# Risk investigation in Non-Compliance of Organizational Processes and Staffs with Strategy Implementations

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#### **Abstract**

Business processes are closely associated with improvements in increased productivity and profitability. Keeping the "content" the same but changing the strategy has often been the approach of many service industries towards strategy implementation. However, non-compliance of employees to an organization's business process towards implementation of a strategy has its associated risks. This study, therefore, investigates some of the associated risks in non-compliance to business process in a typical banking system in South Africa using primary and secondary data sources. This study used qualitative approach through the administration of questionnaires to 100 employees across all relevant segment in the selected commercial bank. These questionnaires were aimed at investigating alignment of business processes to the strategy to be implemented, staff adherence to business processes within their unit, evaluation of business processes in a business unit in the typical bank and evaluation of business process role on individual jobs. Data obtained from secondary sources like criminal investigations, financial loss data, audit data and process maturity dashboards were analysed. The study reveals that business processes are fundamental to any strategy. It is evident that not complying with the laid down business processes result in financial loss, which was as high as R29 million for process breaches and reputational risk for the case study used. Processes that are not documented make it difficult for risk managers to proactively identifying risks and controls. The study concludes with several recommendations on the business process towards risk minimization and profit maximization in an active competition between banking industries.

## **Keywords**

Business process, Financial loss; Non-compliance; Risk; Strategy implementation

#### 1.0 Introduction

The global natural competition in manufacturing and service industries informs the business processes of these organizations. In the 21st century, there exists a gradual paradigm shift from the conventional business processes to a need-based business process which constantly requires periodic business process reengineering (Nikolaidou, Anagnostopoulos, and Tsalgatidou 2001). Banking industry forms one of these service industries where competition and need-based business processes exist (Akande, Kwenda, and Ehalaiye 2018). Thriving amidst the competitiveness in the banking system requires a transformational and strategic wind of change, towards profit maximization and risk minimization. However, each strategy, aimed towards profit maximization is associated with different business processes and non-compliance to these business processes by an employee during discharge of duties have a ripple

effect on the set performance metrics of the organization. It is evident that workers' attitude at work, non-compliance of organization processes and systems, and external factors that negatively affect successful business as well as reputation can negatively affect the productivity of the organization. Hence, there is need for investigating the risks associated with non-compliance to business processes associated with strategy implementation towards proffering solutions on how these can be minimized or eliminated (Chavarín 2019).

Business processes produce both the desired system output(s) as well as waste. They are a collection of activities with a common goal (Nikolaidou, Anagnostopoulos, and Tsalgatidou 2001). A business process connects activities that once completed will deliver desired products and/or services to clients. Furthermore, a business process can be defined as different job functions within a business unit to meet the organization's goals. In service industries, these processes comprise management, operational and supporting processes. The use of balanced scorecard management system has found its use in service industries for strategic management of internal functions for the purpose of improving business processes. Its implementation involves several elements as shown in Figure 1. A balanced scorecard helps to mitigate against deficiency in the traditional management systems.

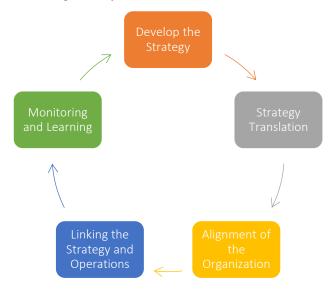


Figure 1: Balanced scorecard Management system (Robert and David 2000)

The balanced scorecard finds its relevance in most organizations operational and management control systems as these systems are built around financial measures and targets. These financial measures and targets, in turn, does not account for the organization progress of actualizing long-tern targets but with emphasis on short-term financial activities (Robert and David 2000). Kaplan and Norton summarized and categorized translating organizational vision and strategy into four groups and is shown in Figure 2. The business process flow diagram is one of the traditional graphical tool used by Business Process Management (BPM). The first is translating the vision; this is a tool that primarily helps a manager to build a consensus around the company's vision and strategy. Although at times, it does not easily translate to operational terms at the shop floor but most importantly is to ensure that the consensus is an integral part of the set objectives, measurable and agreed by all senior executives driving the long-term objective. Communicating and linking the vision and the strategy is the second step, which is also crucial in a typical business process management. The third is business planning- this enables the organization to integrate their business and financial plans. Lastly, feedback and learning is the fourth step employed, this gives the organization the opportunity to get feedback and review.



Figure 2: Business Process Management: Translating Vision and Strategy

Operational processes consist of the core business and supporting processes, which comprises human resources, financial, IT processes and so on that support the core business processes. A business process requires several actions to achieve an objective. Processes can be documented at the lowest level; however, it must be considered that this may result in lengthy processes, which may increase dependency and additional documentation. Organizational processes can be associated with waste that results from processes that are not well defined, manual interventions and businesses' not being able to monitor the inefficiencies within processes. Constantly reviewing processes assists business to identify and mitigate inefficiencies that may influence the bottom line. Business can be more profitable and competitive when processes operate efficiently, effectively and are aligned with business strategic objectives. It has become increasingly critical for organizations to be more agile in today's competitive business world. Organizations with processes that are not flexible to change will be left behind. New opportunities may require change both internal and external to organizations. It is critical that business capitalizes on these changes to remain competitive. For an organization to improve its performance and gain, a competitive advantage they should become more focused on efficient and effective business processes.

Strategy implementation in the banking industry requires integration of several business processes. Non-compliance of stakeholders and staffs to these business processes often leads to detrimental effects on the bank such as risk increment and loss. An investigation on the risks associated with non-compliance to business processes involved in strategy implementation is highly necessary towards ensuring customer satisfaction and profit maximization. This study investigates the state of non-conformance of staffs and business processes of a bank system to the strategy implementation towards ensuring the effectiveness and efficiency in the system. The rest of this study is organized as follows. Section 2 presents a review of the literature on significant concepts in the study. Section 3 presents the methodology used in this study. The results and discussion are presented in section 4 of this work and section 5 concludes the study.

## 2.0. Literature Review

## 2.1. Business Processes and Strategy

The organizational focus among other capabilities allows organizations to integrate, develop, design and reconfigure internal and external competencies to keep up with constant changes in the business environment and for global competitiveness (Teece, Pisano, and Shuen 1997). It is the ability to execute innovative ideas to lead in a highly competitive environment. However, inadequate processes directly affect customer service and customer satisfaction (Hostetler 2010). This becomes particularly evident when there is an increase in customer complaints and queries.

Global competitiveness and customer centricity are vital for an organization to maintain a competitive advantage. Even though organizations are innovative, if delivery of good and services are not provided in consonance with customer expectations, customers can be lost to a competitor in the process. Therefore, efficient and effective process execution is required to support the delivery of these products and services.

Burton (Burlton 2010) highlighted that the key role of managing business processes is to ensure that developed processes are linked to the strategic objectives of the business. It is expected that these processes are aligned to strategic objectives and not to the manager's personal agenda. Actualizing the desired objectives in implementing these processes involves provision of required resources to consistently guarantee that value delivered to customers is enhanced within stakeholder demands and regulatory requirements. Thus, managing business processes is essential in order to fulfil organizational goals and visions. One of the ways by which this is achieved is constant identification of improvement opportunities within processes, as customer needs are dynamic and peculiar. Business processes have a positive impact on business performance. Continuous process improvements are an important strategic driver towards increased productivity through its value addition to business operations. Process improvements further sustain the improvement of existing processes (Bessant and Francis 2005; Škrinjar and Trkman 2013).

Process re-engineering often impacts consumers as well as their "culture" (Hinterhuber and Levin, Boris 1994). Corporate culture is an important factor in any organization, yet it is regarded as a soft success factor for the survival of a process-oriented organization and business process management (Rosemann and Brocke 2014). The viability of a change process in both manufacturing and service industries largely depends on the workforce. The ownership of processes also plays an important role in an organization when implementing processes. The process owner is saddled with the responsibility of ensuring the viability of the process to ensure a competitive edge and organizational efficiency across all process activities (Škrinjar and Trkman 2013). He is responsible for designing and maintaining the processes, which could include process monitoring, optimization and innovation.

## 2.2. Business Processes and Agility

Business process agility has become a key focus area for most Organization. This is due to the need for the commensurate response of a process to perturbation towards achieving set goals. Business agility emphasizes the ability of a business enterprise to maintain competitive advantage during perturbation or turbulence in the business environment (Mathiassen and Pries-heje 2006). This includes the apt with which a business enterprise responds to the business dynamics, customers' requests, changing information technology. Rather than economies of scale, the business agility is concerned with economics of scope, while the concept of the lean operational system is often associated with efficient use of resources, the concept of agile operations is concerned with the efficient response to perturbation in the business environment without compromising productivity (Mathiassen and Pries-heje 2006).

Response to changes by the system under consideration could be related to process activities, people, job functions and so on (Bouwman, Heikkilä, and Heikkilä 2018). Organizations now aim at applying the agile approach to processes because process automation, as well as process information systems, have improved the efficiency and accuracy of process execution. As organizations operate in a highly competitive market and change is constant in the business environment, business process agility aids in business success and redefines value creation in competitive markets (Sambamurthy, Anandhi, and Varun 2003).

To improve the efficiency of an organization, most especially service industry, automation of a significant amount of customer processes is often adopted such that business processes are performed automatically with the support of information systems built on business process management technology. Improved stability within the business environment requires processes to be efficient, cost-effective and reviewed timeously. Maximizing revenue is the key objective of any company seeking to make a profit. Business process management plays a significant role in modelling and simulating business processes, and providing support in terms of decision-making regarding resource allocation and optimization workflows. From an economic point of view the reduction of execution times, efficient process activities structures and resource allocation are examples of how to improve and execute business processes.

## 2.3. Benefits Implementing Business Process Management within a business

Business processes are important for risk managers, managers and auditors to assess the effectiveness of a business's internal financial controls (International standard on auditing 315 2009). To maintain business value, a flexible governance structure must be established which will protect both business and performance goals within-group policies, processes and controls.

Business processes linked to risk management processes are of great interest to managers. The following understanding is highly significant in risk management in service industries:

Management should understand that risk in processes such as operational risk, IT risk; financial risk etc. varies
amongst business units within the organisation, which has a significant impact on the management of these
processes.

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- There is no method or modelling tool that can consistently define risk across the distinct levels of process
  architecture. In addition, the mapping and description of risks must be integrated into the process-modelling tool.
- Evaluation and management of risk are dynamic. This is due to constant changes in how businesses operate locally and internationally. Understanding these dynamics is important as they may influence business processes.
- Risk materialisation and its resulting effect costs money and so does risk management and controls. It is important that an organisation measures risk versus reward. The cost of mitigating risks in a business process must be assessed against the cost of allowing the risk to materialise and the cost spent to fix the controls.

There is a close link between business processes and risk. Risk management must be considered when redesigning processes. Risk management is also a business process that must be managed by business units. Although processes and risks are linked, they must be managed separately in an organisation (Rosemann and Zur Muehlen 2005). Risk management assists with mitigating or reducing risk exposure but can also create performance growth opportunities. The risk management process consists of three levels, which include identification, analysis and control of risks (Kliem 2000). Risk can be defined as the effect of uncertainty on realization of set objectives. Thus, a deterministic expression for risk is not feasible. Risks can be characterised by determining the impact, likelihood, period and associated risks. As risks are generally linked with negative outcomes, the difference between risks and issues are not always clearly articulated. The risk may not always be a problem but can become a problem when making incorrect decisions.

#### 2.4. Impact of Business Process on Customer Service

Effective management of customer relationships positively contributes to achieving overall strategic objectives such as increased customer satisfaction, more customers that are loyal, better cross-selling opportunities and more exposure through verbal means of advertisement. Better customer management does not only improve business performance but also increases customer value (Krasnikov, Jayachandran, and Kumar 2009). Providing superior service to customers in a competitive market is essential. The need to be the market leader in the banking industry forces banks to focus on retaining customers and retain loyal customers through exceptional customer experience. The customer experience framework according to (Botha, Kruger, and Marne 2010) can assist the business to improve customer satisfaction through processes that are focused on customer centricity.

Customer centricity should be the focal point of any strategy. Building and maintain enduring relationships with customers can be achieved through excellent customer experience with an organization. This focuses on customer satisfaction, convenience and effective communication rather than products, pricing and so on. Adopting data-driven process improvement and using different tools and techniques to ensure smooth transactions with customer improves customer experience. Improving processes can result in direct savings for any businesses support processes. However, the best benefit comes from how the customer perceives the organization in terms of customer experience. Improved customer experience and a credible reputation can bring about significant savings and an improved market share.

## 3.0 Research Methodology

A commercial bank was selected for the purpose of this study. The forms one of the prominent banks in South Africa, which has a large database of customers as well as staffs. One of the local branches of this bank was selected for this study. The qualitative based approach, which is exploratory research design, was used in this study.

#### 3.1. Data Collection

Questionnaires were used to determine how informed employees are with the business processes within their units and the organization at large. An initial sample size of 100 was proposed of which 33 ended being participants in the study. The respondents were identified based on their involvement with processes within their respective business units. In addition, questionnaires were structured to investigate the employee's disposition to risk and risk control in their business unit as well as in the organization as a whole.

Secondary data was also used in this study. These secondary data include audit reports, crime reports, loss data reports, and process maturity dashboard. The secondary data was used to evaluate the risk extent of the risk incurred by non-conformance of employees or business processes to operational strategies in business units in the bank. These different data were analyzed using statistical methods.

## 3.2. Data Analysis

For the questionnaires administered, statistical methods for descriptive analysis was employed in presenting a question-to-question cluster response. Each of the responses gives the perception of the staffs on the state of either the business processes used in their business units or the business strategies employed in their daily operations. The data collected were analyzed using descriptive statistic techniques.

The secondary data were analyzed with both a drill-down method, which follows a superficial root-cause analysis and a descriptive statistic. The result of these was presented with further inference of each result on the performance of the commercial bank.

#### 4.0 Results & Discussion

This section presents the analysis of the results based on questions of high interest in the study as posed in the questionnaire.

#### 4.1. Alignment of Business processes to Business Unit Strategies

Investigation of business process alignment with the strategies of each business unit was carried out on a Likert scale of 6. Figure 1 shows the degree of perception of respondents in the alignment of the business processes in their unit to the strategy in the same. It can be rightly said that not all business processes in different unit agree to the business unit strategy of operation. Even though a large percentage of respondents agreed to the alignment of business processes with the business unit strategy of operations. However, a small percentage of the respondents are still of the perception that business processes in their business units do not conform to their strategy of operation.

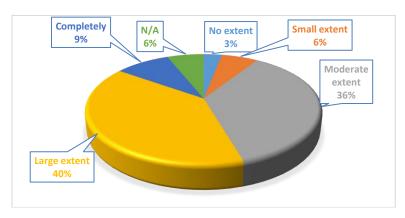


Figure 1. Business process alignment with operation strategy

#### 4.2. Alignment of Staffs to Business Processes in their units

It is expedient to investigate the alignment of staffs to the business processes in their respective units. Shown in Figure 2 is the representation of the perception of staffs on the conformance of staffs in their units to the business processes of the unit. From Figure 2, the perfect alignment of the staffs to the stated business processes of a business unit is very low. This is substantiated in the fact that only 3 % of the responses show that staffs completely conform to outlined business processes in their daily operations. While 58 % of the respondents conform to business unit-specific business processes to "a large extent", 36 % moderately conforms to this. This conformance could lead to a high risk in the business unit and the organization as a whole.

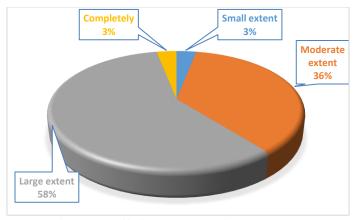


Figure 2. Staff alignment to Business Processes

## 4.3. Efficiency measurement of Business Processes

The efficiency of business processes, which constitute the daily operations of specific business units, was also investigated among the respondents. Figure 3 presents the respondents' perception of the efficiency of outlined business process in their daily operation. To a large extent, the business processes outlined by the organization are efficient in realizing the set objective of a business unit. However, the degree of effectiveness of these processes is very low (39 %) if productivity will be enhanced. A business process re-engineering towards process maximization is highly needed in this bank. While the business processes may not get the job done on time, staffs will need to devise a more efficient process towards reducing customer-waiting time and ensuring that business activity does not take considerably longer time than necessary.

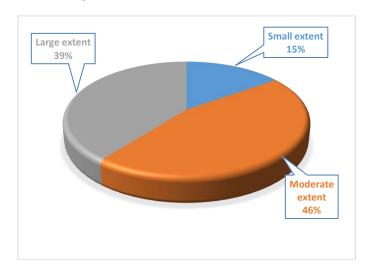


Figure 3. Measuring the efficiency of business processes in a business unit

## 4.4. Effectiveness measurement of Business Processes

To a significant degree, business processes in a different business unit are more effective than they are efficient. This is observed when the results in Figure 3 is compared with that in Figure 4. However, not all the business processes are effective as the degree of complete effectiveness of business processes was 3 %. This shows that redundant processes exist in the system which prolongs the duration of specific business activity and which may not help in achieving the set goals at the end of the process. For organizational growth, such processes should be re-engineered, thus emphasizing the need for business process re-engineering.

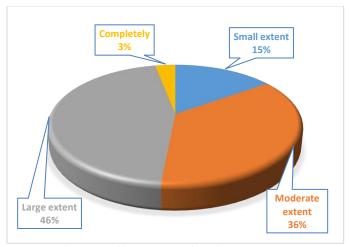


Figure 4. Effectiveness of business processes

## 4.5. Effectiveness of documented business processes towards risk and control identification

The bank used as a case study in this research has documented business processes peculiar to each business units. These documents are delivered to individual employees to enhance their understanding of their job descriptions. These documents are expected to enable employees to identify risks and controls associated with each business process. We investigated the effectiveness of the document towards aiding in the identification of risk and control. While a larger percentage of the respondent believe that these documents have been very helpful in achieving its set goals, some are undecided (12 %) while some respondents disagree (9 %) as shown in Figure 5. More investigations on the negative responses recorded are highly necessary. This is to ensure that all employees understand the usefulness of these documents and realize the risk and control associated with a specific business process. An appraisal of the content of these documents is therefore essential in the bank considered.

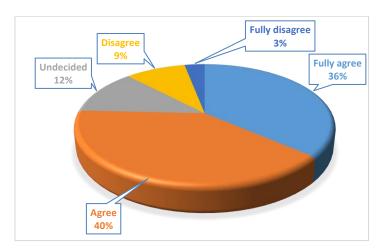


Figure 5. Effectiveness of documented business processes towards risk and control identification.

Some of the identified risks in this study reveal the significance of process breaches. This is highly detrimental to the growth of the system and may be subtle but can destroy the bank. A closer look at these breaches and the common reasons for their violations was carried out for a period of 6 months as shown in Figure 6. The secondary documents were evaluated to obtain results for the cause of these breaches. The results revealed that out of the 310 investigations that were conducted 182 (59%) were related to process breaches.

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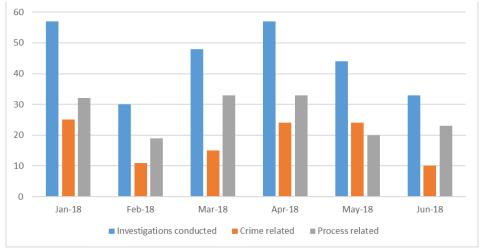


Figure 6: Investigation conducted over a six-month period

Considering the high percentages of breaches, investigating the likely causes of these is essential to forestall its occurrence in the organization in subsequent times. These causes are but not limited to the following:

- 1. Bank staff opened accounts for family members without their consent.
- 2. Bank staff processing transactions on their own accounts.
- 3. Cloned cheques cashed validation procedures not adhered to by supervisors.
- 4. Account take over due to the customer verification process not being followed.
- 5. Incorrect recording of figures due to bank staff negligence and processes not followed.
- 6. Maintenance changes on own accounts and pricing reversals on own accounts.
- 7. Bank staff accessing customer accounts without a valid reason.
- 8. Validation processes not followed when changes are made to business accounts
- 9. Personal customer information divulged to fraud syndicates, which is in both breaches of policy and process.

Breach of processes and policies consequently lead to huge financial loss from an operational and capital investment point of view. Between the periods January 2018 to June 2018, total losses amount to R333 million, which is a12.43%, decrease compared to the previous financial year. This is above the expected risk appetite of R310 million. Losses have negative influence on the bank as it affects growth and the success of strategic operations.

## **5.0 Conclusions and Recommendations**

This study investigated the effect non-conformance of business processes and staffs to strategy implementation in service industry using a bank as a case study. The questionnaire and the investigation of reports were carried out in this study. Although the response was low, some good insights were gained from the employees that responded. The poor response can also be attributed to the fact that employees are very busy and must have blocked their emails from receiving surveys. A larger percentage of the processes involved in the daily operations of employees are not efficient and effective as they were. Thus, a process-re-engineering is highly essential if the bank will increase its profit as well as be able to compete with their counterparts in the banking sector. Some of the business processes do not positively affect business unit under which they are performed. This also requires eliminating non-value adding business processes in the system. The study focuses on identifying some associated risks of non-compliance of organizations processes on strategy implementation. Although most business enterprises such as commercial banks aim at making profit, this study reveals that the commercial bank investigated incurred financial losses following non-compliances of their processes and employees to strategy implementation. The study revealed that the bank lost a total of R333 million in the last financial year of which R 29 million was directly linked to process breaches.

#### References

Akande, Joseph Olorunfemi, Farai Kwenda, and Dimu Ehalaiye. 2018. "Competition and Commercial Banks Risk-Taking: Evidence from Sub-Saharan Africa Region." *Applied Economics* 50 (44): 4774–87.

- https://doi.org/10.1080/00036846.2018.1466995.
- Bessant, John, and David Francis. 2005. "Dealing with Discontinuity How to Sharpen up Your Innovation Act." Advanced Institute for Management Research.
- Botha, Jozine, Paul Kruger, and De Vries Marne. 2010. "Enhancing Customer Experience through Business Process Improvement: An Introduction to the Enhanced Customer Experience Framework (ECEF)." In *The 40th International Conference on Computers & Industrial Engineering*.
- Bouwman, Harry, Jukka Heikkilä, and Marikka Heikkilä. 2018. "Achieving Agility Using Business Model Stress Testing." *Electron Markets* 28: 149–62. https://doi.org/10.1007/s12525-016-0243-0.
- Burlton, Roger. 2010. "Delivering Business Strategy through Process Management." *Handbook on Business Process Management*, 5–37.
- Chavarín, Rubén. 2019. "Risk Governance, Banks Affiliated to Business Groups, and Foreign Ownership." *Risk Management*. https://doi.org/10.1057/s41283-019-00049-9.
- Hinterhuber, Hans H., and M. Levin, Boris. 1994. "Strategic Networks—The Organization of the Future." *Long Range Planning* 27 (3): 43–53.
- Hostetler, Dustin. 2010. "Get Results: Improve Your Accounting Firm Processes Using Lean Six Sigma." *Journal of Accountancy*.
- International standard on auditing 315. 2009. "Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment."
- Kliem, Ralph L. 2000. "Risk Management for Business Process Reengineering Projects." *Information Systems Management* 17 (4): 66–68.
- Krasnikov, Alexander, Satish Jayachandran, and V. Kumar. 2009. "The Impact of Customer Relationship Management Implementation on Cost and Profit Efficiencies." *Journal of Marketing* 73 (6): 61–76.
- Mathiassen, Lars, and Jan Pries-here. 2006. "Business Agility and Diffusion of Information Technology." *European Journal of Information Systems* 15: 116–19. https://doi.org/10.1057/palgrave.ejis.3000610.
- Nikolaidou, Mara, Dimosthenis Anagnostopoulos, and Aphrodite Tsalgatidou. 2001. "Business Processes Modelling and Automation in the Banking Sector: A Case Study." *International Journal of Simulation* 2 (2): 65–76.
- Robert, Kaplan, and Norton David. 2000. "Using the Balanced Scorecard as a Strategic Management System." Harvard Business Review.
- Rosemann, Michael, and Jan vom Brocke. 2014. "The Six Core Elements of Business Process Management." In *Handbook on Business Process Management*, 105–22.
- Rosemann, Michael, and Michael Zur Muehlen. 2005. "Integrating Risks in Business Process Models." In *ACIS* 2005 *Proceedings*, 1–11.
- Sambamurthy, V., Bharadwaj Anandhi, and Grover Varun. 2003. "Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms." *MIS Quarterly* 27 (2): 237–63.
- Škrinjar, Rok, and Peter Trkman. 2013. "Increasing Process Orientation with Business Process Management: Critical Practices." *International Journal of Information Management* 33 (1): 48–60.
- Teece, D., G. Pisano, and A. Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal* 18 (7): 509–33.

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