

PUBLIC VS. PRIVATE SECTOR PERSPECTIVES ON SUPPLY CHAIN MANAGEMENT

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ABSTRACT. The literature suggests public procurement professionals have different perspectives on supply chain management (SCM) vis-à-vis their private sector counterparts. Based on a recent survey of Canadian purchasers, this paper presents an empirical comparison of public vs. private views on SCM. The questionnaire is structured around a set of 54 topics, tools and techniques; along with four perspectives on the relationship between purchasing and SCM. Important findings from this survey of SCM professionals include: (1) public procurement professionals have narrow perspectives on SCM compared to their private sector counterparts; and (2) public sector professionals have different perceptions regarding the importance of topics, tools and techniques to support their performance on the job.

INTRODUCTION

This article reports results of a recent survey of Canadian supply chain management (SCM) professionals. According to the Council of Supply Chain Management Professionals (CSCMP, 2007), "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. It also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers." In a functional sense, this focus on activities and relationships implies logistics, marketing, purchasing/supply, and production/operations are involved in SCM. An on-line questionnaire was designed to

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facilitate the development of a new executive education and accreditation program. To ensure content of the new program would match needs and expectations of the market, the survey focused on topics, tools and techniques required by SCM professionals to perform their duties.

Following the introduction, the article is organized into five more sections. The first section develops the context, focusing on unique characteristics of public sector procurement. Section two is a review of relevant literature on SCM skills and competencies. Next, the third section describes design of the questionnaire and administration of the web-based survey. Section four presents statistical results, including comparisons of public and private sector survey responses. Finally, the fifth section discusses implications of the results for SCM practitioners, researchers and educators.

PUBLIC AND PRIVATE SECTOR VIEWS OF PROCUREMENT

Public procurement is very “big business.” Public Works and Government Services Canada (PWGSC) spends about \$20 billion on goods and services annually, to support the activities of more than 100 federal agencies and departments (see <http://www.tpsgc-pwgsc.gc.ca>). This section reviews a selection of literature on public procurement, and includes a comparison of SCM in the public and private sectors.

According to McCue and Pitzer (2005, p. 8), the public and private procurement professions “are essentially different in their fundamental goals and practices.” While public sector practitioners are governed by legislative bodies, laws, and regulations; private sector practitioners are guided by boards of directors and business plans. Public agencies draw revenues from taxes and fees, and use these funds to serve the public. On the other hand, private firms generate revenue through sales of goods and services. Unlike their public sector counterparts, these private firms have profit-making motives. McCue and Pitzer (2005) also suggest that private sector purchasing has been redefined in terms of strategic SCM. However, constrained by rules and regulations, the public sector remains unable to develop strategic supply chain partnerships.

Leenders, Fearon, Flynn, and Johnson (2002) describe a number of unique characteristics of public sector purchasing, including the

following: (1) perceived lack of interest expenses and other inventory carrying costs, (2) lack of traffic and transportation expertise, (3) lack of confidentiality about dealings with suppliers, and (4) emphasis on competitive bidding (vs. negotiation) in the procurement process. These characteristics have implications for public sector procurement and SCM, such as the tendency for free on board (FOB) destination or delivered buying; a focus on purchase price rather than total cost of ownership (TCO); and a lack of collaborative, long-term relationships with suppliers.

In the public sector context, Korosec (2003, p. 93) states “SCM is a procurement tool that . . . strategically integrates the whole procurement process.” Thus, SCM is thought to be narrow in a functional sense, an element of procurement rather than spanning multiple functional areas.

To the contrary, in the private sector context, Mason-Jones (2004) argues that “procurement is a crucial central element of SCM” and SCM covers “all functions throughout organisations, from marketing and production to procurement.” Similarly, Lambert (2004) describes SCM as the integration of eight business processes: (1) customer relationship management, (2) customer service management, (3) demand management, (4) order fulfillment, (5) manufacturing flow management, (6) supplier relationship management, (7) product development and commercialization, and (8) returns management. These eight processes subsume much of logistics, purchasing, operations management and marketing. According to Mentzer et al. (2001, p. 17), SCM consists of “all the traditional intra-business functions.” These traditional business functions are marketing, sales, research and development, forecasting, production, purchasing, logistics, information systems, finance and customer service.

Newman (2003) notes that while private sector procurement is more receptive to entrepreneurship and innovation; public procurement is based on legislation, policy and process. Public sector procurement serves a broader range of stakeholders, places greater emphasis on accountability and transparency, and allows little or no flexibility for negotiating with bidders/responders to a request for proposal (RFP). McGuinness and Bauld (2004) concur that “the skill set of the public sector purchasing manager is geared more toward supervising the procurement process and preparing reports than negotiating the best deal.” However, they suggest

flexibility rather than formality is the key to improving public procurement performance.

According to Gragan (2005, p. 19), the public procurement task is “to help user agencies obtain the goods and services needed to do their jobs, while controlling the process that spends large amounts of public funds.” Although public sector procurement operates in a rule-bound environment, many of its tasks can be automated. Gragan advises public procurement professionals to promote communication with vendors and users, and to explain the strategic role of purchasing in public sector operations to their requisitioners or users, in particular. He also argues that “training should be mandatory for anyone charged with spending public funds.”

Public procurement has a reputation of being tactical, even clerical; adhering to “stringent policies and guidelines;” not requiring highly educated professionals; and stifling innovation (Matthews, 2005). However, public sector procurement is shifting from tactical to more strategic—and a focus on alliances, global sourcing, life cycle costing, empowerment, and tools such as procurement cards. [While using p-cards to place orders is tactical, making the decision about switching to p-cards and creating the implementation plan are strategic activities.] According to Baily, Farmer, Jessop, and Jones (2005), “professional training and education of those personnel responsible for the strategic direction and practical application of procurement action” is needed in the public sector.

Johnson, Leenders, and McCue (2003) observe a lack of published research comparing public and private sector purchasing and supply organizations. These three authors then compare results of a public sector purchasing survey, conducted in 2000, with a private sector survey from 1995. The public sector survey gathered data from 267 American city and county purchasing organizations; the largest 117 of these were used in the comparison. Public sector procurement professionals were significantly less involved, compared to their private counterparts, in several critical supply chain activities, such as inbound and outbound transportation and materials planning/control. However, the two groups were about equally involved in other supply chain functions, including inventory management and warehousing.

In terms of education levels, public sector chief purchasing officers (CPOs) were more likely to hold graduate degrees, although about ninety percent of both public and private sector CPOs had undergraduate degrees. Private sector professionals had significantly more experience (years of service) with their present employers, compared to public sector professionals. In addition, Johnson, Leenders, and McCue (2003) found public sector organizations significantly more involved in consortia buying and technology planning, compared to private sector firms.

The public procurement and SCM literature inspires the following hypotheses, which are tested in the current study.

H1: Public procurement professionals have a narrow perspective on SCM, compared to their private sector counterparts.

H2: Public procurement professionals have different perceptions on the importance of various topics, tools and techniques for SCM, compared to their private sector counterparts.

It is expected that public sector professionals perceive some elements to be more important (e.g. contract management, legal issues, RFQ) and other elements to be less important (e.g. inventory management, logistics and transportation), compared to the private sector.

TOPICS, TOOLS AND TECHNIQUES FOR SCM

This section reviews a selection of the relevant literature on topics, tools and techniques for SCM. This literature was an important guide during questionnaire design.

Based on survey responses from 136 purchasing professionals active in the National Association of Purchasing Management (NAPM), Giunipero and Percy (2000) identified a seven-factor skill set for world class purchasing. Derived from 30 skill items, the seven skill factors were: strategic skills; process management skills; team skills; decision-making skills; behavioral skills; negotiation skills; and quantitative skills. The top ten rated specific skill items were: interpersonal communication; ability to make decisions; ability to work in teams; analytical skills; negotiation; managing change; customer focus; influencing/persuasion; strategic thinking; and understanding business conditions.

Gammelgaard and Larson (2001) conducted a mail survey of 474 professional logisticians with “supply chain” in their titles, and then five qualitative interviews with Scandinavian supply chain practitioners, to derive skills and competencies for SCM. The survey contained 45 skill items. Recipients were invited to enclose their business cards with completed questionnaires, to be entered in a drawing for U.S. \$300. After one follow-up mailing, 124 usable questionnaires were received. The top ten SCM skill items were: teamwork; problem solving; supply chain awareness; ability to see the big picture; listening; speaking/oral communication; prioritizing; motivation; cross-functional awareness; and leadership. The interviews confirmed many of the highly ranked skills from the survey. An additional skill was identified by all five case study interviewees—gathering and sharing information.

In 2005, the Canadian Logistics Skills Committee (CLSC) released its report on the supply chain sector. Employers in the sector need people with communications and customer service skills, along with analytical and technology skills. People working in the sector note the need for broader knowledge in the areas of transportation, laws and regulations, logistics functions and international business practices. Additional skills and competencies needed by managerial (as opposed to tactical and operational) employees include contract administration and management, negotiation skills, supplier relations and management, performance measurement and quality management, process and change management skills, and the ability to work globally.

Knight, Harland, Walker, and Sutton (2005) studied competence requirements of supply managers, brought about by the “transition from *doing contracting* to *doing strategic management of supply*” in a public (health care) sector context. Specifically, they focused on the United Kingdom (UK) National Health Service (NHS) and its suppliers. These competence requirements are skills, knowledge and attributes people need to be effective supply managers. Based on analysis of verbatim transcripts from twenty-two semi-structured interviews, the researchers identified six themes of strategic supply management competence: network understanding; developing network position; relationship management; strategy formulation; strategy implementation; and knowledge management.

Network understanding is about appreciating the “big picture,” particularly the influence, culture, priorities and objectives of other organizations in the supply chain. *Developing network position* involves creating, improving and maintaining effective relationships with important members of the supply chain. Building on this, *relationship management* entails establishing communication channels and then communicating (listening, speaking and writing) well. Furthermore, it includes effective persuasion, consultation, conflict management and chairing/managing meetings. While *strategy formulation* requires research and analytical skills, ability to assess risk and “present the case,” and negotiation and leadership skills; *strategy implementation* requires preparing a plan, communicating effectively, and using project management skills. Last but not least, *knowledge management* involves accessing and sharing information, research skills, and the ability to learn and to encourage others to learn. Knight et al. (2005, p. 230) conclude that “political and social skills are at a premium” in the new context of strategic supply management.

In another qualitative study, Giunipero, Handfield and Eltantawy (2006) conducted four focus groups with fifty-four American supply chain executives from forty-one companies. The executives were asked to describe their current operating environment, along with knowledge and skills needed by their purchasing people to work in this environment. The environment they described is decidedly strategic; with emphasis on relationship management, integrated systems, total cost of ownership and cost reduction. The executives consider purchasing a strategic function rather than a tactical function.

To support the strategic role of their purchasing and supply managers, the executives identified five critical skill areas: team building; strategic planning; communication (listening, presenting, speaking and writing) skills; technical (research and analytical) skills; and financial skills, e.g. cost accounting. Team building and strategic planning consist of high-level managerial skills, such as leadership, decision-making, compromising, goal-setting and execution. Other critical skills noted by Giunipero, Handfield, and Eltantawy (2006) include negotiation skills, project management, internet literacy, ability to “sell” the supply management function within the

organization, understanding of e-commerce and enterprise resource planning (ERP) systems, and a knowledge of financial statements.

Additional critical qualities for supply chain professionals include being innovative and having an ability to integrate (Nelson, Moody & Stegner 2001), along with creative thinking and perseverance (Paquette, 2004).

THE SURVEY

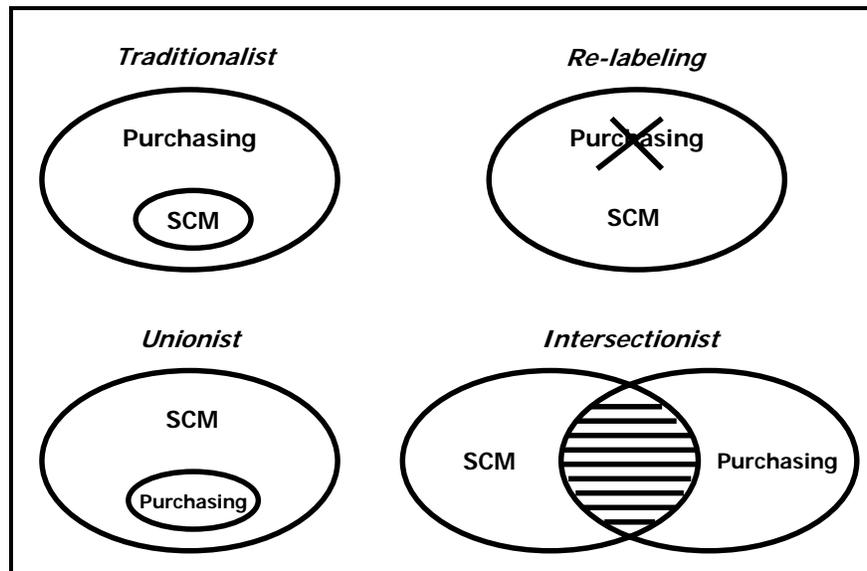
Questionnaire Design

Questionnaire design was guided by the relevant literature and discussions with Purchasing Management Association of Canada (PMAC) management. PMAC's vision is to be the recognized leader in the development and advancement of world-class strategic SCM. Its mission involves serving practitioners and enterprises by advancing the strategic value of SCM (see <http://www.pmac.ca>). Thus, PMAC is in step with the changing role of purchasing and supply management, to be recognized as more strategic, in many organizations (Baily et al., 2005). Leading experts in the field link this strategic role to the emergence of SCM (Leenders et al., 2002). A research firm was hired to program the questionnaire for on-line delivery and host or administer electronic survey data collection.

The questionnaire led with a list of 54 topics, tools and techniques related to SCM. Respondents rated these items on a scale from 0 to 5, in terms of importance in the context of their current professional positions. Next, four perspectives on purchasing versus SCM were described in words, as well as with diagrams (Larson & Halldórsson, 2002).

Figure 1 depicts the four perspectives in diagrams. *Traditionalists* position SCM as a sub-function within purchasing. "Supply chain analysts" study relationships with second-tier suppliers, and report to the head of Purchasing. *Re-labeling* entails only a name change; purchasing is now SCM. "Purchasing managers" are re-titled to become "supply chain managers" with little or no change in job description. To the *unionist*, purchasing is a function within SCM. SCM subsumes many functional areas; such as purchasing, logistics, operations; perhaps even marketing. An organization may appoint a "Vice President of SCM," and then adjust reporting relationships and

FIGURE 1
Four Perspectives on Purchasing vs. SCM



Source: Larson and Halldórsson (2002).

the organizational chart. In the *intersectionist* view, SCM consists of strategic, integrative elements across several functional areas, such as purchasing, logistics, operations and marketing. SCM coordinates cross-functional efforts among the supply chain members. A small, consultative SCM group, operating in a staff (rather than a line) capacity, would be indicative of this perspective.

The four perspectives vary in terms of breadth (single function versus multiple functions) and depth (strategic-only versus strategic and tactical). The unionist and intersectionist perspectives are broad because both involve a multiple function SCM concept. The traditionalist and re-labeling views are narrow, as both align SCM with a single managerial function, purchasing. While the intersectionist and traditionalist perspectives have a strategic-only focus, the unionist and re-labeling views are considered "deep," since they focus on strategic and tactical aspects of the supply chain.

Respondents were asked to select the perspective that most closely matches their organizational approach to SCM.

In addition, the questionnaire included a series of descriptive items covering the respondents, their work, and their organizations. They were asked about their level of education, years of experience in purchasing and SCM, professional titles, and whether they had earned the C.P.P. designation. Questions about the respondents' organizations included industrial sector, geographic location (province/territory), and number of employees. Appendix A presents the structure of the questionnaire.

Survey Administration

During January of 2006, invitations to participate in the survey were e-mailed to 7,690 PMAC members and associates. A hyperlink to the on-line questionnaire was included in the invitations. Recipients were informed that survey respondents would be entered in a drawing to win one of five Apple Shuffles. They were also assured their responses would be treated strictly confidential. By the end of the month, after one follow-up e-mail message, a total of 2,012 questionnaires were received, for a response rate of 26.2 percent.

STATISTICAL RESULTS

Manufacturing (n = 572 respondents) and government (n = 272 respondents) are the two most common sectors represented in the sample. Moving forward, statistical analysis focuses either on public sector respondents only or on comparisons of public sector (government) responses with private sector (manufacturing) responses. As expected, Table 1 reveals that Ontario (with 90 respondents) is the most frequent provincial or territorial location of public sector respondents, followed by British Columbia (64), Alberta (44) and Quebec (21). These provinces account for over 80 percent of all public sector respondents. Table 2 shows that 73 of these respondents represent "small" organizations (less than 500 employees) and 199 represent "large" organizations (500 or more employees).

TABLE 1
Location of Public Sector Respondents

| Province/Territory | Frequency | Percent |
|-------------------------|-----------|---------|
| Ontario | 90 | 33.1 |
| British Columbia | 64 | 23.5 |
| Alberta | 44 | 16.2 |
| Quebec | 21 | 7.7 |
| Manitoba | 18 | 6.6 |
| Saskatchewan | 16 | 5.9 |
| New Brunswick | 8 | 2.9 |
| Newfoundland & Labrador | 4 | 1.5 |
| Nova Scotia | 4 | 1.5 |
| Northwest Territories | 3 | 1.1 |
| Total | 272 | 100.0 |

TABLE 2
Size of Public Sector Organizations

| Number of Employees | Frequency | Percent |
|---------------------|-----------|---------|
| 1 - 99 | 22 | 8.1 |
| 100 - 499 | 51 | 18.8 |
| 500 - 999 | 46 | 16.9 |
| 1,000 - 4,999 | 77 | 28.3 |
| 5,000 - 9,999 | 34 | 12.5 |
| 10,000 or more | 42 | 15.4 |
| Total | 272 | 100.0 |

Public sector respondents are significantly more experienced than their private sector counterparts (see Table 3). Note that nearly 69 percent of public procurement professionals have more than ten years work experience with their current employers, compared to only 46 percent of the private sector people. In terms of education levels, Table 4 presents very little difference between the two groups. For both public and private sector groups, community/technical college was the most common education level reported (at slightly above 50 percent), followed by Bachelor's degree, high school and Master's degree. As shown in Table 5, the public sector survey respondents

TABLE 3
Purchasing/SCM Experience by Sector (Public vs. Private)

| Experience | Sector | | Total |
|--------------------|--------------------|--------------------|-------|
| | Public | Private | |
| Low ¹ | 85 (31.2%) | 307 (53.7%) | 392 |
| High ² | 187 (68.8%) | 265 (46.3%) | 452 |
| Total | 272 (100%) | 572 (100%) | 844 |
| Chi-Square = 37.26 | | | |
| p-value = .000. | | | |

Notes:

1. Low = 10 years or less.
2. High = more than 10 years.

TABLE 4
Level of Education by Sector (Public vs. Private)

| Level of Education | Sector | | Total |
|---|--------------------|--------------------|-------|
| | Public | Private | |
| High School | 35 (12.9%) | 80 (14.0%) | 115 |
| Community College/ Technical College | 140 (51.5%) | 299 (52.3%) | 439 |
| Bachelor's degree | 85 (31.2%) | 161 (28.1%) | 246 |
| Master's degree | 12 (4.4%) | 32 (5.6%) | 44 |
| Total | 272 (100%) | 572 (100%) | 844 |
| Chi-Square = 1.30 | | | |
| p-value = .730 | | | |

TABLE 5
C.P.P. Accreditation by Sector (Public vs. Private)

| C.P.P. | Sector | | Total |
|--------------------|--------------------|--------------------|-------|
| | Public | Private | |
| No | 137 (50.4%) | 402 (70.3%) | 539 |
| Yes | 135 (49.6%) | 170 (29.7%) | 305 |
| Total | 272 (100%) | 572 (100%) | 844 |
| Chi-Square = 31.67 | | | |
| p-value = .000 | | | |

are significantly more likely to have achieved C.P.P. accreditation. While 50 percent of the public procurement professionals hold the C.P.P., only 30 percent of the private sector professionals have the same distinction.

SCM Perspectives and Strategic vs. Tactical Nature of Work

Table 6 reveals respondents' perspectives on purchasing versus SCM. The reader is referred back to Figure 1 and the supporting text for more details on the four perspectives. There are significant differences between the public and private sectors across the four perspectives. While more than 67 percent of private sector respondents report that their organizations adopt a broad, multiple function approach to SCM (i.e. unionist or intersectionist perspectives); over 50 percent of public procurement people take a narrow view of SCM (i.e. traditionalist or re-labeling perspective), considering SCM either an element of purchasing or the same as purchasing. This result supports H1; public procurement professionals have a narrow perspective on SCM, compared to their private sector counterparts.

TABLE 6
SCM Perspective by Sector (Public vs. Private)

| Perspective | Sector | | Total |
|--------------------|-------------------|--------------------|-------|
| | Public | Private | |
| Traditionalist | 77 (28.3%) | 95 (16.6%) | 172 |
| Re-labeling | 64 (23.5%) | 92 (16.1%) | 156 |
| Unionist | 49 (18.0%) | 178 (31.1%) | 227 |
| Intersectionist | 82 (30.2%) | 207 (36.2%) | 289 |
| Total | 272 (100%) | 572 (100%) | 844 |
| Chi-Square = 31.65 | | | |
| p-value = .000 | | | |

Table 7 describes the nature of respondents' work, in terms of its strategic and tactical nature. There is little difference between public and private sectors, in terms of supply chain professionals' perception of the strategic vs. tactical nature of their work. Overall, for both groups, this work is tilted somewhat in the tactical direction.

For both groups; more than 40 percent of respondents are 75 to 100 percent tactical, while less than 20 percent are 75 to 100 percent strategic.

TABLE 7
Nature of Work by Sector (Public vs. Private)

| Tactical vs. Strategic | Sector | | Total |
|----------------------------|-------------|-------------|-------|
| | Public | Private | |
| 100% tactical | 19 (7.0%) | 23 (4.0%) | 42 |
| 75% tactical/25% strategic | 100 (36.8%) | 213 (37.2%) | 313 |
| 50% tactical/50% strategic | 99 (36.4%) | 235 (41.1%) | 334 |
| 25% tactical/75% strategic | 48 (17.6%) | 87 (15.2%) | 135 |
| 100% strategic | 6 (2.2%) | 14 (2.5%) | 20 |
| Total | 272 (100%) | 572 (100%) | 844 |
| Chi-Square = 5.02 | | | |
| p-value = .285 | | | |

SCM Topics, Tools and Techniques

The 54 topics, tools and techniques range from very focused tools—such as activity-based costing (ABC), ISO 9000, price and cost analysis, and statistical process control (SPC); to broad topics or even fields or study/practice—e.g. public sector procurement, purchasing and supply management, and SCM. Generally, *public procurement*, *purchasing*, and *supply management* are similar fields of practice. The latter term is used primarily by the private sector. As observed by Larson and Halldórsson (2002), SCM has alternatively been viewed as: the same as purchasing (re-labeling), a component of purchasing (traditionalist), much more than purchasing (unionist), or a field which partially overlaps the field of purchasing (intersectionist).

Based on average importance ratings, Table 8 reports public and private sector top ten lists of SCM topics, tools and techniques. The following five items are on both top ten lists: communication skills,

TABLE 8
Top Ten Lists of Topics, Tools and Techniques

| | | | |
|---|------|----------------------------|------|
| <p>“Please rate each of the following topics, tools and techniques, in terms of their importance for you in your current professional position.” (0 = no importance; 1 = very low importance; 2 = low importance; 3 = medium importance; 4 = high importance; 5 = very high importance)</p> | | | |
| Public Sector | Mean | Private Sector | Mean |
| 1. Public procurement | 4.60 | 1. Communication skills | 4.46 |
| 2. Communication skills | 4.55 | 2. Negotiation | 4.29 |
| 3. Request for quotation | 4.51 | 3. Price and cost analysis | 4.14 |
| 4. Contract management | 4.35 | 4. Teamwork | 4.09 |
| 5. Legal issues | 4.29 | 5. Computer skills | 4.07 |
| 6. Ethical issues | 4.15 | 6. Inventory management | 4.04 |
| 7. Leadership | 4.15 | 7. Leadership | 4.03 |
| 8. Computer skills | 4.14 | 8. Supplier selection | 4.01 |
| 9. Teamwork | 4.06 | 9. Purchasing & supply | 3.99 |
| 10. Purchasing & supply | 4.05 | 10. SCM | 3.90 |

teamwork, computer skills, leadership, and purchasing and supply management. Both procurement professional groups perceive the need for a strong foundation in supply management, along with general managerial and technological skills. These next five items are unique to the public sector top-ten list: public sector procurement, request for proposal/quotation, contract management, legal issues and ethical issues. This result supports H2; the public sector perceives some elements to be more important, compared to the private sector. The following final five items are unique to the private sector top ten list: negotiation, price and cost analysis, inventory management, supplier selection/evaluation and SCM.

Appendix B reports mean ratings by group, and t-test results, for all 54 topics, tools and techniques on the questionnaire. To test for possible sector differences in respondents' ratings, independent sample t-tests were conducted on all 54 items, with public versus private sector as the grouping variable.

The items are ordered by descending t-statistic. While a positive t-statistic implies an item is perceived more important by public

sector professionals, a negative t-statistic implies an item is more important for the private sector. A higher t-statistic absolute value implies a greater difference between public and private sector perceptions. A p-value less than .01 (the alpha level) implies a significant difference between the public and private sector average ratings on an item.

The two independent samples t-test assumes: (1) the samples are independently and randomly drawn from a source population; (2) there is equal interval scale of measurement for both samples; and (3) the source population follows a normal distribution. The data behind these t-test results are distributed across six ordinal categories (from 0 to 5), which may violate the second and third assumptions. However, the t-test has been shown to be robust despite violations of these assumptions.

Rasch, Teuscher and Guiard (2007) consider the case of data distributed across five ordered categories, e.g. 1 to 5. Using simulated data, they compare the independent sample t-test with the Mann-Whitney test, for various sample sizes. Rasch, Teuscher and Guiard (2007, p. 2706) offer the following conclusion: "The (two-sample) t-test is so robust against non-normality that there is nearly no need to use the Wilcoxon (Mann-Whitney) test in comparing expectations."

Nonetheless, nonparametric Mann-Whitney tests were conducted on the 54 items, for comparison purposes. Mann-Whitney testing relaxes the normal distribution assumption and requires ordinal, rather than interval, scale of measurement (Sprent, 1993). Test conclusions were identical on all but three items: e-commerce, communication skills, and leadership. In these three cases, the Mann-Whitney test found the items significantly more important for the public sector, while the t-test found the differences not significant. Given the robustness of the t-test, along with nearly identical conclusions reached by Mann-Whitney and t-tests, only the independent sample t-test results are reported and discussed.

The first ten items in Appendix B were rated significantly more important by the public procurement professionals, compared to their private sector counterparts. The item with greatest significant difference was *public sector procurement*. On average, public sector respondents rated this item 4.60 (out of 5), and private sector

respondents rated the item 1.52. Another four of the items rated more important by the public sector—*conflict management, contract management, legal issues* and *request for quotation/proposal*—affirm the public sector reliance on competitive bidding (Leenders et al., 2002), along with potential disputes with unsuccessful bidders (Thai, 2004).

Four additional items of greater importance to public sector procurement professionals—*environmental concerns, ethical issues, social responsibility* and *risk management*—reflect the broad range of stakeholders served by the public sector (Newman 2003), as well as a sector focus on social and political objectives, in addition to economic objectives. The final item rated more important by the public sector was *procurement cards*. This confirms the growing interest in and use of p-cards as a procurement tool in the public sector (Matthews 2005).

Group differences on the next thirteen items (from *e-commerce* to *total cost of ownership*) were not significant, i.e. these topics, tool and techniques were rated equally important by public and private sector professionals.

The remaining 31 items in Appendix B were rated significantly less important by public procurement professionals, compared to their private sector counterparts. Four of these items—*inventory management, logistics and transportation, production/operations management* and *supply chain management*—confirm the lack of public procurement involvement in certain SCM functional areas, such as transportation and materials planning (Johnson, Leenders & McCue, 2003). Another fourteen items consist of the ingredients to an alphabet soup of tools and techniques to support functional management, as well as quality and productivity improvement objectives. These ingredients are *activity-based costing* (ABC), *cost of quality* (COQ), *cycle time reduction* (CTR), *forecasting*, *ISO 9000*, *just-in-time* (JIT), *materials requirements planning* (MRP), *performance measurement*, *price and cost analysis*, *statistical process control* (SPC), *supply chain mapping*, *total quality management* (TQM), *vendor certification* and *vendor managed inventory* (VMI).

Seven additional items, rated less important by the public sector—*bar coding, enterprise resource planning* (ERP), *inter-organizational information systems* (IOIS), *outsourcing, partnerships/alliances*,

supplier development and *third-party logistics* (3PL)—suggest a lag in public procurement adoption of supply chain technology and development of supply chain relationships. A further five items—*customs brokerage*, *global purchasing*, *import/export processes*, *multi-cultural skills* and *non-tariff barriers*—reflect the tendency of public agencies to buy locally or nationally, rather than globally, for political reasons (Thai, 2004).

Finally, *negotiation* was also rated significantly less important by public sector respondents. This supports the assertion that negotiation is under-utilized in public procurement (McGuinness & Bauld, 2004).

Collectively, the results presented in Appendix B provide strong support of H2; public procurement professionals have different perceptions on the importance of various topics, tools and techniques for SCM, compared to their counterparts in the private sector.

IMPLICATIONS OF THE RESULTS

The paper closes by discussing implications of survey results for practitioners, researchers and educators.

For Practitioners

Public procurement officials are facing “increasing calls for procurement reform” (Thai 2004, p. 312). For instance, the Government of Canada is initiating “procurement transformation,” with the goal of saving \$2.5 billion over five years. The Government is committed to increasing procurement process transparency and accountability; being easier and less expensive to do business with; and considering social impacts, as well as economic impacts of procurement activities. To deliver better value to Canadian taxpayers, the Government is adopting a variety of “best practices,” including: reduction of models and configurations available to requisitioning agencies; consideration of quality and other total cost factors, beyond just purchase price; order cycle time reduction; and use of electronic tools to facilitate negotiation (<http://www.tpsgc-pwgsc.gc.ca>).

Results of the survey suggest Government of Canada purchasing managers will need an expanded set of skills to achieve the goals of “procurement transformation.” They will need more knowledge about

SCM, and enhanced skills in negotiation, developing partnerships and using inter-organizational information systems. Public procurement professionals have the opportunity to move beyond purchasing to the broader, multi-functional SCM space. Practitioners empowered by SCM, and able to make the move, will find the nature of their work evolve and become more strategic. Others, those who feel threatened by SCM, will be left behind to perform the traditional, tactical work of purchasing. To make the move to SCM, purchasing professionals must understand and apply a new collection of topics, tools and techniques.

For Researchers

The survey results presented in this paper compared the perceptions of public sector (government) procurement professionals with their private sector (manufacturing) counterparts. Future research might compare the public sector with the service side of the private sector. Since the government agencies supported by public procurement are often service providers, service businesses may have more in common with the public sector. Further future research is needed to compare SCM perspectives and perceptions on the tools and techniques across the three levels of government: federal/national, state/provincial, and local/municipal. The National Institute of Governmental Purchasing (NIGP) appears to serve large numbers of city, county, and state or provincial procurement professionals, but relatively few federal employees (NIGP, 2006).

It would also be interesting to take this research beyond the borders of Canada, starting with a survey of American public procurement professionals on SCM. Ideally, samples of members from a variety of organizations; e.g. the Institute for Supply Management (ISM), the National Association of State Procurement Officials (NASPO), and the NIGP; would be surveyed. This research could address questions such as: Do public procurement professionals in the United States perceive similar importance levels of the various topics, tools and techniques for SCM? Are their perspectives on the breadth and depth of SCM similar to those of Canadian public sector professionals?

For Educators

Results of the survey show that public procurement professionals utilize a unique supply chain toolkit, vis-à-vis their private sector counterparts. Public sector people need training tailored to their unique context, such as the series of seminars and workshops offered by the NIGP. The NIGP technical seminars cover contract administration, RFP, legal aspects, and sourcing. Technical workshops are on topics such as: dispute resolution, change management, leadership, negotiation, and inventory/warehouse management (<http://www.nigp.org>). As the public sector pursues procurement reform, and as purchasing becomes strategic, public procurement training programs might broaden their programs to include SCM, plus supply chain relationships and technology.

Colleges and universities across North America, as well as around the world, are developing courses and building new programs in SCM. Most of this activity is focused on the for-profit, private sector; rather than the public and/or not-for-profit sectors. There are a number of options for offering SCM academic programs to the public sector. One option is to insert public sector material into business school courses in purchasing and SCM. While these courses cater primarily to private sector interests, some content is highly relevant in the public sector as well. Moreover, one or two sessions in such courses can be devoted to unique issues in the public sector. A second option is to offer courses focused on the public sector, as is done at the Florida Atlantic University School of Public Administration. A third option, to introduce SCM topics, tools and techniques to the public sector, could involve joint programs offered by schools of business and public administration.

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APPENDIX A The Questionnaire

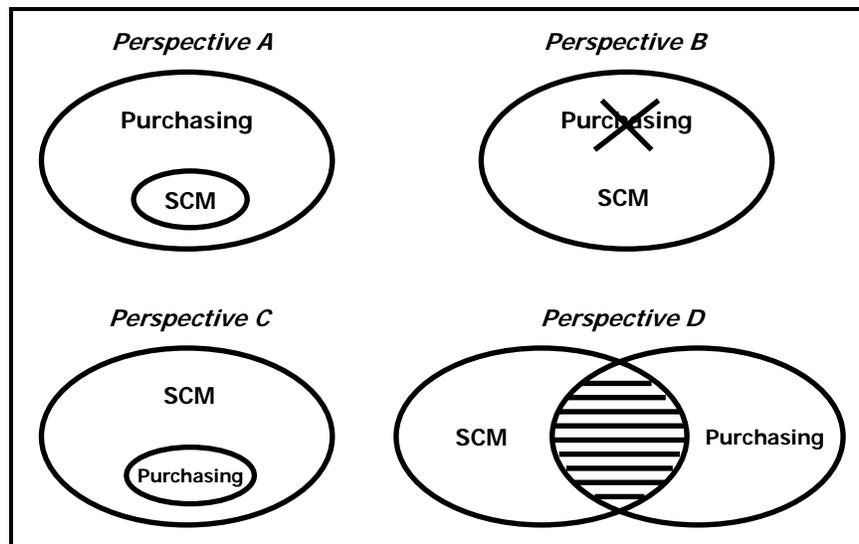
1. Please rate each of the following topics, tools, and techniques, in terms of their importance for you in your current professional position.

| Topics, Tools, Techniques | Importance for SCM | | | | | |
|--|--------------------|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 |
| Appendix B has a complete listing of the 54 items. On the questionnaire; the topics, tools and techniques were listed in alphabetical order. | | | | | | |

0 = no importance; 1 = very low importance; 2 = low importance; 3 = medium importance; 4 = high importance; 5 = very high importance.

- Consider the diagrams and definitions below, and answer the following question about your organization's perspective and approach to supply chain management (SCM).

Four Perspectives on Purchasing vs. SCM



In *Perspective A*, SCM is positioned as a function within purchasing. Supply chain analysts report to the Head of Purchasing. *Perspective B* simply entails a name change; purchasing is now SCM.

“Purchasing managers” are re-titled to become “supply chain managers” with little or no change in job description. *Perspective C* positions purchasing as a function within SCM. SCM also subsumes other functional areas, such as logistics. An organization appoints a “V.P. of SCM,” and adjusts reporting relationships and the organizational chart. In *Perspective D*, SCM consists of strategic, integrative elements across several functional areas, including purchasing. SCM coordinates cross-functional efforts involving multiple organizations. A consultative SCM group, working in a staff (rather than a line) capacity, is created.

Which perspective on purchasing vs. SCM has your organization adopted?

- Perspective A Perspective B
 Perspective C Perspective D

3. Which of the following functional areas are involved in SCM at your organization? (Check all that apply.)

- Purchasing Logistics Operations
 Marketing Management Information Systems
 Accounting Finance Human Resources

4. Estimate the extent to which your current position in purchasing/ SCM is tactical and/or strategic in terms of the issues you consider, duties you perform, and decisions you make.

| 100% tactical | 75% tactical/ 25% strategic | 50% tactical/ 50% strategic | 25% tactical/ 75% strategic | 100% strategic |
|---------------|--------------------------------|--------------------------------|--------------------------------|----------------|
| | | | | |

5. Estimate the number of employees working at your organization:

- 1 - 99 100 - 499 500 - 999
 1,000 - 4,999 5,000 - 9,999 10,000 or more

6. How long have you been working in the purchasing and SCM field?

- 1 year or less 1 - 5 years 5 - 10 years
 10 - 15 years 15 - 25 years 25 years or more

7. What is the highest level of education you have achieved?

- Master's degree Bachelor's degree
 Community/Technical College High School

8. Which PMAC Institute are you a member of? (Please check one.)

Alberta British Columbia Manitoba
 New Brunswick Newfoundland and Labrador
 Northwest Territories Nova Scotia
 Ontario Quebec Saskatchewan

9. Have you earned the C.P.P. designation? Yes No

APPENDIX B
Independent Sample t-tests: Public vs. Private Sector

| Topics, Tools, Techniques | Sector Means | | t-stat. | p-value |
|------------------------------------|--------------|---------|---------|---------|
| | Public | Private | | |
| Public sector procurement | 4.60 | 1.52 | 41.32** | .000 |
| Request for quotation/proposal | 4.51 | 3.71 | 12.72** | .000 |
| Legal issues | 4.29 | 3.43 | 12.15** | .000 |
| Procurement cards | 3.33 | 2.47 | 8.86* | .000 |
| Social responsibility | 3.71 | 3.11 | 7.94* | .000 |
| Contract management | 4.35 | 3.84 | 7.13* | .000 |
| Ethical issues | 4.15 | 3.73 | 5.41* | .000 |
| Risk management | 3.86 | 3.48 | 4.91* | .000 |
| Environmental concerns | 3.56 | 3.34 | 2.78* | .006 |
| Conflict management | 3.94 | 3.77 | 2.77* | .006 |
| e-commerce | 2.97 | 2.80 | 1.88* | .060 |
| Communication skills | 4.55 | 4.46 | 1.86* | .063 |
| Leadership | 4.15 | 4.03 | 1.75** | .081 |
| Relationship building | 3.96 | 3.89 | 1.07* | .284 |
| Computer skills | 4.14 | 4.07 | 1.06* | .292 |
| Purchasing & supply management | 4.05 | 3.99 | 0.77* | .442 |
| Supplier selection/evaluation | 3.99 | 4.01 | -0.32** | .749 |
| Change management | 3.54 | 3.56 | -0.35* | .730 |
| Teamwork | 4.06 | 4.09 | -0.45* | .653 |
| Time management | 3.71 | 3.79 | -1.07* | .287 |
| Single vs. multiple sourcing | 3.50 | 3.59 | -1.18* | .240 |
| Electronic data interchange (EDI) | 2.66 | 2.78 | -1.18* | .240 |
| Total cost of ownership (TCO) | 3.34 | 3.53 | -1.99** | .047 |
| Performance measurement | 3.62 | 3.85 | -3.30** | .001 |
| Multi-cultural skills | 2.45 | 2.83 | -3.82** | .000 |
| Price and cost analysis | 3.86 | 4.14 | -4.34* | .000 |
| Vendor certification | 3.01 | 3.41 | -4.73* | .000 |
| Inter-organizational info. systems | 2.46 | 2.92 | -4.73** | .000 |
| Enterprise resource planning (ERP) | 2.64 | 3.19 | -5.37** | .000 |
| Negotiation | 3.95 | 4.29 | -5.45* | .000 |

APPENDIX B (Continued)

| Topics, Tools, Techniques | Sector Means | | t-stat. | p-value |
|------------------------------------|--------------|---------|----------|---------|
| | Public | Private | | |
| Partnerships/alliances | 3.13 | 3.58 | -5.63* | .000 |
| Supply chain mapping | 2.49 | 3.06 | -5.96** | .000 |
| Total quality management (TQM) | 3.00 | 3.53 | -6.21* | .000 |
| Third-party logistics (3PL) | 2.11 | 2.72 | -6.23** | .000 |
| Supplier development | 3.25 | 3.78 | -6.36** | .000 |
| Statistical process control (SPC) | 1.96 | 2.60 | -6.93* | .000 |
| Activity-based costing | 2.28 | 2.99 | -7.00** | .000 |
| Bar coding | 1.84 | 2.67 | -7.73* | .000 |
| Cost of quality (COQ) | 3.21 | 3.86 | -7.95** | .000 |
| Non-tariff barriers | 1.88 | 2.54 | -7.99* | .000 |
| Supply chain management (SCM) | 3.16 | 3.90 | -8.11** | .000 |
| Outsourcing | 2.75 | 3.47 | -8.24* | .000 |
| Logistics and transportation | 2.96 | 3.74 | -8.92** | .000 |
| ISO 9000 | 2.00 | 2.93 | -9.38* | .000 |
| Forecasting | 2.92 | 3.82 | -9.99** | .000 |
| Customs brokerage & clearance | 2.30 | 3.24 | -10.27** | .000 |
| Vendor managed inventory (VMI) | 2.25 | 3.28 | -10.90* | .000 |
| Cycle time reduction (CTR) | 2.10 | 3.22 | -11.68** | .000 |
| Inventory management | 2.85 | 4.04 | -11.75** | .000 |
| Production/operations management | 2.35 | 3.53 | -12.15** | .000 |
| Just-in-time (JIT) | 2.03 | 3.26 | -12.38** | .000 |
| Global purchasing | 2.50 | 3.81 | -13.48** | .000 |
| Import/export processes | 2.12 | 3.43 | -14.05** | .000 |
| Materials requirements plan. (MRP) | 2.26 | 3.85 | -15.31** | .000 |

Notes: * Equal variances assumed, based on Levene's test.

** Equal variances not assumed.