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An investigation of the total quality management survey based research published between 1989 and 2000

A literature review

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Abstract There has been a plethora of published research related to total quality management (TQM) in the last few decades. However, very few studies focused on cataloging critical factors of TQM. One of the objectives of this literature review was to investigate the state of TQM by examining and listing various TQM factors identified based on survey studies conducted in different countries and published in a variety of journals over the past decade. An examination of 76 survey studies that used an integrated approach to TQM showed that the TQM factors could be grouped under 25 categories. An analysis of the 347 survey based research articles published between 1989 and 2000 using these 25 factors as a framework revealed the most frequently covered TQM factors in the literature. Another goal of the paper was to analyse the objectives of these articles by year and type of journal they were published in to determine the trends in TQM survey based studies and recommend future direction for research. The analysis showed that the objectives of the 347 studies could be grouped under six categories.

I. Introduction

Many articles have been published about TQM over the past decade. Although the majority of these articles supported the benefits of adopting this management philosophy in various types of organizations, some of them (e.g. Harari, 1993) argued that TQM does not work. For instance, the role of TQM in improving business performance and the long period of time that it takes for this improvement to take effect have been the target of some opponents of this management philosophy. However, TQM seems to have survived these opposing points of view since many companies continue to implement it, and various articles continue to be published in this area. A recent article by Van Der Wiele *et al.* (2000a) analyzed the concept of TQM using the "fad, fashion, and fit theory" to examine whether TQM can "survive and become a fit" (i.e. whether TQM concepts can last long enough to eventually become part of the recognized management theory). It has been argued that if TQM is to move from being a fad to being a fashion or a fit, it must "be clearly defined and



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measurable" and must "have no direct link to short-term major losses" (Van Der Wiele *et al.*, 2000a). Like many other TQM studies, they also emphasized the critical role of top management support or motivation for this process to be successful.

A number of reasons have been cited in the TQM literature for the absence of a universally accepted framework for the implementation of TQM such as variations in national cultures (Robert *et al.*, 2000). Although quality "gurus" including Crosby (1979), Deming (1986), and Juran (1986) argued that the elements of TQM are universally applicable, more research is needed to verify their personal prescriptions about TQM. However, even the critical elements or factors that constitute TQM are not completely agreed upon. Many survey studies have been conducted in which the critical factors of TQM were extracted using statistical methods, especially factor analysis. Although there are similarities between the factors found in different studies, the list of the critical factors of TQM varies from study to study. Of course, there may be a number of reasons for this such as the content of the questionnaire used, and the type, size and the location of the companies surveyed.

The objective of this literature review is to investigate the state of survey-based TQM research by:

- examining and listing the various factors of TQM mentioned in TQM survey studies conducted in various countries and published in various types of journals over the past decade; and
- analyzing the objectives of these articles by year and type of journal they were published in to determine the trends in TQM research and recommend future directions for research.

II. Research methodology

Scope of research

A literature review of the TQM-related articles published between 1970 and 1993 by Ahire *et al.* (1995) yielded only 29 empirical articles (field studies of large numbers of organizations), showing a lack of TQM research using empirical methodology during that period. According to this study, conceptual and case studies were more abundant and constituted roughly 72 per cent of the 226 TQM-related articles analyzed. Until the late 1980s, the quality management literature was largely based on the personal prescriptions of researchers in the quality management area. In fact, TQM survey studies, one of the empirical TQM methods, started to increase after 1989 when the critical factors of TQM were first operationalized by Saraph *et al.* (1989). A survey approach to the operationalization of TQM factors by Saraph *et al.* (1989) set a new direction for TQM researchers interested in the set of critical factors that constitutes TQM, who cited Saraph *et al.*'s (1989) work in their studies. These similar survey studies include those conducted by Flynn *et al.* (1994), Anderson *et al.* (1995), Ahire *et al.* (1996), Black and Porter (1996), and several other studies that are detailed in section III of this study.

In addition to these survey studies, other survey studies related to TQM have also been conducted. Overall, there has been a major increase in the number of survey, as well as other types of studies published over the past decade. In this study, survey research is defined as "mail interviewing", which means that a randomly selected sample of firms or human respondents are questioned using a written questionnaire delivered by mail (Davis, 2000, p. 273). Some of the advantages of this method include respondent anonymity, confidentiality, and leisureliness of response made (Davis, 2000). In addition, since a larger number of respondents are involved compared to other research design methods such as case studies, results are more generalizable to the population of firms surveyed. However, case studies allow for a more detailed documentation of practices and the explanation of findings on a more comprehensive basis (Flynn *et al.*, 1990). We do not want to give the impression that survey research is superior to other types of TQM research. However, we chose to focus on survey studies mainly because previous TQM research has been primarily prescriptive or based on anecdotal evidence and case studies as reported by Ahire *et al.* (1995).

Thus, this study investigates how TQM survey research evolved over the 11-year period from 1989 to 2000. The increase in the number of survey studies found in the literature in recent years and the lack of compiled information about these studies stimulated us to look at how TQM research using survey design has evolved over time. The major increase in the number of TQM survey studies has important implications for both managers and researchers in the quality management area. Analyses of various TQM related theories and hypotheses could allow managers to see what really works for them so that they can prioritize their TQM activities accordingly. For instance, in studies examining the relationship between TQM practices and business results, those practices that are found to have a positive impact on business results could be recommended to managers. Thus, they could allocate their companies' resources to improve these practices in order to get the best results. Researchers could also use the results of these studies as guidance to explore various related hypotheses in more detail and improve the accuracy of future TQM survey studies.

Search methods

The following online databases were used to identify the articles published in business related journals relevant to the objectives of this paper. Thus, journals from other scientific disciplines such as health sciences, social sciences, etc. were excluded from this search:

- (1) *Elsevier Science*. All 14 decision sciences journals in this database were searched.
- (2) *Emerald Database*. The search in this database covered the ten quality management journals, the 13 operations, production and economics journals, the 25 human resources journals, as well as an overall search of the database.

- (3) *Anbar International Management Database*. The following categories of journals were searched in this database: 12 quality management journals; 37 operations and production management journals; 60 human resources journals; 83 general management journals; 49 marketing and logistics journals; 14 health care management journals; and 18 hospitality and tourism journals.
- (4) *ABI Inform Global (ProQuest Direct)*. Each of the journals in the above three databases has been searched using each of the 15 keywords listed below. However, since there are a total of 3,790 publications in ABI Inform Global (ProQuest Direct) that include magazines, newspapers and journals, the search in this database has not been on a journal-by-journal basis but has rather been limited only to the search of the whole database using the 15 keywords. These keywords or terms are often used in the literature to describe TQM related practices and were therefore deemed to be the most relevant search keywords:
- total quality management;
 - quality management;
 - strategic quality management;
 - total quality;
 - total quality improvement;
 - total quality control;
 - business excellence;
 - performance excellence;
 - quality excellence;
 - best practices;
 - world-class manufacturing;
 - continuous improvement;
 - continuous quality improvement;
 - quality improvement; and
 - quality assurance.

All the database searches yielded hundreds of articles. Each of the articles was examined to ensure that their contents were relevant to TQM and that they were all survey. Some of the articles had a holistic approach to TQM in that various issues related to TQM were covered in these articles. However, several articles that focused only on one or more specific aspects of TQM such as human resource management, leadership or statistical process control were also included in the study only if they were written within a TQM context. Several survey studies whose target population was all the employees within one or more companies were also included in the analysis. All the articles found

to be appropriate for analysis were primary in nature with the exception of a few articles that were written based on information from secondary survey data. Finally, all the articles reviewed were from journals published in English. As a result, a total of 347 TQM survey studies were identified. These articles were published in the following types of journals:

- quality management (QM);
- production and operations management (POM);
- human resource management (HRM);
- general management (GM);
- management science and information systems (MSI);
- hospitality and tourism (HT);
- health care management (HM);
- special interest (SI);
- finance and accounting (FA); and
- marketing (M).

Table I lists the title and the type of journals that these articles were published in.

III. Framework for analyzing articles

The first part of the analysis involved the identification of those articles that focused on the investigation of the critical factors of TQM using a survey methodology. This was done to classify the extracted TQM factors in the survey literature and also use it as a framework for the analysis of the 347 articles in the fourth section. A total of 76 of the 347 studies analyzed contained TQM factors that were mostly extracted by factor analysis. However, a few of these 76 survey articles that also used an integrated approach to TQM but rated the TQM factors using descriptive statistics were also included.

The other 271 articles were not used to come up with a framework to examine the TQM literature simply because they did not use a holistic approach to TQM. Analyzing the factors extracted by the 76 studies, we found the 25 TQM factors listed below to be the most commonly extracted factors across the 76 studies:

- (1) Top management commitment (TMC).
- (2) Social responsibility (SR) (includes environmental control, security and safety of employees, customers and communities and other related issues).
- (3) Strategic planning (SP).
- (4) Customer focus and satisfaction (CFS).
- (5) Quality information and performance measurement (QI/PPM).

Journal title	Number of survey articles	Journal title	Number of survey articles
Area: Quality Management		Area: Production and Operations Management	
<i>Benchmarking: An International Journal</i>	4	<i>International Journal of Production Economics</i>	5
<i>Benchmarking for Quality Management & Technology</i>	8	<i>International Journal of Production Research</i>	1
<i>International Journal of Quality & Reliability Management</i>	52	<i>International Journal of Technology Management</i>	3
<i>International Journal of Quality Science</i>	7	<i>Journal of Business Logistics</i>	2
<i>Journal of Quality Management</i>	1	<i>Journal of Operations Management</i>	10
<i>The Journal for Quality and Participation</i>	1	<i>Logistics Information Management</i>	2
<i>Managing Service Quality</i>	6	<i>Production and Inventory Management Journal</i>	9
<i>Quality Management Journal</i>	8	<i>Production and Operations Management</i>	1
<i>Quality Progress</i>	4	<i>Research Technology Management</i>	2
<i>Total Quality Management</i>	62	<i>Technovation</i>	3
<i>The TQM Magazine</i>	9	<i>Work Study</i>	1
<i>Training for Quality</i>	2		
Total	164	Total	71
Area: Production and Operations Management		Area: Human Resource Management	
<i>Management</i>		<i>Asia Pacific Journal of Human Resources</i>	3
<i>Business Process Management Journal</i>	2	<i>British Journal of Industrial Relations</i>	3
<i>Computers & Industrial Engineering</i>	2	<i>Employee Relations</i>	7
<i>Engineering Management Journal</i>	5	<i>Human Resource Management</i>	1
<i>IEEE Transactions On Engineering Management</i>	1	<i>Human Resource Management Journal</i>	2
<i>Industrial Management</i>	1	<i>Human Resource Planning</i>	2
<i>Industrial Management + Data Systems</i>	6		
Area: Human Resource Management		Area: General Management	1
<i>Industrial Relations</i>	1	<i>Managerial Auditing Journal</i>	1
<i>The Journal of Applied Behavioral Science</i>	1	<i>Thunderbird International Business Review</i>	

(continued)

Table I.
The journal titles, their
respective areas, and
the number of survey
articles published in
each journal

Table I.

Journal title	Number of survey articles	Journal title	Number of survey articles
<i>The International Journal of Human Resource Management</i>	7	<i>International Journal of Management</i>	1
<i>Journal of Organizational Change Management</i>	1	<i>Journal of Managerial Issues</i>	1
<i>Leadership & Organization Development Journal</i>	2	<i>Mid American Journal of Business</i>	2
<i>Personnel Psychology</i>	1	<i>Multinational Business Review</i>	1
<i>Personnel Review</i>	1	<i>Strategic Management Journal</i>	2
<i>Public Personnel Management</i>	1	<i>Technology Analysis & Strategic Management</i>	1
<i>Team Performance Management: An International Journal</i>	2		
<i>Journal Total</i>	35	<i>Total</i>	28
Area: General Management		Area: Management Science and Information	
<i>Academy of Management Journal</i>	1	<i>Decision Sciences</i>	11
<i>Asia Pacific Business Review</i>	1	<i>Management Science</i>	3
<i>Australian Journal of Management</i>	2	<i>MIS Quarterly</i>	1
<i>Business Horizons</i>	2	<i>Omega</i>	5
<i>European Management Journal</i>	3	<i>Total</i>	20
<i>IBAR-Irish Business and Administrative Research</i>	1		
<i>Industry Week</i>		Area: Hospitality and Tourism	
	1	<i>Cornell Hotel and Restaurant Administration Quarterly</i>	4
<i>Journal of Applied Management Studies</i>	1	<i>FIU Hospitality Review</i>	1
<i>Journal of General Management</i>	1	<i>International Journal of Hospitality Management</i>	2
<i>Long Range Planning</i>	1	<i>International Journal of Service Industry Management</i>	1
<i>Management Decision</i>	3	<i>Tourism Management</i>	2
<i>Management International Review</i>	1	<i>Total</i>	10

(continued)

Journal title	Number of survey articles	Journal title	Number of survey articles
Area: Special Interest		Area: Finance/Accounting	
<i>International Small Business Journal</i>	1	<i>Accounting, Organizations and Society</i>	1
<i>Journal of Small Business Management</i>	2	<i>Australian Accountant</i>	1
<i>Logistics and Transportation Review</i>	1	<i>CMA: the management accounting magazine</i>	1
<i>Journal of Supply Chain Management</i>	1	<i>Journal of Accounting Research</i>	1
Total	5	Total	4
Area: Marketing			
<i>Industrial Marketing Management</i>	2		
<i>Journal of Marketing Practice: Applied Marketing Science</i>	1		
Total	3		

Table I.

- (6) Benchmarking (B).
- (7) Human resource management (HRM) (when HRM is mentioned in articles as a broad category or when other HRM issues other than those below (8-13) are discussed such as job rotation, internal recruitment, quality circles, and employment security policy).
- (8) Training (T).
- (9) Employee involvement (EI).
- (10) Employee empowerment (EE).
- (11) Employee satisfaction (ES).
- (12) Teamwork (TW).
- (13) Employee appraisal, rewards, and recognition (EARR).
- (14) Process management (PM).
- (15) Process control (PC).
- (16) Product and service design (PSD).
- (17) Supplier management (SM).
- (18) Continuous improvement and innovation (CII).
- (19) Quality assurance (QA) (the term is used in various contexts in the literature, but in this study, it is used to describe a "preventive rather than a corrective" approach to problem solving suggested by TQM).
- (20) Zero defects (ZD).
- (21) Quality culture (QC).
- (22) Communication (C).
- (23) Quality systems (QS) (mostly issues involving ISO 9000).
- (24) Just in time (JIT).
- (25) Flexibility (F).

Only those factors that were extracted as a separate factor by two or more different studies were included in this list. The 76 studies that were used to extract the 25 TQM factors are identified by a superscript "a" in Table II.

IV. Aspects of TQM covered in the analyzed articles

Using the 25 TQM factors as a framework, each of the 347 articles was analyzed to determine whether or not the 25 factors were covered in each article. The analysis was extended not only to the analysis and results sections of each article but also to the literature review section, and if provided, to the questionnaire items in the appendix of each article. Therefore, these factors did not have to be emphasized or covered in detail to be included in Table II. Even a brief reference to a specific factor was also considered to be a recognition of the

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Abraham <i>et al.</i> (1999) ^a	X																								
Adam <i>et al.</i> (1994)	X																								
Adam (1994)	X																								
Adam <i>et al.</i> (1997) ^a	X																								
Adebanjo and Kehoe (1998) ^a	X																								
Adebanjo and Kehoe (1999)	X																								
Agus and Abdullah (2000) ^a	X																								
Agus (2000b) ^a	X																								
Ahire (1996) ^a	X																								
Ahire and Gothar (1996) ^a	X																								
Ahire <i>et al.</i> (1996) ^a	X																								
Ahire and O'Shaughnessy (1998) ^a	X																								
Ahire and Dreyfus (2000)	X																								
Al-Faraja and Alidi (1992)	X																								
Al-Khalifa and Aspinwall (2000) ^a	X																								
Anderson <i>et al.</i> (1995) ^a	X																								
Anderson and Sohal (1999) ^a	X																								
Anderson <i>et al.</i> (1998) ^a	X																								
Appleby and Mavin (2000)	X																								
Askey and Malcolm (1997)	X																								
Avella (1999)	X																								
Aziz <i>et al.</i> (1998)	X																								
Badri <i>et al.</i> (1995) ^a	X																								
Barad and Kayis (1994)	X																								
Batley (1993)	X																								
Batley (1996)	X																								
Batley (1999)	X																								
Beattie and Sohal (1999)	X																								
Beaumont <i>et al.</i> (1997a)	X																								
Beaumont and Schroeder (1997)	X																								

(continued)

Table II.
TQM factors or
elements covered in the
analyzed articles

Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Beaumont and Sohal (1999)	X																								
Benson <i>et al.</i> (1991)	X																								
Bilich and Neto (2000)	X																								
Birch and Pooley (1995)	X																								
Black and Porter (1996) ^a	X																								
Bonn and Christodoulou. (1996)	X																								
Brah <i>et al.</i> (2000)	X																								
Brannstrom-Stenberg and Deleryd (1999)	X																								
Breiter and Kline (1995) ^a	X																								
Breite and Bloomquist (1998)	X																								
Brookshaw and Terziowski (1997)	X																								
Brown and Van der Wiele (1996)	X																								
Buckley <i>et al.</i> (1998)	X																								
Buckley <i>et al.</i> (1996) ^a	X																								
Camison (1996) ^a	X																								
Carter (2000)	X																								
Chan and Ho (1997)	X																								
Chapman <i>et al.</i> (1997a) ^a	X																								
Chapman <i>et al.</i> (1997b)	X																								
Chaudhry <i>et al.</i> (1997)	X																								
Chen (1992)	X																								
Chen and Paetsch (1997)	X																								
Cheng and Chan (1999) ^a	X																								
Choi and Liker (1995)	X																								
Choi and Eboch (1998)	X																								
Collins <i>et al.</i> (1996)	X																								
Cooper (1998)	X																								
Corbett (1998)	X																								
Corbett and Rastrick (2000)	X																								
Corbett and Cutler (2000)	X																								

(continued)

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Coyle-Shapiro (1995)	X			X								X	X						X						X
Coyle-Shapiro (1999)	X			X								X	X						X						
Crosby and LeMay (1998)	X			X								X	X						X						
Cunningham and Ho (1996)	X			X								X	X						X						
Curkovic <i>et al.</i> (2000) ^a	X			X								X	X						X						
Dahlgaard <i>et al.</i> (1998)	X			X								X	X						X						
Das <i>et al.</i> (2000)	X			X								X	X						X						
Davidson and Pruden (1996)	X			X								X	X						X						
Davis and Lansbury (1996)	X			X								X	X						X						
Dean and Snell (1996)	X			X								X	X						X						
De Groote <i>et al.</i> (1996)	X			X								X	X						X						
De Toni and Nassimbeni (2000)	X			X								X	X						X						
Dellana and Hauser (2000) ^a	X			X								X	X						X						
Dickenson <i>et al.</i> (2000)	X			X								X	X						X						
Douglas and Glen (2000)	X			X								X	X						X						
Dow <i>et al.</i> (1999) ^a	X			X								X	X						X						
Drew and Coulsen-Thomas (1996)	X			X								X	X						X						
Dube and Renaghan (1998)	X			X								X	X						X						
Dunbar 1992)	X			X								X	X						X						
Ebrahimpour and Mangaimeli (1990)	X			X								X	X						X						
Edvardsson <i>et al.</i> (2000)	X			X								X	X						X						
Eklöf and Selivanova (2000)	X			X								X	X						X						
Elmuti and Kathawala (1997)	X			X								X	X						X						
Elmuti and Kathawala (1999)	X			X								X	X						X						
Emeryn (1996)	X			X								X	X						X						
Ennis and Harrington (1999)	X			X								X	X						X						
Entekin and Pearson (1995)	X			X								X	X						X						
Eskildsen and Dahlgaard (2000) ^a	X			X								X	X						X						
Eskildsen and Nussler (2000)	X			X								X	X						X						

(continued)

Table II.

Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Filiatrault <i>et al.</i> (1996) ^a	X			X	X	X		X	X		X	X		X	X		X	X				X			
Fisher <i>et al.</i> (1995)	X			X	X	X		X	X		X	X		X	X		X	X				X			
Fletcher (1999)			X	X	X	X	X	X	X		X	X		X	X		X	X				X			
Flynn <i>et al.</i> (1994) ^a	X		X	X	X		X	X	X		X	X		X	X		X	X				X			
Flynn <i>et al.</i> (1995) ^a	X		X	X	X		X	X	X		X	X		X	X		X	X				X			
Flynn and Schroeder (1997)	X			X	X		X	X	X		X	X		X	X		X	X				X			
Flynn <i>et al.</i> (1999)	X			X	X		X	X	X		X	X		X	X		X	X				X			
Forker (1997) ^a	X			X	X		X	X	X		X	X		X	X		X	X				X			
Forker and Hershauer (2000) ^a	X			X	X		X	X	X		X	X		X	X		X	X				X			
Forza and Filippini (1998) ^a	X			X	X		X	X	X		X	X		X	X		X	X				X			
Fowler (1996)	X		X	X	X		X	X	X		X	X		X	X		X	X				X			
Geary (1999)									X									X							
Germain and Spears (1999)	X		X		X	X	X	X	X		X	X		X	X		X	X							
Gieskes <i>et al.</i> (1997)				X	X		X	X	X		X	X		X	X		X	X							
Godard (1998)				X	X		X	X	X		X	X		X	X		X	X							
Goh and Ridgway (1994) ^a	X			X	X		X	X	X		X	X		X	X		X	X				X			
Golhar <i>et al.</i> (1997)	X			X	X		X	X	X		X	X		X	X		X	X				X			
Gore (1999)	X		X	X	X		X	X	X		X	X		X	X		X	X							
Grandzol (1998) ^a	X		X	X	X		X	X	X		X	X		X	X		X	X							
Gray <i>et al.</i> (1996)	X		X	X	X		X	X	X		X	X		X	X		X	X							
Gronholdt <i>et al.</i> (2000)	X			X	X		X	X	X		X	X		X	X		X	X							
Guilhon <i>et al.</i> (1998)	X		X	X	X		X	X	X		X	X		X	X		X	X							
Guimaraes (1997)	X			X	X		X	X	X		X	X		X	X		X	X							
Hackl <i>et al.</i> (2000)	X			X	X		X	X	X		X	X		X	X		X	X							
Hallowell <i>et al.</i> (1996)	X			X	X		X	X	X		X	X		X	X		X	X							
Handfield <i>et al.</i> (1998)	X		X	X	X		X	X	X		X	X		X	X		X	X							
Harber <i>et al.</i> (1991)	X			X	X		X	X	X		X	X		X	X		X	X							
Harber <i>et al.</i> (1993)	X			X	X		X	X	X		X	X		X	X		X	X							
Harrington and Akehurst (1996)	X		X	X	X		X	X	X		X	X		X	X		X	X							
Harrington (1996)				X	X			X	X		X	X		X	X		X	X							

(continued)

Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Hendricks and Singhal (1996)	X			X	X			X					X	X					X	X					
Hendricks and Singhal (1997)				X	X								X	X					X	X					
Hinton <i>et al.</i> (2000)				X	X	X							X	X					X	X					
Ho and Fung (1995) ^a		X		X	X	X		X	X			X	X	X				X	X	X					
Ho <i>et al.</i> (1995)				X	X	X		X	X			X	X	X				X	X	X					
Ho (1997)				X	X	X		X	X			X	X	X				X	X	X					
Hoffman and Mehra (1999)				X	X	X		X	X			X	X	X				X	X	X					
Honeycutt (1990)				X	X	X		X	X			X	X	X				X	X	X					
Hoque (1999)				X	X	X		X	X			X	X	X				X	X	X					
Huq and Stolen (1998) ^a				X	X	X		X	X			X	X	X				X	X	X					
Humphrey (1996)				X	X	X		X	X			X	X	X				X	X	X					
Humphrey and Hashmi (1998a)				X	X	X		X	X			X	X	X				X	X	X					
Ismail <i>et al.</i> 1998b)				X	X	X		X	X			X	X	X				X	X	X					
Ismail and Hashmi (1999)				X	X	X		X	X			X	X	X				X	X	X					
Itner and Larcker (1995)				X	X	X		X	X			X	X	X				X	X	X					
Itner and Larcker (1997)				X	X	X		X	X			X	X	X				X	X	X					
Jaafari (1996)				X	X	X		X	X			X	X	X				X	X	X					
Jawaharnesan and Price (1997)				X	X	X		X	X			X	X	X				X	X	X					
Jayaram <i>et al.</i> (1997)				X	X	X		X	X			X	X	X				X	X	X					
Jayaram and Ahire (1998)				X	X	X		X	X			X	X	X				X	X	X					
Johnson (1997)				X	X	X		X	X			X	X	X				X	X	X					
Juhl <i>et al.</i> (1997)				X	X	X		X	X			X	X	X				X	X	X					
Juhl <i>et al.</i> (2000)				X	X	X		X	X			X	X	X				X	X	X					
Kabst <i>et al.</i> (1996)				X	X	X		X	X			X	X	X				X	X	X					
Kadipasaoglu <i>et al.</i> (1999)				X	X	X		X	X			X	X	X				X	X	X					
Kane (2000)				X	X	X		X	X			X	X	X				X	X	X					
Kanji and Wallace (2000)				X	X	X		X	X			X	X	X				X	X	X					
Kannan <i>et al.</i> (1999) ^a				X	X	X		X	X			X	X	X				X	X	X					
Kavis (1998)				X	X	X		X	X			X	X	X				X	X	X					
Kim <i>et al.</i> (1997)				X	X	X		X	X			X	X	X				X	X	X					

(continued)

Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
King and Garey (1997)	X			X			X	X	X	X	X		X								X	X			
Kivimaki <i>et al.</i> (1997)				X			X	X	X	X	X			X					X		X	X			
Knights and McCabe (1996)	X			X				X	X	X	X	X		X					X		X	X			
Knotts and Tomlin (1994)			X	X				X	X	X				X											
Kohse (1994)	X			X		X		X	X					X											
Kowalski and Walley (1993)	X			X		X		X	X					X											
Krasachol <i>et al.</i> (1998)	X			X			X	X						X											
Kristensen <i>et al.</i> (1999)	X			X				X						X											
Kristensen (1992)				X							X	X		X											
Krumwiede and Lavelle (2000)	X			X				X	X		X	X		X											
Kuei and Madu (1995)	X			X			X	X	X		X	X		X											
Kuei <i>et al.</i> (1997) ^a						X	X	X	X		X	X		X											
Kuei <i>et al.</i> (1998) ^a						X	X	X	X		X	X		X											
Kunst <i>et al.</i> (1998) ^a								X																	
Kunst and Jos (2000)	X		X	X			X	X																	
Lackritz (1997)				X				X			X	X		X											
Lahndt (1999)				X				X		X				X											
Lam (1995a)				X				X			X			X											
Lam (1995b)				X				X			X			X											
Lam (1996)				X		X		X			X			X											
Lee (1998)	X							X			X			X											
Lee and Palmer (1999)				X				X			X			X											
Lee <i>et al.</i> (1999a)	X			X				X			X			X											
Lee <i>et al.</i> (1999b)	X		X	X				X			X			X											
Lefebvre and Lefebvre (1998)				X		X		X			X			X											
Lewis (1992)	X			X				X						X											
Li (1997) ^a	X			X				X						X											
Liker <i>et al.</i> (1998)				X				X						X											
Lima <i>et al.</i> (2000)	X							X						X											
Lin <i>et al.</i> (1999)	X					X		X		X				X											
Lin (1998)	X		X	X				X		X				X											

(continued)

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Lloyd-Walker and Cheung (1998)				X	X	X	X										X								X
Lo and Cheng (1997) ^a	X	X							X						X			X		X			X		
Longbottom (1997) ^a	X	X	X	X	X	X	X			X															
Longbottom (2000)	X	X	X	X	X	X	X			X															
Longo and Cox (1997)	X	X	X	X	X	X	X			X															
Longo and Cox (2000)	X	X	X	X	X	X	X			X															
Luzon (1993)	X	X	X	X	X	X	X			X															
Maani <i>et al.</i> (1994)																									
Madu and Kuei (1995)	X	X							X																
Mandal <i>et al.</i> (1999)	X	X							X																
Martensen <i>et al.</i> (2000)			X	X	X	X	X																		
Martinez-Lorente <i>et al.</i> (1998)	X	X							X																
McAdam and McKeown (1999)	X	X							X																
McAdam <i>et al.</i> (2000)			X	X	X	X	X																		
McNary (1997)	X	X							X																
Meyer <i>et al.</i> (1999)	X	X							X																
Michele (1999)	X	X							X																
Millen and Maggard (1997)	X	X							X																
Millen <i>et al.</i> (1999)	X	X							X																
Miller (1995)	X	X							X																
Millson and Kirk-Smith (1996)	X	X							X																
Min and Min (1997)	X	X							X																
Modarress and Ansari (1989)	X	X							X																
Mohr-Jackson (1998) ^a	X	X							X																
Mohrman <i>et al.</i> (1995) ^a	X	X							X																
Mohrman <i>et al.</i> (1996)	X	X							X																
Monkhous (1995)	X	X							X																
Monks <i>et al.</i> (1997)	X	X							X																
Monks (1998/1999)	X	X							X																
Moras <i>et al.</i> (1994)	X	X							X																

(continued)

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Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Morita and Flynn (1997)	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X						
Motwani <i>et al.</i> (1994) ^a	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X						
Motwani <i>et al.</i> (1996)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X						
Motwani <i>et al.</i> (1997) ^a	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X						
Natarajan <i>et al.</i> (1999)			X	X		X	X	X		X		X	X	X	X	X	X	X	X						
Nankervis and Debrah (1995)			X	X		X	X	X		X		X	X	X	X	X	X	X	X						
Nankervis and Leese (1997)			X	X		X	X	X		X		X	X	X	X	X	X	X	X						
Neergaard (1999)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Ngowi (2000)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
O'Brien (1995)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Oliver and Wilkinson (1989)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Orr (1999a)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Orr (1999b)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Parkin and Parkin (1996)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Parzinger and Nath (2000) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Pavett and Whitney (1998) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Peterson (1993) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Porter and Parker (1993)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Powell (1995) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Power and Sohal (2000)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Prabhu and Robson (2000)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Prasad <i>et al.</i> (1999)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Pritchard and Armistead (1999)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Purcell <i>et al.</i> (1999)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Quazi and Padibjo (1998) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Quazi <i>et al.</i> (1998) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Radovilsky <i>et al.</i> 1996)	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Raghunathan <i>et al.</i> (1997) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Rao <i>et al.</i> (1997a) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						
Rao <i>et al.</i> (1997b) ^a	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X						

(continued)

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Rao <i>et al.</i> 1999a) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rao <i>et al.</i> (1999b)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rapley <i>et al.</i> (1999)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Ravichandran and Rai (2000) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Ravichandran (2000) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Redman <i>et al.</i> (1995)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rees (1999)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rho and Yung-Mok (1998)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rodwell <i>et al.</i> (2000)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Ross and Georgoff (1991)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rowley and Sneyd (1996)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Ruggieri and Merli (1998) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Rungtusanatham <i>et al.</i> (1998)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sako (1998)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Samson and Parker (1994)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Samson (1997)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Samson and Terziovski (1999) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Samson and Ford (2000)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Saraph <i>et al.</i> (1989) ^a	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Schroeder <i>et al.</i> (1992)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Shortell <i>et al.</i> (1995)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sillince <i>et al.</i> (1996)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sim and Curatola (1999)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sinclair and Zairi (1995a)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sinclair and Zairi (1995b)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Sjoblom (1995)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Small (1998)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Smith and Hayton (1999)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Snape and Wilkinson (1996)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					
Snell and Dean (1992)	X	X		X	X	X	X	X	X	X	X		X			X	X	X	X	X					

(continued)

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Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Sohal (1994)	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sohal <i>et al.</i> (1996)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sohal (1998)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sohal and Terziovski (2000) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Solis <i>et al.</i> (1998) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Solis <i>et al.</i> (2000) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sommerville and Sulaiman (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Soriano (1999)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sripavastu and Gupta (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stone (1996)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sun (1999) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sun (2000a) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sun (2000b) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sussan and Johnson (1996)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tamimi and Gershon (1995) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tamimi (1995) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tamimi and Sebastianelli (1996)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tamimi (1998) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tamimi and Sebastianelli 1998)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tan and Kannan (1999)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tan <i>et al.</i> (2000)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tang and Butler (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Taninecz <i>et al.</i> (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tanner <i>et al.</i> (1995)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tata <i>et al.</i> (2000) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Taylor (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Taylor (1998)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Terziovski <i>et al.</i> (1997)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Terziovski and Dean (1998) ^a	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Terziovski <i>et al.</i> (1999)	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Theodorakioglou and Tsiotras (2000)	X		X	X	X		X	X	X		X	X	X	X	X		X	X	X			X		X	
Theyel (2000)	X	X	X	X	X			X	X		X	X	X	X		X	X	X	X						
Thiagarajan and Zairi (1998) ^a	X		X	X	X	X		X	X	X		X	X	X		X	X	X	X				X		
Thomas and Oliver (1991)				X																					
Tung-Chun (1997)		X		X	X	X		X	X	X			X	X	X		X	X	X			X			
Usilaner and Silota & Alper Associates (1993)				X	X	X		X	X	X			X	X	X		X	X	X			X			
Van der Wiele <i>et al.</i> (1996)	X	X	X	X	X	X	X	X	X		X	X	X	X	X			X	X			X	X	X	
Van der Wiele and Brown (1998)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Van der Wiele and Brown (1999)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Van der Wiele <i>et al.</i> (2000a)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Van der Wiele <i>et al.</i> (2000b)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Vermeulen and Crous (2000)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Vloeberghs and Bellens (1996)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Voss and Blackmon (1996)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Voss <i>et al.</i> (1997)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wagar and Rondeau (1998)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Walker and Salameh (1990)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Weerakoon and Lai (1997) ^a	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Weiner <i>et al.</i> (1997)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Whitfield (2000)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wilkinson <i>et al.</i> (1994)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wilson and Collier (2000) ^a	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wilson (1998)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wisner and Lewis (1997)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Withers <i>et al.</i> (1997)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wong <i>et al.</i> (1999)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wong (1998)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wood and Peccei (1995)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	
Wood (1999)	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X	

Table II.

Author(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Woon (2000) ^a	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wu and Wiebe (1997)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yamin <i>et al.</i> (1997)																									
Yarrow <i>et al.</i> (2000)																									
Yasmin <i>et al.</i> (1995)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yavas (1995)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yearout (1996)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yeung and Chan (1999) ^a	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yoo (1998)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Youssef and Zairi (1995)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yusof and Aspinwall (1999)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yusof and Aspinwall (2000) ^a	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zairi <i>et al.</i> (1994)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zantanidis and Tsiotras (1998)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zhang <i>et al.</i> (2000) ^a	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zhao <i>et al.</i> (1995a)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zhao <i>et al.</i> (1995b)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zink <i>et al.</i> (1998)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zinn <i>et al.</i> (1998)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	244	56	181	285	213	128	140	260	220	131	107	231	141	174	164	132	106	201	216	75	43	112	100	69	191

Notes: 1 = TMC/L; 2 = SR; 3 = SP; 4 = CSF; 5 = QJ/PFM; 6 = B; 7 = HRM; 8 = T; 9 = EI; 10 = EE; 11 = ES; 12 = TW; 13 = EARR; 14 = PM; 15 = PC; 16 = PSD; 17 = F; 18 = SM; 19 = CII; 20 = QA; 21 = ZD; 22 = QC; 23 = QS; 24 = JI; 25 = C

Full descriptions of all column headings are listed in the text

^a Identifies the 76 studies that were used to extract the 25 TQM factors

existence of that factor in the literature and was thus included as a "X" mark in the table. The results are displayed in Table II.

According to this analysis, issues related to customer focus and satisfaction had the highest coverage (285) followed by issues related to employee training (260), leadership and top management commitment (244), teamwork (231), employee involvement (220), continuous improvement and innovation (216), and quality information and performance measurement (213). These numbers are in agreement with what many authors consider to be the major elements of TQM.

It is not surprising that issues related to customer focus and satisfaction received the biggest coverage in the TQM survey literature analyzed here given the major push toward a customer satisfaction orientation in virtually all types of businesses. Three of the seven factors that received the highest coverage (i.e. training, teamwork, and employee involvement) are human resource management related TQM factors. This shows that the literature on the survey based studies assigns a critical role to human resource management in the implementation of TQM. Furthermore, the important role of leadership and top management commitment in TQM implementation is also indisputable, and this factor was appropriately given the attention it deserves by the studies analyzed here.

Issues related to quality information and performance measurement were also embraced by many of the studies. The Malcolm Baldrige National Quality Award (MBNQA) structure also considers this factor to be the "backbone" of a TQM system. It assumes that information and analysis is "critical to the effective management of your organization and to a fact-based system for improving performance and competitiveness" (NIST, 2001, p. 5).

The concept of continuous improvement and innovation, which is considered to be an essential element of TQM, was also included in a relatively large number of the studies. Even though process management was not included in the above list as one of the factors that appeared very frequently in the literature, it in fact was covered by many of the studies. The reason for this is that we used three different categories related to process management as can be seen from Table II: process control (164); product and service design (132); and process management (174) as a broad category. Therefore, process management should probably be mentioned as one of the important TQM factors espoused by the TQM survey literature.

Other factors that received relatively large coverage by these studies included supplier management (201), communication (191) and strategic planning (181). On the other hand, the rest of the factors including benchmarking, employee empowerment, employee satisfaction, flexibility, quality assurance, zero defects, quality culture, quality systems, just-in-time, and public responsibility and citizenship were not mentioned as much as the other factors.

V. Classifying articles by journal title, type of journal and year of publication

Tables I and III show the number of survey articles published in each type of journal and suggest that, from 1989 to 2000, the majority of the survey based TQM articles have been published in QM journals (164), followed by POM (71), HRM (35), GM (28), MSI (20), HT (ten), HHM (seven), SI (five), FA (four), and M (three) journals. Table III shows that the total number of survey articles published in all the ten types of journals doubled in both 1992 and 1994 compared to the previous year and more than doubled from 14 in 1994 to 36 in 1995. This number increased to 44 in 1996 and 57 in 1997 after which it remained roughly steady until 2000. Thus, the total number of articles that have been published during the past four years leveled off based on our analysis of the journals listed in Table I.

The same trend also applies to QM journals. More specifically, although the number of survey articles published in QM journals more than doubled from 11 in 1996 to 24 in 1997, this growth has been very steady from 1997 to 2000. On the other hand, although the number of articles published in POM journals doubled from eight in 1996 to 16 in 1997, this number dropped by almost one half to nine in 1998 after which it remained steady. The number of publications in the HRM journals reached a peak at ten in 1999 after which it dropped to three in 2000. There were no survey-based TQM publications in the HM, FA and M journals during 1999 and 2000. However, such studies in these types of journals were scant in previous years as well. After three years of no TQM survey publications between 1992-1994 in MSI journals, there were approximately three publications each year between 1995-1997. Although there was only one TQM related survey article in MSI journals during the two years from 1998 to 1999, this number jumped to six in 2000.

This analysis suggests that, depending on the type of journal, the number of survey-based TQM publications have either leveled off or actually declined in recent years. However, our analysis of the most recent publications suggests

Table III.
Number of TQM
survey studies
published between
1989-2000 in ten areas

1989-2000	QM	POM	HRM	GM	MSI	HT	HM	SI	FA	M	Total
1989	0	1	1	0	1	0	0	0	0	0	3
1990	2	0	0	0	0	1	0	0	0	0	3
1991	1	1	0	0	2	0	0	0	0	0	4
1992	2	3	0	2	0	0	1	0	0	0	8
1993	5	2	0	0	0	0	0	0	0	0	7
1994	8	4	0	1	0	0	0	0	1	0	14
1995	12	7	5	4	4	2	1	0	1	0	36
1996	11	8	6	9	3	2	1	1	1	2	44
1997	24	16	7	3	3	1	2	0	1	0	57
1998	30	9	3	3	1	2	2	3	0	1	54
1999	33	10	10	3	0	2	0	0	0	0	58
2000	36	10	3	3	6	0	0	1	0	0	59
Total	164	71	35	28	20	10	7	5	4	3	347

that, as extensions of the Saraph *et al.* (1989) and similar studies, the new trend in survey research may be in the direction of identifying causal relationships among TQM factors and between TQM factors and various performance measures. Although many related studies were conducted before, the most recent ones seem to involve the use of more performance measures and more rigorous statistical analyses relative to previous studies. In addition, all the studies that attempted to examine these relationships did so using cross-sectional studies. However, cross-sectional studies can only help us investigate the correlations between variables, not the direction of causation (Bullock *et al.*, 1994; Tabachnick and Fidell, 1996). Even though the term "causal" is often used to describe the relationships among TQM factors and between TQM factors and performance in various studies, one of the biggest limitations of these studies is probably their inability to meet all three basic requirements needed to establish causality. These three basic requirements are:

- (1) association between two variables (that is, two variables must be correlated);
- (2) isolation of the effect (that is, ruling out extraneous variables); and
- (3) temporal ordering (i.e. a cause must be shown to unambiguously precede an effect) (Bullock *et al.*, 1994).

Although all of the studies we analyzed in this paper that used various statistical techniques to establish causality met the first requirement, only a few of them met both the first and the second requirements. However, none of them met the third requirement. Longitudinal studies must be conducted to establish temporal ordering. For instance, if a TQM factor is positively correlated with profits (after partialing out all the other effects), one cannot claim that this factor is the cause of increase in profits. Therefore, longitudinal studies must be conducted in this area to establish causal linkages among TQM factors and between these factors and various performance measures. In addition, the new studies should explore these relationships within the context of country location factors, culture, firm size, firm and industry type and other internal and external factors. So far, such factors have largely been ignored by most of the researchers in this area.

VI. Classifying the articles by the country origin of the sampled companies

The target population of all the survey articles have been listed in Table IV using two main categories: survey studies that investigated TQM in one particular country and those in two or more countries. One-country studies have also been categorized under seven regions of the world; namely, North America, Europe, Australasia, Asia, South America, Africa and the Middle East.

According to this table, there were a total of 61 comparative or multiple-country studies. Out of these 61 studies, seven studies surveyed "Australian

Country	Number of articles	Country	Number of articles
<i>Comparative/multiple country studies</i>	61	<i>Comparative/multiple country studies</i>	
Australia, New Zealand	7	USA, UK, Middle East, Singapore/Malaysia	1
USA, Canada	4	USA, Canada, Western Europe, Japan, the Pacific Basin, Mexico, Latin America, Southeast Asia, Central, Eastern Europe	1
USA, Japan	3	Australia, Japan	1
India, China, Mexico	3	Australia, Singapore	1
Australia, Europe	3	Australia, New Zealand, UK	1
Japan, UK	2	Australia, UK	1
USA, Canada, Germany, Japan	2	Brazil, UK	1
USA, Mexico	2	Germany, UK	1
USA, Mexico, Australia	1	Spain, Netherlands, UK	1
USA, Spain, Europe	1	China, Norway	1
USA, Spain	1	Argentina, Brazil, Chile, Mexico	1
USA, Costa Rica	1	Asia/South Pacific, Europe, North America	1
USA, India, China, Mexico	1	Eastern and Western Companies	1
USA, India, China, Mexico	1	Nordic countries and East Asia	1
USA, India, China, Mexico, Taiwan	1	An international survey of 45 major corporations	1
USA, UK, Japan	1	Twelve countries – Russia, USA etc.	1
USA, Taiwan	1	Japan, Korea	1
USA, Luxembourg	1	East Japan, Korea and Taiwan) and West (Denmark, Finland, Sweden and Australia)	1
USA, Germany, Denmark, Canada	1	Denmark, East Germany, West Germany, Finland, France, UK, Ireland, Italy, Netherlands, Norway, Sweden, Switzerland, Spain, Turkey	1
USA, Germany, Japan	1	<i>One-country studies</i>	286
USA, Germany, UK	1	North America	102
USA, UK, Canada	1	USA	9
USA, Korea, New Zealand	1	Canada	4
USA, Japan, Korea, EU, Mexico	1		
<i>Europe</i>	93	<i>Asia</i>	35
UK	44	Hong Kong	8
Ireland	9	Singapore	5
Europe (countries not specified)	8	Taiwan	5
Denmark	5	China	5
Italy	4	Malaysia	4
Spain	4	India	3

(continued)

Table IV.
Countries investigated
and the number of
corresponding articles

Country	Number of articles	Country	Number of articles
Northern Ireland	4	South Korea	3
Russia	3	Japan	1
Sweden	2	Thailand	1
Norway	2	<i>Middle East</i>	3
France	2	Saudi Arabia	1
Greece	2	United Arab Emirates	1
Finland	1	Qatar	1
Netherlands	1	<i>Africa</i>	3
Belgium	1	South Africa	2
Switzerland	1	Botswana	1
<i>Australasia</i>	47	<i>South America</i>	3
Australia	39	Brazil	2
New Zealand	8	Costa Rica	1
		Total	347

Table IV.

and New Zealand" firms, and four surveyed "US and Canadian" firms. There were three studies of each for "US and Japan", "India, China and Mexico", and "Australia and Europe", and two studies of each for "Japan and UK", "US, Canada, Germany, and Japan", and "US and Mexico". There was only one study for each of the rest of the multiple-country studies.

As far as one-country studies are concerned, the majority of the studies were conducted in the USA (98), UK (44) and Australia (39). Of course, this was not unexpected due to the fact that these three countries are English-speaking countries and that only articles written in English were searched for this paper. However, it is also true that quality management research and implementation in these countries are at a more developed stage relative to other countries (probably except Japan), and there is also a lack of information about the nature and stage of TQM implementation in other countries. One would also expect to see more survey studies about Japan given that many principles of the TQM philosophy originated in this country.

VII. Objectives of the analyzed articles

As can be seen in Table V, all the articles were grouped under six objectives by year of publication and type of journal.

We identified these six categories of objectives by analyzing each of the 347 articles. The objectives of each article were classified under separate headings. This grouping allowed us to realize that the objectives of these articles had common characteristics, enabling us to classify them under five broad categories of objectives. Although most of the articles could be categorized under five objectives, a group of articles had different objectives from the rest, as well as from each other for the most part, and were therefore grouped under the "Others" title. Since some of the articles covered issues related to more than

Table V.

Objectives of the analyzed articles under six categories by journal type and year of publication

1989-2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
1989	QM	Everett <i>et al.</i>		Adam <i>et al.</i>			Modarress and Ansari
	POM						Oliver and Wilkinson
	HRM						
	MSI	Saraph <i>et al.</i>					
1990	QM			Ebrahimpour and Mangiameli	Honeycutt		
	HT			Walker and Salameh			
1991	QM		Harber <i>et al.</i>				
	POM	Ross and Georgoff		Benson <i>et al.</i>			1. Benson <i>et al.</i> 2. Thomas and Oliver
	MSI						
1992	QM	1. Al-Faraj and Alidi					
		2. Chen					
	POM	Lewis					Kristensen
	GM						Schroeder
	HM	Dunbar					
1993	QM	1. Harber <i>et al.</i>	1. Luzon	Kowalski and Walley	Ebrahimpour and Withers		
		2. Porter and Parker	2. Harber <i>et al.</i>		Snell and Dean		Batley
			3. Porter and Parker				
	POM		1. Usilaner and Silota & Alper Associates	1. Usilaner and Silota & Alper Associates	Kowalski and Walley		
			2. Peterson	2. Peterson			

(continued)

1989- 2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
1994	QM	1. Wilkinson <i>et al.</i> 2. Samson and Parker 3. Goh <i>et al.</i> 4. Motwani <i>et al.</i>	1. Wilkinson <i>et al.</i> 2. Goh and Ridgway	1. Zairi <i>et al.</i> 2. Wilkinson <i>et al.</i> 3. Maani <i>et al.</i>			1. Sohal 2. Wilkinson <i>et al.</i>
	POM	1. Knotts and Tomlin 2. Moras <i>et al.</i> 3. Flynn <i>et al.</i>		Adam			
	GM						
	FA	Kohse		Kohse			Barad and Kayis
1995	QM	1. Ho and Fung 2. Ho <i>et al.</i> 3. Yavas 4. Kuei nand Madu 5. Zhao <i>et al.</i> 6. Sjblom 7. Badri <i>et al.</i> 8. Youssef and Zairi	1. Ho and Fung 2. Ho <i>et al.</i> 3. Sinclair and Zairi (a) 4. Sinclair and Zairi (b) 5. Youssef and Zairi	1. Sinclair and Zairi (a) 2. Sinclair and Zairi (b) 3. Youssef and Zairi	Ho <i>et al.</i>		Monkhouse
	POM	1. Yasmin <i>et al.</i> 2. Miller 3. Fisher <i>et al.</i> 4. Tamimi and Gershan 5. Tamimi (b)	1. Zhao <i>et al.</i> 2. Fisher <i>et al.</i>	Tanner <i>et al.</i>			

(continued)

Table V.

Table V.

1989- 2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
		HRM	Mohrman <i>et al.</i>	Mohrman <i>et al.</i>	1. Entekin and Pearson 2. Coyle-Shapiro 3. Wood 4. O'Brien Lam		
	GM	1. Redman <i>et al.</i> 2. Birch and Pooley 3. Powell	Redman <i>et al.</i>	1. Redman <i>et al.</i> 2. Powell			
	MSI	Anderson <i>et al.</i>	Choi and Liker	1. Madu and Kuei 2. Flynn <i>et al.</i> 3. Anderson <i>et al.</i> 4. Choi and Liker			
	HT	Breiter and Kline		Nankervis and Debrah Shortell <i>et al.</i>	Nankervis and Debrah		
	HM		Shortell <i>et al.</i>				
	FA	Ittner and Larcker	Ittner and Larcker				
1996	QM	1. Gray <i>et al.</i> 2. Harrington 3. Yearout 4. Lam 5. Knights and McCabe 6. Van der Wiele <i>et al.</i> 7. Voss and Blackmon	1. Gray <i>et al.</i> 2. Radovitsky <i>et al.</i> 3. Lam 4. Rowley and Sneyd 5. Knights and McCabe	1. Mohrman <i>et al.</i> 2. Harrington <i>et al.</i> 3. Cunningham and Ho	Mohrman <i>et al.</i>		Sohal <i>et al.</i>

(continued)

1989- 2000	Identification of critical Area TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
	POM 1. Batley 2. Parkin and Parkin 3. Ahire <i>et al.</i> HRM	1. Silince <i>et al.</i> 2. Davidson and Pruden 3. Parkin and Parkin	Sussan and Johnson	1. Vloeberghs and Bellens 2. Kabst <i>et al.</i> 3. Hallowell <i>et al.</i> 4. Millson and Kirk-Smith 5. Snape and Wilkinson 6. Johnson 7. Davis and Pruden	Vloeberghs and Bellens	Tamimi and Sebastianelli Stone
GM		1. De Groote <i>et al.</i> 2. Emery	1. Collins <i>et al.</i> 2. De Groote <i>et al.</i> 3. Dean and Snell	1. Jaafari 2. Drew and Coulsen-Thomas 3. Humphrey	Brown	Bonn and Christondoulou
MSI	1. Black and Porter 2. Ahire <i>et al.</i>		Hendricks and Singhal			
HT	Camison		1. Harrington 2. Camison			
HM	Motwani <i>et al.</i>		Ahire <i>et al.</i>			
SI	Ahire <i>et al.</i>	Fowler				
FA	Fowler					
M	Filiatrault <i>et al.</i>		Filiatrault <i>et al.</i>			

(continued)

Table V.

Table V.

1989-2000	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
1997	QM	1. Weerakoon and Lai 2. Millen and Maggard 3. Beaumont <i>et al.</i> 4. Lackritz 5. Askey and Malcolm 6. Longbottom 7. Lo and Cheng 8. Rao <i>et al.</i> (a) 9. Rao <i>et al.</i> (b) 10. Raghunathan <i>et al.</i>	1. Sommerville and Sulaiman 2. Chapman <i>et al.</i> 3. Longo and Cox 4. Lackritz 5. Juhl <i>et al.</i> 6. Longbottom	1. Weerakoon and Lai 2. Brookshaw and Terziovski 3. Chaudhry <i>et al.</i> 4. Voss <i>et al.</i> 5. Morita and Flynn 6. Motwani <i>et al.</i> 7. Rao <i>et al.</i> (a) 8. Rao <i>et al.</i> (b) 9. Raghunathan <i>et al.</i> 10. Chapman <i>et al.</i>	1. Golhar <i>et al.</i> 2. Weerakoon and Lai 3. Guimaraes 4. Juhl <i>et al.</i>	Rao <i>et al.</i> (a) Jayaram <i>et al.</i>
	POM	1. Gieskes <i>et al.</i> 2. Wisner and Lewis 3. Adam <i>et al.</i>	1. Ho 2. Sripavastu and Gupta 3. Wu and Wiebe 4. Forker	1. Flynn 2. Beaumont <i>et al.</i> 3. Yamin <i>et al.</i> 4. Chen and Paetsch 5. Adam <i>et al.</i> 6. Forke	1. Terziovski <i>et al.</i> 2. Ho 3. Withers <i>et al.</i>	
	HRM	Kivimaki <i>et al.</i>		1. Nankervis and Leece 2. Huang 3. Monks <i>et al.</i> 4. Kivimaki <i>et al.</i> 5. Tang and Butler		McNary

(continued)

1989- 2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
MSI	GM	1. Taninecz <i>et al.</i> 2. Samson 3. Kuei <i>et al.</i>	Samson	Taninecz <i>et al.</i>	Elmuti and Kathawala		1. Kim <i>et al.</i> 2. Kuei <i>et al.</i>
		Taylor	1. Hendricks and Singhal 2. Li		Taylor		
	HT HM FA		Chan and Ho		King and Garey		Min and Minl Weiner <i>et al.</i>
1998	QM	1. Ahire and O'Shaughnessy 2. Guilhon <i>et al.</i> 3. Zantanidis and Tsiotras 4. Krasachol <i>et al.</i> 5. Aziz <i>et al.</i> 6. Dahlgaard <i>et al.</i> 7. Ruggieri and Merli 8. Thiagarajan and Zairi 9. Solis <i>et al.</i> 10. Huq and Stolen 11. Tamimi 12. Grandzol 13. Quazi <i>et al.</i> 14. Yoo	1. Kayis 2. Krasachol <i>et al.</i> 2. Tamimi and Sebastianelli 3. Wong 4. Dahlgaard <i>et al.</i> 5. Martinez-Lorente <i>et al.</i> 6. Huq and Stolen 7. Grandzol 8. Ismail <i>et al.</i> 9. Wilson 10. Yoo	Ittner and Larcker 1. Ahire and O'Shaughnessy 2. Corbett 3. Lloyd-Walker and Cheung 4. Jayaram and Ahire 5. Solis <i>et al.</i> 6. Grandzol 7. Terziovski and Dean 8. Handfield <i>et al.</i> 9. Wilson		1. Krasachol <i>et al.</i> 2. Kunst <i>et al.</i> 3. Lloyd-Walker and Cheung	

(continued)

Table V.

Table V.

1989-2000	Identification of critical Area TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
	POM 1. Rungtusanatham <i>et al.</i> 2. Mohr-Jackson 3. Ismail <i>et al.</i>	1. Sohal 2. Mohr-Jackson 3. Forza and Filippini	1. Rho and Yung-Muk 2. Small 3. Choi and Eboch 4. Forza and Filippini 5. Ismail <i>et al.</i> Sako			1. Small 2. Lefebvre and Lefebvre 3. Crosby and LeMay
	HRM			1. Buckley <i>et al.</i> 2. Godard 3. Sako 1. Lin 2. Monks		
	GM 1. Adebajo and Kehoe 2. Pavett and Whitney 3. Cooper		Cooper			Adebajo and Kehoe
	MSI HM Zinn <i>et al.</i>	Taylor	Wagar and Rondeau Anderson <i>et al.</i>			
	SI Anderson <i>et al.</i>				Van der Wiele and Brown	Lee

(continued)

1989- 2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
1999	QM	1. Beaumont and Sohal 2. Neergaard 3. Lin <i>et al.</i> 4. Batley 5. Terziovski <i>et al.</i> 6. Ismail and Hashmi 7. Yusof and Aspinwall 8. Elmudi and Kathwala 9. Ennis and Harrington 10. Millen <i>et al.</i> 11. Sun 12. Yeung and Chan 13. Cheng and Chan 14. Abraham <i>et al.</i> 15. Rao <i>et al.</i> (a)	1. Brannstrom-Stenberg and Deleryd 2. Terziovski <i>et al.</i> 3. McAdam and McKeown 4. Ismail <i>et al.</i> 5. Yusof and Aspinwall 6. Elmudi and Kathwala 7. Ennis and Harrington 8. Millen <i>et al.</i> 9. Sun 10. Abraham <i>et al.</i> 11. Rao <i>et al.</i> (b)	1. Mandal <i>et al.</i> 2. Lee <i>et al.</i> (b) 3. Terziovski <i>et al.</i> 4. McAdam and McKeown 5. Ismail <i>et al.</i> 6. Elmudi and Kathwala 7. Sun 9. Abraham <i>et al.</i> 10. Anderson and Sohal	Rao <i>et al.</i> (b)	1. Lee and Palmer 2. Beattie and Sohal 3. McAdam and McKeown 4. Ismail <i>et al.</i>	1. Germain and Spears 2. Van der Wiele and Brown 3. Sim and Curatola 4. Rapley <i>et al.</i> 5. Kristensen <i>et al.</i> 6. Natarajan <i>et al.</i> 7. Hoffman and Mehra 8. Wong <i>et al.</i>

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Table V.

Table V.

1989-2000	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
POM	1. Adebajo and Kehoe	1. Adebajo and Kehoe	1. Samson and Terziovski			Avella
	2. Prasad <i>et al.</i>	2. Lahndt	2. Dow <i>et al.</i>			
HRM	3. Pritchard and Armistead	3. Pritchard and Armistead	3. Kadipasaoglu			Gore
	4. Dow <i>et al.</i>		<i>et al.</i>			
GM		1. Orr	1. Fletcher	1. Wood		
		2. Fletcher	2. Hoque	2. Geary		
HT		3. Coyle-Shapiro		3. Smith and Hayton		
				4. Purcell <i>et al.</i>		
				5. Michele		
				6. Rees		
				7. Hoque		
				8. Coyle-Shapiro		
		Lee <i>et al.</i> (a)				
	1. Dube <i>et al.</i>		1. Dube <i>et al.</i>			
	2. Soriano		2. Meyer <i>et al.</i>			
	3. Breiter <i>et al.</i>					

(continued)

1989- 2000	Area	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s)) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
2000	QM	1. Eklof and Selivanova 2. Longo and Cox 3. Dickenson <i>et al.</i> 4. Al-Khalifa and Aspinwall 5. Zhang <i>et al.</i> 6. Yusof and Aspinwall 7. Agus and Abdullah 8. Agus 9. Solis <i>et al.</i> 10. Sohal and Terziovski 11. Sun	1. Bilich and Neto 2. Theodorakioglou and Tsiotras 3. Ngowi 4. Dickenson <i>et al.</i> 5. Al-Khalifa and Aspinwall 6. Zhang <i>et al.</i> 7. Kanji and Wallace	1. Eklof and Selivanova 2. Corbett and Rastrick 3. Prabhu and Robson 4. Appleby and Mavin 5. Yarrow <i>et al.</i> 6. Juhl <i>et al.</i> 7. Longbottom 8. Sun (a) 9. Sun (b) 10. Zhang <i>et al.</i> 11. Kunst and Jos 12. Agus 13. Solis <i>et al.</i> 14. Parzinger and Nath 15. Kanji and Wallace 16. Edvardsson <i>et al.</i> 17. Eskildsen and Dahlgard	1. Vermeulen and Crous 2. Appleby and Mavin 3. Eskildsen and Dahlgard 4. Eskildsen and Nussler (b)	1. Hackl <i>et al.</i> 2. Sun (b)	1. Gronholdt <i>et al.</i> 2. Martensen <i>et al.</i> 3. Douglas and Glen 4. Tan <i>et al.</i>

(continued)

Table V.

Table V.

1989-2000	Identification of critical TQM factors	Issues in the implementation of TQM	Link between TQM (or factor(s) of TQM) and performance	HRM within a TQM context	Relationship between TQM and ISO 9000	Others
	POM 1. Theyel 2. Woon	1. Krumwiede and Lavelle 2. Ahire 3. Woon	1. Ahire and Dreyfus 2. Lima <i>et al.</i> 3. Samson and Ford 4. Theyel 5. Forker and Hershauer Rodwell <i>et al.</i>	Power and Sohal	Lima <i>et al.</i>	McAdam <i>et al.</i>
	HRM			1. Kane 2. Whitfield		
	GM Tata <i>et al.</i>	1. Van der Wiele <i>et al.</i> (a) 2. Dellana and Hauser			Van der Wiele <i>et al.</i> (a)	
	MSI 1. Ravichandran and Rai 2. Ravichandran	Ravichandran and Rai	1. Ravichandran and Rai 2. Wilson and Collier 3. De Toni and Nassimbeni 4. Curkovic <i>et al.</i>			1. Das <i>et al.</i> 2. Ravichandran
	SI			Carter		

one of these six objectives, they were placed under two or more categories. These objectives were broadly defined as:

- (1) *The identification of the critical factors of TQM.* Articles classified and listed under this objective (see Table V) included those that identified the critical factors of TQM by surveying a sample of companies. Most of these articles employed factor analysis as a statistical method to derive these factors. Others used descriptive statistics to assess the extent of adoption of these factors in the surveyed companies. Even if the main focus of the article was not the critical TQM factors, it was listed under this category if it took a holistic approach to TQM and covered these factors. Some of the articles also used other statistical methods such as structural equation modeling to examine the relationships among the TQM factors as well as between TQM factors and performance. In that case, they were grouped under two categories: "the identification of the critical factors of TQM" and "the link between TQM factors and firm performance".

Table V suggests that there has been a surge in the number of survey articles published that focused on "the identification of the critical factors of TQM" starting in 1994. Most of these articles came from QM and POM journals followed by GM journals. This is not surprising given that other types of journals such as HRM and FA would be expected to have a less integrated approach to TQM, focusing mostly on quality issues related to their respective areas. However, industry-specific journals such as those related to HM and HT had only a few survey articles published in this category of the six objectives. In fact, the number of TQM-related survey studies that were published in these journals between 1989 and 2000 has been rather low across all the six categories of objectives used in this paper. More interesting to observe, however, was the very small number of TQM survey articles published in marketing journals (only three) over this period (see Tables I and III).

- (2) *Issues in the implementation of TQM.* Articles placed in this category included those that dealt with issues related to the implementation of TQM such as obstacles to TQM, and country factors (e.g. culture) and firm-specific factors (e.g. firm size and firm type) that may affect the process of TQM implementation. Some of the articles discussed the TQM implementation issues using award models such as the Malcolm Baldrige National Quality Award (MBNQA) model and the European Foundation for Quality Management (EFQM) model. The increase in the use of such award models for self-assessment by many companies in recent years has also led to an increase in published research on these models. Increasingly, many quality management researchers are using these award models as frameworks for their studies or as the main focus of their analysis. One of the main reasons for this push toward award

models is probably the absence of a universally accepted TQM model. Nevertheless, there are more similarities than differences among these models in terms of the criteria that constitute them. Therefore, their use for self-assessment purposes by companies or as a framework for analysis by researchers should not create big disparities in the development of TQM. As can be seen from Table V, although almost non-existent between 1989 and 1992, survey research related to the implementation of TQM increased in 1993.

- (3) *The links between TQM factors and performance.* The articles in this category mostly examined the impact of one or more TQM factors on firm performance in various dimensions such as product quality, financial performance and customer satisfaction. The increasing use of statistical methods in the literature such as path analysis and latent variable models for such analysis is also notable.

TQM's impact on the bottom line has been an area of concern for some companies. Although some companies reported a number of benefits that accrued from the implementation of TQM, others did not, labeling the philosophy as just another fad. However, some authors attributed such TQM failures to the mistakes in or obstacles to its implementation. In addition, the fact that the time horizon to realize these benefits is rather long (around two to five years) has discouraged many companies from pursuing and sustaining the long-term view approach required by this philosophy of continuous improvement.

An analysis of Table V reveals that research in this area started to increase in 1993 and reached its peak in 2000. As mentioned before, the TQM survey literature seems to have intensified its focus on the effect of the TQM factors on performance in recent years in search of the realized outcomes and the significant factors that bring about those outcomes. However, an analysis of the results of these studies shows that there are no distinctive patterns in the way in which these factors affect performance. For instance, studies including Ahire *et al.* (1996), Flynn *et al.* (1994), Grandzol (1998), Parzinger and Nath (2000) and Powell (1995) found that top management commitment or leadership was positively correlated with many firm performance measures such as financial and operational results and customer satisfaction. However, Wilson and Collier (2000) reported that top management commitment was not related to financial results, and Li (1997) reported that this factor was not related to service quality performance. Similar conflicting results across studies could also be observed with other TQM factors. Therefore, more survey research is needed to investigate the relationship between TQM and firm performance. The new studies should take into account the effects of organizational context and environmental factors that may, in fact, be the underlying reasons for the differences in the findings of the previous studies.

- (4) *Human resource management within a TQM context.* The importance of effective human resource management for the proper implementation and success of TQM is indisputable. Accordingly, Table II shows that the human resource management aspects of TQM such as training, employee involvement and teamwork had a large amount of coverage in the survey-based TQM literature. Table V shows that until 1995 only a few survey studies were published that analyzed human resource management within the context of TQM, but this number started to increase in 1995.

- (5) *Relationship between TQM and ISO 9000.* Research on the relationship between ISO 9000 and TQM is relatively new. According to Table V, survey research in this area started in 1996. Most of the survey articles published in this area so far considered ISO certification as an integral part of TQM. In general, ISO 9000 certification has been considered as a phase that companies need to reach before they move on to become TQM companies. However, evidence also shows that some companies seek ISO certification after they have TQM activities in place.

The survey studies that we analyzed in this category explored various issues such as the following: comparisons and links between ISO 9000 and TQM; the benefits of ISO 9000 and its effect on organizational performance; the human resource aspects of ISO 9000; and issues related to the implementation of ISO 9000 in certain countries. So far, most of the survey research in this area has been published in POM journals in 1997 and in QM journals in 1999.

- (6) *Others.* The articles that did not fit under any of the above five objectives were included under this category. In addition, some of the articles that focused on a specific objective such as the identification of the critical factors of TQM but also covered other issues related to TQM in detail that did not fit under any of the other objectives were listed here as well. The relatively small number of articles (45 out of 347) listed under this category shows that the use of the six categories of objectives to classify the TQM survey research between 1989-2000 is warranted. However, note that some of these 45 articles that were placed under the "Others" category had several objectives, which means that number of articles that were solely listed under this category is actually less.

An overall analysis of Table V shows that, starting in mid-1990s, there has been a parallel growth in the number of survey articles published in the objectives categories including "identification of critical TQM factors", "issues in the implementation of TQM", and the "link between TQM (or factor(s) of TQM) and performance". However, in 2000, survey research that examined the relationship between TQM and performance has well exceeded those in the other two categories. This may be an indication of a shift of interest of survey researchers from what constitutes TQM and how it is implemented to how well it works. The increased use of sophisticated statistical techniques by these

researchers to examine the relationships between various TQM factors and performance measures also points toward an increased emphasis on identifying these relationships.

VIII. Future directions for research

A review of the survey based TQM research published between 1989 and 2000 revealed that the majority of the survey studies were published in QM and POM journals. The rate of growth of the number of these studies was dramatic until 1997 in both types of journals, but this growth in the number of survey research that appeared in QM journals remained steady thereafter. The number of TQM survey articles published in POM journals between 1998 and 2000 (nine articles in 1998 and ten articles in both 1999 and 2000) was well below its peak in 1997 when a total of 16 survey articles were published. Other observations on the TQM survey research published between 1989 and 2000 and suggestions for future survey research are as follows:

(1) *TQM studies in hospitality and tourism and health care management.*

Our research showed that the journals that are geared toward the two important service sectors, hospitality and tourism and health care management, had an insufficient amount of TQM survey research. Although there were a few survey studies that appeared in QM journals that studied TQM specifically in health care organizations, TQM studies on the hospitality industry, and especially those on hotels (Breiter and Bloomquist, 1998) and health care organizations (Li, 1997) mostly involved the use of case studies and the personal prescriptions of researchers and were therefore not included in the analysis.

In addition, whether survey-based or not, quality management research in the hospitality industry in particular has taken a less holistic approach to TQM, mostly focusing on the human resource management aspect of TQM (e.g. Orly, 1988; Partlow, 1996; Hoque, 1999). Although it is true that this aspect of TQM plays a very important role in service organizations, other factors of TQM such as process management and quality information and performance measurement are also critical elements that must be examined within the context of hospitality and tourism as demonstrated by Camison (1996) and Soriano (1999), as well as within the context of health care management (Nwabueze, 2001). Therefore, we suggest that more holistic TQM survey studies be conducted in these sectors.

Although the assessment and the measurement of quality management in services may seem more difficult because of the intangible nature of services (Parasuraman *et al.*, 1985), more comprehensive questionnaires that deal with various TQM factors can be designed to examine the state of TQM in these industries. This is especially true for the hospitality industry because, for many years, the managers in the industry viewed service quality as intangible and difficult to measure, and their acceptance of quality management

techniques has been slow (Luchars and Hinkin, 1996). However, Ritz-Carlton, a hotel company, did not conform to this general perception of quality management held by the hospitality industry and reaped the benefits of having an intense quality focus. The company became the first hotel company to win the MBNQA in 1992. The company won the award a second time in 1999, and, so far, it is the only hospitality organization to win this honor. Although the hotel industry is a very people-oriented industry, Ritz-Carlton uses many of the quality control principles used by manufacturing companies in manufacturing and improving their products. However, the difference is that, as a service company, Ritz-Carlton strives "to create excellence with people rather than with machines or raw materials" (Watkins, 1992).

Many survey studies dealing with the implementation of TQM and the effect of TQM on performance have been published. Although some of the studies analyzed in this paper dealt with TQM specifically within the context of services (e.g. Harrington, 1996; Li, 1997; Terziovski and Dean, 1998; Meyer *et al.*, 1999), our examination of the sample of companies targeted by these studies showed that manufacturing companies have been surveyed to a greater extent. Thus, it would be interesting to conduct more survey studies and see how much progress the service sector has made in terms of implementing TQM in recent years. In addition, the applicability of various TQM implementation models to service companies could be examined in more detail. Given that the service sector makes up a bigger percentage of the economies of many developed countries than the manufacturing sector, an increasing focus on TQM in services would be warranted.

- (2) *Quality award models and self-assessment.* Recently, there has been an increase in the use of self-assessment models such as the MBNQA and the EFQM by companies. These "performance excellence" or "best practice" models have also been used by many TQM researchers as frameworks for analysis and questionnaire development. The use of these models for self-assessment may reveal that a complete overhaul of corporate culture is needed to adapt to these practices. The lack of a systematic and standard approach to the use of these self-assessment models and the unpredictability of what companies might expect from this process may cause them to shy away from going through such an undertaking. Therefore, the implementation of TQM must be preceded by a well-designed self-assessment methodology to detect the critical points for improvement and avoid making big mistakes during the implementation process. There is a lack of published research on the experiences of various companies that went through the self-assessment process using award models such as the MBNQA and EFQM. For instance, although there are many studies and much information about the MBNQA winners' experiences with the award, there is a lack of such research on those companies that could not apply the model

successfully. It would be interesting to examine these companies' experiences with self-assessment and the reasons for their eventual failure in implementing TQM. It is true that some studies analyzed the reasons for TQM failures but not within the context of award models. Because of a lack of a universally accepted TQM model, many companies are putting their faith in these models and using them as guidelines. Therefore, more research is needed on the use of these award models to increase their credibility as effective approaches to achieve performance excellence.

- (3) *Implementation of TQM around the world.* An analysis of the TQM studies conducted in various countries revealed that there is a lack of information about the nature and stage of TQM implementation in other regions of the world including South America, Africa and the Middle East. Thus, more survey research evidence is needed to see how countries around the world compare to each other in terms of their understanding and implementation of TQM practices. More such studies can help answer questions about whether a contingency approach to TQM is indeed warranted or not. For instance, it would be interesting to examine the role of country factors (e.g. culture which impacts the way of doing business; availability of technology and infrastructure; government policies etc.) on the implementation of TQM and to see whether these factors have any impact on the nature of the critical factors of TQM, and if so, how and to what extent. This has become especially more important with the increasing globalization of the world markets and has important implications for the TQM activities of today's global companies operating in various countries.
- (4) *ISO 9000 and TQM.* As mentioned before, survey research on the relationship between ISO 9000 and TQM has recently increased. As can be seen in Table II, 100 survey articles that dealt with issues related to quality systems to some extent, particularly ISO 9000, have been classified under the quality systems heading. However, only a small number of TQM survey studies published between 1989 and 2000 examined ISO 9000 within the context of TQM in detail. Since the ISO 9000:1994 standards have been vastly modified in the sixth edition (now called ISO 9000:2000) to include eight quality management principles, it is most likely that the lines between research examining ISO 9000 and that examining TQM will probably blur where each will borrow the concepts and philosophies underlying the other. Future survey research in this area may involve the following objectives:
 - A comparison of companies' implementation approaches to ISO 9000 and TQM (TQM only, ISO 9000 only, TQM first and ISO 9000 second, ISO 9000 first and TQM second, and both ISO 9000 and TQM at the same time), and the effect of the implementation approach on various business results such as financial performance,

product quality and customer satisfaction. The implementation approach is important in that many companies allocate their resources to the implementation of these programs without having a true understanding of what their impact will be. Is implementing either ISO 9000 or TQM sufficient to increase a firm's competitiveness? If they are both implemented, does the order in which they are implemented have any implications for a company's performance outcomes? If so, what are they? In addition, now that ISO 9000:2000 and TQM have various overlapping practices, should a company still allocate its resources to the implementation of two distinct programs, or can it achieve both by coordinating the overlapping activities required by both ISO 9000:2000 and TQM together? New studies should explore these issues to gain a more in-depth understanding of various implementation approaches. This could help companies to not only reduce their implementation costs but obtain better business results as well.

- Development and testing of models that involve the systematic and effective implementation of ISO 9000 and TQM simultaneously.
 - A detailed examination of the internal and external factors that motivate or force TQM companies to seek ISO 9000 certification and ISO 9000 certified companies to implement TQM.
- (5) *The need for more focus on certain TQM factors.* This category of the future directions for research section involves our observations concerning limited research on certain TQM factors. Table II shows that some of the aspects of TQM such as strategic planning, product and service design, communication, social responsibility, and "employee appraisal, rewards, and recognition" were included in many of the survey studies analyzed. However, most of these articles did not analyze these TQM factors exclusively. Their coverage of issues related to these factors was very brief for the most part as compared to the other factors of TQM such as leadership, employee involvement and customer satisfaction. Therefore, we believe that more survey research is needed to examine the following issues dealing with these five factors:
- *Strategic quality planning.* There were only a few survey articles that examined the importance of the integration of the strategic planning process with the quality management practices of a company in detail. For instance, survey research could be conducted to examine how TQM companies tie their strategic planning processes into their competitive environment, customer and market needs, technological and other important changes and supplier management. In addition, how are these strategies developed and deployed to achieve the objectives set? What is the effect of effective strategic planning on organizational performance?

- *Product and service design.* Survey studies in this area may involve an investigation of the coordination and the effectiveness of product and service design processes in companies and the role played by these processes in improving product and service quality, customer satisfaction, financial and operational performance and so on. In addition, the design approaches taken by both TQM and non-TQM manufacturing and service companies in new product and service development can be analyzed and compared to identify those processes that yield the best results.
- *Communication.* Some of the country studies analyzed in this paper found that communication plays an important role in the successful implementation of TQM. Factors related to communication that were extracted in these studies involved:
 - the importance of effective communication across functions and work units to ensure that customer requirements are addressed and that an environment of trust and knowledge sharing is created; and
 - the communication of TQM within and outside the organization *per se*.

Factors that fell under the first category included “cultural communications” (Abraham *et al.*, 1999), “effective top-down and bottom-up communication” (Thiagarajan and Zairi, 1998), “organizational learning and communications” (Yeung and Chan, 1999) and those that fell under the second category included “adoption and communication of TQM” (Powell, 1995) and “communication of improvement information” (Black and Porter, 1996). Although communication was mentioned as an important factor in the effective implementation of TQM in many of the studies analyzed here, only three articles (Buckley *et al.*, 1998; Choi and Liker, 1995; Fletcher, 1999) analyzed it in detail. Some future survey research on this issue may include:

- the mechanisms or channels used by companies to communicate their TQM efforts and progress across functions and work units; and
 - the use of the Internet as a vehicle to conduct business and communicate with employees, customers and suppliers, and the impact of this technology on the TQM system and activities of companies. Increasingly, the Internet is affecting not only the nature of business transactions but the collection, sharing and the communication of data and information as well.
- *Social responsibility.* This TQM factor includes an organization’s responsibility for good public citizenship and involves the protection of public and employee health, safety and the environment.

Although this factor is considered to be important in award models including the MBNQA and EFQM and has been extracted as a separate factor in many TQM survey studies (Camison, 1996; Weerakoon and Lai, 1997; Kannan *et al.*, 1999; Rao *et al.*, 1999a; Solis *et al.*, 2000; Kunst and Jos, 2000; Sun, 1999; 2000a,b), we found only two survey studies (Corbett and Cutler, 2000; Theyel, 2000) that analyzed the environmental management systems used by companies within a TQM context. Future survey research in this area can investigate issues such as:

- How do companies address issues related to resource conservation and waste reduction as part of their TQM activities?
 - What do companies do to prevent or eliminate the possible adverse effects of their operations on the public and the environment?
 - What kinds of measures do companies use to manage social responsibility?
 - How do the companies' public citizenship activities such as their contribution to environmental protection and education and health care in their communities affect their customers' perception of them and the bottom line?
- *Employee appraisal, rewards, and recognition.* According to Deming (1986), the use of rating and merit systems is not fair and can work against a company, because these systems label only a few employees winners and may encourage unwanted, harmful competition within the company. Deming argues that most of the causes of low quality and low productivity are inherent in the system and are not created by employees. If the system in which people work is predictable, the deviation in the employees' performance levels will diminish in the long term. However, the TQM survey literature does not have enough evidence to either support or reject this Deming view. Although the use of employee appraisal, rewards, and recognition systems have been mentioned briefly in 141 of the survey articles analyzed in this paper, only a few of the articles analyzed them in detail within the context of TQM. It would be interesting to see what kinds of experiences companies have had with these systems. Did they have a positive impact on employee performance? How were the relationships among employees affected? What is the extent to which these systems affect employee satisfaction, employee performance, teamwork, customer relationships and organizational performance? It would also be interesting to compare these results across countries by conducting

IX. Conclusions

In this paper, we examined the state of TQM survey research by analyzing the survey articles published between 1989 and 2000 in various types of journals. Some of the findings of this analysis within the survey-limited context of the paper are the following:

- An examination of 76 survey studies that used an integrated approach to TQM showed that the TQM factors can be grouped under 25 names as listed previously.
- An analysis of the 347 survey articles published between 1989 and 2000 using these 25 factors as a framework revealed that the most frequently covered TQM factors in the literature were customer focus and satisfaction, employee training, leadership and top management commitment, teamwork, employee involvement, continuous improvement and innovation, and quality information and performance measurement, respectively. In addition, many of the articles dealt with issues related to process management including process control and product and service design to a certain degree, as well as supplier management, communication and strategic planning. However, five of these factors including strategic planning, communication, product and service design, employee appraisal and rewards, and social responsibility were not covered exclusively by most of the studies. In addition, the other factors that received relatively low coverage in the TQM survey literature, including benchmarking, employee empowerment, employee satisfaction, flexibility, quality assurance, zero defects, quality culture, quality systems, and just-in-time, can be examined further within a TQM context. Thus, more survey studies must be conducted to better understand the extent to which these factors contribute to the TQM activities of companies.
- Depending on the type of journal, the number of TQM survey publications have either leveled off or decreased in the past few years, which may suggest that TQM survey research may be at a junction where new directions need to be taken by TQM researchers. In fact, this is especially necessary as far as those studies examining the TQM factors-performance linkages are concerned. This is because the various studies conducted in this area have so far yielded conflicting results, and the true nature of these relationships can only be assessed by longitudinal studies, which we have not found between 1989 and 2000.
- A total of 286 of the 347 articles analyzed were one-country studies conducted in different regions of the world including North America, Europe, Australasia, Asia, Africa, South America and the Middle East. The biggest number of studies was conducted in North America, Europe

and Australasia, respectively, followed by Asia. There were only three studies found in each of the remaining regions. Thus, more studies must be conducted in these regions to examine the extent to which TQM practices are implemented by companies located there. It would be of interest for today's global companies to have more information about the nature of these activities and whether these activities differ from those in their home country. Such potential differences may have important decision-making implications for companies operating in different parts of the world.

- Finally, we were able to categorize the 347 studies under six objectives: identification of critical TQM factors; issues in the implementation of TQM; the relationship between TQM and firm performance; HRM within a TQM context; relationship between TQM and ISO 9000; and others.

As mentioned before, one of the studies that examined TQM literature is that by Ahire *et al.* (1995). In this study, the authors analyzed a total of 226 overview, conceptual, case study, empirical, analytical and simulation articles from the TQM literature published between 1970 and 1993 using the seven MBNQA criteria as a framework. Thus, one of the strengths of this study was that it examined the articles using six different orientations. The study clearly demonstrated that there was a lack of empirical research (especially survey research) during this period. Given that there is no compiled information about survey based research, our study attempted to examine the progress of TQM survey research since its emergence. The total number of journals that were used in Ahire *et al.*'s (1995) literature review was 43, whereas our study cited articles from 83 journals in ten disciplines. Ahire *et al.* (1995) also recommended a list of future directions for research using the seven MBNQA criteria. However, our recommendations go beyond the seven TQM factors represented by the MBNQA criteria and include various other issues discussed in section VIII of the paper. In addition, our recommendations are discussed in much more detail.

Just like Ahire *et al.* (1995) and our study, Thiagarajan and Zairi (1997a, b, c) also reviewed the TQM literature using sets of criteria similar to those of the MBNQA and the European Quality Award (EQA). However, unlike Ahire *et al.* (1995) and our study, the authors focused on TQM implementation case studies and the prescriptions of quality researchers such as Deming and Feigenbaum in these three-part articles in order to discuss various issues related to the implementation of TQM.

In another literature review paper, Fynes (1998/1999) examined 20 empirical TQM studies that tested and validated the critical factors of TQM. In this paper, we analyzed 76 such studies to come up with 25 most commonly extracted factors that were consequently used as a framework to analyze a total of 347 TQM survey studies. Fynes (1998/1999) also adopted the seven critical TQM factors (top management support, quality information, process

management, product design, workforce management, supplier involvement and customer involvement) identified by Flynn *et al.* (1994) as a framework to further examine empirical TQM studies conducted in each of these seven areas.

The most recent review of TQM literature that we found is by Yong and Wilkinson (1999). This study had a narrow focus in that it only examined those articles that argued that TQM was beneficial to companies and those that argued that it was not. The article also provided a comparative summary table of 15 survey studies that analyzed the link between TQM practices and performance. In addition, the article discussed obstacles to achieving TQM, as well as human resource management issues including the values and attitudes of various organizational actors in the implementation of TQM, the barriers between departments/functions, high labour turnover and culture.

X. Limitations

Although we have been thorough in our search for survey-based researches in the area of TQM, there are, however, some limitations that can be attributed to this study. This section discusses these limitations:

- Only survey-based research studies have been analyzed, and all other types of research such as case and theory based studies, as well as individual observations, etc. were excluded.
- Only English publications in four databases were searched, which may have resulted in the omission of some relevant articles published in journals not included in these databases, as well as in other languages.
- The focus of this study was on business-related databases and journals, and thus, other disciplines such as social sciences were excluded from this research.
- Each of the 347 articles analyzed gave different weights to the coverage of the 25 factors listed in Table IV. For instance one paper may have devoted the whole article to top management commitment whereas another just mentioned it briefly. However, the total number of "X's" in each column does not reflect that. Therefore, using solely these totals in the analysis may not truly be reflective of the scope or the comprehensiveness of these factors' coverage in the literature.

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