A Retrospective View of Research in the *Quality Management Journal:* A Thematic and Keyword Analysis

JAMES R. EVANS, UNIVERSITY OF CINCINNATI
S. THOMAS FOSTER, JR., BRIGHAM YOUNG UNIVERSITY
ZHEN GUO, UNIVERSITY OF CINCINNATI

This paper presents a retrospective analysis of quality management research that has been published in the Quality Management Journal (QMJ) *since its inception. The authors use two approaches—a text analysis tool called centering resonance analysis (CRA), supported by a software package called Crawdad, and an analysis of keywords, which has been used in other studies to evaluate bodies of literature. CRA results in word pairings that are influential in predicting the content of articles. The results suggest that the papers published in the journal have adequately addressed the core issues of quality management. To provide additional insight into emerging trends, the authors studied keywords before and after 2002 to analyze changes in research topics during those time periods. This analysis suggests that quality management research has matured and moved beyond the principles of quality and its underlying philosophies, evolving to focus on contemporary issues using better methodologies such as empirical research and case studies. Finally, the authors provide some suggestions for future research in the field.*

Keywords: centering resonance analysis, keyword analysis, quality management research

INTRODUCTION

The study, refinement, and dissemination of research in an academic discipline results in the circulation of knowledge and ideas through scholarly articles in peer-reviewed journals. Scholarly interest in the field of quality management (QM) emerged in the 1980s as business and industry in the United States began to react to global competitive forces, primarily from Japan. A study of doctoral dissertation research in quality showed a growing interest in the field throughout the 1980s that peaked in the mid-1990s (Jack, Stephens, and Evans 2001).

Several authors have examined and assessed QM research to provide researchers with an improved understanding of the state-of-the-art and provide direction to maintain and encourage growth of the field. As QM research was beginning to flourish, Flynn, Schroeder, and Sakakibara (1994) conducted an extensive literature review to identify and substantiate key dimensions of QM. At about the same time, Ahire, Landeros, and Golhar (1995) performed a keyword search of total quality management (TQM) related articles, resulting in a database of 226 articles published between 1970 and 1993. From this set of articles, they developed a two-dimensional classification scheme based on orientation (research method) and focus (based on the Baldrige categories) and suggested a future research agenda. Sousa and Voss (2002) studied the growing literature and

identified five main themes focusing on three questions: 1) What is QM? 2) Are QM practices valid? and 3) How should QM be implemented? Schroeder, Linderman, and Zhang (2005) reviewed quality-related articles published in the *Production and Operations Management* journal between 1992 and 2004 and also suggested future areas for research.

The *Quality Management Journal (QMJ)* was initiated by ASQ in 1993 during the height of interest in QM as a research discipline. Its objective was, and still is, to publish significant research relevant to QM practice. As its audience primarily consists of members of ASQ who are QM practitioners, the scope of the published research has tried to focus on research that not only extended the state-of-the-art and theory, but is meaningful to this audience. Truth be told, the interest in QM research peaked in the 1990s, and has fallen in recent years as new topics such as supply chain management have garnered the interest of academic researchers. Therefore, the authors felt it was appropriate to review the literature published in *QMJ* to gain a perspective of the key areas of interest, identify trends, and provide some new direction to the field. Their analysis covers all research papers published in *QMJ* through 2010. The purpose of this paper is twofold: to take a retrospective look at the field, and to provide guidance to researchers interested in the field of QM.

METHODOLOGY

Numerous approaches exist to summarize and classify literature. Generally, these fall into two categories—subjective and objective. For example, the approach to synopsizing the QM literature used by Sousa and Voss (2002) relied on judgment. Other approaches are more objective and are based in communications theory (Giddens, 1984). The communications theory approaches have led to the development of objective methods that analyze speech and text to identify patterns that help to recognize influential phraseology and patterns of word use in text and speech. The authors use two approaches—a speech analysis tool called centering resonance analysis, supported by a software package called Crawdad, and an analysis of keywords, a method that has been used in other studies to evaluate bodies of literature.

Centering Resonance Analysis

Centering resonance analysis (CRA) borrows from structuration theory (Giddens 1979; 1984) from the field of communications that holds that communications processes can be studied to identify emerging structures within literature. Traditional approaches to studying communication patterns included ethnographies, conversation analysis, surveys, and complex computation models. For example, ethnographic techniques sought insights in specific literatures and attempted to find links between literatures by studying deep and overall patterns of communication. These approaches naturally exhibited selection and affective demand effects, which can result in filtering out critical details about communication processes and how they work (Browning and Beyer 1998). CRA, on the other hand, is a method for representing the content of large volumes of text to understand their central themes and phrases. CRA is a text analysis method that is best applied to formal communication such as written text. This is particularly useful for higher-order collections of texts such as research articles. CRA has been used in a variety of research papers in management and communications such as an analysis of Sarbanes-Oxley (Canary and Jennings 2008) and studies in organizational knowledge management (McPhee, Corman, and Dooley 2002).

CRA is a representational method that forms networks of text analysis (Corman et al. 2002). It is based on a theory of communicative coherence and draws on centering theory that assumes that erudite authors and speakers will focus their statements on conversational centers. Writers of text create coherence in their writing by using noun phrases that the authors refer to as "centers." Centers are noun phrases constituting the subjects and objects of utterances, and are generally entities such as objects, events, or persons (Corman et al. 2002; Gordon, Grosz, and Gilliom 1993). Centers are phrases that are both forward and backward looking. Some sentences have

backward-looking centers and others have forward-looking centers. CRA analyzes how writers create text deploying a "stream of centers" (for example, noun phrases) that create a strategic, semantic structure.

These influential centering phrases have predictive value. That is, these centers consist of phrases that can be networked in a way that will quantify the predictive value of a word pairing. Another way of stating this is that these centers are influential phrases that predict future patterns of speech. CRA uses "resonance" to measure the structural likenesses among various keywords with a quantitative similarity metric.

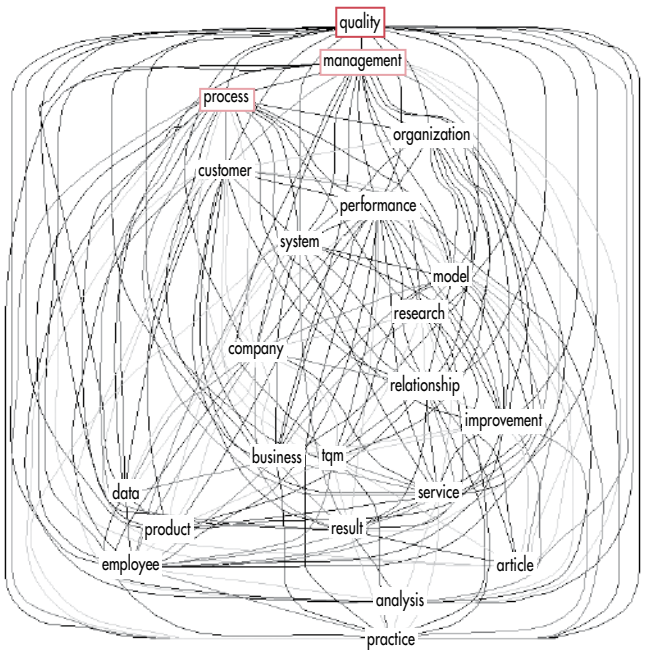
The steps deployed in performing CRA include selecting, linking, indexing, and concept mapping. The authors will discuss each of these steps briefly. During the selection process, CRA creates centering tokens out of noun phrases in sentences. This step is a filter that retains only words that are important to the centering process. These noun phrases are the important entities in discourse. Linking in CRA converts sequences into networks of relationships between centering tokens. These centering tokens are strung together to form an utterance or word pairing. Indexing involves analyzing the network of centering tokens to determine the relative influence of each relationship. This includes betweenness centrality computation to demonstrate the extent to which a centering token mediates a chain of association in a CRA network.

Word resonance is calculated directly from influence scores that are calculated from the strength of relationships between terms. The greater frequency with which two texts use the same word in influential positions, the more resonance they have (Corman et al. 2002). As these structures show, CRA is a technique that describes the extent to which words are prominent in creating structural coherence in a text. CRA performs concept mapping. This results in a visualized network with the objective of highlighting a network to give sense to the context of a text. These networks are demonstrated as word maps that show the relationships between key terms resulting from vast amounts of written text.

The abstracts the authors compiled were analyzed using a computerized text analysis tool called Crawdad (Corman et al. 2002), which uses CRA. This tool addresses the traditional problems associated with content analysis; that is, the human judgment associated with coding keywords. As a result, Crawdad is a more reliable method than traditional coding methods for analyzing large amounts of qualitative data (Corman et al. 2002).

The Crawdad software (Corman et al. 2002) parses text into noun phrases. An example of a noun phrase may be "managing reliability." If this phrase is networked with other abstracts where this phrase predicts the content of other abstracts, then the particular center will have a significant similarity score. These centers consist of word pairings that are influential in predicting the content of articles. An example of an application of Crawdad is with homeland security where the text of large amounts of spoken and written information have been analyzed to identify patterns of communication. In the

Figure 1 Network map of Crawdad word pairings.



same way, the authors used Crawdad to analyze 300 research abstracts in QM to identify influential word pairings as a means for categorizing the research.

Crawdad Results

A CRA using Crawdad software was performed for abstracts from 300 journal articles from the beginning of the journal until 2011. Figure 1 shows a graphical representation of word relationships. As one can see, the most central terms were *quality* and *management*. The other words were linked to these two centering terms.

Table 1 shows word pairings resulting from the authors' analysis. Included with these pairings is a similarity score. Similarity scores above 0.15 are considered of significant importance. The most significant pairings (see Figure 2) are quality and the following: management, service, system, performance, process, improvement, customer, TQM, relationship, and practice. These represent the important research themes that have been published in the *QMJ*.

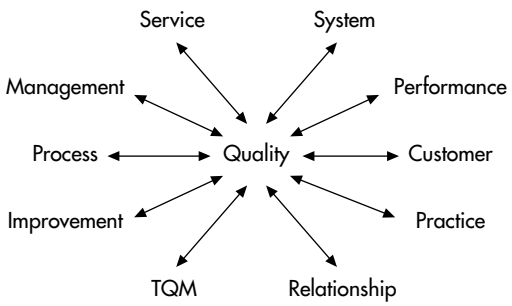
The authors briefly discuss their perspective of why these word pairings emerged as the most influential.

- *Quality + Management:* Understanding the characteristics of managing quality in organizations has been a fundamental topic of QM research. Nearly every study has important implications for managers, and it should not be surprising that this is the most influential concept. Indeed, a primary objective of the *QMJ* is to convey contemporary research to practicing managers.
- *Quality + Service:* The service economy in the United States dominates some 80 percent of the U.S. workforce. Manufacturing firms are recognizing and emphasizing service more. As a result, this represents one of the most important quality topics in today's business environment.
- *Quality + System:* The concept of a system goes back to W. Edwards Deming and has been re-emphasized through the Baldrige and other quality frameworks. Understanding the relationships of quality to other organizational functions is fundamental to providing managerial insight.

Table 1 Crawdad word pairs with scores.

quality | management 2.223	quality | research 0.065
quality | service 0.375	quality | firm 0.065
quality | system 0.363	quality | business 0.064
quality | performance 0.347	quality | manager 0.058
quality | process 0.257	quality | program 0.058
quality | imrovement 0.224	management | process 0.054
quality | customer 0.178	quality | cost 0.053
quality | tqm 0.178	management | system 0.041
quality | relationship 0.168	management | tqm 0.040
quality | practice 0.156	quality | satisfaction 0.039
quality | model 0.138	quality | development 0.036
quality | organization 0.137	quality | employee 0.035
quality | product 0.098	quality | measure 0.034
quality | total 0.074	quality | tool 0.034
quality | company 0.072	quality | information 0.033
	quality | implementation 0.032

Figure 2 Most influential word pairings.



- *Quality + Performance:* Much research has been performed that links quality practices to performance. This is a reminder that the "focus on results" is a key element of quality management (as well as a Baldrige core value).
- *Quality + Process:* Quality management and process improvement are inextricably tied together. Process focus is one of the founding principles of QM, and part of every business activity. The recent change in

Table 2 Pareto analysis of top keywords.

Keyword	Citation frequency
quality management	26
total quality management	22
quality	20
TQM	20
customer satisfaction	15
quality function deployment	13
service quality	12
Six Sigma	11
empirical research	8
Malcolm Baldrige Award	8
quality improvement	8
statistical process control	7
Baldrige Award	6
continuous improvement	6
human resource development	6
performance	6
problem solving	6
SERVQUAL	6
case study	5
education	5
leadership	5
organizational change	5
organizational learning	5
process improvement	5
quality measurement	5
self-assessment	5

Table 3 Pareto analysis of primary keyword classification categories.

Primary category	Citation frequency
method	112
process	103
human resources	94
TQM	85
information	72
quality	61
customer	60
industry	53
education	50
management	45
process design	38
strategy	33
organizational theory	26
global	25
leadership	25
service	24
Baldrige	23
cost of quality	21
system	18
ISO 9000	15
culture	13
Six Sigma	12
implementation	11
statistics	10
supplier	10

the Baldrige criteria category 6 to operations focus was driven by the fact that every "How do you…?" question in all other categories implies a process.

- *Quality + Improvement:* Continuous improvement is also a core principle of QM and correlates strongly with performance and process. Consequently, any change in management approaches, product designs, and so on, are naturally focused on improvement.
- *Quality + Customer:* Customer focus is perhaps recognized as the most important principle of QM, and is strongly related to service. Little can be done to manage or improve quality in an organization without a thorough understanding of customers.

Table 4 Top keywords during 1993-2001.

human resources	72
process	69
method	57
TQM	52
information	38
customer	35
quality	34
education	32
management	27
strategy	25
process design	23
organizational theory	18
leadership	15
cost of quality	15
industry	14
system	12

Table 5 Top keywords during 2002-2010.

method	55
industry	39
information	34
process	34
TQM	33
quality	27
customer	25
human resources	22
service	20
management	18
education	18
global	16
process design	15
Baldrige	14
Six Sigma	11
leadership	10

- *Quality + TQM:* As the *QMJ* began, "TQM—total quality management" was the buzzword in business. Similar to the quality + management word pairing, it is not surprising that most articles use this term.
- *Quality + Relationship:* A more recent trend in quality management has to do with the relationships among firms, suppliers, and customers. This is reflected in growing research on supply chains, as well as relationships between customers and the workforce, customer satisfaction and financial results, and relationships between other metrics and managerial processes.
- *Quality + Practice:* A consistent theme in the *QMJ* has been a focus on practice. How can the results of research be applied in a practical setting? Being an influential word pair suggests that the journal is achieving its primary objective.

These results suggest that the papers published in the journal have adequately addressed the core issues of QM; however, they do not describe how the field has changed since its inception nor do they provide insight into emerging trends. To do this, the authors also conducted a keyword analysis to provide additional insight into these issues.

Keyword Analysis

Keyword analysis has been used to evaluate published literature in other fields. For example, Nel et al. (2011) examined 417 papers over 11 years in the *Journal of Services Marketing.* Their classification included the topic, sample, method, and analysis of each paper, top keywords, and top keywords in the titles. A frequency analysis of keywords was used to provide insight into the topics covered in the journal. The use of keywords provided insights into the "hot" topics for different time periods over the 11 years and those topics that have had an enduring influence as opposed to short-lived fads. Kevork and Vrechopoulos (2009) used keyword analysis

as the principal methodology in reviewing literature on customer relationship management (CRM). They analyzed the frequencies of 1,565 keywords in 396 relevant articles during the period 2000 to 2006 from 135 scientific journals. These were classified into nine categories and 226 subgroups to form an exhaustive and informative CRM framework. The uniqueness of their paper was the sole use of keywords to drive the classification. Author-provided keywords were assumed to be authentic indicators about the article's subject areas. Dwivedi et al. (2008) reviewed 139 research articles published in a specific journal, the *Journal of Electronic Commerce Research,* between 2000 and 2007. Their analysis included an assessment of the most frequently used keywords, and suggested the use of keywords to assess diffusion of theories. Taticchi, Flavio, and Cagnazzo (2010) reviewed literature in performance measurement and management, examining 6,618 papers published in 546 different journals. Using the social network of keywords for the most frequently cited works, their analysis provides insight into fields of interest.

QMJ has published a wide variety of articles on numerous topics and using different research methodologies. Each article is accompanied by a set of two to 12 author-provided keywords. A database was developed listing each keyword for every article from 1993 through 2010. The raw keywords were sorted in a Pareto fashion to identify the most-frequent cites. Table 2 shows a Pareto summary of the top keywords having a frequency of at least five over the journal's history. It is probably not surprising that keywords such as quality management, quality, and TQM dominated the list. Most of the others on this list focus on the core principles of QM: customers, human resources, and process improvement, as well as organizational leadership and performance excellence, and service quality.

Table 6 Keyword category citation decreases between 1993-2001 and 2002-2010.

Primary	1993-2001	2002-2010	Total	Diff	% change
human resources	72	22	94	-50	-53%
process	69	34	103	-35	-34%
TQM	52	33	85	-19	-22%
strategy	25	8	33	-17	-52%
education	32	18	50	-14	-28%
customer	35	25	60	-10	-17%
organizational theory	18	8	26	-10	-38%
management	27	18	45	-9	-20%
cost of quality	15	6	21	-9	-43%
process design	23	15	38	-8	-21%
quality	34	27	61	-7	-11%
system	12	6	18	-6	-33%
leadership	15	10	25	-5	-20%
implementation	8	3	11	-5	-45%
market	7	2	9	-5	-56%
problem solving	6	1	7	-5	-71%
information	38	34	72	-4	-6%
statistics	7	3	10	-4	-40%
benchmarking	4	0	4	-4	-100%
variation	4	0	4	-4	-100%
culture	8	5	13	-3	-23%
value	4	1	5	-3	-60%
Deming	3	0	3	-3	-100%
marketing and sales	3	0	3	-3	-100%
method	57	55	112	-2	-2%
self-assessment	4	2	6	-2	-33%
engineering	3	1	4	-2	-50%
assessment (self-assessment)	2	0	2	-2	-100%
creativity	2	0	2	-2	-100%
discipline	2	0	2	-2	-100%

Because different authors used different keywords to identify similar concepts, further aggregation was performed to smooth out these differences and create a more information-rich database. Each keyword was tagged by the authors according to a primary and secondary classification. Primary categories correspond to standard terms and concepts in quality management, such as human resources, leadership, cost of quality, Baldrige, customer, process, and so on. For instance, a keyword such as activity-based costing models was classified as cost of quality; and the keywords clustering algorithms and case study were classified as method. Table 3 shows the Pareto analysis of this classification for cite frequencies of 10 or more.

The most frequent group of keywords is method, which refers to the particular type of research methodology used. Following this category, there is a predominance of the core concepts of QM. Similar to the CRA analysis, this supports the authors' conclusion that research in the journal has clearly addressed the breadth of topics that characterize accepted notions of QM.

A more insightful analysis is to compare the frequencies of keywords over time. Tables 4 and 5 show the top keywords during the periods 1993 to 2001 and 2002 to 2010. This dichotomy was chosen for two reasons; first it divides the time period into approximately two equal segments, but more importantly, it separates the era of basic research during the 1990s that was focused on understanding the "new" phenomenon of QM at a basic level from the more recent era that can best be described as research on emerging topics (which continues today). Although many of the core topics have continued to be emphasized in the articles, the rates at which these topics have been studied have decreased. Table 6 shows the rates of citation decreases for primary categories from the first half of the journal's history as compared with the second half. One can see that the major topics that have declined in interest include many of the traditional and foundation topics associated with QM; specifically, the core principles of human resource, process, and customer focus, cost of quality, and implementation (strategy, organizational theory, leadership, culture, and implementation).

In contrast, Table 7 shows the rates of citation increases for primary categories over the first half of the journal's history as compared with the second half. The authors note that a significant number of papers dealing with specific industries, services, and Lean Six Sigma have been published

Table 6 Keyword category citation decreases between 1993-2001 and 2002-2010 (continued).

Primary	1993-2001	2002-2010	Total	Diff	% change
resources	2	0	2	-2	-100%
waste	2	0	2	-2	-100%
tools	3	2	5	-1	-20%
frameworks	2	1	3	-1	-33%
process capability	2	1	3	-1	-33%
reengineering	2	1	3	-1	-33%
work	2	1	3	-1	-33%
agility	1	0	1	-1	-100%
best practices	1	0	1	-1	-100%
cycle time	1	0	1	-1	-100%
decision making	1	0	1	-1	-100%
development	1	0	1	-1	-100%
economics	1	0	1	-1	-100%
entrepreneurship	1	0	1	-1	-100%
flinching	1	0	1	-1	-100%
framework	1	0	1	-1	-100%
horizontal integration	1	0	1	-1	-100%
integration	1	0	1	-1	-100%
philosophy	1	0	1	-1	-100%
supply chain	1	0	1	-1	-100%
sustainability	1	0	1	-1	-100%

more recently, as have been papers dealing with global themes and Baldrige/performance excellence.

The authors also conducted an analysis of secondary keywords. Table 8 shows the most frequent secondary keywords over the journal's history. Table 9 shows the secondary keywords sorted by the percent change. The research areas having the largest increases were healthcare, SERVQUAL, (surprisingly) quality, empirical and case-study methodology, measurement issues, and training. Organizational change, quality improvement design, teamwork, QFD, and customer satisfaction had the largest decreases.

This analysis suggests that QM research has moved beyond basic research on the principles of quality and its underlying philosophies, and has evolved to focus on understanding more contemporary issues in the field, using better methodologies such as empirical research and case studies.

CONCLUSIONS

Using two different analysis methods, the authors have identified the principal themes that researchers in QM have investigated throughout the history of the *QMJ*. Their analysis shows that the *QMJ* has adequately and thoroughly covered the core topics of QM, and that researchers are now addressing more contemporary topics in the field, thus maintaining relevance of the journal to the practitioner audience of ASQ.

Any research of this type should not only be a mirror representing the past, but also a beacon for the future. The emerging topics the authors have identified as more contemporary research should provide a more relevant guide for future research, rather than "beating a dead horse" on topics that have been thoroughly investigated. They are concerned, however, that the nature of research in *QMJ*—overall and in recent years—does

Table 7 Keyword category citation increases between 1993-2001 and 2002-2010.

Primary	1993-2001	2002-2010	Total	Diff	% change
industry	14	39	53	25	47%
service	4	20	24	16	67%
Six Sigma	1	11	12	10	83%
global	9	16	25	7	28%
lean	0	6	6	6	100%
supplier	2	8	10	6	60%
performance excellence	0	5	5	5	100%
Baldrige	9	14	23	5	22%
performance	1	5	6	4	67%
FMEA	0	3	3	3	100%
project management	1	4	5	3	60%
results	2	5	7	3	43%
environmental	0	2	2	2	100%
history	0	2	2	2	100%
ISO 14000	0	2	2	2	100%
expert systems	1	3	4	2	50%
governance	1	3	4	2	50%
reliability	1	3	4	2	50%
SME	1	3	4	2	50%
software	1	3	4	2	50%
Internet	2	4	6	2	33%
organization	2	4	6	2	33%
climate	0	1	1	1	100%
customization	0	1	1	1	100%
Lean Six Sigma	0	1	1	1	100%
maintenance	0	1	1	1	100%
modeling	0	1	1	1	100%
Taguchi	0	1	1	1	100%
healthcare	1	2	3	1	33%
social	1	2	3	1	33%
TOC	1	2	3	1	33%
ISO 9000	7	8	15	1	7%

Table 8 Most frequent secondary keywords (six or more citations).

improvement	38
control	23
satisfaction	23
measurement	22
QFD	22
teamwork	22
healthcare	19
design	17
quality	13
empirical	12
service	11
change	9
survey	9
learning	8
training	8
practices	7
case study	6
manufacturing	6
SERVQUAL	6

Table 9 Change in secondary keywords.

Secondary	1993-2001	2002-2010	Diff	% Change
healthcare	0	19	19	100%
SERVQUAL	1	5	4	67%
quality	3	10	7	54%
empirical	3	9	6	50%
case study	2	4	2	33%
measurement	8	14	6	27%
training	3	5	2	25%
practices	3	4	1	14%
service	5	6	1	9%
learning	4	4	0	0%
manufacturing	3	3	0	0%
survey	5	4	-1	-11%
control	13	10	-3	-13%
satisfaction	15	8	-7	-30%
QFD	15	7	-8	-36%
teamwork	15	7	-8	-36%
design	12	5	-7	-41%
improvement	28	10	-18	-47%
change	8	1	-7	-78%

not adequately represent topics with breakthrough potential for future progress in QM. Perhaps the best opportunities lie in those topics that have not been actively researched; namely, those near the bottom of the list in Table 6. These include such topics as sustainability, supply chain, integration, economics, cycle time, best practices, and agility, which, while fundamentally at the heart of effective QM practice, better address 21st century challenges that organizations face. Similarly, the secondary keywords in Table 9 that have exhibited the largest decreases are change, improvement, design, teamwork, and QFD. The authors believe these represent under-researched topics that should be part of a new research agenda for quality. The questions that should be asked are: 1) Does research on these topics provide significant value to QM and the profession in today's world? 2) Why haven't they been researched more extensively or have declined in interest? While they don't have definitive answers to these questions, the authors believe they provide a springboard for the future development of the field.

ACKNOWLEDGEMENT

The review of this paper was handled by former *QMJ* editor Dr. Barbara B. Flynn.

REFERENCES

Ahire, S., D. Landeros, and Y. Golhar. 1995. Total quality management: A literature review and an agenda for future research. *Production and Operations Management* 18, no. 5:277-306.

Browning, L. D., and J. M. Beyer. 1998. The structuring of shared voluntary standards in the U.S. semiconductor industry: Communicating to reach agreement. *Communication Monographs* 65, no. 1:220-243.

Canary, H., and Jennings. 2008. Principles and influence in codes of ethics: A centering resonance analysis comparing pre- and post-Sarbanes-Oxley codes of ethics. *Journal of Business Ethics* 80, no. 2:263-278.

Corman, S., T. Kuhn, R. McPhee, and K. Dooley. 2002. Studying complex discursive systems: Centering resonance analysis of organizational communication. *Human Communication Research* 28, no. 2:157-206.

Dwivedi, Y., M. Kiang, M. Williams, and B. Lal. 2008. Profiling research published in the *Journal of Electronic Commerce Research*. *Journal of Electronic Commerce Research* 9, no. 2:77-91.

Flynn, B., R. Schroeder, and S. Sakakibara. 1994. A framework for quality management research and an associated measurement instrument. *Journal of Operations Management* 11, no. 4:339-366.

Giddens, A. 1979. *Central problems in social theory*. Berkeley, CA: University of California Press.

Giddens, A. 1984. *The constitution of society: Outline of the theory of structuration*. Berkeley, CA: University of California Press.

Gordon, P. C., B. J. Grosz, and L. A. Gilliom. 1993. Pronouns, names, and the centering of attention in discourse. *Cognitive Science* 17, no. 1:311-347.

Jack, E., P. Stephens, and J. R. Evans. 2001. A comparative summary of doctoral dissertations in quality management. *Production and Operations Management* 10, no. 4:363-382.

Kevork, E., and A. Vrechopoulos. 2009. CRM literature: Conceptual and functional insights by keyword analysis. *Marketing Intelligence & Planning* 27, no. 1:48-85.

McPhee, R., S. Corman, and K. Dooley. 2002. Organizational knowledge expression and management: Centering resonance analysis of organizational discourse. *Management Communication Quarterly* 16, no. 2:274-281.

Nel, D., G. Van Heerden, A. Chan, M. Ghazisaeedi, W. Halvorson, and P. Steyn. 2011. Eleven years of scholarly research in the *Journal of Services Marketing*. *Journal of Services Marketing* 25, no. 1:4-13.

Schroeder, R., K. Linderman, and D. Zhang. 2005. Evolution of quality: First fifty issues of production and operations management. *Production and Operations Management* 14, no. 4:468-481.

Sousa, R., and C. Voss. 2002. Quality management revisited: A reflective review and agenda for future research, *Journal of Operations Management* 20, no. 1:91-109.

Taticchi, P., T. Flavio, and L. Cagnazzo. 2010. Performance measurement and management: a literature review and a research agenda. *Measuring Business Excellence* 14, no. 1:4-18.

BIOGRAPHIES

James R. Evans is a professor in the Department of Operations and Business Analytics in the College of Business at the University of Cincinnati. He holds bachelor's and master's degrees in industrial engineering from Purdue, and a doctorate in industrial and systems engineering from Georgia Tech. Evans is the author or co-author of two of the most popular quality management textbooks used in business schools worldwide: *Managing for Quality and Performance Excellence, 8th Edition,* and *Quality & Performance Excellence: Management, Organization, and Strategy, 6th Edition,* as well as *An Introduction to Six Sigma and Process Improvement,* all for Cengage Learning. In 2003, Evans and his co-author received the ASQ Philip Crosby Medal for *The Management and Control of Quality, 5th Edition*. In addition, he has also written books on statistical process control, management science, operations management, simulation and risk analysis, statistics and business analytics, and creative thinking. He has published more than 90 papers in the fields of operations research, operations management, and quality. Evans is a Fellow in and past president of the Decision Sciences Institute, and served as an examiner and judge for the Malcolm Baldrige National Quality Award program. He can be reached by email at James.Evans@uc.edu.

S. Thomas Foster is area leader and the Donald L. Staheli professor of quality and supply chain management at Brigham Young University. He has experience in manufacturing, financial services operations, and international oil exploration. Foster currently serves on the board of overseers for the Malcolm Baldrige National Quality Award. He has consulted for a number of companies including Hewlett-Packard, Trus Joist Macmillan, Cutler-Hammer/Eaton Corp., Heinz Frozen Foods, US West Corp., Healthwise Corp., and the United States Department of Energy. Foster is on the editorial boards of the *Journal of Operations Management, Quality Management Journal,* and *Decision Sciences*. He has published more than 60 quality-related articles in journals. His book is entitled, *Quality Management: An Integrative Approach* (Prentice Hall). Foster is founder of www.freequality.org, was awarded the Marriott School of Business Management Outstanding Researcher Award and received the prestigious 2002 Decision Sciences Institute Instructional Innovation Award.

Zhen Guo is pursuing his doctorate in operations and business analytics at University of Cincinnati. He acquired a master's degree in logistics engineering from Fudan University and a bachelor's degree in information security from Shanghai Jiao Tong University. He has worked as an IT security engineer at HSBC (China).