

The role of early purchasing involvement in innovative projects at public research institutes

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ABSTRACT

Many studies proposed the importance of early purchasing involvement in new product development processes at private organizations. In contrast, there are other studies and empirical evidence show that early purchasing involvement is not always necessary. The purpose of this study is to determine the critical role of early purchasing involvement in the outcomes of innovative projects at two research institutes (MIRA and MESA+) within the University of Twente. To answer the research question, personal interviews with personnel from the Purchasing Department and the two research institutes were conducted. The findings imply that early purchasing involvement contributes to the success of innovative projects if the technical expertise required for the commodities is not too advanced and sophisticated.

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Keywords

Public procurement, public sector innovation, strategic purchasing function, early purchasing involvement, purchasing agent, scientific equipment procurement

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1. INTRODUCTION

The research activities of universities and public research institutions (PRIs) can contribute to innovation in many different ways. From a traditional view, those activities will lead to codified knowledge shown in publications. However, research does not only need to be theoretically appealing, it should also have a certain practical value so that the research done truly matters to the world and universities need to pursue education because they are able to provide the highest knowledge standards. Furthermore, it is important to educate the future generation of high-potential knowledge workers and researchers. Therefore, universities and public research institutions have an important mission due to their teaching role, especially to research students, who have person-embodied knowledge and skills from the universities and may seek for stable and long-term employment in organisations. Moreover, another significant contribution from public sector research is that those publicly funded R&D activities can result in technological inventions and innovations, which are likely to be widely adapted by innovative business firms. As a consequence, this knowledge transfer can be enhanced by R&D collaboration with private firms and direct interaction with local business, especially those in the same geographical locations (North America and European Union as examples). Similarly, businesses can also draw on the skills in universities and PRIs to support innovation activities, for example, through advice, consultancy and extension services. Therefore, the possible collaboration between universities, PRIs and business in the same fields for innovative projects is unavoidable, especially in a dynamic market where new innovations are strongly encouraged by the government like The Netherlands. Thus, the potential for using public procurement as an instrument for innovation is considerable (Edler & Georghiou, 2007).

However, studies show that “purchasing in public institutions” or “public procurement” suffers “competing priorities which cannot be reconciled completely” (Erridge and McIlroy, 2012). Erridge and McIlroy (2012) introduced three competing priorities or strands of public procurement: commercial, regulatory and socio-economic. Commercial and regulatory priorities are presented in Figure 1. The key priorities has known mostly to be the commercial aspect, such as greater demands on public spending to achieve cost reductions and quality improvement at the same time. In this perspective, the most popular goals are believed to be economy, efficiency and effectiveness. On the other hand, there is also a regulatory perspective that focuses on both international and national tendering procedures, to increase competition and competitiveness while ensuring transparency and equality of opportunity to suppliers.

The last set of objectives which often conflicts with both commercial and regulatory approaches arises from the socio-economic responsibility of government. An example of this conflict concerns the question of whether the government can use public procurement to support local economic development while at the same time achieving efficiency gains through open competition and complying with regulations on transparency. In the scope of this research, only commercial and regulatory perspectives will be taken into account.

Strands	Key objectives	Definition
Commercial	Value for money	Making taxpayer’s money meet user requirements.
	Economy	Minimising the cost of resources acquired, taking into account the quality of inputs.
	Efficiency	Is concerned with the relationship between the output of goods/services and the resources used.
	Effectiveness	Is concerned with the achievement of targets, not only in terms of quantity but also quality.
Regulatory	Competition	By complying with EU public procurement Directives, (inter)national tendering procedures and organizational tendering rules, purchases must be made in the intention of increasing competition and competitiveness while ensuring transparency and equal opportunity for all potential suppliers.
	Transparency	
	Equality	
	Compliance	

Figure 1. Commercial and regulatory competing priorities in public institutions (Erridge and McIlroy, 2012).

As can be seen, public institutions are mostly under the pressure to meet users’ demand with minimum costs with an emphasis on the quality of inputs. On the other hand, they are required to comply strictly with regulations regarding competitive domestic and international tendering, as well as transparency, which can make public procurement at universities and PRIs a problematic issue due to a large amount of people and money that are involved.

For example, there are many studies believe that *early purchasing involvement* in the procurement process may help to guarantee the success of innovative projects, which secure the achievements of organizational objectives within the legal framework (Ellram and Carr, 1994; McGinnis and Vallopra, 1999; Narasimhan and Das, 2001; Schiele, 2005; Van Weele, 2005). However, Bellizzi and Walter (1980) in their study indicate the fact that the purchasing agents have more influence on the “searching for” and “evaluating suppliers” stage and the “order routine” stage but they may not be heavily involved in earlier buying stages such as “recognition of a problem” or “determination general characteristics and quantity of needed items.” As a result, this study is conducted to determine the critical role of early purchasing involvement in the outcomes of innovative projects at research institutes of University of Twente. The research question is presented as below:

Does the early involvement of the purchasing department in the procurement processes contribute to success of innovative projects at research institutes?

The remainder of this paper is organized as followed. Section 2 is the research approach and method that I used to handle the research question. Sections 3 reviews the literature about how a purchasing department and their early involvement can contribute to different procurement projects through their distinctive skills and strategic impacts. Section 4 will present and analyse findings from the interviews. Finally, a conclusion will be drawn in section 5.

2. RESEARCH APPROACH

2.1 Problem Identification

In a very early study of Strauss (1962) about the work of purchasing agents, the author finds that a purchaser originally has two primary functions: (1) negotiate and place orders at the best possible terms in accordance with specifications set by the engineers and (2) expedite orders, which means checking with suppliers to make sure that deliveries are made on time. The functions gave the agent broad power in dealing with suppliers but little power and status within the organization. In line with this finding, the study of Bellizzi and Walter (1980) also supports the belief that purchasing agents have more influence on the “search for and qualification of potential sources” stage, the “acquisition of proposals” and the “analysis of information” stage but they are not heavily involved in other buying stages as “recognition of a problem”, “determination characteristics and quantity of needed items” and “post-sale performance feedback”.

According to the purchasing department of the University of Twente, only 60% of all procurement projects at research institutes involve the purchasing function at an early stage (G.J. Westhof, personal communication, June 4th, 2014). Mr. W. Platvoet, tactical buyer, who works as the main purchasing agent between the purchasing department and the two research institutes MIRA and MESA+, also claims that he does not get involved early in approximately 40% of the buying projects (personal communication, June 6th, 2014).

However, both G.J. Westhof (purchasing manager) and W. Platvoet (tactical buyer) insist on aiming to be involved right at the beginning in all procurement activities at those research institutes as they believe the purchasing department will help the research groups to avoid problems that may arise in the long term (personal communication, June 2014). Using the buying process developed by Bellizzi and Walter (1980), the problem of the purchasing department was sketched in Figure 2.

On the other hand, representatives from one research institute claim that early purchasing involvement from the 1st stage is not necessary in many cases (G. Roelofs, personal communication, March 2014). There appears to be some disagreement here, which is why the true role of early purchasing involvement and its importance to procurement at research institutes should be explored further.

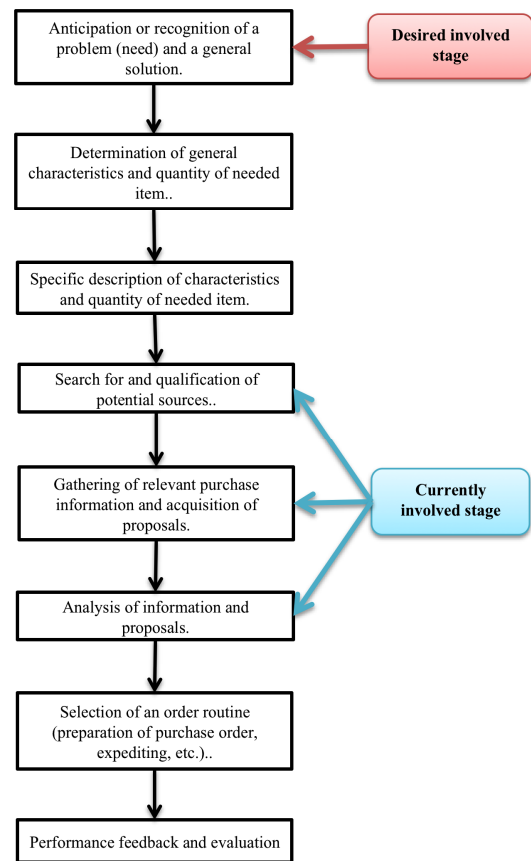


Figure 2. Buying process (Bellizzi and Walter, 1980) and the problem of Purchasing Department in getting early involvement

2.2 Methodology

Firstly, a literature review will be conducted to identify the important role of the purchasing department that exists in current literature. For example, the roles and the strategic structure of the purchasing department will be considered as supportive factors for procurement in innovative projects, capabilities and competencies of the purchasing team are factors that enhance the importance of early purchasing involvement, and especially the contribution of purchasing agents, who are working as a medium between the purchasing department and the research groups. Secondly, because of the exploratory nature of this study, no research hypotheses are stated and the data collection process makes use of a qualitative research method which may result in more interesting and unexpected outcomes. Interviews are conducted with personnel in Research and Purchasing functions.

There are four research institutes on the campus of University of Twente that are working in collaboration with the purchasing department, namely MESA+ (Institutes for Nanotechnology), MIRA (Institute for Biomedical Technology and Technical Medicine), IGS (Institute for Innovation and Governance Studies) and CTIT (Center for Telematics and Information Technology). Moreover, the interview’s framework is divided into “university-wide” and “case-specific” contexts, while the commodities are narrowed down to only a “scientific equipment” category. Thus, two out of four research institutes were picked to conduct the research, which are MIRA and

MESA+ as the commodities in IGS and ICTS are not considered to be scientific equipment.

The interviews were conducted separately with each respondent at two research institutes and the purchasing department of the University of Twente. The respondents were as follows:

- Mr. G.J. Westhof, Manager Purchasing Department, University of Twente on 4th June, 2104.
- Mr. W. Platvoet, Tactical Buyer, Purchasing Department, University of Twente on 6th June, 2104.
- Mr. R. Gerritsen, Senior buyer, Purchasing Department, University of Twente on 13th June, 2104.
- Ms. G.M.J. Segers-Nolten (PhD) – Nanobiophysics, Institute for Nanotechnology MESA+, University of Twente on 11th June, 2014
- Dr. G. Roelofs, Head of MESA+ NanoLab, University of Twente on 12th June, 2014.
- Dr. M. Kuit, Managing Director MIRA, University of Twente on 26th June, 2014.

All the interviews were recorded on a digital device to gather as much information as possible and to avoid biases or misunderstandings. From the recordings, findings were noted to be as precise as possible.

2.3 Interview Procedure

A list of questions was developed to examine the collaborating experiences between the purchasing department and research institutes in specific cases.

The general questions were as follows:

1. How did the research institute/research groups and the purchasing department collaborate in procurement processes? What are the input/skills/benefits that the purchasing department might bring to you?
2. What are the innovative projects that your research institute/group have worked on together with the purchasing department?

The first question was asked to find out the general impression on the working procedure between the two parties – purchasing department and research institute. The second question was to gather a number of cases for analysis, which were randomly selected by the interviewees and the final results were not known beforehand by the interviewer. Furthermore, to understand further the situation in each case presented above, a few case-specific questions were asked:

1. In that project, what stage does the purchasing department get involved? Right at the beginning or at a later stage?
2. What are the (possible) reasons for that decision?
3. (When the purchasing department gets involved at the beginning), what was the result of that procurement process?
4. How did that result affect the general outcomes of the innovative project (negative/positive)?
5. (When the purchasing department gets involved at a later stage), what was the result of procurement process?
6. How did that result affect the general outcomes of the innovative project (negative/positive)?

These questions mainly focused on the reason why or why not the purchasing department got involved early in a procurement project, which criteria might affect the decisions, and what

would be the outcome of the innovative project in the case of EPI or otherwise. The findings will be analysed and summarized so that their similar characteristics are emphasized.

3. LITERATURE REVIEW

In previous studies about early purchasing involvement (EPI) in private sector, many authors point out that EPI contributes to new product success, regardless suppliers' involvement (McGinnis and Vallopra, 1999; Schiele, 2005). Especially when suppliers are involved, one of the key issues contributing to new product success is the involvement of the purchasing function right from the concept stage of new product development (McGinnis and Vallopra, 1999). Schiele (2005) seems to agree with this point of view as he states that early involvement of the purchasing department can clarify the situation's background and deepen understandings to positively affect the purchase decision, which leads to meaningful involvement (Schiele, 2005). For example, early involvement of purchasing professionals can help the NPD team to formulate their goals more concisely and illustrate the purchasing specification needed (Schiele, 2005). Further, in the very early stage of NPD processes, the purchasing function can contribute to the decision-making process if the firm actually needs to involve suppliers or not because the purchasing department can analyse if there is any supplier with desirable technologies or be able to help achieve time-to-market objectives (McGinnis and Vallopra, 1999; Tracey and Neuhaus, 2013). After that, purchasing professionals can also assist managers in identifying suppliers with a suitable competence profile (Schiele, 2005). Therefore, we believe that EPI is crucial to the procurement processes of innovative projects and the contributing factors would be: 1) purchasing's strategic functions in the organization, 2) the organization structure of the purchasing department, 3) skills and competencies of the purchasing teams and 4) the contribution of the purchasing agents.

3.1 Purchasing's Strategic Functions in the Organization

Through historical developments, purchasing functions are no longer working as a cost-saving function (Cousins and Spekman, 2003) but their strategic fit into an organization's strategy has been catching a greater attention from top management. Narasimhan and Das (2001) referred to this as purchasing integration and can be defined as "the integration and alignment of strategic purchasing and goals with that of the firm" (Narasimhan and Das, 2001, pp. 593). This means purchasing activities must be aligned with the company's strategic plans, which requires that purchasing participates in the strategic planning process, has access to strategic information and important purchasing decisions are made in coordination with other strategic decisions of the firm (Narasimhan and Das, 2001). Furthermore, Ellram and Carr (1994) argue that purchasing functions have to take a more integrated role due to increased competition, the need of global sourcing and recent rapid changes in technology development. Similarly, a large part of a firm's overall performance is determined by the efficiency and effectiveness of purchasing activities due to the expansion of outsourcing activities (Gadde, Håkansson and Persson, 2010).

In 2000, Das and Narasimhan presented four popular practices in many purchasing functions: supply-base optimisation, buyer-supplier relationship development practices, supplier capability

audit, and purchasing integration. They mainly focused on the supplier and stated organizations should handle the supply base first and then develop close relationships with the important suppliers. This is agreed by Gadde and Snehota (2000), who argued that buying companies tend to outsource non-critical activities, and subsequently establish a close partnership with selected suppliers to cut down their supply bases. Last but not least, more recently Van Weele (2005) lists some new developments in organizations, such as building leveraged purchasing and supply strategies, global sourcing, supplier integration, early supplier involvement in product development, reciprocity agreements, compensation obligations, environmental issues, and business integrity. For a firm to achieve good performance in all these activities, the strategic role of the purchasing department is undeniable.

3.2 Roles and the Strategic Structure of the Purchasing Department as Supportive Factors for Procurement in Innovative Projects

Wynstra, Weggeman and Van Weele (2003) define three different strategic roles of purchasing function: rationalization, structure, and development (Wynstra, Weggeman and Van Weele, 2003). The rationalization role concerns tasks to minimize total production costs. This is parallel to the "transactional orientation" in the level of purchasing involvement (Van Weele, 2005) which focuses on clerical tasks and "commercial orientation" level, in which purchasing department request quotations and compare different tenders, and actively anticipate in negotiation processes (Van Weele, 2005). Moreover, purchasing's structure role is to handle the supplier network by influencing its structure, for example, by supporting newly established suppliers that possibly play a critical role to the firm (Wynstra et al, 2003). Purchasing's development role contributes to the firm's competitive strength by aligning the internal technological development with the development of suppliers and the supplier network, including tasks such as ensuring that the technical competencies of suppliers are exploited and affecting suppliers' interest to focus on developing the products that are important to the firm (Wynstra et al, 2003). Van Weele (2005) defines similar tasks as "coordination of purchasing" in the level of purchasing involvement that purchasing teams manage the supplier base and to some extent, gain control over and coordinate demand with the production team (Van Weele, 2005). Wynstra et al (2003) conclude that the integration of purchasing in the product development process has to be based not only on purchasing's development role, but also on the rationalization and structure roles (Wynstra et al, 2003).

In addition, McGinnis and Vallopra (1999) declare that purchasing involvement can increase new product success if purchasing plays a leadership role in the NPD cross-functional team from the beginning (McGinnis and Vallopra, 1999) as purchasing departments can proactively and systematically identify suppliers that can provide technological competitive advantages (McGinnis and Vallopra, 1999). This is defined by Van Weele (2005) as the "internal integration" level (Van Weele, 2005) which is concerned with cross-functional involvement between departments with regards to supplier-base development. Wynstra, Axelsson and Van Weele (2000) suggest that engineers should join the purchasing department, and a few purchasers can be assigned to the R&D team and production department. This action may develop a mutual

understanding about the links between engineering and purchasing. Finally, a purchasing department can communicate with other departments about the possible support they can offer to create a more positive perception regarding the need for and effectiveness of purchasing involvement as well as the skills and competences of the purchasing department (Wynstra, Axelsson and Van Weele, 2000).

3.3 Capabilities and Competencies of Purchasing Staff as a Factor Enhancing Purchasing Involvement

In the area of recruitment and training, prior education and technical experience of potential employees, and their perception of the tasks of purchasing can serve as important selection criteria (Wynstra, et al, 2000; Werr and Perner, 2007). Moreover, the purchasing professional may contribute to new product success by encouraging a competitive responsive climate within the organization (McGinnis and Vallopra, 1999). Consequently, Wynstra, Van Weele, and Axelsson (1999) conclude from one of their case studies that activities related to purchasing involvement in NPD occur at different levels within the firm. For example, purchasers and development engineers discuss the design of a new product, and monitor the progress of suppliers who make specific components for that product together and/or purchasing managers and R&D specialists may meet with important suppliers to classify ongoing issues and discuss future promising collaborations in regard with new technology developments. Last but not least, purchasing managers may develop guidelines and provide some guidance for purchasing's role in different procurement projects (Wynstra, Van Weele and Axelsson, 1999).

3.4 Contribution of the Purchasing Agents

In the context of this paper, purchasing agents or purchasers are understood to acts as a medium (contact person) between the purchasing department and the research groups. Strauss (1962) points out that the purchasing agent may perceive his most important functions such as informing management about new market developments such like new materials, new sources of supply, price trends, and so on. In an attempt to make this information more valuable in the eye of other departments, the agent will expect to be consulted while the product is still in the planning stage, before the final decisions on the needed commodities are made. The purchaser always believes that his knowledge of the market should be recognized equally to the technical knowledge of engineers and accountants. More specifically, the agent should have the capability to suggest the operational team about (1) alternative materials or parts to use, (2) changes in specifications or redesign of components which will save money or result in higher quality or quicker delivery, (3) more economical lot sizes, and (4) "make or buy" decisions. These functions are often called "value analysis" by the agent (Strauss, 1962).

Furthermore, according to Gelderman, Ghijsen and Brugman (2006), the purchasers' familiarity with the rules has a positive impact on the compliance with the EU rules. For example, the EU directives forbid that contracts are extended without going to the market. In contrast, there is empirical evidence that public buyers prefer to renew a contract rather than issue a new contract (Jones, 1997). One of the main reasons for not adopting the directives could be the expected administrative paperwork and time-consuming procedures (De Boer and Telgen, 1998),

the purchasers with their knowledge and skills in procurement legislation can handle that. Moreover, professional purchasers may find it laborious and counterproductive that poor performing suppliers cannot be excluded from the unavoidable (public) tendering procedure and try to develop a pre-selection scheme to receive only bids from the most capable suppliers.

4. ANALYSIS

4.1 Findings

Case number	Commodity	Supplier
1	Fluid FM	Cytosurge
2	High Throughput Cell Analysis System	Perkin Elmer
3	Automated confocal Imager	Perkin Elmer
4	Confocal fluorescence microscope	Nikon
5	Confocal Raman microscope	WLTec
6	CD spectrometer	Jasco
7	Dip-pan nanolithography system	Nanoink
8	Nano particle tracking and DLS system	Nanosight
9	Microscale thermophoresis system	Nanotemper
10	Digital dispenser	Tecan/HP
11	Ultracentrifuge	Sorvall/Systemex

Figure 3. Procurement projects under the collaboration of Purchasing Department and research institutes from 2010 to 2013. (G.M.J Segers-Nolten, G. Roelofs and M. Kuit, personal communication, June 2014).

The cases drawn from the interviews are gathered in Figure 3. More specifically, cases 1, 4, 5, 7, 8, 9, 10 (60% of the cases) require very unique technical descriptions, which were decided by a *scientific committee*, the purchasing department only got involved after the research groups decided which suppliers to buy from beforehand.

In case 2 and 3, the technical expertise required is not too specific, there was more than one supplier available and the costs for those commodities were higher than €200,000.00, the purchasing department got involved early to prepare for a European tendering process. In these cases, the purchasing department will send a Request for Quotation (RFQ) to a number of suppliers that were available in the market, when at least 3 quotations have been received, the research institute and purchasing department work together to determine a scoring method to evaluate those suppliers.

For case 6 and case 11, when the technical knowledge was not complex and the overall cost is lower than €200,000.00, the purchasing department can choose the supplier based on price and general specifications such as availability, after-sale services, delivery time, and warranty duration.

4.2 Discussion

The main findings are summarized in Figure 4. The technical expertise and expenses on a specific commodity play a major role in the decision regarding EPI. According to G.M.J Segers-Nolten and G. Roelofs (personal communication, June 2014), the higher the technical expertise needed to purchase certain scientific equipment, the less likely it becomes that the purchasing department gets involved at an early stage of procurement process.

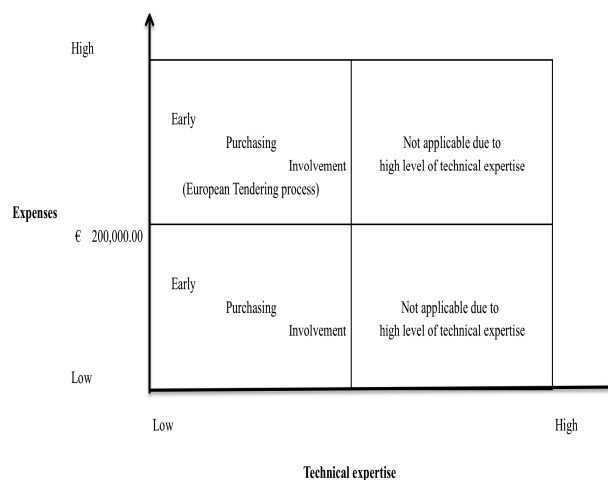


Figure 4. EPI matrix based on expenses and technical expertise

For example, in the bottom-left quadrant present case 6 and case 11, when the technical knowledge was not complex and the overall cost is lower than €200,000.00, the purchasing department can choose the supplier based on price and several specification such as availability, after-sale services, delivery time and guarantee duration.

On the other hand, cases 1, 4, 5, 7, 8, 9, 10 (60% of the cases from MIRA and MESA+) require very unique technical descriptions, which were decided by a *scientific committee*. The purchasing department got involved after the research groups determined the supplier beforehand; these cases are located in the top-left and top-right quadrant of the matrix.

In case 2 and 3, which belong to the bottom-right quadrant, the technical expertise required is not too specific, but the costs for those commodities are higher than €200,000.00 and there is more than one supplier available. The purchasing department therefore got involved early to prepare for a European tendering process.

In most of the cases the research groups experienced little or no problems from the buying process regardless of which stage the purchasing department got involved. The findings of the study are neutral; early purchasing involvement only contributes to the success of around 36.4% of all innovative projects (4 out of 11 cases). In the other 7 projects (account for 63.6%), the contribution of the purchasing department occurs in later stages as indicated in Bellizzi and Walter's buying process (1980). However, as scientific apparatus are not one-time-purchase products, the capability and necessity of the purchasing department in these projects is proven in negotiation processes, which usually bring lower price, shorter delivery time and longer warranty duration (R. Gerritsen, G.M.J Segers-Nolten, G. Roelofs and M. Kuit, personal communication, June 2014).

5. CONCLUSION

Getting early involvement in important decision-making processes seems to be the problem of most purchasing functions in the private sector before the 90s. However, as shown in the literature review, purchasing functions in those organizations improved their strategic importance together with dynamic market development step by step to achieve the recognition that they deserve as of today. When Kraljic's paper "Purchasing Must Become Supply Management" (1983) was published, he argues that purchasing must be perceived as a strategic function instead of an operational unit. This perspective serves as the foundation for many purchasing theories after that. Much later, Monczka, Handfield and Giunipero (2009) propose that the future of purchasing includes expanding the mission, goals, and performance expectations of purchasing and supply, developing category strategies, developing and managing suppliers, designing and operating multiple supply networks, leveraging technology enablers, collaborating internally and externally, attracting and retaining supply management talent, and managing and enabling the future supply management organisation and measurement systems. As a result, for the purchasing department to be able to get the required attention, top management must recognize, accept and operationalize the strategic importance of purchasing (Ellram and Carr, 1994).

It should be noted that there is very little literature about early purchasing involvement in the public sector. One of the reasons can be that public institutions' reaction to market changes is much slower than that of their private-sector counterparts due to several specific characteristics, such as the mechanistic top-down organizational structure, the pressure to be a role model for legal compliance and the fact that they are funded by public money. To gain more recognition, The Purchasing Department and purchasers in the public sector can refer to different tactics developed by Strauss (1962), such as using direct persuasion that the procurement is unreasonable, implying formal authority to require the research institutes to follow the rules, or seeking to change the interaction pattern, asking the research institutes to check with the Purchasing Department before they decide to work with any supplier. As it can be seen, the evolution of purchasing into a strategic function is a slow process and requires a change in attitudes of the purchasing managers, the purchasing agents, the research scientists as well as top management of the university.

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