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INVESTIGATING THE EFFECT OF PROCUREMENT COORDINATION ON SUCCESS IN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

In the past decade, the growing focus that companies have imposed on purchasing and supply chain management has put the value of procurement processes at the forefront. However, the majority of studies also analyse IT implementation enablers given the fact that procurement processes in industrial companies are viewed as product. Studies that explore requirements for post adoption that promote efficiency improvements in the realms of supply chain management remain scarce. Within this paper, impact analysis of business / IT-alignment within the procurement context to decide how it influences the efficiency of the procurement is illustrated. Furthermore, the effect that centralisation of supply chain control has on ensuring coordination in procurement is discussed. A study of 176 European firms was evaluated using Partial Least Squares (PLS) analysis to answer these questions. The observational findings confirm the observations that cooperation with selection contributes to improved efficiency over time and in comparison to competition, with the influence of the former being stronger than the latter. However, researchers find that contrary to empirical data supporting the argument that a decentralized system enables the implementation of e-procurement, centralization of the administration of supply chain management decisions facilitates coordination in procurement.

1. Introduction

Because of increased competition, today's companies are forced to become more flexible, creative and produce high-quality goods within shorter periods, thus reducing acquisition costs. The ability to handle supply chain operations efficiently has been reported as a key determinant of maintaining a competitive edge and enhancing operational efficiency, as it is viewed as a productivity engine. The value of supply chain management is mirrored in expenditures, with companies investing on related operations on average more than 70 per cent of their revenues. This fact has attracted the interest of academics in the field of supply chain management especially regarding the potential of information technology [1]. Over the past decade, the adoption of electronic procurement systems has been a subject of much attention, with a large number of studies highlighting potential benefits that include lower procurement costs, higher quality of purchased goods, better supplier relationships and more. Consequently, a wide stream of work has been undertaken to investigate deployment enablers and supply chain management barriers for Information Technology (IT). Despite strong investments in IT, however, companies still struggle to understand efficiency enhancements. This hypothesis, i.e. the efficiency hypothesis, has driven both researchers and consultants to move beyond isolating adoption variables to explore post-adoption dimensions that promote their investment leveraging. The profitability paradox is also apparent in the field of sourcing and supply management, with professionals failing to increase the associated value of their sourcing processes expenditure. It is a well-known fact, both in scientific literature and in practice, that identifying key factors that contribute to increased IT investment performance is a crucial step towards maximizing potential benefits. However, there also seems to be a lack of good systematic work in this direction for the acquisition environment, with the bulk of studies focused on acceptance enablers and triggers rather than success contributors [2].

The aim of this paper is to examine the post-adoption conditions allowing firms to realize performance gains from their investment in procurement. More precisely, in order to decide whether the coherence between elements of the procurement process contributes to efficiency results, we apply a business-IT coordination perspective. The alignment perspective was one of the predominant ways to determine the impact of IT, and was examined at both the generic and domain levels [3]. The key proposition is that IT must be in accordance with the plan and procedures in order to achieve any efficiency gains. Work into post-adoption facets of IT and how they affect efficiency is also limited within the supply chain management domain. To this end, the purpose of this paper is to determine whether alignment with procurement leads to performance gains, and if so how best to measure them. To do this we distinguish between two types of performance measures relevant to the supply chain, competitive performance and performance over time. In fact, we are looking at how centralization of the procurement process impacts coordination of procurement [4].

This paper is structured according to the following. A literature summary of the most relevant and recent work on business-IT alignment, supply chain management performance, and governance structures is presented in the next section. They draw conclusions based on the theoretical argumentation and propose a hypothesis to be empirically evaluated with. Section 3 describes the sample used to operationalize the principles and the calculation processes. Section 4 presents the results by applying modelling techniques for Partial Least Squares (PLS) along with validity and reliability measures. Conclusions are made in the final section based on observations, and the consequences for scholars and clinicians are illustrated. Additionally, researchers propose some further research directions that are based on the results and limitations [5].

Data Collection:

The target audience consists of businesses that have implemented IT programs that serve their recruitment role and work in a number of different size categories in company domains. Respondents were invited to complete specially designed questionnaires by direct two-hour sessions conducted at the University of Utrecht's Department of Information and Computer Sciences. Their presence was sought by "cold calling", mainly from students of Business Informatics at Utrecht University's social and business networks. This method of data collection is known as easy random sampling or sampling by respondents. To eliminate non-response bias, company representatives who did not attend the direct sessions despite being invited were asked to either complete a digital questionnaire or participate in a brief telephone interview covering the research study's main topics. The data collection took place over a three-year period (2006-2008) and resulted in a sample of 172 companies. Much of the comments came from staff who occupied managerial roles in the Department of Buying and Supply Management, and were extremely educated about the operation [6].

The survey represented the full range of micro to broad enterprise sizes. They follow this categorisation in line with the scale division suggested by the Recommendation of the European Commission of 6 May 2003 (2003/361 / EC) with a group of large companies (+260 employees) representing 53.9% of the study and SMEs (1-260 employees) representing 48.1%. The respondents filled out the questionnaires during the meetings which were divided into three major sections. The first section contained 14 general company questions, including questions about the buying portfolio, the governance structure and the supply chain position held by the respondent. The second and principal component consisted of 16 questions relating to the six dimensions of procurement on which the principle of alignment is based. The third and final section included concerns regarding the efficiency of the supply chain enterprises. A group of procurement experts reviewed a draft version of the questionnaire via interviews to verify its conformity to the criteria that are to be evaluated. Throughout the direct workshops, coordinating students and researchers responded to questions from the respondent about any items in the

questionnaire that were not obvious to them. The average time respondents spent answering to all items from the three groups was about 46 minutes.

Construct Measurements:

Alignment of procurement is developed as a construct of second order that reflects the balance between the six dimensions of the procurement process. For each of the six dimensions identified as critical for the procurement process, a number of questions have been formulated as items with 5-point response categories in accordance with Van Weele's five stages of buying evolution. These five stages include evolutionary maturity stages, where 1 denotes a level of transactional orientation and 5 external integrations. The procurement function dimensions to which the five maturity stages apply are: Strategy (STG), Processes (PRC), Control (CNT), Organization (ORG), Information (INF), and IT (IT). A company with aligned procurement functions is therefore one where all six dimensions are in congruence in terms of maturity [7].

For the two performance-related constructs subjective indicators, respondents were asked to assess the expected organizational productivity over time (TPERF) and in competition with competitors (CPERF). The use of subjective over quantitative metrics is considered a legitimate method in assessing performance, since the expected outcomes are a true representation of real success to a large degree. Additionally, financial metrics cannot reflect any variability in attempting to calculate changes in operating performance over time and in comparison to rivals [8]. In addition, since respondents in their majority hold senior management positions in the Department of Supply Chain Management, researchers assume that they are well informed, so the information they provide is accurate and reliable. Each of these two perspectives is represented on the questionnaire as four questions, from “Strongly Disagree” to “Strongly Agree” on a 5-level Likert scale, in which the state of the respondent to which level they agree with the statement mentioned. The elements used to measure efficiency have been adapted from research [9].

The need for sustainable growth calls on decision-makers to be prepared to take into consideration a plurality of heterogeneous data in all organizational ways. Corporate Environmental Management Information Systems (CEMIS) are usually computer systems in the area. Today, CEMIS used is unlikely to satisfy the criteria arising from the mitigation debate, since it does not provide strategic action guidance at earlier implementation levels and is widely utilized since end-of - pipe approaches. There is also a shortage of influences that affect the production of renewable goods, market practices or systemic frameworks for cause and effect chains. A resource-friendly architecture of business operations and their energy- and material-efficient management additional demands for operational systems that are geared towards sustainability. The European Study and Distribution Network for Environmental Management Information Systems (ERTEMIS) has been developed to address today's problems. It group launched the project "IT-for-Green: Climate, Power and Resource Management for next generation CEMIS," with the aim of creating a

CEMIS spanning the full life cycle of the commodity. Three modules represent the key components of this CEMIS, namely "Green Logistics," "Green IT," and "Sustainability Monitoring and -Dialogue."

Next Generation CEMIS is designed in a modular fashion, adopting the principle of Service-Oriented Architecture (SOA). The OASIS SOA Comparison Model community describes SOA as follows: "SOA is a framework for organizing and using dispersed resources which may be under the influence of various spheres of ownership. It offers a clear way of providing, finding, communicating with and using capabilities to achieve desirable outcomes in accordance with observable preconditions and expectations.' Operation direction inside Next Generation CEMIS implies that the smallest organizations are Web Services, combining to execute task-oriented tasks across workflows in functional and thematic cohesive systems. Web technologies are seen as the basic elements for achieving penetration into Business-to - Business (B2B) settings. One of the first ways of Cloud allowing was the servers for the program. Web Services accelerate the development of Cloud enabling and deemed important innovations for achieving convergence by encouraging loose coupling of device functionality and offering well-defined programmatic interfaces. Based on this, Cloud Services are predestined in this project because of their flexible nature and orchestration capability. In particular, workflow-based orchestration is required to have as much consistency as possible in the creation of workflows that precisely model processes inside industry.

Supply chains seek to preserve internal safety and environmental protection by taking use of the opportunity to self-correct based on external environment knowledge. As supply chain organizations are becoming aware of customer requirements for products and services delivered without harming the environment, managers will take choices that reflect the communication and collaboration of GSCM practices throughout the supply link. Supply chains and companies, by becoming the first to embrace environmental protection and incorporate GSCM policies, will achieve a comparative edge. Researchers emphasize SCM's "boundary-spanning" position as a key to enforcing both downstream and upstream environmental policies across the supply chain. They describe the possibility of a "green multiplier effect" resulting from supply chain partners' collaboration regarding Natural considerations. Researchers warn that procurement costs associated with supply chain partners transactions should be addressed because the stakeholders are seeking to enhance supply chain environmental sustainability. Besides customer requirements, environmental law and regulation have been identified as drivers of green practices.

Lastly, the supply chain management system structure was calculated in terms of centralizing / decentralizing decision freedoms. Researchers distinguish between centralized purchasing structure, federated structure, and non-hierarchical (decentralized) structure according to past studies. Researchers thus calculate the centralisation of government structure on a three-level scale

with reflecting a consolidated system, a federated one, and a democratic one [10].

2. Analysis

Researchers use Partial Least Squares (PLS) modelling to check the hypotheses proposed above as it allows for the creation of latent second-order constructs. The dataset of 162 responses exceeds the observations threshold required according to the Smart PLS documentation.

The durability of products was tested by checking that for first and second order structures, item loadings were above 0.7. Additionally, convergent validity was checked such that the Average Variance Derived (AVE) construct was above 0.6, and the internal accuracy of composite reliability construct values was above 0.8. Finally, researchers applied AVE values to inter-construct inequalities in order to check for discriminant validity, so that the former was greater than the latter. The reliability and validity testing were performed in two phases; an initial one for alignment constructs of first order, and then for the constructs used in the structural model. The descriptive statistics and reliability measures has been illustrated in Table 1.

Table 1. Descriptive Statistics and Reliability Measures

Construct	Number of items	Mean	Std. Deviation	AVE	Composite Reliability
Strategy	3	3,24	1,24	0.643	0.787
Processes	5	3,45	0,70	0.553	0.830
Control	4	3,28	0,84	0.653	0.843
Organization	3	3,36	1,26	0.732	0.848
Information	3	2,64	1,17	0.742	0.855
IT	3	2,41	1,12	0.688	0.831
Alignment	14	3,16	0,78	0.647	0.913
Competitive Performance	4	3,30	0,55	0.646	0.782
Performance over time	4	3,39	0,60	0.649	0.783

Researchers then proceed to test the hypotheses using PLS analysis after having carried out all necessary reliability tests. Initially, researchers analyse the impact of conformity on the two efficiency metrics and evaluate how the centralization of judgment rights impacts the attainment of a state of agreement with the procurement. By Using a Bootstrapping with substitution taking 1000 subsamples researchers predict causal effects importance. In Figure 1, the results are shown in the structural model.

With respect to the convergence of procurement coordination with the success of supply chain management both linkages have a positive and important impact. More precisely, H1 which explores the influence that procurement coordination has on results over time has a highly important effect (ÿ = 0.360 p < 0.02). Although the variance explained is at a rather low percentage of 12.2 percent (R2 = 0.132), researchers must take into account that it is the result of

only one construct. Similarly, H2 is verified as synchronization of procurement has a major and optimistic effect on business success (ÿ = 0.214 p < 0.05). Competitor performance is explained by the alignment of procurement by 4.3 per cent (R2 = 0.052), which represents a weaker link than with performance over time. This finding suggests that other constructs might better explain the relative competitive position of an enterprise with its antagonists.

While explained variation is at a very low level this does not negate findings as the combination of procurement coordination is optimistic and important on both performance measures. With respect to factors that promote the attainment of procurement conformity, researchers find that centralizing the right to supply chain management judgment favourably affects the attainment of such a condition (ÿ = 0.211 p<0.05), thereby supporting H3.

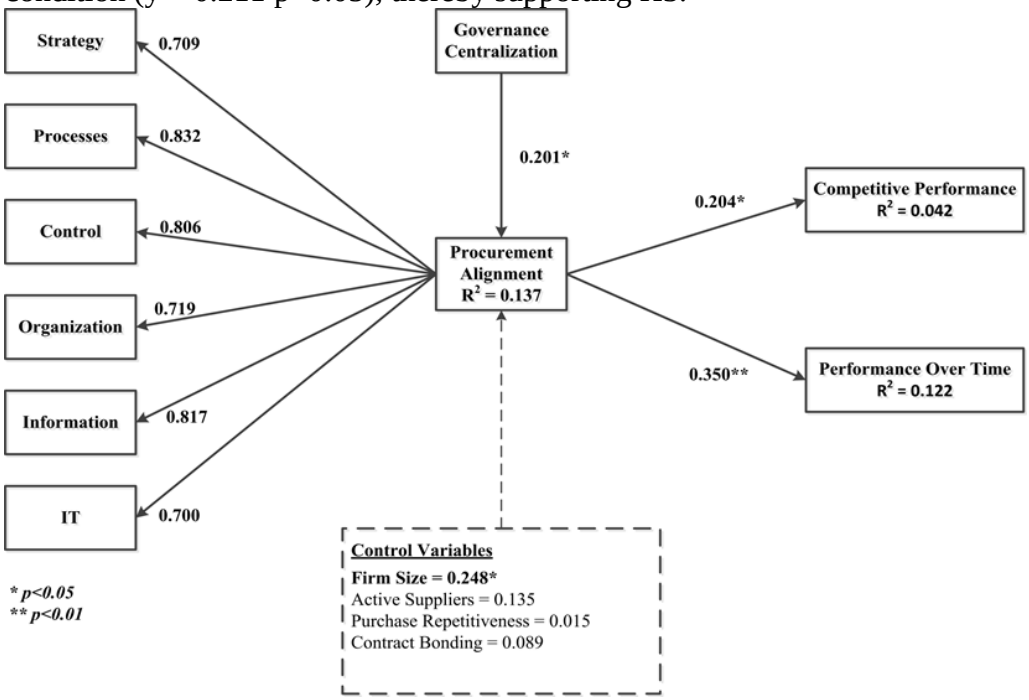

Figure 1. Structural Model with Path Coefficients

However, the explanatory influence of centralization of government in maintaining procurement consistency and in combination with other control variables is comparatively small at 12.7 per cent (R2 = 0.127), which needs more enablers analysis.

3. Conclusion

It has become common practice in modern enterprises to adopt IT procurement systems to automate and increase supply chain efficiency. Despite the widespread adoption of e-procurement systems, academic research continues to focus largely on enablers and inhibitors for adoption. To date, few studies explore post-adoption aspects that encourage increased IT investment efficiency. This study attempts to fill that gap by examining whether business-IT alignment within the procurement domain leads to supply chain management performance gains. In fact, researchers analyse how the denial of judgment rights impacts this state's attainment. The structural model results

support the hypothesis that supply chain management performance will have a positive impact on the alignment of the procurement. More precisely, relative to rivals, researchers differentiate between two metrics of efficiency, efficiency over time and output improvements. Aligning the dimensions of the acquisition environment were observed to have a favourable and important effect on both steps, with the former being a greater link than the latter. Procurement collaboration with an extremely important relationship demonstrates efficiency gains achieved over time by 12.2 per cent. The company's competitive position compared to its antagonists is also found to be affected, however to a lesser extent, by alignment of procurement. Such results have significant consequences for practitioners as they show that implementing procurement processes is not adequate, but that some degree of coherence between elements needs to be reached in order to reap benefits. With some counter-arguments on the consequences of business-IT coordination suggesting that it is a firm as static, the positive impact on corporate efficiency shows that it helps firms to achieve a strategic advantage in terms of operations. Therefore, one can infer that procurement alignment should be a sought after state with the supply chain management domain.

The finding that alignment of procurement has a positive impact on the performance of supply chain management should encourage research in determining factors that facilitate attainment of this state. Numerous studies on aspects enabling the achievement of match between company and IT have been conducted in IS science, however, it has been argued that domain-specific studies produce more fine grained outcomes. To this point researchers analysed how the allocation of decision rights affects the coordination of procurement, with findings showing that the more concentrated the administration of the supply chain is, the greater the degree of cooperation of procurement. While this finding is not true for the business-IT alignment generic scenario, it is essential for the alignment of e- recruitment, thus demonstrating that additional factors can be unique to the domain.

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