

# **Operations Management Research: A 10-year Survey**

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## **Abstract**

Following the evolution and growth of the field of production and operations management POM, a number of studies have recently appeared which provide insights on the ranking of the research outlets of the field.

This paper presents a brief history of the development of operations management (OM). This provides the backdrop for a content analysis of journal articles published in the Journal of Operations Management and the International Journal of Operations & Production Management between January 2001 and December 2009. MBA student survey data are then used to explore any gaps that may exist between the focus of academic research and the perceived importance of given OM subject areas to practitioners. The practical and conceptual insights highlighted are then used as the basis for a discussion of extant research priorities. By considering the three following intervals, (i.e. 2001-2003; 2004-2006, 2007-2009), possible trends in OM are discussed. Supply chain, performance measurement, quality, and process technology are the ones discussed.

## **Keywords**

Operations management Research, Practitioners Survey, Operations strategy

## **1. Introduction**

The theoretical underpinnings of the OM field are somewhat different from other academic management subjects like strategy, marketing or finance. Whereas these fields of study are more-or-less directly connected to base theoretical disciplines such as economics, sociology, psychology and mathematics, OM's underpinnings are more fragmented.

- (1) Are the "two worlds" of OM research and practice far apart?
- (2) Does their relative proximity actually matter?
- (3) What are the trends followed in main generic topics of OM and OS; based on papers published in two relevant journals?

Recently there have been a number of reviews of empirical research, focusing on specific topics such as operations strategy (e.g. Boyer et al., 2005), interdisciplinary and inter-organizational research (e.g., Buhman et al., 2005), sustainability (e.g., Kleindorfer et al., 2005), new product development (e.g., Krishnan and Loch, 2005), quality management (e.g., Schroeder et al., 2005), and supply chain management (e.g., Kouvelis et al., 2006). There have also been other studies that reviewed the state of survey research methods and data collection techniques (Barratt et al., 2011). A number of articles have attempted to provide guidance as to how to undertake such research from a variety of disciplines—management (Bitektine, 2008; Eisenhardt and Graebner, 2007), information systems, marketing, and operations management (Barratt et al., 2011). The paper begins by presenting a brief history of the development of OM. This provides the backdrop for a content analysis of journal articles published in the Journal of Operations Management and the International Journal of Operations & Production Management between January 2001 and December 2009, which have been chosen according to some available research on OM journals. This data reveals the trend of operations management research MBA student survey data

(January 2000 to June 2005) is then used to explore any gaps that may exist between the focus of academic research and the perceived importance of given OM subject areas to practitioners. The practical and conceptual insights highlighted are then used as the basis for a discussion of extant research priorities.

## **2. A Brief History of OM<sup>1</sup>**

The early history of management thought is, in large part, the history of published works concerned with the act of production (e.g. Smith, 1776; Babbage, 1963; Taylor, 1911; Ford and Crowther, 1922, 1926). This production-centred content reflects the symbiotic relationship between the emergence of capitalism and the development of the modern factory system, private profit provided the impetus to expand production as efficiently as possible and profit was in turn invested as capital for further expansion. Moreover, large-scale manufacturing, built upon the principle of division of labour and the application of dedicated machinery to specific tasks, necessitated the creation of “managers”. It is no coincidence that the earliest management ideas emerged in the UK but that their further development and widespread acceptance happened in North America. The UK’s industrial revolution began in the textile industry during the eighteenth century (Landes, 1999), stimulated by coincidental geo-political (a rapidly growing empire, centred around India) and technological events (in particular James Watt’s refinement of the steam engine and other celebrated manufacturing inventions such as James Hargreaves’ “spinning jenny”). By the mid-nineteenth century however, an alternative system of manufacturing was emerging in America (Rosenberg, 1969; Wilson, 1998). For example, the first widespread introduction of interchangeable parts (a system first seen in the arsenal of Venice in the fifteenth century), allowed manufacturers to fundamentally break with craft production and fully exploit the division of labour. Likewise, unhindered by long-established organisational structures such as craft guilds and supported by the growth of a nation-wide railroad, the American system moved towards more vertically-integrated and hence larger scale, modes of production.

### **2.1. Modern OM research**

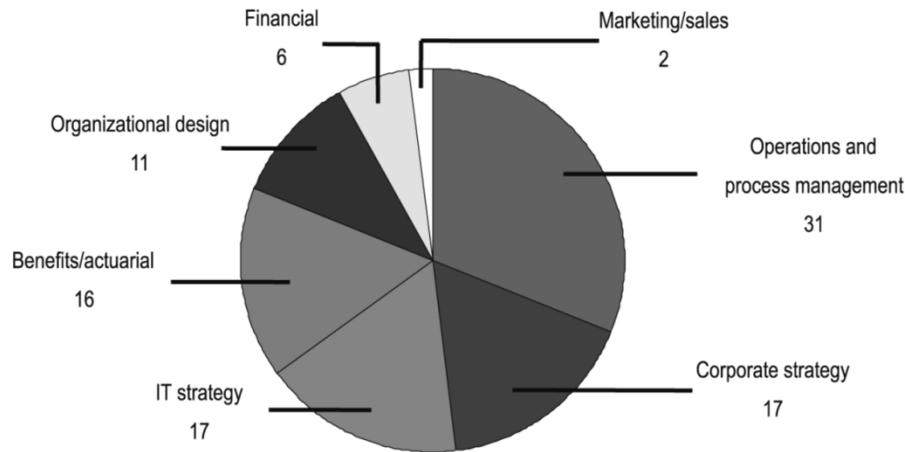
Despite its rich heritage, OM spent several years as something of a Cinderella subject; to such an extent that many people questioned the need for its continued inclusion in the business curriculum (Andrews and Johnson, 1982). Such a direct challenge to its legitimacy may have revived the disciplines pre-occupation with current practitioner concerns (Voss, 1995) and led to much greater emphasis being placed on empirical work (Ebert, 1990; McCutcheon and Meredith, 1993). Whatever the trigger (e.g. Miller and Graham, 1981), by the early 1980s OM-related research had begun to reflect mainstream management concerns once again. As an illustration, by the end of the 1980s managers at US utility Florida Power and Light (the first non-Japanese winner of the prestigious Deming quality prize) were able to claim that 90 per cent of Fortune 100 companies had attended their monthly quality seminars. If it is argued that quality issues (for example, quality circles, total quality management (TQM), awards and standards like ISO 9000 and the Deming Prize, etc.) were in the vanguard of the re-emergence of OM as a core concern for many managers and academics (Cole, 1998), more ideas such as lean production, business process reengineering (BPR), supply chain management and e-business have all been closely associated with OM.

### **2.2. Modern OM practice**

If the 1980s saw the beginning of an OM renaissance, then by the mid-1990s the discipline was once again firmly located in both the academic and practitioner mainstreams. For example, if where firms spend their money offers any indication of what they deem to be important for business success, then a 1997 survey of global consultancy services (The Economist, 1997) provides ample evidence of OM’s increased importance. Figure 1 illustrates the results of a world-wide survey of client spending on consultancy services subdivided into areas of management activity and the largest single share of the market (31 per cent) is devoted to “operations and process management” related work. Acknowledging that any results may be in part explained by boundary categorization anomalies (i.e. if a respondent was unsure as to the category in which to place a consultancy project, “operations and process management” could be interpreted as relevant to most projects) and that the survey does not attempt to analyze the underlying reasons for this large market share, it is still valid and interesting to propose some potential explanations for this apparently overwhelming evidence of the subject’s relevance. For instance:

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<sup>1</sup> Based on “The two worlds of operations management research and practice” by N. Slack et al.



Source: *The Economist* (1997)

Figure 1: a 1997 survey of global consultancy spending

- No other functional area has such a direct impact on both revenue and cost. The popularization of ideas such as TQM and lean production established in both practitioner and research arenas the idea that operations practice must pursue the twin objectives (even if to different extents) of improving aspects of service such as quality, variety, responsiveness etc., while at the same time reducing costs. Given the business maxim that “profit is a very small number made up of the difference between two very big numbers”, any subject that claims to increase revenue and reduce costs must demand the attention of companies that can appreciate its potentially disproportionate effect on profitability.
- All types of services (including “internal” services such as HR) have become more concerned about their levels of productivity, quality, responsiveness, etc. (Levitt, 1972). As a result, the audiences for process management and reengineering courses, books and consultancy, are no longer limited to functional operations managers. Increasingly, all sorts of administrative personnel and managers see themselves as managing processes and therefore have something to learn from operations management ideas (Womack and Jones, 1994, 1996).
- Interest in OM has paralleled the growth of interest in resource-based (Wernerfelt, 1984; Barney, 1991; Mahoney and Pandian, 1992) or capability-based (Teece and Pisano, 1994, Teece et al., 1997) models of competitive strategy. The overlaps between operations management/strategy and resource-based driven views of general strategy are often explicit. Prahalad and Hamel (1990), for example, defined their “core competencies” as “collective learning . . . especially how to coordinate diverse production skills and integrate multiple streams of technologies”.

Even without an exact measure of the current extent of practitioner interest in OM, this discussion raises a number of important questions for the OM research discipline. In particular, if practitioners are taking the subject seriously, to what extent is academic research truly engaged with the world of practice?

### 3. Why to choose these journals?

Following the evolution and growth of the field of production and operations management POM, a number of studies have recently appeared which provide insights on the ranking of the research outlets of the field. A number of POM journal evaluation and ranking studies has recently been conducted (Barman et al., 1991; Vokurka, 1996; Goh et al., 1997). Such rankings can be of help to a number of stakeholders. Researchers, for example, can use such evaluations as a reference when choosing among potential journals for their research work, since promotion and tenure decisions are typically influenced by the relevance and quality of the journals they publish in. Faculty and librarians can use them to identify important journals.

Practitioners can use them to keep up with current POM topics, research, and new ideas. Journal editors seeking market feedback on their article selection process can also benefit from such evaluations. Barman et al. 1991 report a survey questionnaire study which classified 20 selected journals, based on their perceived relevance and quality. The research framework of the study included all the Decision Science Institute members with POM listed as their primary interest area. The top journals concerning their relevance to POM research were the *Journal of Operations Management*, the *International Journal of Production Research*, and the *International Journal of Operations and Production Management*. Another survey resulted in a similar ranking (Andreas C. Soteriou et.al 1997). The *Journal of Operations Management (JOM)*, the *International Journal of Operations and Production Management (IJOPM)*, *Production and Operations Management (POM)*, and the *International Journal of Production Research (IJPR)* were placed at the top of the list. The perceived relevance ratings from the European POM researchers are shown in Table1.

Table 1: Comparison of Barman and Soteriou

POM academic journal relevance ratings as perceived by European researchers

Relevance				
RANKS	Journals	Mean	St. d.	Rank in Barman et al. (1991)
1	Journal of Operations Management	7.62	1.37	1
2	Intern'l J. of Operations and Production Mgt.	7.60	1.52	3
3	Production and Operations Mgt.	7.44	1.38	
4	International Journal of Production Research	6.73	1.89	2
5	International Journal of Production Economics	6.66	1.87	4
6	Production and Inventory Mgt. Journal	6.65	2.08	6
7	Management Science	6.43	1.99	9
8	Harvard Business Review	6.19	2.24	11
9	European Journal of Operational Research	6.18	1.84	12
10	Sloan Mgt. Review	6.15	1.77	
11	Intern'l J. of Service Industry Mgt.	6.06	2.13	
12	IIE Transactions	6.06	2.10	7
13	Interfaces	5.93	1.67	8
14	Operations Research	5.92	2.10	15
15	Omega	5.75	1.70	14
16	J. of the Operational Research Society	5.72	1.85	16
17	Journal of Purchasing and Materials Mgt.	5.68	1.59	10
18	Quality and Reliability Mgt.	5.65	1.39	
19	Naval Research Logistics	5.54	2.06	13
20	Decision Sciences	5.47	1.92	5
21	Service Industries Journal	5.46	2.19	
22	TQM Magazine	5.35	1.72	
23	Computers and Operations Research	5.35	1.96	18
24	Intern'l Transactions in Operational Research	5.33	1.73	
25	Strategic Mgt. Journal	5.28	2.20	
26	Computers and Inventory Mgt. Journal	5.26	2.03	
27	European Mgt. Journal	5.03	1.66	
28	Computers and Industrial Engineering	5.03	1.95	17
29	Academy of Mgt. Journal	4.87	2.03	20
30	Quality Journal	4.86	2.01	
31	Journal of Productivity Analysis	4.81	2.25	
32	Operations Research Letters	4.80	1.78	
33	Academy of Mgt. Review	4.77	2.07	19
34	Location Science	4.27	2.09	
35	Journal of Business and Mgt.	4.19	1.78	

A sidebar indicates no significant differences in means at the .05 significance level

Table 1 also shows the original Barman ranking of the journals, thus providing the means for a direct comparison with the rankings obtained in this study. This finding is consistent with the results of Barman in the sense that all journals that appear at the top of the list can be considered primarily as POM journals by specifically emphasizing on POM related publications. In both surveys, JOM and IJOPM are among the three top journals. That could strongly support the candidacy of these two journals.

#### 4. Methodology

Research/practice gap question necessitates an investigation of the content priorities of OM-related managerial and research activity. In order to achieve this, some form of topic categorization is necessary and, once again, this introduces the challenge of establishing essentially artificial boundaries. Using the same journal data set as before, current research content priorities were established by classifying 1039 papers (see table 2 and Figure 2) against a series of 16 generic topic headings in three periods from 2001-2009 (see Table 3).

Table 2: No. of papers studied for each year (total of 1039 papers)

Year	Journals	
	IJOPM	JOM
1997	81	24
1998	76	39
1999	75	32
2000	68	29
2001	72	35
2002	69	40
2003	61	33
2004	63	44
2005	71	37
2006	62	28
total	698	341

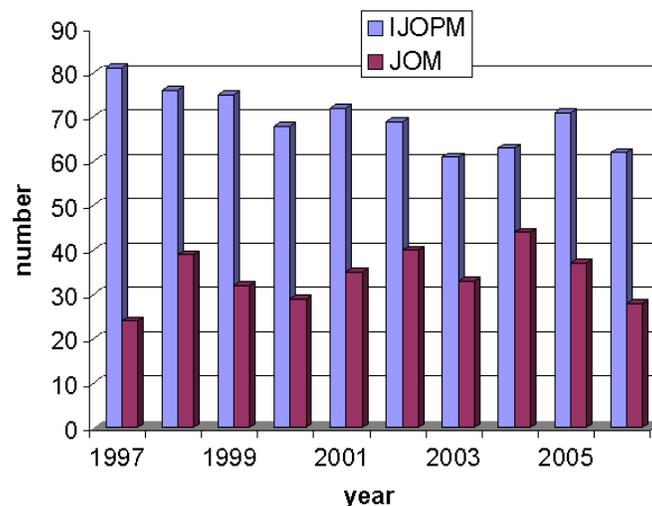


Figure 2: Trend of Paper studied for each year

The percentage of these papers as a component of the total paper set is then used as a surrogate measure of relative research priority.

In order to obtain an approximate measure of the practitioner priorities, data from an annual survey of MBAs at Warwick University were examined. This survey of full-time and executive MBAs is conducted by the OM group at Warwick Business School and the data employed in this paper cover the period of 6 years (i.e. 2000-2005). It is drawn from a sample of 312 students (89 per cent of whom are European; average age is 32.5 years; 12 per cent manufacturing background; 88 per cent general service background). Assessments of the importance of each of the 16 content topics were framed in terms of individual perceptions (based on previous industrial experience) of this “subjects” impact on overall business performance, a five-point scale was used. Table I present the two sets of findings together, in rank order to facilitate identification of any obvious similarities and disconnects.

Table 3: Comparison of practitioners (2000-2005) and research content priorities (2000-2009)

Mean practice contribution score	Ranked practice content MBA survey 2000-2005	Ranked research content extract from JOM and IJOPM 2000-2009	Combined mean percentage of papers
4.25	Quality and Improvement	Operations strategy (D)	18.90
4.15	Supply chain (A)	Supply chain (A)	17.95
4.1	JIT/lean (B)	Performance measurement	12.32
4.05	MRP/ERP (C)	Quality & Improvement	12.17
3.9	Planning and control	Process design	7.37
3.35	Process design	Product/service design	6.24
3.3	Operations strategy (D)	JIT/lean (B)	5.26
3.3	Capacity	Process technology	5.22
3.2	Performance	Planning & control	4.83
3.05	Inventory	Inventory	3.05
3	Product/service design	MRP/ERP (C)	1.89
2.95	Process technology	Capacity	1.29
2.95	Job design	Failure/risk	1.19
2.15	Failure/risk	Maintenance	1.08
2.1	Maintenance	Layout	0.66
1.7	Layout	Job design	0.60

## 5. Results

Justifications can include: there is a gap in existing theory that does not adequately explain the phenomenon under investigation (Benbasat et al., 1987; Eisenhardt and Graebner, 2007; Meredith, 1998; Rothlisberger, 1977); the research is exploratory and therefore calls for case research to build theories (Meredith, 1998; Yin, 1989); the research is explanatory (i.e., asking “how” and “why” types of questions) and the context and experiences of actors are critical (Benbasat et al., 1987; Bonoma, 1985), especially the experiences of managers so as to increase the practical relevance of the findings (Fisher, 2007).

### 5.1. Research/practice gap: content priorities

As discussed in the previous section, there are clear limits to the validity and reliability of any findings from this analysis – especially with respect to the interpretative nature of the paper content classification process and the use of a narrowly-based sample (i.e. age, education profile, European bias, etc.) of practitioner perceptions. Yet even accepting once again that they are, at best, indicative findings, some interesting observations can be made (letters refer to annotation on table):

- A. There are several topics that appear to have generated an equivalent level of practice and research interest. For instance, supply chain issues have recently become extremely visible in both the popular management press and OM conference proceedings. Similarly, a number of specialist supply chain journals have emerged. It is interesting to note however that in the overall data set (i.e. 1990-2003) supply chain issues are the smallest category; confirming that the number of supply chain related papers increased substantially over the period covered by the survey.
- B. There are also topics that practitioners appear to ascribe a greater significance than academics. For instance, JIT/lean production is a long-established OM research priority that in recent years has probably become less prominent as a subject as the core principles have matured. In terms of practice however, there is still a great deal of scope for applying these, now clearly articulated and

- tested, principles – especially beyond their traditional manufacturing roots (e.g. Womack and Jones, 1994, 1996).
- C. Conversely, other subjects where practice appears to lead research (like MRP/ERP) may reflect the apparent difficulties of providing a rapid academic response to an organizational phenomenon that appears very quickly (e.g. the massive growth of ERP spending in the immediate pre-2000 period). A more heritable interpretation may be that it also reflects recognition on the part of researchers that research issues associated with ERP systems are directly related to earlier well-established MRP findings.
  - D. There are also some topics where practitioner interest appears to strongly lag academic priorities. For instance, operations strategy is the most popular research priority and yet it ranks six places above its practice score. The explanations for this may lie in the limitations of the research method: for example, it is much more challenging to articulate (on a single five-point scale) the “contribution” of an amorphous construct like an operations strategy than a widely shared notion like quality. At the same time, we should also entertain the possibility that these ideas remain intellectually interesting rather than practically relevant.
- ***Does this relative proximity actually matter?***

Figure 3 is an abstraction used to represent the interaction between operations capability and market requirements, the 45° line indicating a state of exact alignment or “fit” (Slack and Lewis, 2001; Lewis, 2003). For the purposes of this paper, it is important to stress that the figure is not intended to act as a prescriptive model indicating that research competences and practitioner requirements are easily measured and their trajectories predictable. Rather this simple scalar representation is employed to help visualize the practical and conceptual challenges of achieving fit over time.

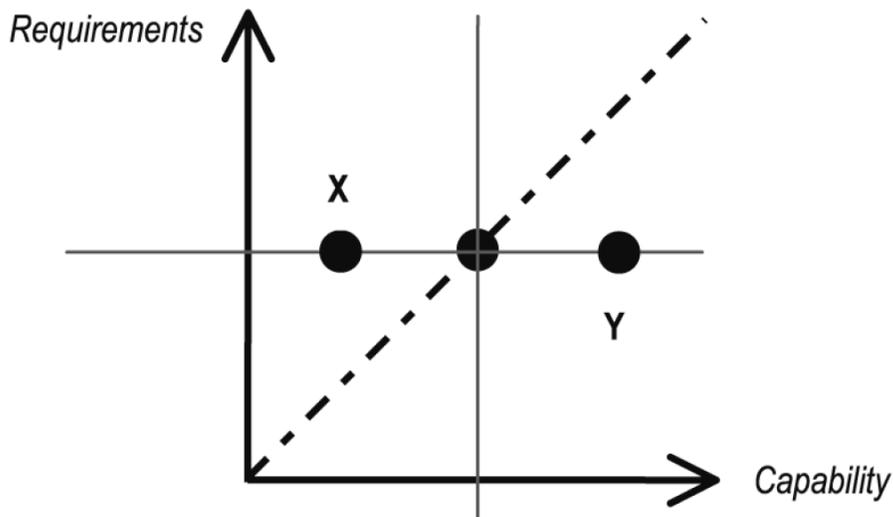


Figure 3: Indicative degree of fit between capability and requirements

The concept of “fit” is to achieve an approximate balance between “market requirements” and “operations capability”. To a large extent this model can be interpreted as analogous to the issue of reconciling OM research and practice. Although no-one is arguing that OM practice would collapse without OM research, the exchange between research and practice is undoubtedly two-way.

## 5.2. Trends followed in main generic topics of OM and OS

Figure 4 illustrates how final numbers obtained through exact enumeration of available papers during three periods (i.e. 2001-2003; 2004-2006; 2007-2009); show some trends along the years:

- supply chain management
- quality

- performance measurement
  - operations strategy
  - process technology
- are the ones with significant variations.

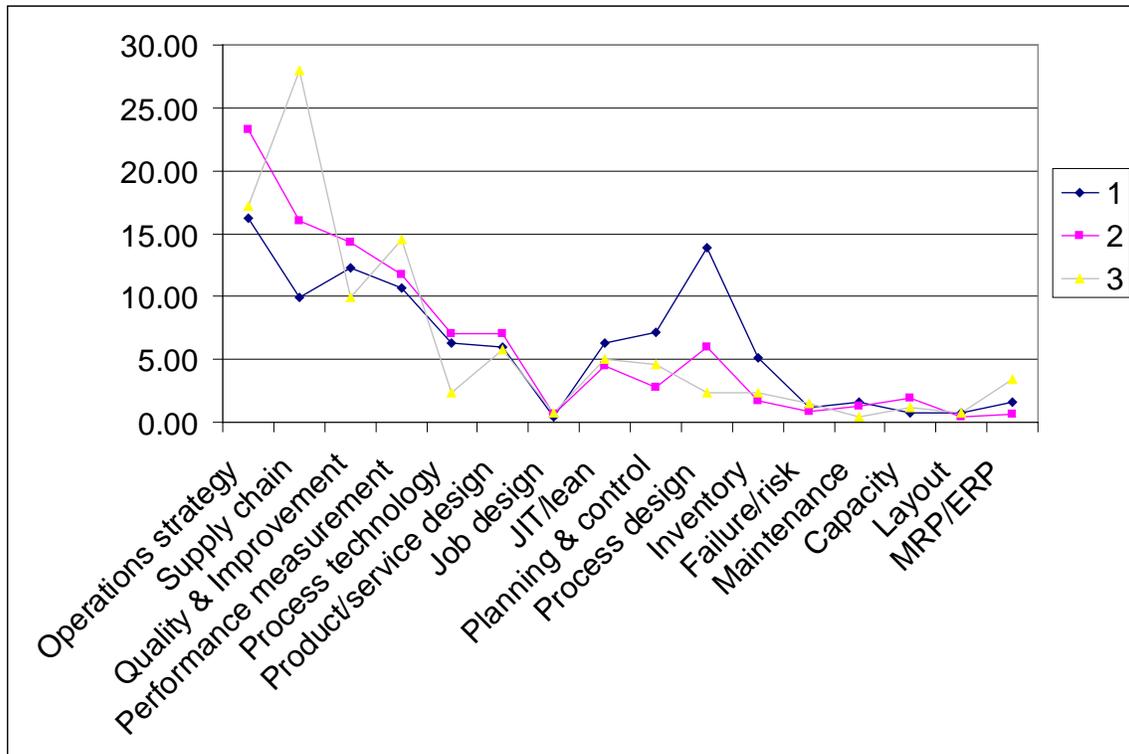


Figure 4: comparison of three periods of publication

### 5.2.1 Supply chain and operations management

Purchasing has a growing influence on a company's ability to compete in today's global marketplace. Due to decreased vertical integration, purchasing volumes are growing constantly. The focus of purchasing shifts from buying toward the management of complex procurement processes. Outsourcing involves the transfer of the management and/or day-to-day execution of an entire business function to an external service provider (Overby, S; 2007). This is not just outsourcing the procurement of materials and components, but also outsourcing of services that traditionally have been provided in-house. The logic of this trend is that the company will increasingly focus on those activities in the value chain where it has a distinctive advantage and everything else it will outsource. Organizations increasingly find that they must rely on effective supply chains, or networks, to successfully compete in the global market and networked economy. In Peter Drucker's (1998) management's new paradigms, this concept of business relationships extends beyond traditional enterprise boundaries and seeks to organize entire business processes throughout a value chain of multiple companies. During the past decades, globalization, outsourcing and information technology have enabled many organizations such as Dell and Hewlett Packard, to successfully operate solid collaborative supply networks in which each specialized business partner focuses on only a few key strategic activities (Scott, 1993). As seen in figure 5 through a long-term operations management steps to purchasing excellence include supplier management.

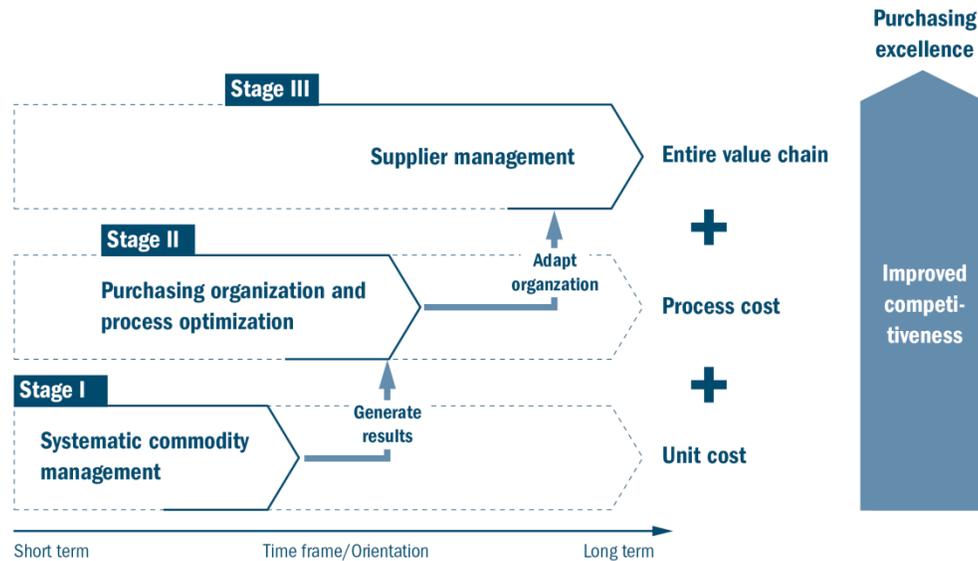


Figure 5: Three stages towards purchasing excellence

### 5.2.2 Quality

We have long been working on quality, and the new era seems to be the time for quality management more than quality control. Although practitioners are eager about this topic, in research area quality has recently been used as an index for other topics, not an individual subject of discussion.

### 5.2.3 Performance measurement

Performance measurement also shows a significant growth. An approach to performance measurement is a necessary ingredient for ensured success, that is why it seems to be an advancing topic in OM. Nevertheless, it alone is not sufficient. You will also need to know what to do with performance measurement data once it has been collected.

### 5.2.4 Process technology

Process design and technology also continues to be a commonly researched topic within OM. The issues addressed in this topic area are getting more strategic and include issues such as choice of technology and information technology. In our statistics the summation of process technology and process design show a decreasing trend. However, the incremental decrease is not enough to be judged as an obvious trend in this field. So, one could suggest more studies in this area to get to a stronger conclusion.

## 6. Conclusion

The practical and conceptual insights are used as the basis for a discussion of extant research priorities. By considering the three following intervals, (i.e. 2001-2003; 2004-2006; 2007-2009), possible trends in OM are discussed. Supply chain, performance measurement, quality, and process technology are the ones discussed. Statistical results indicate that percentage of supply chain performance measurements are increasing and for quality, that is just the opposite. Process technology and design were the exceptions .these two fields are good candidates for future work.

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