Business Alignment in the Procurement Domain

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Abstract

Procurement is increasingly important for organizations acting in dynamic and competitive markets. In practice however, companies struggle with adopting and implementing improvements in the procurement domain. Complexity hampers the achievement of a solid procurement approach that truly integrates all organizational aspects and levels. The central aim of this working paper is to develop a framework that supports an integrative procurement approach. The framework builds upon insights from business-alignment and capability maturity. Moreover, it facilitates a procurement deployment approach dependent on benchmark data and values of company attributes. The framework is to be validated; it is anticipated to be suitable for assessing organizations that are in different stages of adopting, implementing or evaluating procurement improvements.

Keywords, procurement maturity, procurement alignment, strategic alignment, capability maturity, benchmarking, competitive advantage

1 INTRODUCTION

Through a well-managed procurement business function, organizations can gain numerous benefits. Already in the 1980's of the previous century Adamson (1980), Kraljic (1983) and Sutton (1989) identified the strategic importance of the procurement business function. Nowadays, new focal areas, with possible benefits, related to procurement arise: e-procurement (e.g. Harink, 1999), trading exchanges (e.g. Versendaal and Brinkkemper, 2003), collaborative engineering (e.g. McCutcheon, et al., 1997; Wynstra, et al., 2001), offshore sourcing (Carmel, 1999), etc.

Yet at the same time anecdotal evidence shows that many procurement initiatives in general, and IT-implementations in the procurement domain in particular are not successful, or do not deliver promised benefits; see for example Adamson (2001), and Pan, et al. (2004).

1.1 Research question and methodology outline

With the potential of procurement, and the struggle of many companies with regard to its full deployment, in this working paper we aim to:

> *Explore the optimal deployment strategy for companies to accomplish significant added value and hence competitive advantage through procurement.*

We search for the successful deployment of procurement by encountering two aspects: procurement maturity and business-alignment. In this working paper a conceptual procurement framework is

constructed, which builds upon insights from business-alignment, capability maturity and existing procurement frameworks. The framework enables us to assess organizations that are in different stages of adopting, implementing or evaluating procurement. Empirically, it is to be operationalized by a structured questionnaire that is to be validated through a number of firms. Once validated, the framework will provide a basis for assessment of the current procurement situation of a firm, and hence for procurement advice. The data set resulting from the validation will not only provide generic benchmark opportunities, but will also take company characteristics (such as company size, supply chain power, the company's type of industry, etc.) into account. Breaking down these background variables will facilitate a situational procurement advice for organizations towards achieving (sustainable) competitive advantages.

1.2 Organization of the paper

In the following section we provide more details on procurement, procurement maturity and business/IT-alignment, which allows us to subsequently create the procurement alignment framework. Section 3 describes a data collection methodology that can be used to test the hypothesis, and to determine an optimal deployment strategy for organizations that search for a procurement improvement program. In section 4 possible implications of the data collection methodology are listed. We close this working paper by drawing conclusions and presenting our research agenda.

2 THE PROCUREMENT ALIGNMENT FRAMEWORK

2.1 Procurement maturity

The first pillar of our theoretical framework is based on the concept of progress maturity. In general, the idea of maturity is presented by sketching a number of growth stages that depict the potential-upward development or performance of organizations during several sequential periods of time. In most representations time or periods are labeled on the horizontal dimension, whereas the performance level is projected on the vertical dimension. Within the field of information systems, the Nolan model is often quoted as the origin of the maturity perspective (Nolan, 1979). Nolan's model represents the specific pattern of IT-adoption or IT-management by organizations. Its baseline is that IT-adoption or IT-management are adopted slowly by a small group at the beginning of its emergence, quickly followed by a large group, and finally with a small group that might stay behind in adoption for a long time. This pattern is labeled the S-curve, as this resembles the cumulative frequency distribution of adoption within groups (cf. Rogers, 1995). With the adaptation of the Nolan growth model by the movement of quality management and related activities, the principle of defining stages of growth was further extended and applied to the development of organizations or their parts. Within the field of information systems planning, Earl's model of learning curves with respect to IT can be considered as one the first examples of this extension (Earl, 1989). Since then, both the original Nolan and Earl models have been revised, extended, specified and modified, in line with progress made in the field of information systems and software engineering (see Galliers, 1991). After publication by the Software Engineering Institute (SEI) at Carnegie Mellon, the Capability Maturity Model (CMM) has become an established model in the field of information systems. It is designed to measure, monitor and evaluate the professional development and engineering of software and many related domains such as IT-governance, project management, people management and so on (Peppard and Ward, 1999), with the assumption that the higher the level, the more mature and the higher the performance of an organization.

With the idea that the procurement function has the ability to influence corporate profitability favorably, the functional development has been a topic of great interest. Departing from the passive, re-active clerical viewpoint of the 70's the procurement function has the ability to develop itself in a strategic pro-active function contributing, as much as other business functions, to the creation of

(sustainable) competitive advantages. The fact that such a significant advantage can be achieved is described by many authors (Adamson, 1980; Porter, 1985; Cavinato, 1991; Herberling, 1993). During the last two decades numerous authors proposed, and constructed, development models for corporate procurement, most of which assume a stage/step-wise development. Van Weele and Rietveld (2000) derive an integrated purchasing development model, based on twelve of such distinct models, (a.o. Keough, 1993), addressing procurement maturity through development stages:

- Transactional orientation;
- Commercial orientation;
- Purchasing co-ordination;
- Internal integration;
- External integration;
- Value chain integration.

In our framework we will adopt these stages.

2.2 Procurement alignment

The second pillar of our framework is based on the concept of business-alignment. In addition we explicitly reflect on the alignment of Information Systems and Information Technology (IS/IT) with the rest of the business: deployment of new IT is often a trigger for improving the business (Ward and Peppard, 2003). Since the 1980's, scholars, analysts and consultants alike have advocated an aligned approach with regard to introduction and deployment of information systems in organizations. One widely cited source is Porter (2001), who argues that the Internet does not make business strategy obsolete. Instead, an Internet and business strategy should coincide. On an operational level, many authors can be cited for the statement that IT implementations should come along with a careful consideration of business processes and other organizational issues (cf. Peppard and Ward, 1999; Hammer and Champy, 1994). This message is also recognized within practical guidelines, such as Sowa and Zachman (1992) who propose a system development perspective that can be considered holistic, taking the views of data, function, network, organization, strategy, and scheduling into account. All of the mentioned authors similarly encourage the alignment of IT with business processes, structures and strategies.

Historically, Scott Morton's book on *The Corporation of the 1990's* (1991) can be considered as the foundation of business/IT-alignment. Better known however, is Henderson and Venkatraman's Strategic Alignment Model, one of the first concepts to support organizations in leveraging new IT technologies (Henderson and Venkatraman, 1993). Business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes should be in balance through strategic fit, and functional integration (see also Luftman et al., 1993). Subsequently, several authors applied the Strategic Alignment Model. With varying success, the connection between alignment and organizational performance has been investigated (Cragg, et al., 2002; Kearns and Lederer, 2000; Peppard and Ward, 1999).

With this in mind we elaborate the business domain (while explicitly connecting it with the IT domain) by using the strategic alignment model of Turban, et al. (1999) and specifically its extension by Scheper (2002). In Scheper's adaptation of the model, the following five 'business dimensions' are crucial parts of every organization that need to be integrated:

- Strategy and policy
- Monitoring and control
- Organization and processes
- People and culture
- Information technology

Basically, Scheper's hypothesis is that synchronizing or leveling of the five dimensions will significantly contribute to the performance of an organization. Based on his benchmark study over 265 Dutch housing corporations this hypothesis is indeed confirmed (Scheper, 2002). In addition, the same hypothesis was confirmed by data collected among 30 CRM-managers (Batenburg and Versendaal, 2004).

Because of its proven value, we will follow Scheper's framework of (strategic) business-alignment. In fact, its foundations are applied to combine the concept of procurement maturity and procurement alignment within one integrative framework. The six maturity stages as identified in the previous paragraph are allocated as the concrete achievement levels for a (equal) number of indicators that cover each of the five business dimensions in relation to the procurement function. The empirical appearance of the framework will be described in the next chapter. At this point, it is important to stress that our procurement framework serves the goal of measuring, monitoring, and comparing corporate procurement related design and activities through self-assessment in absolute and relative terms. The key is that the framework is generally applicable, yet it provides situational instead of general recommendations.

Other scholars and practitioners have identified multiple perspectives in describing the procurement business function. Cavinato (1999) identifies 15 attributes or viewpoints, to track procurement across developmental maturity stages: a.o. key procurement measures, management style, budgetary approach towards procurement. A.T. Kerney's house of purchasing and supply management framework identifies eight dimensions ("The New," 2000): purchasing/supply strategy, purchasing/supply organization, strategic sourcing, supplier management, day-to-day purchasing, performance management, information management, human resource management. The Michigan State University (MSU) purchasing model (cf. "Purchasing Excellence", 2003) distinguishes eight strategic processes (e.g. insourcing/outsourcing, commodity development) that need to be supported by a number of other aspects: general purchasing and supply chain strategy, organizational strategies, globalization strategy, purchasing and supply chain measurement, IS/IT support, human resource development and training. In the next section we will map all variables and dimensions mentioned in other procurement models

The major characteristics of *our* procurement framework are:

- Each dimension is equally important and should be 'in-alignment'. The performance of the organization in the procurement domain is as high as the weakest (least mature) dimension.
- Information technology is addressed explicitly, and is also valued as a potential enabler for improved procurement performance.
- We allow for a situational application of our framework, taking into account company characteristics, like company size, branch, etc (see next chapter).
- We explicitly incorporate procurement performance (see next paragraph).

A similarity in the mentioned procurement models, including our procurement framework, is that the characteristics of the different dimensions are obtained through continuous benchmarking practices. While procurement has gained much scientific attention during the last decades in its quest for the 'strategic grail', the roots of the function are (and remain) in essence a practical issue. Most models rely on the identification of 'best practices', 'best in class solutions' and upcoming trends in defining procurement maturity.

2.3 Procurement performance

The goal of our framework is to let organizations perform better in the procurement domain. Therefore, we explicitly insert procurement performance into our framework. Berkowitz and Mohan (1987), Monczka and Trent (1991), Novack and Simco (1991), Porter (1985), Speckman (1985) and

Sutton (1989) identify the following benefits when effectively manage the procurement function: cost reduction, enhanced profitability, assured supplies, quality improvements, and competitive advantage.

The I-Frame (Versendaal and Brinkkemper, 2003), a procurement improvement framework, provides no less than twenty different benefits derived from several sources in the (procurement and e-business) literature. Those benefits can be categorized as follows: process-related (with e.g. the benefit of improved sourcing decisions), cost-related (e.g. reduced purchasing costs), product quality-related (e.g. better product quality), and organization-related (e.g. increased trustworthiness). In an investigation of procurement improvement effectiveness, Accenture (2002) identifies the following four procurement performance indicators: purchase price index, quality conformance, raw material inventory turnover, and supplier delivery accuracy. These indicators can be easily mapped onto the identified benefits in the I-Frame.

So for our framework we can select from many performance indicators and benefits. In order to limit the performance indicators for our framework we include only one indicator per procurement level (strategic, tactical and operational) (Note that procurement functions can be considered on the strategic, tactical and operational level; e.g. De Paoli (1999), Weele (2001), mySAP (2003), and Versendaal and Brinkkemper (2003)). The successful research from Accenture encourages us to select the following procurement performance indicators.

- Quality conformance (strategic)
- Price purchase index (strategic and tactical)
- Supplier delivery accuracy (operational)

Summarizing we can now launch the following hypothesis associated with our framework:

> *Procured product quality conformance, price purchase index and supplier delivery accuracy is positively affected by (1) the level of maturity (ranging from 1-6) of IT, procurement strategy and policy, procurement monitoring and control, procurement organization and processes, procurement people and culture, and (2) by the alignment of IT, procurement strategy and policy, procurement monitoring and control, procurement organization and processes, procurement people and culture.*

Figure 1 depicts the procurement alignment framework, and visualizes the hypothesis.

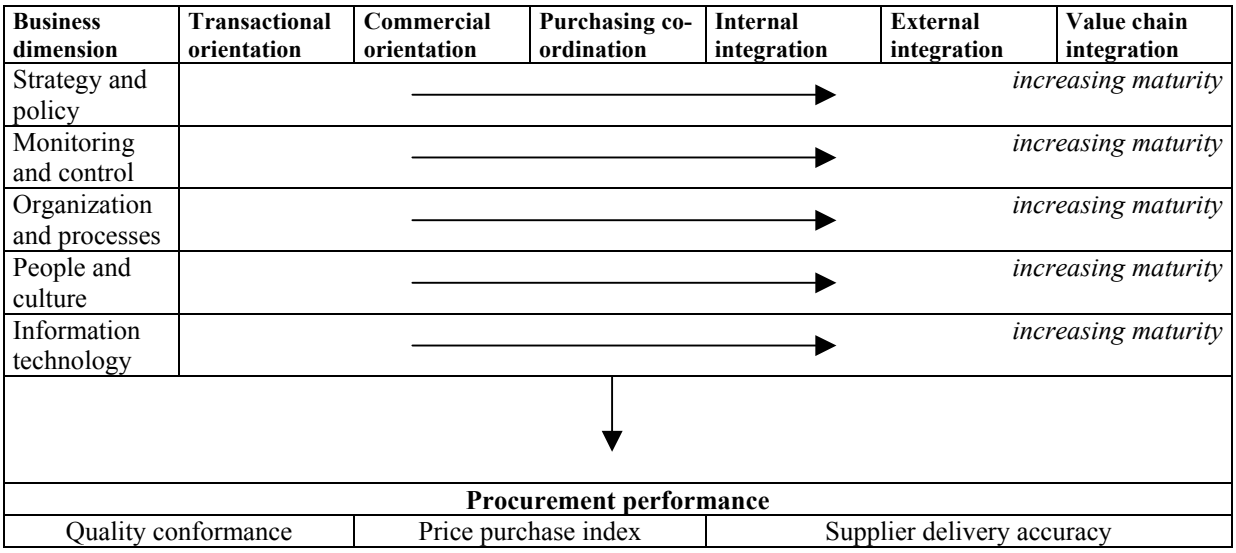

Figure 1: The procurement alignment framework

3 PROPOSAL FOR DATA COLLECTION

3.1 Framework operationalization

To validate and apply the procurement framework, we need to operationalize it. For each of the six cells per business/IT-dimension characteristics are listed. These characteristics are defined with the help of existing procurement frameworks like Van Weele and Rietveld (2000) and Cavinato (1999). This is depicted in figure 2.

Business dimension	**Transactional orientation**	**Commercial orientation**	**Purchasing co-ordination**	**Internal integration**	**External integration**	**Value chain integration**
Strategy and policy	*Clerical & Reactive*	*Commercial & elimination of transactional activities*	*Savings & Proactive & top management recognition*	*Internal integration & top management support*	*Supplier integration*	*Customer value & core competencies based*
Monitoring and control	*Control of purchasing expenditure*	*Supplier base management*	*Contracting & Supply market analyses & Translation of corporate targets in procurement targets*	*Performance based contracts & Industry benchmarking & Define Key Performance Indicators*	*Service level agreements & Supplier his added value and risk evaluation*	*Customer service level agreements*
Organization and processes	*Order processing & Decentralized*	*Tendering, outsourcing operational purchasing*	*Global sourcing & Centre-led*	*Cross-department & added value interpretation & coordinating function*	*E-business & supplier feedback rounds*	*Outsourcing; offshore sourcing*
People and culture	*Clerical buyer & Task oriented*	*Commercial oriented buyer & function oriented*	*Contract-oriented buyer & training and skills development & Sell Procurement function in own organization*	*Buyer and planner coordination & Cross functional teams & career path development programs*	*Make or buy decision maker & Portfolio management & Job rotation*	*Customer service driven buyer*
Information technology	*Non integrated buying system*	*Separate sourcing system*	*Separate contract management system*	*System integration (ERP + order management) & Standardization*	*E-Procurement (direct + indirect materials)*	*Supply and demand optimization systems*

Figure 2: operationalized independent part of the procurement alignment framework

Regarding the procurement performance indicators we assess improvements by twofold comparison: (1) has organizational purchasing performance improved over time, and (2) is organizational purchasing outperforming the organization's major competitors.

In order to anticipate on situational application of the framework, a number of company characteristics are included in our research. Following the successful comparable research in the domain of customer relationship management (Batenburg and Versendaal, 2004), we measure company size (small, medium, large), and company industry (e.g. electronics) when assessing an organization and looking for purchasing improvements. Furthermore, Versendaal and Brinkkemper (2003) identify a number of variables related to successfully implementing a procurement information system (in this case a buyer-owned trading exchange) that need further research: supply chain power of the buying organization,

whether or not the buying organization is a virtual organization, the company's awareness of Internet technology and application, frequency of transactional purchasing, and purchase quantities. These are also taken into account as situational background variables in our approacht.

3.2 Framework validation

In order to validate the framework, to test our hypothesis, and to provide procurement-related deployment advice we will invite procurement managers from different firms divided over the company characteristics mentioned above. This should result in what is called a 'convenience random sample' (Triola, 2004). Because the respondents are invited to come to the 'board room lab'-facility at Utrecht University, we have control over collecting the survey data: if respondents themselves have questions about the survey, we can immediately clarify.

Before answering the questionnaire the respondents will receive a presentation, in which provision of background information to the research, and common understandings of the procurement domain are the main goals.

Respondents will be asked to complete the questionnaire to assess their organization according to the operationalized procurement framework. Each question's answer should refer to maturity level on a certain business-dimension. This relates to the independent part of our hypothesis. In addition, procurement performance will be measured through questions related to our identified procurement performance indicators (the dependent part of our hypothesis). Finally, general questions about the characteristics of the company will be posed, to allow for situational application of procurement improvement. In practice, the participants will complete the questionnaire independently using the Survey-tool within GroupSystems, a widely used software tool for supporting group discussions and meetings (cf. Weatherhall and Nunamaker, 1999).

4 CONCLUSIONS AND RECOMMENDATIONS

We presented the procurement alignment framework that contributes to the research question "*Explore the optimal deployment strategy for companies to accomplish significant added value and hence competitive advantage through procurement"*. Associated with the procurement alignment framework came the hypothesis:

> *Procured product quality conformance, price purchase index and supplier delivery accuracy is positively affected by (1) the level of maturity (ranging from 1-6) of IT, procurement strategy and policy, procurement monitoring and control, procurement organization and processes, procurement people and culture, and (2) by the alignment of IT, procurement strategy and policy, procurement monitoring and control, procurement organization and processes, procurement people and culture.*

We operationalized the procurement alignment framework. We anticipate validating both the framework and the hypothesis by constructing a questionnaire that contains questions related to:

- The independent part of the hypothesis;
- The dependent part of the hypothesis;
- Company characteristics for situational application of procurement improvement.

The questionnaire needs to be answered by procurement managers, and buyers, etc. from different companies, (equally) divided over the company characteristics.

The independent part of the framework and the benchmark data (including company characteristics) inherit a strategic tool to improve a company's procurement performance. Hence, procurement investments should be conducted having an integrative plan that assures the concept of alignment and

application of benchmark data. Such a structured approach can be called a 'procurement roadmap'. This roadmap should describe and monitor the actions or projects to bring a company to the next level of procurement maturity *and* alignment. We suggest the following approach to support the development of a procurement roadmap that is based on the procurement framework presented in this working paper:

1. Determine the as-is maturity and alignment level of your company using the multi-dimensional procurement alignment framework and corresponding questionnaire. Preferably, complete the questionnaire with a small group of responsible managers and compare the results to check on consistency.
2. Benchmark your company's as-is maturity level against the best-practices in your industry, and other situational background variables using the benchmark data resulting from the validation of the framework. Highlight the low-maturity dimensions (like people & culture) through comparing the absolute and relative scores for your organizations
3. Based on the benchmark results, determine the desired maturity level of your company. Given the nature of the maturity concept, note that it is too ambitious to increase more than one maturity level at the time. In addition, make use of the *portfolio* of procurement issues that are important within each business domain as outlined in figure 2 of this paper. Goal formulation should be drilled down on the level of the concrete procurement issues of our framework/questionnaire.
4. Define a procurement roadmap in order to integrate and mutually adjust the investments towards the desired procurement maturity defined in each domain. During the execution of the projects, monitor the level of alignment between the business domains. The concept of program management might be of use to achieve balance and integration.

References

Accenture (2002), The Buying Organisation Of The Future - 2002 European Procurement Survey. Accenture.

Adamson. J (1980). Corporate long-range planning must include procurement. Journal of Purchasing and Materials Management, 16, 25-32.

Adamson, J. (2001). Why is eProcurement failing?. In Supply Management, April 2001. Retrieved 8 January 2005, from http://www.tranmit.com/newsroom/0401_sm.htm.

Batenburg, R. and Versendaal, J. (2004). Business alignment in the CRM Domain: Predicting CRM performance. In: T. Leino, T. Saarinen & S. Klein, Proceedings of the 12th European Conference on Information Sytems. Turku: Turku School of economics and business Administration (CD-ROM).

Carmel, E. (1999), Global Software Teams: Collaborating Across Borders and Time Zones, Upper Saddle River, NJ, Prentice Hall PTR.

Carter, P.L., Carter, J.R., Monczka, R.M., Slaight, T.H., Swan, A.J. (1998). The future of purchasing and supply: A five- and ten-year forecast. Center for Advanced Purchasing Studies.

Cavinato, J.L. (1999). Fitting purchasing to the five stages of strategic management. European Journal of Purchasing & Supply Management, 5, 75-83.

Cavinato, J.L. (1991). Evolving procurement organizations: logistics implications, Journal of Business Logistics, 13, 27-45.

Cragg, P., King, M. and Hussin, H. (2002). IT alignment and firm performance in small manufacturing firms. Journal of Strategic Information Systems, 11(2), 109-132.

Earl, M.J. (1989). Management Strategies for Information Technologies. New Yersey: Prentice Hall.

Galliers, R.D. and Sutherland, A.R. (1991). Information systems management and strategy formulation: the 'stages of growth' model revisited. Journal of Information Systems, 1, 89-114.

Hammer, M. and Champy, J. (1994). Reengineering the corporation: a manifesto for business revolution. New York, Harper Business.
Harink, J.H.A. (1999), Excelleren met elektronisch inkopen, Alphen aan den Rijn, Samson.
Henderson, J.C. and Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. IBM Systems Journal, 32(1), 4-16.
Herberling, M.E. (1993). The rediscovery of modern purchasing, International Journal of Purchasing and Materials Management, 29, 48-53.
Kearns, G.S. and Lederer, A.L. (2000). The effect of strategic alignment on the use of IS-based resources for competitive advantage. Journal of Strategic Information Systems, 9(4), 265-293.
Keough, M. (1993). Buying your way to the top. The McKinsey Quarterly, 3, 22-39.
Kraljic, P. (1983). Purchasing must become Supply Management, Havard Business Review, Sep-Oct.
Luftman, J.N., Lewis, P.R. and Oldach, S.H. (1993). Transforming the enterprise: The alignment of business and information technology strategies. IBM Systems Journal, 32(1), 198-221.
McCutcheon, D.M., Grant, R.A., and Hartley, J. (1997), Determinants of new product desingers' satisfaction with suppliers' contributions, Journal of Engineering and Technology Management, 14(3-4), 273-290.
Monczka, R. M., Trent, R. J. (1991). Global Sourcing- A Development Approach, International Journal of Purchasing and Materials Management, 27 (2).
Nolan, R. (1979). Managing the crises in data processing. Harvard Business Review, 2, March-April.
Pan, G.S.C., Pan, S.L., and Flynn, D. (2004), De-escalation of commitment to information systems projects: a process perspective, Journal of Strategic Information Systems, 13, 247-270.
Peppard, J. and Ward, J. (1999). 'Mind the Gap': diagnosing the relationship between the IT organisation and the rest of the business. Journal of Strategic Information Systems, 8(1), 29-60.
Peters, T. and R.H. Waterman (2004). In Search of Excellence. Lessons from America's Best-Run Companies. New York, Warner Book.
Porter, M.E. (1985). Competitive Advantage. New York, The Free Press.
Porter, M.E. (March, 2001). Strategy and the Internet. Harvard Business Review (March-April) 63-78.
Purchasing Excellence (2003), Dutch firms on the road to Purchasing Excellence (In Dutch), Project 2 and 3, Zoetermeer, Netherlands, NEVI.
Rogers, E.M. (1995). Diffusion of innovations. New York, The Free Press.
Scheper, W.J. (2002). Business IT Alignment: solution for the productivity paradox (In Dutch). Deloitte & Touche, Netherlands.
Sowa, J.F. and Zachman, J.A. (1992). Extending and formalizing the framework for information systems architecture. IBM Systems Journal, 31(3), 590-616.
Morton, M.S. (1991). The Corporation of the 1990's: Information Technology and Organizational Transformation. New York, Oxford University Press.
Sutton, B. (1989). Procurement and its role in corporate strategy: an overview of the wine and spirit industry, International Marketing Review, 6, 49-59.
Triola, M.F. (2004). Elementary Statistics. Ninth Edition. Boston, Pearson Education.
Turban, E., McLean, E. and Wetherbe, J. (1999). Information technology for management: making connections for strategic advantage. Chichester, England: John Wiley & Sons.
Versendaal, J., Brinkkemper, S. (2003). Benefits and Succes Factors of Buyer-Owned Electronic Trading Exchanges: Procurement at Komatsu America Corporation, Journal of Information Technology, Cases and Applications 5(4), 39-52.
Ward, J. and Peppard, J. (2003), Strategic planning for information systems, 3rd edition, Chichester, England, Wiley.
Weatherhall, A. and Nunamaker, J. (1999). Getting results from electronic meetings. Chichester, England: St. Richard's Press.
Weele, A.J. (2001), Purchasing and supply Chain Management:Analysis, Planning and Practice (3rd revised ed.), London, England: Thomson International.
Weele, van, A.J., Rietveld, G. (2000). Professional Development of Purchasing in Organisations: Towards a Purchasing Development Model.. Global Purchasing & Supply Chain Strategies - December 2000. retrieved from http://www.bbriefings.com

Wynstra, F., Weele, A. van, and Weggeman, M. (2001), Manageing supplier involvement in product development: Three critical issues, European Management Journal, 19(2), 157-167.