

# Process Performance Measurement and Firm Performance: The Moderating Role of the Process Owner

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**Summary.** Business process orientation can be interpreted as the organizational approach making business processes the platform for organizational structure and strategic planning. Although there is much emphasis on the importance of organizational process alignment, little attention has been paid to the specific dimensions of process orientation and their importance. Specifically, there is a clear lack of studies investigating the performance impact of process performance measurement and the role of the process owner as well as their interaction and joint effect on organizational performance. By using a sample of Austrian manufacturing companies, we address this issue and empirically explore the interaction effect of process performance measurement and the process owner role on organizational performance. The empirical evidence indicates that implementing process performance measurement or the process owner role alone is insufficient to achieve high performance. Rather, organizations must implement both concepts to reap the fruits of process management.

**Key words:** process management, process owner, process performance measurement, firm performance

## 1.1 Introduction

A central question in strategy is: How do firms achieve sustainable competitive advantage? According to the resource-based view (RBV) of the firm, organizations in the same industry perform differently because they possess different resources and capabilities [1] [2]. Organizational processes have emerged as critical building blocks in these difficult-to-imitate capabilities [3] [4]. At the same time, a focus on organizational processes has increased in managerial practice [5]. Process orientation (PO) can be interpreted as the organizational effort required making business processes the platform for organizational structure and strategic planning [6] [7] [8]. A process-oriented organization is also often referred to as "horizontal organization" [9], "process centered

organization" [10], "process enterprise" [11], "process focused organization" [12] or simply "process organization" [13] [14]. A process-oriented organization comprehensively applies the concept of business process management. A firm which adopted the process-view of its organization, regardless of whether it has already run through business process reengineering and/or process improvement projects or not, is concerned with the management of its business processes [15]. Business process management incorporates the discovery, design, deployment, execution, interaction, control, analysis and optimization of business processes [16]. A lot of the existing literature of the process-oriented organization aimed at educating managers on implementing process management practices and lacks research or an empirical focus [17] [18]. Many companies started to realize the benefits associated with implementing business process orientation [19]. Several authors and empirical studies refer to a positive impact of process-oriented organizational design on firm performance [20] [21] [22] [23]. Despite the growth in the business process management literature, certain important gaps still remain.

Specifically, many studies treat the construct of process orientation as a unidimensional measure. However, process orientation exhibits a multidimensional nature. As such, the construct consists of dimensions such as documentation of business processes, management commitment towards the process view, the process owner role, process performance measurement, etc. [24]. While the importance of process management has often been highlighted, much more remains to be understood about the impact of specific dimensions of process orientation on organizational performance. In this paper, we focus on the process owner role and process performance measurement - as they represent two key dimensions of process orientation [25]. There is a remarkable lack of studies investigating the importance of the process owner and process performance measurement in organizations. By using a sample of Austrian manufacturing companies, we address this issue and empirically explore the interaction effect of process performance measurement and the process owner role on organizational performance. The empirical evidence will show that both concepts must be present in the organization in order to gain high organizational performance. In summary, we advance the growing body of literature on process management by focusing on the process owner role and process performance measurement - two key dimensions of process orientation - and their interaction effect on firm performance. Through our empirical assessment, we contribute to a greater clarity and better understanding of how the process approach impacts organizational performance. In the next section, we present the literature review and our hypothesis. After describing our research method, we present the empirical findings using data on Austrian manufacturing firms. We conclude with a discussion of the results, implications, and issues for further research.

## 1.2 Theory

Organizational effectiveness depends on business processes that have been designed from a stakeholder perspective, i.e. customers [26]. Inevitably, business processes, once deployed, hardly ever remain unchanged over time. There will be necessary changes in the process design over time as business conditions and customer requirements change. Improvement of the process design is key to improve business performance [27]. Organizations no longer compete on processes, but the ability to continually improve processes [28]. Continuous improvement is defined as "a systematic effort to seek out and apply new ways of doing work, i.e. actively and repeatedly making process improvements" [29]. Continuous improvement initiatives help enhance the organization's ability to make cohesive and quick process changes to improve performance. Hence, continuous improvement initiatives can serve as a dynamic capability for the organization [29]. Improvement of the process design must be properly supported [27]. The concept of process performance measurement allows for tracking current process performance and therefore supports the identification for improvements [26]. However, while we argue that the concept of process performance measurement supports achieving higher performance, we also argue that solely measuring the performance of business processes without initiating appropriate measures will not lead to any improvements. Hammer [27] states that a performance metric has to be used systematically. Even the best-designed metrics are of little value unless they are utilized to drive improved performance. Thus, every metric must have an individual who is personally responsible and accountable for it. This individual must ensure that his/her metrics achieve the planned target levels. Responsibility for end-to-end process metrics therefore needs to rest with the process owner. It is the process owner who uses the metrics to track the status of the business process and guide improvement efforts [11]. The design of a process establishes an upper limit on its performance; no process can perform better on a sustained basis than its design allows. Therefore, a process owner must be in place as he/she has the competence and power to redesign the process. Based on these thoughts, we argue that process performance measurement and the process owner role both must be present in order to achieve high organizational performance. We therefore predict that there is an interaction effect between process performance measurement and the process owner role on organizational performance.

*Hypothesis 1: Process performance measurement and the process owner role will have a positive interaction effect on organizational performance.*

## 1.3 Measurement of Constructs

For operationalizing the two constructs "process owner" and "process performance measurement", we carefully derived items from existing models and

studies which already measured process orientation: the process and enterprise maturity model by Hammer (2007) [25], and the models by Fischermanns (2006) [30], McCormack and Johnson (2001) [22], Reijers (2006) [6], Vera and Kuntz (2007) [23], and Willaert et al. (2007) [31].

#### *Operationalization of Process Owner*

The existence of process owners is the most visible difference between a process enterprise and a traditional organization [11]. This dimension measures the extent to which the role of the process owner is implemented in the firm and uses the following items.

*Existence of process owners:* A business process needs to have a process owner having end to end responsibility of the process [8]. This indicator is adopted from the models by Fischermanns (2006) [30], Hammer (2007) [25], Reijers (2006) [6] and Willaert et al. (2007) [31] and measures whether the role of the process owner is established in the organization and whether a process owner has been assigned to each business process.

*Experience of process owners:* A process owner needs to have leadership experience [32]. This measure is adopted from the model by Hammer (2007) [25] and captures whether process owners are experienced leaders/managers.

*Power of the process owner in order to be able to act for the process interests:* Process owners have to have the authority to take all measures necessary to coordinate and improve the business process [33] [34]. The process owner must have the authority to manage and resource the development and implementations of the process [26]. This measure is adopted from the model by Hammer (2007) [25] and captures whether process owners are members of the enterprise's seniormost decision-making body.

*Are process owners responsible for continuous improvement of their processes and do they perform this task proactively?* An important task of a process owner is the continuous improvement and optimization of the process the owner is responsible for [32]. This measure is adopted from the model by Hammer (2007) [25] and captures whether process owners are responsible for continuous improvement of their processes and whether they perform this task proactively.

*Process owner's influence over personnel assignments:* Process performance logically depends on the workers executing the actual work within the process. If process owners have influence over personnel assignments, they thereby also have more influence on the performance of the process. This measure is adopted from the model by Hammer (2007) [25] and captures whether process owners have strong influence over personnel assignments.

#### *Operationalization of Process Performance Measurement*

Process performance measurement is the monitoring of agreed performance indicators to identify whether a process meets planned targets [34]. By focusing measurement on processes rather than functions, alignment and common

focus across separate organizational units can be achieved [27]. Implementing measures and taking corrective actions are operating precepts of process management [35], since a business process can only be mastered if it can be measured [33]. This dimension measures to which degree measurement of process performance is carried out in the organization.

*Existence of process performance indicators for business processes:* Process performance indicators are metrics capturing the performance of a business process. This indicator is derived from the models by Fischermanns (2006) [30], Hammer (2007) [25], McCormack and Johnson (2001) [22], Reijers (2006) [6] and Willaert et al. (2007) [31] and captures whether performance indicators are defined for business processes.

*Derivation of process performance indicators from enterprise goals:* Process performance indicators have to be derived from the process objectives which themselves have to be derived from business objectives. This is crucial because business processes have to be aligned with business strategy [36] [34]. This indicator is derived from the model by Hammer (2007) [25] and captures whether process performance indicators are derived from enterprise goals and/or from (internal) customer requirements.

*Are actions actually initiated by performance indicators?* Measuring process performance without reacting on poor performance stresses resources, but does not lead to any improvements. This indicator is derived from the models by Fischermanns (2006) [30], Hammer (2007) [25], and Reijers (2006) [6] and captures whether improvement actions are actually initiated if poor process performance is encountered.

*Presentation of metrics to process workers:* Process workers who know the performance of the business process are able to timely react on bad performance and are therefore considered as really empowered. This indicator is derived from the model by Hammer (2007) [25] and captures whether process metrics are presented periodically to process performers (for e.g. awareness and motivation).

*Use of metrics for process benchmarking:* Process benchmarking uses business processes as comparison units and aims to identify best operating practices [37]. This measure is adopted from the model by Hammer (2007) [25] and captures whether process benchmarking is carried out in the organization.

*Use of activity based costing:* Activity based costing captures costs horizontally in line with business processes [33]. This measure is adopted from the models by Hammer (2007) [25], Reijers (2006) [6], and Vera and Kuntz (2007) [23] and captures whether activity based costing is comprehensively applied in the organization.

#### *Operationalization of Firm Performance*

Financial performance was measured by return on sales (ROS); the data was gathered by inspecting the financial statements of the firms in our sample. We control for several variables that may affect firm performance to rule out

alternative explanations and enhance the fidelity with which the relationship between process performance measurement, the process owner role, and firm performance is examined. As financial performance depends on the industry a firm is operating in, industry affiliation is included as a control variable. Industry affiliation is measured by one single dichotomous variable, differentiating between firms primarily operating in metal industry (coded as 0) and organizations primarily operating in machinery industry (coded as 1). Firm size, measured by the natural logarithm of number of employees, is associated with economies of scale and, hence, is expected to have a positive association with firm performance [38]. Capital structure has been argued to affect firm performance. In particular, debt can produce tradeoffs such as reductions in long-term expenditures (e.g. R&D). Such reductions can be harmful to the firm over time [39]. Capital structure is therefore also included as a control variable and is measured by the ratio of liabilities to total assets.

## 1.4 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. For practical reasons, the metal and machinery industry was chosen since these industries include a sufficient large number of organizations in Austria. Firms were selected randomly and telephone interviews were used for data collection. All telephone interviews were personally conducted by the researchers. 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 70 firms remained in the sample since many firms did not provide their financial statements.

## 1.5 Analysis

Before one can proceed with testing the hypotheses, one has to ensure that the multi-item constructs (i.e. process performance measurement and the process owner role) are unidimensional, reliable, and valid. Unidimensionality of the constructs was assessed by a principal components analysis (with varimax rotation). All items loaded on their associated factor (all loadings on associated factors were well above 0.5). Adequate construct reliability was checked by using Cronbach alpha (the alpha values for both constructs were .921 and .938, respectively). Construct validity was assessed by the criteria that none of the items loaded greater than 0.50 on more than one factor reported by

the factor analysis. Having assessed unidimensionality, reliability, and validity, dimension measures were calculated by computing the equally-weighted average of the item scores associated with each dimension. Table 1 shows descriptive statistics, Cronbach's alpha for the multiple-item variables, and Pearson's correlation for all pairs of variables. Note that there is a strong positive correlation between process performance measurement and the process owner role, and a relatively strong negative correlation between debt and profitability.

**Table 1.1.** Descriptive statistics, Cronbach's alpha for the multiple-item variables, and Pearson's correlation for all pairs of variables.

Variables	Mean	S.D.	alpha	1	2	3	4	5	6
1. ROS	6.65	5.29		1	-.046				
2. Process performance measurement	1.90	1.49	.921	-.046	1				
3. Process owner role	2.61	1.71	.938	-.003	.668**	1			
4. Firm size	398.17	478.29		.160	-.006	-.018	1		
5. Debt	45.34	18.22		-.337**	-.138	-.124	-.118	1	
6. Industry	.51	.50		.066	.073	.021	.182*	-.016	1

*Notes: Pearson's correlation is significant at levels: \* $p < 0.05$  and \*\* $p < 0.01$ . alpha = Cronbach's alpha for all multiple-item variables.  $n=70$*

We used regression analyses to investigate the relationships between process performance measurement, the process owner role and return on sales. To avoid multicollinearity problems that are likely in regression variates with moderating effects, the independent variables of interest were centered, as suggested by Aiken and West (1991) [40]. 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) [41]. 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 2.787), 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 0.359 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. Table 2 presents the results of our regression analyses. Model 1 presents the results without the interaction term. Process performance measurement and the process owner role have no significant impact on firm performance. The

control variables firm size and industry affiliation neither have a significant effect on firm performance. By contrast, capital structure (debt) has a significant negative impact on firm performance ( $p < 0.01$ ). This finding is in line with prior studies, e.g. Chari et al. (2008) [42]. Test results of the interaction effect of process performance measurement and the process owner role on return on sales are shown in Model 2. We find the interaction term to be positive and significant ( $p < 0.05$ ), supporting our Hypothesis 1.

**Table 1.2.** Interaction effects between process performance measurement and the process owner role on return on sales.

	Model 1		Model 2	
	beta	t-value	beta	t-value
Process performance measurement	-.241	-.403	-.388*	-2.129
Process owner role	.138	.817	.318 <sup>+</sup>	1.701
Process performance measurement x process owner role			.268*	2.050
Firm size	.098	.801	.060	.495
Debt	-.368**	-3.112	-.349**	-3.016
Industry	.082	.671	.092	.774
R <sup>2</sup>	.155		.208	
R <sup>2</sup> change			.053*	
F	2.357 <sup>+</sup>		2.762*	

*Notes: Dependent variable: return on sales. Standardized regression coefficients are reported. <sup>+</sup> $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ , all tests are two tailed.  $n = 70$*

## 1.6 Discussion and Conclusion

Process performance measurement and the process owner role are two key dimensions of business process orientation. This research contributes to the process management literature on the interaction effect of the process owner and process performance measurement on organizational performance. The empirical evidence indicates that implementing process performance only is insufficient to achieve high performance. Measuring the performance of business processes without a process owner in place who initiates appropriate measures will not lead to any improvements. Responsibility for end-to-end process metrics needs to rest with the process owner who uses the metrics to track the status of the business process and to guide improvement efforts. Organizations therefore must implement both concepts - process performance



measurement and the process owner role - to reap the fruits of process management. Our research also contributes to management practice. The promise of process management is to help firms gaining competitive advantage, and, as such, managers facing organizational problems may adopt process management practices as a response to these problems. But managers must fully understand the concept of process management to ensure these practices are used in the appropriate contexts. Managers must understand the multidimensional nature of process orientation and the importance of its key dimensions. Our research highlights that process management is a multidimensional phenomenon. The study contributes to the understanding of the construct by focusing on two key dimensions, i.e. process performance measurement and the process owner role, and their impact on organizational performance. The empirical findings suggest that managers must implement both concepts in order to achieve firm performance improvements. As with any empirical study, this work has obvious limitations that should be recognized. First, the sample in this work only included Austrian firms operating in metal and machinery industry. Although one should expect similar findings in similar industries (particularly in manufacturing industries), 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. A third important limitation of this work is the small number of cases in the regression models. Such a small number of cases is not appropriate for a clear demonstration of a connection between process performance measurement, the process owner and organizational performance. Fourth, in common with most organizational studies, this work relies on survey data, which leaves open the possibility of self-serving bias in the data. There are a number of avenues for further research. First, the dynamics of PO could be investigated through a longitudinal study of PO efforts and their outcomes. Second, this study could be applied to other industries (particularly interesting would be service industries) and/or other countries. One could e.g. carry out a cross-industry study, which investigates the effects of PO in highly versus in less competitive industries. Third, financial performance was assessed by the widely used financial performance ratio return on sales, indicating short run performance. One might wonder whether the findings also hold in the long run, e.g., with organizational survival as the dependent variable. Fourth, other methodologies could be used to estimate the impact of PO dimensions. For instance, the effects could be investigated by a structural equation model. However, this would require more data in order to obtain reasonable results.

## References

1. Barney, J.B.: Strategic factor markets: expectations, luck, and business strategy. *Management Science* **32**(10) (1986) 1231–1241

2. Peteraf, M.A.: The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal* **14**(3) (1993) 179–191
3. Teece, D.J., Pisano, G., Shuen, A.: Dynamic capabilities and strategic management. *Strategic Management Journal* **18**(7) (1997) 509–533
4. Eisenhardt, K.M., Martin, J.A.: Dynamic capabilities: what are they? *Strategic Management Journal* **21**(10–11) (2000) 1105–1121
5. Benner, M.J., Veloso, F.M.: Iso 9000 practices and financial performance: a technology coherence perspective. *Journal of Operations Management* **26**(5) (2008) 611–629
6. Reijers, H.A.: Implementing BPM systems: the role of process orientation. *Business Process Management Journal* **12**(4) (2006) 389–409
7. Sabherwal, R., Hirschheim, R., Goles, T.: The dynamics of alignment: insights from a punctuated equilibrium model. *Organization Science* **12**(2) (1979) 179–197
8. Suter, A.: *Neues Wachstum*. Verlag Industrielle Organisation, Zürich (2009)
9. Ostroff, F.: *The Horizontal Organization*. Oxford University Press, Oxford and New York (1999)
10. Hammer, M.: *Beyond Reengineering*. Harper Collins, London (1996)
11. Hammer, M., Stanton, S.: How process enterprises really work. *Harvard Business Review* **77**(6) (November–December 1999) 108–118
12. Gardner, R.A.: *The process-focused Organization*. Quality Press, Milwaukee (2004)
13. Osterloh, M., Frost, J.: *Prozessmanagement als Kernkompetenz*. 5 edn. Gabler, Wiesbaden (2006)
14. Gaitanides, M.: *Prozessorganisation*. 2 edn. Vahlen, München (2007)
15. Armistead, C., Machin, S.: Business process management: implications for productivity in multi-stage service networks. *International Journal of Service Industry Management* **9**(4) (1998) 323–336
16. Smith, H., Fingar, P.: *Business Process Management: The Third Wave*. Meghan-Kiffer Press, Tampa, Florida (2002)
17. Benner, M.J., Tushman, M.: Process management and technological innovation: A longitudinal study of the photography and paint industries. *Administrative Science Quarterly* **47** (December 2002) 676–706
18. Sussan, A.P., Johnson, W.C.: Strategic capabilities of business processes: looking for competitive advantage. *Competitiveness Review* **13**(2) (2003) 46–52
19. Kumar, U., Lavassani, K.M., Kumar, V., Movahedi, B.: Measurement of business process orientation in transitional organizations: An empirical study. In: *Business Information Systems*, Innsbruck (May 2008)
20. Ittner, C.D., Larcker, D.F.: The performance effects of process management techniques. *Management Science* **43**(4) (1997) 522–534
21. Kohlbacher, M.: The perceived effects of business process management. In: 2009 IEEE Toronto International Conference. (2009) 399–402
22. McCormack, K.P., Johnson, W.C.: *Business Process Orientation. Gaining the E-Business Competitive Advantage*. St. Lucie Press, Boca Raton (2001)
23. Vera, A., Kuntz, L.: Process-based organization design and hospital efficiency. *Health Care Management Review* **32**(1) (January–March 2007) 55–65
24. Kohlbacher, M.: The effects of process orientation: a literature review. *Business Process Management Journal* **16**(1) (2010) 135–152
25. Hammer, M.: The process audit. *Harvard Business Review* **85**(4) (April 2007) 111–123

26. Siemieniuch, C., Sinclair, M.: On complexity, process ownership and organizational learning in manufacturing organizations, from an ergonomics perspective. *Applied Ergonomics* **33** (2002) 449–462
27. Hammer, M.: The 7 deadly sins of performance measurement. *MIT Sloan Management Review* **48**(3) (Spring 2007) 19–28
28. Teece, D.J.: Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal* **28**(8) (2007) 1319–1350
29. Anand, G., Ward, P.T., Tatikonda, M.V., Schilling, D.A.: Dynamic capabilities through continuous improvement infrastructure. *Journal of Operations Management* **27** (2009) 444–461
30. Fischermanns, G., Vlpel, M.: Der reifegrad des prozessmanagements. *Zeitschrift für Organisation* **75**(5) (2006) 284–290
31. Willaert, P., Van den Bergh, J., Willems, J., Deschoolmeester, D.: The process-oriented organization: a holistic view. In Alonso, G., Dadam, P., Rosemann, M., eds.: *BPM 2007, LNCS 4714*, Berlin and Heidelberg, Springer-Verlag (2007) 1–15
32. Schmelzer, H.J., Sesselmann, W.: *Geschäftsprozessmanagement in der Praxis*. 5 edn. Carl Hanser, München and Wien (2006)
33. Hinterhuber, H.H.: Business process management: the european approach. *Business Change & Re-engineering* **2**(4) (1995) 63–73
34. Nenadal, J.: Process performance measurement in manufacturing organizations. *International Journal of Productivity and Performance Management* **57**(6) (2008) 460–467
35. Melan, E.H.: Process management: a unifying framework for improvement. *National Productivity Review* **8**(4) (Autumn 1989) 395–406
36. Ndede-Amadi, A.A.: What strategic alignment, process redesign, enterprise resource planning, and e-commerce have in common: enterprise-wide computing. *Business Process Management Journal* **10**(2) (2004) 184–199
37. Delpachitra, S., Beal, D.: Process benchmarking: an application to lending products. *Benchmarking: An International Journal* **9**(4) (2002) 409–420
38. Hitt, M.A., Hoskisson, R.E., Kim, H.: International diversification: effects on innovation and firm performance in product-diversified firms. *The Academy of Management Journal* **40**(4) (1997) 767–798
39. Hitt, M.A., Smart, D.L.: Debt: a disciplining force for managers or a debilitating force for organizations? *Journal of Management Inquiry* **3**(2) (June 1994) 144–152
40. Aiken, L.S., West, S.G.: *Multiple Regression: Testing and Interpreting Interactions*. Sage Publications, Newbury Park, CA and London and New Delhi (1991)
41. Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L.: *Multivariate Data Analysis*. 6 edn. Pearson Prentice Hall, Upper Saddle River, New Jersey (2006)
42. Chari, M.D.R., Devaraj, S., David, P.: The impact of information technology investments and diversification strategies on firm performance. *Management Science* **54**(1) (January 2008) 224–234