormack and Johnson (2001) give evidence that process orientation helps companies to improve business performance, reduce inter-functional conflict and improve "esprit de corps". In this study, manufacturing firms across multiple industries in the United States were analyzed. Silvestro and Westley (2002) carried out case study research to explore the operational changes resulting from reengineering companies along process. One large electronics company and one large retail company (both U.K. based organizations) were investigated. Perceived benefits were increased market responsiveness, improved collaboration between functions and alignment of organizational objectives. They also report disadvantages like duplication of functional expertise and increased operational complexity resulting in an escalation of cost. A case study of Volvo car company conducted by Hertz et al. (2001) reported that Volvo’s shift to a process organization resulted in lower inventory costs, shortened lead-times, increased delivery reliability, and higher customer satisfaction.

3 Research Design

Based on the literature review, the following hypotheses are formulated:

Hypothesis 1: The degree of PO is related positively to product quality.
Hypothesis 2: The degree of PO is related positively to customer satisfaction.
Hypothesis 3: The degree of PO is related positively to delivery speed.
Hypothesis 4: The degree of PO is related positively to delivery reliability.
Hypothesis 5: The degree of PO is related positively to time to market speed.

3.1 Operationalization of Process Orientation

For operationalizing the term PO existing models and studies which already measured PO were used: the process and enterprise maturity model by Hammer (2007b), and the models by Fischermanns (2006), McCormack and Johnson (2001), Reijers (2006) and Willaert et al. (2007). From these models ten dimensions (each measured by several indicators) of a process-oriented organization were derived. The quality of the resulting model was approved by expert interviews. A questionnaire was designed based on the model. For all indicators – each measuring one aspect of process orientation – a statement was formulated. Each statement had to be rated by the respondents using a six point Likert scale ranging from full disagreement to full agreement. The questionnaire was tested and improved by conducting cognitive interviews and a pilot study. The ten dimensions of the model are as follows (the individual indicators of each dimension are not reported):

Process Design and Documentation

A prerequisite for managing an organization based on its processes is to know which business processes are performed within the organization and how they are related to each other. This dimension measures to which degree the firm's processes are explicitly designed and documented.

Management Commitment

In a process-oriented organization, management needs to support the process program. Without the support of senior executives, the process idea cannot unfold its full potential. Hence, this dimension captures to which degree management supports the process program.

Process Owner

The existence of process owners is the most visible difference between a process enterprise and a traditional organization (Hammer and Stanton, 1999). A business process needs to have a manager who has end to end responsibility of the process. This dimension measures the extent to which the role of the process owner is implemented in the firm.

Process Performance Measurement

Implementing measures and taking corrective actions are operating precepts of process management (Melan, 1989). By focusing measurement on processes rather than functions, alignment and common focus across separate organizational units can be achieved (Hammer, 2007a). This dimension measures to which degree measurement of process performance is carried out in the organization.

Corporate Culture

PO is also a matter of enterprise culture. Only a culture based on teamwork, readiness to change, customer orientation and a cooperative leadership style goes hand in hand with the process approach. This dimension measures whether the firm has a process-oriented enterprise culture or not.

Information Technology

Information technology can act as an enabler for PO. IT systems which seamlessly integrate all the information flowing through a company support the process approach. Also, a business process management system – which is a software tool that facilitates activities such as modeling, analysis and enactment of business processes (Reijers, 2006) – supports at least process documentation. Hence, this dimension captures whether information technology supports the process idea.

Organizational Structure

A process-oriented organization has adapted its structure to the process view, following the principle "structure follows process". This dimension measures the extent to which organizational structure fits process design.

People and Expertise

In a process-oriented firm, people who execute the processes need to have appropriate skills and knowledge. Furthermore, knowledge of certain process improvement, process redesign and change management techniques have to be present. This dimension maps certain knowledge, expertise and skills of the people working in a process-oriented organization.

HR Systems

This dimension captures whether process-oriented HR systems are in place or not. In a process-oriented enterprise, the process design should drive job descriptions. Also, incentive systems should be implemented which emphasize the process' needs.

Coordination and Integration of Process Projects

Finally this dimension captures the existence of an instance coordinating and integrating process projects (also often referred to as business process management office).

3.2 Performance Measures and Control Variables

The outcome variables are measured by perceptual ratings. Perceptual ratings rely on the interviewee's judgment and allow him/her to give an answer without giving specific numerical information. Interviewees are more willing to answer a subjective question than to queries about numerical data (Ahire et al., 1996). Respondents were asked to evaluate product quality, time to market and delivery time (each as compared to their major competitors) as well as customer satisfaction (by 4 items) and delivery reliability by using six point Likert scales. The end-points of the scales were selected such that high rating reflects high performance. The effects are controlled by firm size (measured by the natural logarithm of number of employees) and manufacturing process type (according to Hill (2000), three groups were defined: project or jobbing producers, batch or line producers, and firms applying both manufacturing process types). It is also examined if firm size and manufacturing process type have moderating effects on the relationships in question.

3.3 Sample and Data Collection

The population of this study is defined as Austrian corporations operating in metal and machinery industry with at least 50 employees. Firms were selected randomly and telephone interviews were used for data collection. All telephone interviews were personally conducted by the researcher. For every firm one executive (CEO, CIO or quality manager) was interviewed. This is a clear difference to studies which are using a mail survey method for data collection. Data quality of this study is expected to be high since respondents are personally identified and interviewed assuring that the interviewee has the knowledge to truthfully answer the questions. A total of 152 organizations were interviewed. However, only 133 firms remained in the sample as some respondents did not have the knowledge to meaningfully answer the questions. The collected data was pre-processed. First, missing values were replaced (missing values were only replaced for the PO indicators and not for the performance variables reducing the sample sizes in some tests) and indicators were recoded. Second, dimension measures were computed from their indicators and finally the overall degree of PO was computed.

4 Analysis and Preliminary Results

To avoid multicollinearity problems that are likely in regression variates with moderating effects, the independent variables of interest (PO and firm size) were centered, as suggested by (Aiken and West, 1991). In order to examine if the results are affected by multicollinearity, the variance inflation factors (VIFs) and the tolerance values were examined, as suggested by Hair et al. (2006). For all regression models, the VIFs were well below the threshold value of 10 or greater, which is indicative of multicollinearity (none of the VIFs were above 1.589), and the tolerance values were well above the suggested 0.10 or less threshold, which is indicative of multicollinearity (for all models, the tolerance values were 0.629 or greater). In addition, normality and homoscedasticity violations were assessed by applying the Kolmogorov–Smirnov test and by visually inspecting normal probability and residual plots. The plots and the tests did not indicate deviations from normality nor from homoscedasticity. As described by (Aiken and West, 1991) dummy variables are used to examine the interaction effect of manufacturing process type on the PO-to-performance relationships. The three groups (project/jobbing manufacturers, batch/line manufacturers and firms applying both manufacturing process types) require two dummy variables. Project/jobbing manufacturers are chosen to represent the comparison group. The first dummy variable (D_{batch}) compares the batch/line producers with the project/jobbing producers whereas the second dummy variable (D_{both}) compares the firms applying both manufacturing process types to the project/jobbing producers. The interaction between PO and the manufacturing process type variable is formed by multiplying PO by each of the dummy variables comprising the categorical variable.

Tables 1 to 5 present the result of regression analyses testing the hypotheses. PO has a significant positive effect on product quality (Table 1, Model 1), supporting Hypothesis 1 (at a 1% level). Neither firm size (Table 1, Model 2) nor manufacturing process type (Table 1, Model 3) is moderating this relationship. According to Table 2, PO has a significant positive effect on customer satisfaction (at a 10% level), supporting Hypothesis 2. Table 3 presents the results of the PO-to-delivery speed relationship examination. According to this Table, PO has a significant positive effect on delivery speed (at a 1% level), supporting Hypothesis 3. Table 4 reports that PO has a significant positive effect on delivery reliability (at a 5% level), supporting Hypothesis 4. Finally, the findings provided by Table 5 indicate the PO has a significant positive effect on time-to-market speed (at a 10% level), supporting Hypothesis 5. All relationships examined are neither moderated by firm size, nor by manufacturing process type.

Table 1: Effects of PO on product quality, moderated by firm size and manufacturing process type

	Model 1		*Model 2*		*Model 3*	
	beta	*t-value*	*beta*	*t-value*	*beta*	*t-value*
PO	0.238**	2.736	0.232**	2.663	0.273^{+}	1.969
Size	0.176^{+}	1.925	0.157^{+}	1.675	0.167^{+}	1.794
D_{batch}	0.023	0.228	0.034	0.335	0.022	0.215
D_{both}	-0.055	-0.580	-0.062	-0.648	-0.058	-0.601
POxSize			-0.081	-0.911		
$POxD_{batch}$					-0.010	-0.078
$POxD_{both}$					-0.070	-0.688
R^2	0.101		0.107		0.105	
R^2 change			0.006		0.004	
F	3.422*		2.900*		2.339*	

Notes: Dependent variable: product quality. Standardized regression coefficients are reported.
$^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$, all tests are two tailed.

Table 2: Effects of PO on customer satisfaction, moderated by firm size and manufacturing process type

	Model 1		*Model 2*		*Model 3*	
	beta	*t-value*	*beta*	*t-value*	*beta*	*t-value*
PO	0.179^{+}	1.886	0.179^{+}	1.871	0.380*	2.586
Size	0.059	0.598	0.051	0.502	0.055	0.555
D_{batch}	0.103	0.947	0.111	1.007	0.110	1.013
D_{both}	0.088	0.849	0.084	0.810	0.075	0.734
POxSize			-0.054	-0.567		
$POxD_{batch}$					-0.217	-1.590
$POxD_{both}$					-0.148	-1.361
R^2	0.056		0.059		0.084	
R^2 change			0.003		0.028	
F	1.615		1.348		1.630	

Notes: Dependent variable: customer satisfaction. Standardized regression coefficients are reported.
$^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$, all tests are two tailed.

Table 3: Effects of PO on delivery speed, moderated by firm size and manufacturing process type

	Model 1		*Model 2*		*Model 3*	
	beta	*t-value*	*beta*	*t-value*	*beta*	*t-value*
PO	0.255**	2.770	0.245*	2.634	0.436**	2.944
Size	-0.161	-1.644	-0.183^{+}	-1.829	-0.163	-1.619
D_{batch}	0.230*	2.116	0.253*	2.286	0.224*	2.068
D_{both}	0.010	0.094	0.002	0.022	-0.004	-0.035
POxSize			-0.102	-1.059		
$POxD_{batch}$					-0.174	-1.279
$POxD_{both}$					-0.157	-1.420
R^2	0.130		0.140		0.152	
R^2 change			0.009		0.022	
F	3.901**		3.348**		3.059**	

Notes: Dependent variable: delivery speed. Standardized regression coefficients are reported.
$^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$, all tests are two tailed.

Table 4: Effects of PO on delivery reliability, moderated by firm size and manufacturing process type

	Model 1		*Model 2*		*Model 3*	
	beta	*t-value*	*beta*	*t-value*	*beta*	*t-value*
PO	0.206*	2.248	0.202*	2.193	0.291*	2.075
Size	0.038	0.399	0.029	0.296	0.021	0.218
D_{batch}	0.060	0.572	0.065	0.619	0.055	0.527
D_{both}	-0.057	-0.579	-0.062	-0.620	-0.072	-0.724
POxSize			-0.052	-0.563		
$POxD_{batch}$					-0.041	0.313
$POxD_{both}$					-0.153	-1.465
R^2	0.062		0.064		0.079	
R^2 change			0.003		0.018	
F	1.930		1.598		1.654	

Notes: Dependent variable: delivery reliability. Standardized regression coefficients are reported.
$^{+}p<0.10$, $*p<0.05$, $**p<0.01$, all tests are two tailed.

Table 5: Effects of PO on time to market speed, moderated by firm size and manufacturing process type

	Model 1		*Model 2*		*Model 3*	
	beta	*t-value*	*beta*	*t-value*	*beta*	*t-value*
PO	0.227^{+}	1.834	0.227^{+}	1.818	0.281	1.304
Size	-0.098	-0.740	-0.098	-0.721	-0.107	-0.794
D_{batch}	0.043	0.278	0.043	0.271	0.038	0.245
D_{both}	-0.131	-0.910	-0.131	-0.903	-0.138	-0.940
POxSize			-0.001	-0.005		
$POxD_{batch}$					-0.007	-0.036
$POxD_{both}$					-0.132	-0.918
R^2	0.078		0.078		0.092	
R^2 change			0.000		0.015	
F	1.329		1.046		1.035	

Notes: Dependent variable: time to market speed. Standardized regression coefficients are reported.
$^{+}p<0.10$, $*p<0.05$, $**p<0.01$, all tests are two tailed.

5 Conclusion

This paper empirically investigated the relationship between process orientation and non-financial firm performance, i.e. product quality, customer satisfaction, delivery speed, delivery reliability and time-to-market speed. The preliminary findings indicate that PO has a significant positive effect on all these performance dimensions. Another finding is that firm size does not moderate these relationships. Therefore, PO should not be branded as an organizational approach only for large firms as the positive relationship between PO and firm performance also holds for medium-sized firms. Neither does the manufacturing process type moderate these relationships, i.e. PO leads to better performance not only for batch/line producers, but also for project/jobbing manufacturers. The further course of action of this ongoing research project includes (1) the investigation of the relationship between PO and financial firm performance, and (2) the examination of how individual PO dimensions effect firm performance.

Limitations of this study are as follows. First, the sample in this work only included Austrian firms operating in metal and machinery industry. Generalizability of the findings to other industries or other countries is open to scrutiny. Second, only one interview per firm was conducted. Interviewing several managers per firm would have led to even higher data quality.

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