

## **GLOBAL AFFILIATION, COMPETITION INTENSITY, FIRM SIZE AND ADOPTION OF BENCHMARK QUALITY PRACTICES BY FIRMS IN EMERGING ECONOMIES: THE CASE OF TRINIDAD AND TOBAGO**

*Eisenhower C. Etienne\**

**Abstract:** *This paper investigates the impact of global affiliation, local industry competition intensity and firm size on the number and type of benchmark total quality practices adopted by firms in an emerging economy. Six propositions that expressed the nature of the relationships to be investigated were formulated and a survey was designed to generate the requisite data. That survey was distributed to firms that are members of both the American Chamber of Commerce of T&T and the T&T Chamber of Industry and Commerce. The survey was deployed using Survey Monkey and was distributed by the email. Follow-up emails were sent in an effort to elicit a high response rate. After three weeks, thirty-three (33) responses were received. Of these, four (4) were discarded because of too many incomplete responses. Data analysis was executed using the Survey Monkey analysis tool kit. Although the analysis of the data and the conclusions drawn were limited by the small size of the sample, the six propositions that related the number and type of benchmark quality practices that were implemented by firms in emerging economies and the factors that drive adoption were all supported by the research results. These results show that current deployment of total quality practices by firms in emerging economies is quite weak. The results argue for making extensive education in total quality practices for all employees a strategic priority for firms in emerging economies.*

**Keywords:** *TQM, Six-Sigma, Benchmark quality practices, Emerging economies, Competition intensity, Globalization, Global affiliation, Technology transfer.*

### **INTRODUCTION**

Globalization has accelerated the diffusion of technology on a planetary scale and this is leveling the competitive playing field. That phenomenon has been well explored in Friedman's book, 'The World Is Flat'. Because total quality management (TQM) is bona fide technology, globalization would be expected to level the arena where companies compete on quality. Thus, one should expect to see a diminishing gap in the mastery of benchmark total quality systems between firms in advanced industrialized nations and those in emerging economies.

This research proposes that there will be a small gap in the mastery of quality technology between independent firms in the advanced countries and those in

---

\* Ph.D., Professor of Business Administration, School of Business and Industry, Florida A&M University, Tallahassee, Florida, USA, E-mail: [Etienne.eisenhower@fam.u.edu](mailto:Etienne.eisenhower@fam.u.edu)

emerging economies. Moreover, the research conjectures that subsidiaries of global corporations that are operating in emerging economies will display increasing mastery of total quality (TQ) technology that will be converging towards the level of quality competency that exists in the domestic (global platform) operations of their parent companies. The research also conjectures that these foreign-owned subsidiaries will have a clear advantage in the mastery of TQ technology over local firms with no global corporate affiliation or firms with little or no global industry activity.

## **LITERATURE REVIEW**

TQM is the paradigm that emerged out of the efforts of a few notable experts that started in the 1950s to make superior quality and its systematic pursuit a strategic and competitive priority. TQM started with the work of Feigenbaum, Deming, Juran and Crosby, and was fed by the Japanese thinking encapsulated in the work of Ishikawa and Ohno (Feigenbaum, 1961; Deming, 1986; Juran, 1964; Ishikawa, 1981; Ohno, 1988). TQM, has been defined as the set of managerial philosophies, principles, systems, policies, tools and methods that are designed to pursue the long term, sustainable mission of creating and delivering to market, products and services that meet or surpass customer requirements (Etienne-Hamilton, 1994).

There is abundant evidence that shows that when judiciously implemented, TQM has measurable, significant impact on a company's competitive and financial performance. Profit Impact of Marketing Strategy (PIMS), has tracked data since 1972 on over 3000 companies to understand the factors that explain their financial and market performance. One factor tracked by PIMS is Relative Product Quality, which measures the percentage of a Strategic Business Unit's sales that are generated by products and services that customers evaluate to be 'Superior', 'Equivalent' or 'Inferior' to the quality provided by the three leading competitors in the market. The data have consistently shown that companies whose quality index placed them in the top 33% of competitors had significantly higher market share, ROI, growth and profit margins than those whose index placed them in the bottom 33% of competitors. Most of the leading competitors had implemented one benchmark TQM system or another (Evans and Lindsay, 2008). Studies have consistently shown that the vast majority of major US companies have implemented TQM (Benson, 1993; Grayson and O'Dell, 1988; Imai, 1986; Juran, 1993). Benson and Swain also provide evidence for the financial impact of TQM implementation (Benson and Swain, 1999).

The General Accounting Office (GAO) of the US Government, tracked the financial returns that would have resulted if an investor had bought equity of a winner of the Baldrige Awards, a benchmark TQ System. The data show that an investment made in a Baldrige winner would have beaten the performance of a

portfolio based on the S&P by a wide margin, sometimes by a factor of two or three (USGAO, 1991). Studies that have found a positive relationship between TQM and performance include USGAO (1991), American Society of Quality Control (1992), Hoover (1995), Garvin (1991). The NIST(1995, 1996, 1997), the administrator of the Baldrige compared the returns on the stock of Baldrige winners with the returns on the Standard and Poor's 500 Index and found that the former have outperformed the S&P 500 Index. Other studies have argued for a broader competitive impact of TQM (Ishikawa, 1985; Akao, 1991; Ohno, 1988).

Studies that have found a weak relationship between quality and financial performance include Mahajan *et al.* (1992) and Schilit (1994). Both these studies tracked performance over too-short a period to make strong conclusions on the relationship between financial performance and quality. The definitive study on the impact of TQM on the competitiveness of companies is contained in the work of Powell (Powell, 1995). He concluded that TQM can create economic value for a company but, of course, all implementers do not benefit equally. Success in deploying TQM for strategic advantage depends on three intangible (soft) factors; Executive commitment, open organization and employee empowerment. Traditional TQM mechanisms such as benchmarking, training, flexible manufacturing, process improvement and improved measurement did not appear to have as much impact as TQM advocates assert. Further, TQM implementation does not produce competitive advantage in the absence of intangibles. One key intangible is the quality culture and value system (Etienne-Hamilton, 1994; Etienne, 2005; 2002).

This research views TQ Systems as soft technology and the process of a parent company deploying its TQ systems in its subsidiary as technology transfer. Various studies have shown that most large firms in industrialized economies have implemented TQM systems (Benson, 1993; Juran, 1993; Grayson and O'Dell, 1988; Imai, 1986). Hence, subsidiaries of multinational enterprises, MNEs, located in emerging economies will have deployed a greater number of total quality systems and practices than local companies that have no MNE affiliation (Luo and Tung, 2007; Meyer, 2004; Hermosilla and Martinez, 2003; Crone, 2001; UNCTAD, 2001; Birkinshaw, 2000; Bresman *et al.*, 1999; Ismail, 1999; Driffield, 1999; UNCTAD, 1999; Mirza, 1998; Buckley *et al.*, 1997; Dobson, 1993; Dunning, 1993; Wong, 1991; Halbach, 1989).

Other work has shed light on the qualitative difference between transfers of technology to foreign affiliates versus those to independent firms by way of licenses. Mansfield and Romeo provide evidence that MNCs transfer newer technology to their foreign subsidiaries than to non-affiliates. Moreover, while the age of such technology transferred to foreign subsidiaries in developed countries had decreased over the period observed, the age of that transferred to subsidiaries in developing countries or licensed to non-affiliates had not (Mansfield and Romeo, 1980). These

results would indicate that subsidiaries of MNCs operating in emerging markets will benefit more from technology transfers from their parent companies than independent local firms would through acquiring technology by way of licenses. This is so even though subsidiaries in emerging economies will derive less of a competitive advantage from these transfers compared to their developed economy counterparts. In the Mansfield and Romeo study, the mean age of technology transferred to subsidiaries in developed countries was 5.8 years, compared to 9.8 years for emerging economies. By contrast, the mean age at which technology was made available to non-affiliates by way of licensing was 13.2 years, an advantage of 3.4 years compared to independent firms.

The reverse flow of technology referred to in these studies reaches its peak when the subsidiary has been granted a world product mandate by its parent. In that case, the subsidiary becomes the primary strategic unit for exploiting a significant market or segment of it on a global scale. The studies cited previously lead to the expectation that because subsidiaries in emerging markets receive older technology from their parent companies than that transferred to subsidiaries in developed economies, these emerging market subsidiaries will lag their developed-economy counterparts in their ability to develop and exploit technology. Consequently, few of these will have developed to the point where they will have world product mandates conferred on them.

The resource-based view of the firm underscores the role that difficult-to-imitate internal resources play in the creation of competitive advantage. Nonetheless, although all firms potentially have fair access to external resources, some firms may still have more favorable access than others by virtue of their location or position in a knowledge-rich network. Subsidiaries of MNEs may be favored on both scores, since they may be located in attractive host countries and are already part of a network that may be knowledge-rich (Bartlett and Ghoshal, 1989). Porter avers that knowledge flows among firms is greatly facilitated by the fact that these are located in host country regions where there may be existing social, technological and professional relationships between firms that compete in an industry (Porter, 1990). Favorable access to technology that is facilitated by location and access to a knowledge-rich network should be expected to influence the development of subsidiaries and confer a technological and innovation advantage on them (Andersson and Forsgren, 2000; Almeida and Anupama, 2004).

That the MNE structure enhances the innovative potential of a parent company and its subsidiaries is well accepted in the literature. MNEs operate across many national boundaries by way of foreign subsidiaries, which place them close to global sources of technology and knowledge. Thus, MNE structure and operation provide far-flung subsidiaries with competitive advantage from technology and innovation that they would not have as stand-alone companies. The reverse flow of technology back to the parent from subsidiaries enhances the competitive

advantage from technology that is an inevitable fallout from the MNE structure and operations (Perlmutter, 1969; Bartlett and Ghoshal, 1989; Hedlund, 1994; Porter, 1990; Gupta and Govindrajana, 2000; Jaffe, 1989; Jaffe, Trajtenberg and Henderson, 1993; Jarillo and Martinez, 1990; Kogut and Zander, 1992; Kogut and Zander, 1996; Kuemmerle, 1997; Kuemmerle, 2002; Leonard-Barton, 1995; Lord and Ranft, 2000; Powell, Koput and Smith-Doerr, 1996; Szulanski, 1996; Zander and Solvell, 2000; Zander, 1997; Pack, 1997; Saggi, 2002; UNCTAD, 1992; Caves, 1974).

Hence, subsidiaries of MNEs located in emerging economies will have deployed a greater number of TQ systems and practices than local companies that have no MNE affiliation (Luo and Tung, 2007; Meyer, 2004; Hermosilla and Martinez, 2003; Crone, 2001; UNCTAD, 2001; Birkinshaw, 2000; Bresman *et al.*, 1999; Ismail, 1999; Driffield, 1999; UNCTAD, 1999; Mirza, 1998; Buckley *et al.*, 1997; Dobson, 1993; Dunning, 1993; Wong, 1991; Halbach, 1989).

A study of Indian firms has shown that companies deploy much greater effort and resources when they are transferring technology to their Indian affiliates than when they were transferring it to either partially-owned subsidiaries or independent firms (Ramachandran, 1993; Teece, 1977). Hence, the organizational and strategic linkages that bind an innovator to a transferee, the greater the effort expended on the transfer to ensure that the full competitive value of the technology is harnessed by the transferee. Thus, multinational affiliates located in emerging economies will derive a greater competitive impact from technology transfers from their parent companies than the competitive impact derived by independent local firms that acquire technology either through outright purchase or by way of a license. We conjecture that that competitive impact extends to transfers of TQM and related practices.

A number of studies have viewed human resource and operations management practices, particularly by Japanese firms, as an integral aspect of the technology transfer process and have evaluated their impact on the competitive advantage of foreign affiliates. Japanese firms view human resource and operations management practices as key factors in their ability to create competitive advantage. In consequence, one would expect that when they enter foreign markets by way of direct investment through the creation of foreign affiliates, they will want to conserve and enhance the competitive advantage embedded in these practices by transferring these to their subsidiaries. This thesis has been largely found to be valid (Beechler and Yang, 1994; Doz and Prahalad, 1986; Ghoshal and Bartlett, 1990; Ishida, 1986; Kagono, 1985; Kenney and Florida, 1993; Koike, 1984; Kujawa, 1983; Nonako, 1988; Ouchi, 1981; Pucik, 1989; Shimada and Macduffie, 1987; Yoshida, 1985).

More recent studies have argued for a positive impact of Six-Sigma approach to TQ on the performance of micro, small and medium manufacturing and service

companies (Mondal *et al.*, 2010; Soti *et al.*, 2012; Desai, 2012; Kumaravadivel *et al.*, 2012; Chiarini, 2013; Lee and Chang, 2014).

## **PROPOSITIONS AND RESEARCH METHODOLOGY**

The literature review leads to the following propositions;

P1: Because of relatively low exposure to global competition, firms in emerging economies will be found to be deploying few of the benchmark TQ practices and tools that are the standard for firms in industrialized countries.

P2: Notwithstanding the low number of benchmark TQ practices and tools deployed by firms in emerging economies, the number of benchmark quality practices and tools deployed by these firms will increase with firm size.

P3: Notwithstanding the low number of benchmark TQ practices and tools deployed by firms in emerging economies, the number of benchmark quality practices and tools deployed by these firms will increase with their degree of participation in global markets through exports.

P4: Wholly and partially owned subsidiaries of MNEs that are operating in emerging economies will deploy a broader range of benchmark TQ practices and tools than domestic firms with no foreign affiliation.

P5: The number of quality improvement programs implemented by firms operating in emerging economies will increase with the perceived competitive intensity of the industry or industries in which they compete.

P6: The deployment of TQ practices and tools by firms in emerging economies will be expressly done in pursuit of higher quality as opposed to cost reduction.

The research targeted both global corporations operating in Trinidad and Tobago (T&T) through either wholly or partially owned subsidiaries and independent domestic firms with no foreign affiliation. Since very few domestic firms in T&T operate in global markets through wholly or partially owned subsidiaries, with the exception of a handful of firms that operate subsidiaries outside of T&T but within the Caribbean Community (CARICOM), the research anticipates a clear segregation of the sample of respondents into foreign firms competing in T&T through affiliates and domestic firms that are competing exclusively in T&T.

Because global corporations have long histories of competing in their competitively sophisticated global markets, they are expected to have much experience in adopting, refining and perfecting deployment of benchmark practices and tools of TQ. Accordingly, they will attempt to bolster the competitive position of their subsidiaries in emerging economies by transferring the technologies embodied in these benchmark practices and tools to these subsidiaries, both at inception and over time. The research conjectures that local firms domiciled in

these emerging markets, because they are in these markets, would have less access to technology embodied in these benchmark quality practices and tools, and would lag global firms in their implementation. Consequently, there should emerge a clear pattern of deployment of these practices and tools in firms operating in emerging economies where subsidiaries of global firms will be found to have deployed a broader range of these benchmark total quality practices and tools, while local domestic firms will have deployed and mastered fewer of these.

A survey was designed and distributed to firms that are members of both the American Chamber of Commerce of T&T and the T&T Chamber of Industry and Commerce. The American Chamber of Commerce of T&T was selected because a large percentage of foreign firms operating in T&T are subsidiaries of US global corporations. Moreover, most domestic firms that are large enough to be included in the study would be members of the Chamber of Industry and Commerce of T&T.

The survey instrument was designed for distribution through the internet, was deployed using Survey Monkey and was distributed to the target population of firms through the email addresses provided by the chambers of commerce referred to earlier. Once initial distribution was done, follow-up emails were sent to the entire population of firms in an effort to elicit as high a response rate as possible. After three weeks, the survey was closed and thirty-three (33) responses were received. Of these, four (4) were discarded because of too many incomplete responses. Data analysis was executed using the Survey Monkey analysis tool kit.

## **RESULTS AND DISCUSSION**

### **Results: Descriptive Data on the Sample of Firms:**

Tables 1 to 9 present descriptive data for the sample of firms and the perception of respondents of the intensity of competition in their industries and the key factors driving such competition. Tables 1 to 4 show that these firms are small, concentrated in the retail, banking, construction and manufacturing sectors and largely produce for the domestic market. Table 4 shows that fifteen firms are engaged in exports to CARICOM. Although Trinidad and Tobago is one of the major countries of CARICOM, the firms in our sample export only 1.9% of their sales to other CARICOM countries. The data seem to indicate that location of global corporations through affiliates in small, less technologically advanced emerging economies is done simply to exploit the local market for a particular product or service, and without the strategic mandates to use these affiliates to serve the global market, or even a broader regional market such as CARICOM.

The implication is that despite very good progress towards industrialization over the last two decades or so, T&T has still not developed to the point that global corporations are willing to confer World Product Mandates on their subsidiaries located there for serving a broader global or even regional market for a particular

product or service. Moreover, despite strong historical and economic links to the UK by way of the Commonwealth, exports to the UK are miniscule and, indeed, below the level of exports to the US. It may be that the integration of the UK into the EU has diminished or even reversed the advantage for exporting to the UK that the Commonwealth confers on member states such as T&T that were former colonies.

The data in Table 5 show that the sample is largely made up of domestic firms, with only four reporting that they were either wholly-owned or substantially-owned subsidiaries of foreign firms. This latter category was defined as subsidiaries where a foreign corporation held 60-89% of the outstanding voting stock of the company domiciled in the local market. Of the twenty-nine firms that reported on their ownership structure, twenty-four were either single entity domestic firms with no foreign ownership or wholly owned subsidiaries of domestic firms.

**Table 1**  
**Firm Size by Revenue**

<i>Firm revenue (million \$)</i>	<i>No. of firms</i>	<i>Percentage</i>
Less than \$20 million	12	42.9
\$20-\$40 million	2	7.1
\$40-\$60 million	3	10.7
Greater than \$60 million	11	39.2
Total	28	100.0

**Table 2**  
**Firm Size by Employment**

<i>Number of employees</i>	<i>No. of firms</i>	<i>Percentage</i>
Less than 50	10	34.5
51-100	3	10.3
101-150	3	10.3
151-250	4	13.7
Greater than 250	9	31.0
Total	29	100.0

**Table 3**  
**Distribution of Firms by Industry**

<i>Industry</i>	<i>No. of firms</i>	<i>Percentage</i>
Banking	3	10.3
Retail	5	17.2
Other services	11	37.9
Mining/extraction	1	3.4
Manufacturing	6	20.7
Construction	3	10.3
Other industries	5	17.2
Total	29	100.0



**Table 4**  
**Distribution of Firms by Export Activity**

<i>Domestic and export sales</i>	<i>No. of firms</i>	<i>Percentage</i>
Domestic	27	96.4
Exports to CARICOM	15	1.9
Exports to US	5	0.6
Exports to UK	2	0.3
Exports to other countries	3	0.8
Total	-	100.0

**Table 5**  
**Distribution of Firms by Ownership**

<i>Ownership structure</i>	<i>No. of firms</i>	<i>Percentage</i>
Wholly-owned subsidiary of foreign firm	3	10.3
Substantially foreign owned subsidiary of foreign firm	1	3.4
Wholly-owned subsidiary of domestic firm	6	20.7
Domestic company with minority foreign ownership	1	3.4
Domestic company with no foreign ownership	18	62.1
Total	29	100.0

### Results: Nature and Intensity of Competition

Tables 6 to 8 describe the perception of respondents as to the intensity of competition in their industries, the factors driving it and the key success factors of the industry. The data in Table 6 show that the vast majority of firms, sixteen out of twenty-three, view their industries as highly or severely competitive while an additional four rate their industries as moderately to highly competitive. Thus, twenty out of twenty-three firms view their industries as having a fairly high degree of competition. Most firms compete in the service industries which are typically intensely competitive due to very low entry barriers.

Table 7 provides data on the perception of respondents as to the factors driving the severity of competition. The two primary factors identified are 'ease of entry into the industry' reported by ten out of thirty-one firms and 'buyers have many options' reported by seventeen out of thirty-one firms. Note that the numbers do not add up to the sample size since respondents could choose more than one factor. Three factors, 'availability through imports', 'low local demand' and 'availability of cheap substitutes' appear to play a secondary role in driving competition intensity. The factors that are perceived to be the primary and secondary drivers of competition are all consistent with the nature of service industries in which most of the firms operate.

**Table 6**  
**Perception of Competition Intensity**

<i>Competition intensity</i>	<i>No. of firms</i>	<i>Percentage</i>
Weakly competitive	0	0.0
Moderately competitive	3	13.0
Moderately to Highly competitive	4	17.4
Highly or severely competitive	16	69.6
Total	23	100.0

Table 8 summarizes the perception of respondents as to the Key Success Factors (KSFs) of their industries and, once again, a similar clear pattern emerges where there appear to be three dominant KSFs and four secondary ones. The dominant KSFs are (1) 'Innovation in products, services, processes and systems', (2) 'ability to provide high levels of customer service' and (3) 'the ability to produce high quality'. The secondary KSFs are 'ability to keep costs low', 'ability to respond quickly to market conditions', 'high productivity' and 'high market share'. Although we expected innovation to be recognized by firms as a major means of successfully responding to the competitive exigencies of their industries, the fact that it was so overwhelmingly recognized to be so, identified by twenty-three of twenty-nine respondents, was surprising.

**Table 7**  
**Key Factors Driving Competition**

<i>Key factor</i>	<i>No. of firms</i>	<i>Percentage</i>
Easy to enter industry	10	41.7
Difficult to shut down operations	1	4.2
Buyers have many options	17	70.8
Suppliers control market	1	4.2
Government protection of national firms	2	8.3
Availability through imports	5	20.8
Low local market demand	5	20.8
Cheap substitutes	5	20.8
Other factors	1	4.2

In retrospect, this makes much strategic sense since innovation is itself a driver of performance on the other KSFs. Equally noteworthy is the fact that very few firms, 3 out of 31, view effective advertizing and promotion KSF in their industries. This is consistent with the view that what determines a firm's success in its industry is what it creates for customers through innovation, the execution of high levels of customer service and the creation of high quality products and services.

**Table 8**  
**Key Success Factors of Industry**

<i>Key success factor</i>	<i>No. of firms</i>	<i>Percentage</i>
Ability to keep costs low	11	47.8
Ability to produce high quality	15	65.2
Ability to provide high customer service	17	73.9
Ability to respond quickly to market conditions	11	47.8
Innovation in products, services, processes, systems	23	100.0
High productivity	9	39.1
High market share	7	30.4
Effective advertizing/promotion	3	13.0
Other	2	8.7

The research instrument was designed to find out the extent to which firms were consistent in matching their sought-after competitive advantage with the KSFs of their industries. Table 9 shows a very high level of consistency and very little variation between the dominant KSFs identified by respondents and the areas of their firms' competitive advantage. The primary areas of competitive advantage are 'ability to produce high quality', ability to provide high customer service' and 'innovation in products, services, processes and systems'. As is the case with the KSFs, four secondary areas of competitive advantage emerge from the data; 'ability to keep costs low', 'ability to respond quickly to market conditions', 'high productivity' and 'high market share'. This seems to indicate that firms in emerging economies still see TQ Systems as drivers of quality performance and not of productivity improvement or cost reduction.

The research instrument was also designed to find out whether firms were systematically matching action programs to create core competency with the KSFs

**Table 9**  
**Areas of Competitive Advantage**

<i>Area of competitive advantage</i>	<i>No. of firms</i>	<i>Percentage</i>
Ability to keep costs low	7	30.4
Ability to produce high quality	15	65.2
Ability to provide high customer service	13	56.5
Ability to respond quickly to market conditions	6	26.1
Innovation in products, services, processes, systems	18	78.3
High productivity	5	21.7
High market share	7	17.4
Effective advertizing/promotion	1	4.3
Other	1	4.3

identified by them, and the corresponding areas of competitive advantage targeted by their competitive strategies. The data in Table 10 show a high level of consistency with the primary KSFs being the dominant targets of the improvement programs implemented by firms over the last five years.

**Table 10**  
**Action or Improvement Programs Implemented Last five Years**

<i>Area of competitive advantage</i>	<i>No. of firms</i>	<i>Percentage</i>
Ability to keep costs low	7	30.4
Ability to produce high quality	15	65.2
Ability to provide high customer service	13	56.5
Ability to respond quickly to market conditions	6	26.1
Innovation in products, services, processes, systems	18	78.3
High productivity	5	21.7
High market share	7	17.4
Effective advertizing/promotion	1	4.3
Other	1	4.3

One can conclude that even if the sample is small, the level of consistency in the data means that one would be able to make reasonably conclusions about the propositions of the research.

## **RESULTS AND DISCUSSION: TOTAL QUALITY PRACTICES OF FIRMS**

Proposition 1 anticipates that the number of benchmark TQ practices and tools deployed by firms in emerging economies will be low. Tables 11, 12 and 13 provide evidence in support of the proposition. Table 11 shows that only 13 of 23 firms that had implemented some kind of TQ system or had adopted any of the 7 benchmark total quality approaches. These firms show a strong preference for the European model of TQM as opposed to the American or Japanese model, by choosing ISO Certification. Only 13 out of 29 firms had adopted an approach TQ embodied in a benchmark TQ system. Ten out of 23 firms that responded had implemented home-grown systems which, on further probing, proved to be far removed from the benchmark TQ systems. For example, none of the companies that reported having implemented home grown systems were found to have deployed any of the key practices and tools of a benchmark quality systems such as Quality Improvement Teams, defect measurement and reporting, quality cost measurement and reporting, Pareto analysis and quality cause effect analysis, to name only a few.

The research tried to assess the extent of deployment of the benchmark TQ practices and tools by having respondents rate the degree of implementation of

the key practices and tools of these benchmark total quality systems, and the results are summarized in Table 12. No more than five firms had completely implemented any or all of the key practices of benchmark quality systems such as Quality Improvement Teams, preventive maintenance, defect measurement and reporting, quality cost measurement and reporting, Pareto analysis and quality cause effect and analysis. No company had completely or partially implemented any of Statistical Process Control (SPC), Six-Sigma methods (DMAIC) and Taguchi methods. Only one had implemented Kaizen/Andon/Jidoka and only two implemented supplier certification.

The research tried to evaluate the extent of deployment of benchmark quality systems in these firms by eliciting responses on specific knowledge of the key concepts and tools of these benchmark total quality systems and the key factors

**Table 11**  
**Quality Management Systems Completely or Partially Implemented**

<i>Quality management system</i>	<i>No. of firms</i>	<i>Percentage</i>
TQM based on Deming philosophy	3	18.8
TQM based on Crosby philosophy	0	0
TQM based on Juran philosophy	1	6.3
TQM based on Baldrige Awards	0	0
TQM based on Ishikawa philosophy	0	0
Quality management based on Six-Sigma Methods	3	18.8
Quality management ISO Standards Certification	6	37.5
Other approaches to quality management	10	62.5
Total	23	100.0

**Table 12**  
**Quality Improvement Programs Have Implemented or Are Implementing**

<i>Improvement Program/Degree of Implementation</i>	<i>Complete</i>		<i>80% Complete</i>		<i>60% Complete</i>		<i>20-40% Complete</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Quality Improvement Teams	4	36.4	1	9.1	1	9.1	5	45.5
Preventive maintenance	5	45.5	1	9.1	1	9.1	4	36.4
Defect measurement reporting	3	37.5	0	0	2	25.0	3	37.5
Quality cost meas/report/anal	4	40.0	1	10.0	1	10.0	4	40.0
Pareto analysis	3	27.3	0	0	2	18.2	6	54.5
Quality cause effect analysis	3	23.1	0	0	4	30.8	6	46.1
Statistical process control (SPC)	0	0	0	0	3	50.0	3	50.0
Six-Sigma DMAIC/methods/anal	0	0	1	12.5	1	12.5	6	75.0
Taguchi methods	0	0	0	0	1	25.0	3	75.0
Kaizen/ Andon/Jidoka proc.	1	10.0	0	0	1	10.0	8	80.0
Supplier certification	2	25.0	0	0	1	12.5	5	62.5

that drive successful implementation. If indeed these systems have been deployed by these firms, it must show up as such knowledge, the related implementation KSFs and the appropriate deployment of quality teams. Tables 13, 14, 15, 16 and 17 summarize the results. Tables 13 and 14 seem to confirm our conjecture since the data show weak knowledge of the concepts and tools which point to weak deployment of the benchmark TQ systems by these firms. However, Table 15 seems to show that respondents possess good knowledge of the KSFs of implementation of benchmark TQ systems.

**Table 13**  
**Knowledge of Key Concepts of Quality Management Systems**

<i>Quality management system</i>	<i>FKC</i> <i>No.</i>	<i>FKC</i> <i>%</i>	<i>STKC</i> <i>No.</i>	<i>STKC</i> <i>%</i>	<i>DKN</i> <i>No.</i>	<i>DKN</i> <i>%</i>	<i>NR</i> <i>No.</i>	<i>NR</i> <i>%</i>
TQM based on Deming philosophy	2	6.5	1	3.2	5	16.1	24	77.4
TQM based on Crosby philosophy	0	0	1	3.2	4	12.9	26	83.9
TQM based on Baldrige Awards	0	0	0	0	5	16.1	26	83.9
Quality management Six-Sigma	2	6.5	1	3.2	3	9.7	25	80.6
Quality management ISO Standards	5	16.1	4	12.9	3	9.7	22	71.0
Means	1.8	5.8	1.4	4.5	4	12.9	24.6	79.4

Legend: FKC, First key concept; STKC, second and third key concept

**Table 14**  
**Knowledge of Key Tools of Quality Management Systems Completely or Partially Implemented**

<i>Quality management system</i>	<i>FKT</i> <i>No.</i>	<i>FKT</i> <i>%</i>	<i>STKT</i> <i>No.</i>	<i>STKT</i> <i>%</i>	<i>DKN</i> <i>No.</i>	<i>DKN</i> <i>%</i>	<i>NR</i> <i>No.</i>	<i>NR</i> <i>%</i>
TQM based on Deming philosophy	2	6.5	0	0	5	16.1	24	77.4
TQM based on Crosby philosophy	0	0	0	0	6	19.4	25	80.6
TQM based on Baldrige Awards	0	0	0	0	6	19.4	25	80.6
Quality management on Six-Sigma	1	3.2	1	3.2	5	16.1	24	77.4
Quality management ISO Standards	4	12.9	1	3.2	4	12.9	23	74.2
Mean	1.4	3.2	0.4	1.3	5.2	16.8	24.2	78.1

Legend: FKT, First key tool; STKT, Second and third key tools

The factors that drive successful implementation of these systems identified by respondents as important or critically important, that is, human resource training, use of a knowledgeable project manager, provision of adequate implementation time, availability of a strong project champion, top management support and involvement, provision of clear goals and effective communication are well supported by the literature (Etienne, 2002; Garvin, 1991; Ishikawa; Juran, 1969; Etienne-Hamilton, 1993). Table 16 and 17 show the results on the deployment of QITs by the firms that report that they had completely or substantially

implemented a total quality system. The participation approach generally conforms to what is common practice in firms that have implemented a TQ system in that some firms make participation mandatory while others allow it to be voluntary. We know of benchmark TQ system where participation is mandatory for some employees and voluntary for others in the same firm.

**Table 15**  
**Factors Determining Successful Implementation of Total Quality Management System**

<i>Factor \ Importance</i>	<i>CI</i>		<i>VI</i>		<i>IM</i>		<i>MI</i>		<i>NI</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Adequate budget	2	13.3	5	33.3	5	33.3	2	13.3	1	6.7
Avail. external consultants	1	6.7	6	40.0	3	20.0	3	20.0	0	0
Avail. internal consultants	3	20.0	5	33.3	3	20.0	3	20.0	1	6.7
Human resource training	6	40.0	4	26.7	4	26.7	1	6.7	0	0
Knowledgeable project manager	4	26.7	7	46.7	2	13.3	1	6.7	1	6.7
Adequate implementation time	5	33.3	4	26.7	5	33.3	1	6.7	0	0
Strong project champion	6	40.0	4	26.7	3	20.0	1	6.7	0	0
Top MGT support/involvement	10	66.7	5	33.3	0	0	0	0	0	0
Provision of clear goals	6	40.0	8	53.3	1	6.7	0	0	0	0
No-layoff policy	0	0	0	0	4	26.7	7	46.7	4	26.7
Adequate incentives to employees	1	6.7	3	20.0	5	33.3	5	33.3	1	6.7
Effective communication	7	46.7	7	46.7	1	6.7	0	0	0	0
Use Quality Improvement Teams	6	40.0	3	20.0	4	26.7	2	13.3	0	0

Legend: CI, critically important; VI, very important; IM, important; MI, moderately important; NI, not important

Proposition 2 predicts that firm size influences the number of the benchmark quality practices and tools deployed by firms in emerging markets. To isolate this relationship, we searched within the sub-sample of firms that have implemented some benchmark quality practices and tools and noted how many of these firms could be classified as small, medium or large on the basis of employment, and taking into account the fact that T&T is a very small economy. The data in Table 18 provide good support for proposition 2. Of the responding firms, 13 were classified as small, with employment of less than 100 employees and only one (1) of these firms, or 7.7%, had implemented any type of TQ System. Additionally, only one (1) firm had implemented one (1) quality improvement program. There was only 1 medium-sized firm in the category of 101-200 employees, and it had implemented one (1) TQ system and three (3) quality improvement programs. By contrast, there were twelve (12) firms classified as large with employment greater than 200, and six (6) of those firms had implemented some form of TQ system, while the subgroup as a whole had implemented a total of fourteen (14) improvement programs, with a mean of 2.33 improvement programs per firm. Thus, there appears to be a strong

tendency for larger firms to implement both TQ Systems and the improvement programs that are a necessary component of these.

**Table 16**  
**Quality Improvement Teams: Participation Approach**

<i>Participation approach</i>	<i>Number</i>	<i>Percentage</i>
Voluntary	2	18.2
Mandatory	4	36.4
Mixed voluntary/mandatory	5	45.5
Totals	11	100.0

**Table 17**  
**Time Devoted to Improvement Team Activity**

<i>Minutes/week</i>	<i>Number</i>	<i>Percentage</i>
15	1	9.1
30	2	18.2
60 (1hr.)	5	45.5
>1hr.	3	27.3

**Table 18**  
**Firm Size and the Implementation of Total Quality Systems and Improvement Programs**

<i>CompanySize</i>	<i>No. of Companies</i>	<i>No. Implemented Quality System</i>	<i>Total Improvement Progs. Implemented</i>	<i>Mean No. Improvement Progs.</i>
0-51	10	0	0	0
51-100	3	1	1	0.3
101-150	0	0	0	0
151-200	1	1	3	3.0
201-250	3	1	11	3.7
>250	9	5	14	1.6

Proposition 3 predicts that the number of the benchmark quality practices and tools deployed by these firms will increase with the degree of participation of these firms in global markets through exports. We measured export activity by the percentage of a firm's total revenues that were exported to markets outside of CARICOM. The data do not allow a systematic evaluation of this proposition since exports constitute a miniscule percentage of sales for the sample of firms. As shown in Table 4, exports to non-CARICOM countries account for a mere 1.7% of the total sales of the sample of firms. Indeed, the very low level of export activity may explain the small number of firms that have implemented benchmark total quality systems, the partial knowledge of the core concepts and tools of these systems, and the predominance of home-grown quality systems as opposed to globally recognized benchmark ones observed in the sample as a whole.



Proposition 4 anticipates that wholly and partially owned subsidiaries of global corporations that are operating in emerging economies will deploy a broader range of benchmark TQ practices and tools than domestic firms with no foreign affiliation. The data to evaluate this proposition are shown in Table 19 which provides some support for the proposition. Only one firm reported significant foreign ownership, Majority-owned Subsidiary of a Foreign Corporation (MSFC) and it had implemented a TQ System and eleven (11) associated improvement programs. There were four (4) Wholly-owned Subsidiaries of Domestic Corporations (WSDC) and only one, that is 25%, had implemented a TQ System and seven (7) related improvement programs. Of the nineteen (19) Domestic Corporations with no Foreign Ownership (DCNFO), three (3) or 16% had implemented any type of TQ System and, collectively, eleven (11) associated improvement programs. The deployment of both TQ Systems and associated improvement programs by domestically owned firms is very low, particularly when one considers that these systems embody benchmark practices that are an integral part of the response of firms to global competition for better of three decades.

**Table 19**  
**Firm Foreign Affiliation and Implementation of TQ Systems and Improvement Programs**

<i>Foreign Affiliation</i>	<i>No. of Firms</i>	<i>No. Implemented TQ System</i>	<i>No. Total Quality Improvement Programs</i>	<i>Mean Total Improvement Programs</i>
WSFC	4	0	0	0
MSFC	1	1	11	11.0
WSDC	4	1	7	1.8
DCNFO	19	3	11	0.6

Proposition 5 states that the number quality improvement programs implemented by firms will increase with the perceived competition intensity of the industry in which these firms compete. Table 20 summarizes the results and the data appear not to provide support for the proposition. Moreover, there were four (4) firms that reported that they were operating in severely competitive markets, yet none of these firms had implemented either a benchmark TQ System or any of the associated improvement programs.

Proposition 6 anticipates that deployment of the practices and tools embodied in benchmark TQ systems by firms in emerging economies will be expressly done in the pursuit of higher quality as opposed to cost reduction. By implication, the deployment of these systems will be in pursuit of specific quality advantage instead of overall competitive advantage. The data in Tables 21 and 22 provide strong validation of proposition 6. Table 21 shows 53.8% of respondents are of the view that the TQ system implemented by their companies had high impact on overall competitive and quality advantage, while 38.5%, 54.5% and 46.1%, thought that

these systems had high impact on overall speed of response, overall customer satisfaction and overall product/service differentiation, respectively. Only one firm, or 7.7% of respondents was of the view that the quality system deployed by their firm had a high impact on overall cost advantage.

The fact that a significant percentage of firms also deploy these Total Quality Systems specifically in the pursuit of overall speed of response and product/service differentiation is an unexpected result. This seems to imply that firms view competitive requirements such as responsiveness and product/service differentiation, and not cost, as legitimate dimensions of overall quality. Either these firms have not been influenced by Lean Thinking or they hold to the traditional view of quality where the pursuit of lean is incompatible with quality improvement, or that there is little or no synergy between the two approaches.

**Table 20**  
**Perceived Competition Intensity and the Implementation of Total Quality Systems and Improvement Programs**

<i>Competition Intensity</i>	<i>No. of Firms</i>	<i>No. Implemented TQ System</i>	<i>No. Total Quality Improvement Programs</i>	<i>Mean Total Improvement Programs</i>
MODCOMP	3	1	11	3.7
MTHCOMP	3	0	0	0
HICOMP	9	7	18	2.0
SECCOMP	4	0	0	0

**Table 21**  
**Overall Impact of Implemented Quality Systems and Quality Improvement Programs**

<i>Impact on</i>	<i>No Impact</i>		<i>Little Impact</i>		<i>Moderate Impact</i>		<i>High Impact</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Overall competitive advantage	0	0	1	7.6	5	38.5	7	53.8
Overall quality advantage	0	0	0	0	6	46.2	7	53.8
Overall cost advantage	0	0	5	38.5	7	53.8	1	7.7
Overall speed of response to market/customer requirements	0	0	2	15.4	6	46.2	5	38.5
Overall customer satisfaction	0	0	0	0	6	46.2	7	54.5
Product/service differentiation	1	7.7	1	7.7	5	38.5	6	46.1

We use the data in Table 22 to assess the impact of the implemented TQ systems on specific elements of performance. A strong majority and sizeable minority of respondents are of the view that the implementation of these systems had a high

or very high impact on reduction in defects and customer complaints, and improvement in employee satisfaction and profit margins. Significant minorities of respondents expressed the view that these systems had high or very high impact on reduction in non-quality costs, returns from customers and rework costs and improvement in productivity. There is some inconsistency between the fact that respondents do not view these systems as contributing to overall cost advantage but think that these same systems have high to very high impact on productivity improvement.

**Table 22**  
**Specific Impact of Implemented Quality Systems and Quality Improvement Programs**

<i>Impact on</i>	<i>No Impact</i>		<i>Little Impact</i>		<i>Moderate Impact</i>		<i>High/V. High Impact</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Defect reduction	1	7.6	0	0	5	38.5	7	53.8
Reduction in customer complaints	1	7.6	0	0	4	30.8	8	61.5
Reduction in non-quality costs	1	7.6	2	15.4	6	46.2	4	30.8
Reduction returns from customers	0	0	1	7.6	7	53.8	5	38.5
Reduction in warranty costs	4	33.3	1	8.3	6	50.0	1	8.3
Reduction in rework costs	1	7.6	1	7.6	6	46.2	5	38.5
Productivity improvement	0	0	1	7.6	6	46.2	6	46.2
Employee satisfaction	0	0	0	0	6	46.2	7	53.8
Improved market share	0	0	1	8.3	8	66.7	3	25.0
Improved profitability	0	0	1	8.3	6	50.0	5	41.7
Improved profit margins	0	0	2	15.4	4	30.8	7	53.8

Moreover, notwithstanding the high or very high impact that the implementation of these systems had on overall competitive, quality, and responsiveness advantage, and on improvement in productivity, employee satisfaction and some key elements of cost, few respondents were of the view that improved market share resulted from the implementation of benchmark TQ systems. The explanation may lie in the fact that respondents are of the view that their companies must make these improvements just to protect their existing market positions and prevent them from deteriorating. What this seems to be saying is that failure to make these improvements would result in deterioration in a company's market position, but making them will not significantly improve that market position. Moreover, it may be that improvements in market share are the result of sustained, long term improvements in quality and cost. It may also be that compared to firms in advanced, mature economies, the companies studied here have not implemented the benchmark quality systems and sustained their related improvements long enough for these to have significant impact on their market share positions.

## IMPLICATIONS OF THE RESEARCH

### Implications for Management Research and Practice

Four of the six propositions advanced by this research were supported by the available data. Firms in the emerging economy studied were found to have very weak deployment of the global benchmark total quality practices (P1). Firm size and global company affiliation appear to influence the number of benchmark quality practices deployed by firms (P2 and P4), but neither management's perception of competition intensity (P5) nor firm exposure to global markets by way of export activity (P3) appears to exert any influence on the degree of deployment of total quality practices. The relationship between export activity and deployment of total quality practices was not confirmed because of the very low level of exports undertaken by the sample of firms. The data did reveal a tendency for firms in emerging economies to deploy total quality practices strictly in the pursuit of improved quality and not in the reduction of cost as well (P6). Thus, one can state that lean systems or lean thinking have not as yet begun to be deployed as valid competitive strategies by firms in emerging economies.

That the production and delivery of high quality products and services is critical to the success of companies in a competitive industry is a well established managerial principle. Decades of research and management practice in leading-edge companies in all advanced industrialized countries have demonstrated that superior financial and market performance depend crucially on the capability of a company to meet and surpass customer expectations.

The state-of-the-art in strategic quality management has been encoded in a few widely accepted, broadly disseminated, benchmark quality systems, whose core principles are available to any company, anywhere in the global economy. It is thus surprising that so few companies in an open and dynamic emerging economy like T&T have deployed even a modest version of a globally accepted benchmark quality system. This has to be interpreted as a weakness in management because, ultimately, top management is completely responsible for creating and nurturing the quality culture and value system of a company, of relating it to the overall corporate culture, and of leveraging that culture to build and reinforce core quality competency. If so few companies have deployed benchmark TQ systems when these are known and widely accessible globally, it means that superior quality is not completely integrated into the corporate vision and mission that is driving a company and, as a direct consequence, that company has not learned the art and science of listening to the voice of the customer (Etienne-Hamilton, 1994).

Most respondents perceive that they are competing in markets that have a fairly high degree of competition. It is a well established maxim of modern

management that quality is a key driver of firm performance and a critical weapon for responding effectively to competition. Yet, only a small percentage of the firms surveyed had implemented even a rudimentary total quality system. The implication is that managements in the emerging economy studied are losing out in a rather important way on an opportunity to create greater value for customers, greater wealth for the society and greater shareholder value.

In advanced industrialized economies, quality systems now have a dual quality-cost focus. These systems are increasingly being designed, implemented and systematically improved to simultaneously pursue both high quality and low cost through lean thinking. The few companies in the study that have deployed some semblance of a quality system do so in the single-minded, pursuit of better quality and do not see quality systems as also a driver of lower cost. The absence of a rigorously dual quality and cost focus may be the result of overall weakness in the deployment of total quality systems, since the cost focus of these systems is a natural progression and maturation of quality management within a firm (Crosby, xxxxxx; Etienne-Hamilton, 1994; Womack and Jones, xxxxxx). Clearly, if companies do not have TQ systems, they cannot be expected to have implemented six-sigma methods, and lean thinking would be foreign to their managerial philosophy, culture and value systems. Moreover, these same companies cannot be expected to have deployed any semblance of a Hoshin process, nor andon mechanism or kaizen processes.

Firm size does appear to influence implementation of quality systems, but the overall rate of deployment is so low that it is hardly a differentiating factor between small and large firms. However, even at this very low level of overall quality system implementation, large local firms did relatively poorly in the deployment of the benchmark TQ systems. This may be one factor slowing down the rate of adoption of these systems because in the normal scheme of diffusion of management technology large firms would serve as gatekeepers to the local market to scan the global environment. These large firms would identify, evaluate and select new technologies, dovetail these to the requirements of the local market, and incentivize their small local suppliers, subcontractors and even customer firms to adopt them as well. With time, this would increase the level of local understanding, knowledge, and core competency to broaden the deployment of these quality systems to the vast majority of local firms, large and small, foreign-owned or domestic-owned. This gatekeeper function can be equally performed by domestic-owned firms and foreign-owned ones because, as the research has shown, although foreign-owned firms are somewhat ahead of the local ones in the deployment of total quality practices and systems, there is not a huge difference between these two classes of firms.

The research has uncovered a clear weakness in local knowledge of the key quality philosophies and practices that are accepted worldwide as integral aspects

of the benchmark quality systems. This shows up as very weak or no familiarity with the work of those widely regarded as the giants of the modern TQ Movement such as Deming, Juran, Crosby and the integration of these works of these pioneers into the Baldrige. There is little or no familiarity with tools, concepts and principles of the science of variation that are at the core of the approaches espoused by these pioneers. As a case in point, only one firm had implemented what can be referred to as a rudimentary system of Statistical Process Control, SPC, a set of tools that was invented over eighty (80) years ago, which has been systematically refined, expanded and perfected since inception, and which is now deployed in advanced economies by every major firm, global, national or local and irrespective of the type and extent of competitive advantage sought by these firms.

The results obtained make the case for making extensive education in TQ practices and systems, for all employees and all levels of the organizations, a strategic priority for firms in the emerging economy that is the focus of this research.

### **Public Policy Implications**

This research points to a set of key public policy implications. The results of this research have shown that the high intensity of competition perceived by firms is not driving top managements in emerging economies to deploy state-of-the-art, benchmark total quality systems as quickly and thoroughly as one would expect them to. We conjecture that this may be due to the following factors; Weak consumer protection legal framework or laws that are not being vigorously and/or successfully enforced; Product liability penalties that are not high enough to discourage the production and delivery of inferior quality products and services; Weak civil litigation framework that prevents customers that have been harmed by inferior products and services from vigorously pursuing remedy in the courts; Weak or absence of regulatory agencies such as what exists in the US in the form of the Environmental Protection Agency, EPA, Consumer Protection Agency and the National Automobile and Highway Safety Agency, which have the power to force companies to recall inferior quality products, or to bar them from placing defective products on the market. If our conjecture is correct, it would mean that the cost of placing inferior products and services on the market is relatively low, and companies make a calculated tradeoff to bear the potential cost of inferior product quality instead of investing heavily in benchmark total quality systems to avoid that potential cost.

Government has the primary responsibility for the creation or reinforcement of the legislative, regulatory and law enforcement framework that change the tradeoff that managers perceive between quality prevention and external failure costs. By government increasing consumer protection and imposing severe penalties for producing inferior quality products that have been put on the market, companies will determine that it is more profitable and less costly to prevent

defective products than to absorb the cost of external failure. That will in turn make it easier for top management to justify high investment in quality assurance and improvement to avoid potentially crippling product liability and litigation costs. The inevitable consequence is that companies will increase investment in Total Quality Management education that will also stimulate the adoption of benchmark Total Quality Management Systems and practices.

Governments can also play a more proactive role in stimulating education and training in total quality by designing and implementing appropriate fiscal regimes that give companies the incentive to invest in their own internal educational programs. The impact of these internal educational programs can also be amplified by public investment in quality education at the secondary and post-secondary levels, particularly at the technical college level. These educational programs must be viewed as integral to and necessary for the promotion of economic, industrial and technological development. They have become indispensable for competing in the global economy.

## CONCLUSION

Over the last six decades or so, management theory and practice have created and refined a well articulated set of quality management principles, concepts, tools and methods that have been encoded in the form of a few widely accepted and tested benchmark TQ systems. These systems, in one form or another, have been deployed by industries and companies in the technologically advanced countries, and have become a pillar of the creation and delivery unprecedented levels of quality and value to customers, and to create sustainable competitive advantage for the companies that deploy them. Without doubt, these benchmark total quality systems are an integral part of the superior technology harnessed by advanced industrialized societies to produce very high standards of living. But this research has shown that the mastery of that quality technology has been absorbed by very few of the companies in the emerging economy studied, whether they be affiliates of global corporations or local corporations with little or no global company affiliation.

Finding out why progress is so slow on the part of firms located or domiciled in the emerging economy studied in harnessing the technology embedded in these TQM systems is beyond the scope of this research. However, finding out the causes is a critical management development priority for governments in similar emerging economies. Accelerating the rate of deployment of these TQ systems and practices by individual firms must be seen by their top managements as a key competitive and strategic mission to be aggressively pursued in the short and medium term. Currently, so few firms have deployed even a basic version of these systems that companies that are first or early in harnessing them will recoup substantial first-mover advantages.

### *References*

- Almeida, Paul and Phene Anupama, (2004), Subsidiaries and Knowledge Creation: The Influence of the MNC and Host Country on Innovation, *Strategic Management Journal*, Vol. 25, pp. 847-864.
- Birkinshaw, L., (2000), MNE Strategy and Organization: An Internal Market Perspective, Chap. 3 in Hood, N. and S. Young (2000). *The Globalization of Multinational Enterprise Activity and Economic Development*, (Basingstake, MacMillan Press, Ltd.).
- Bresman, H., L. Birkinshaw and R. Nobel, (1999), Knowledge Transfer in International Acquisitions, *Journal of International Business Studies*, Vol. 30, No. 3, pp. 439-462.
- Buckley, P. J., J. Campos, H. Mirza and E. White, (1997), *The International Transfer of Technology by Small Firms* (London, MacMillan).
- Chiarini, Andrea, (2013), Differences between Six-Sigma in Manufacturing and the Service Industry, *International Journal of Productivity and Quality Management*, Vol. 12, No. 3, 2013, pp. 345-360.
- Crone, M., and S. Roper, (2001), Local Learning from Multinational Plants: Knowledge Transfer in the Supply Chain, *Regional Studies*, Vol. 35, No. 6, pp. 535-548.
- Deming, W. E. (1986). *Out of Crisis* (Cambridge: MIT University Press).
- Desai, Darshak, A., (2012), Quality and Productivity Improvement through Six-Sigma in Foundry Industry, *International Journal of Productivity and Quality Management*, Vol. 9, no. 2, 2012, pp. 258-280.
- Dobson, Wendy, (1993), *Japan in East Asia: Trading and Investment Strategies* (Singapore: Institute of South Asia Studies).
- Doz, Yves and C. K. Prahalad, (1986), Controlled Variety: A Challenge for Human Resource Management in the MNE, *Human Resource Management*, Vol. 1, pp. 55-71.
- Driffield, N., and A. H. M. Noor, (1999), Foreign Direct Investment and Local Input Linkages in Malaysia, *Transnational Corporations*, Vol. 8, No. 3, pp. 1-25.
- Dunning, J. H., (1993), *Multinationals and the Global Economy* (London: Addison Wesley).
- Etienne, Eisenhower, C., (2002), "The Global Strategies of Service Businesses". Proceedings, ASAC, 30<sup>th</sup> Annual Conference Proceedings, Winnipeg, Manitoba, Canada, May.
- (2002), *Six-Sigma in Service Businesses: Barriers to Implementation and How to Overcome Them*, Administrative Sciences Association of Canada (ASAC), 30<sup>th</sup> Annual Conference Proceedings, Winnipeg, Manitoba, Canada, May.
- (2005), "Supply Chain Responsiveness and the Inventory Illusion". *Supply Chain Forum: An International Journal*, Vol. 6, no. 1, 2005.
- (2005), "Synergy, Tradeoff and the Dimensions of Supply Chain Responsiveness". *International Journal of Applied Operations Management*, Vol. 1, no. 1, 2005.
- (2005), "The Implementation Challenges of Six-Sigma in Service Businesses", *International Journal of Applied Quality Management*, Vol. 2, no. 1.
- (2008), "Comparative Quality System Analysis and Evaluation Using the Six-Sigma Benchmark: Evidence from Two Manufacturing Industry Case Studies". *Int. Journal of Six Sigma and Competitive Advantage (IJSSCA)*, Vol. 4, No. 4, pp. 409-433.



- (2008), “Interactions between Product R&D and Process Technology”, in *The Strategy of managing Technology and Innovation*, Millson, Murray, R. and David Wilemon, editors (Upper Saddle River, NJ: Prentice Hall), pp. 399-406.
- (2009), “The Analysis and Evaluation of a Quality System Using the Six-Sigma Benchmark: Evidence for the Robustness of Six-Sigma Processes”. *Int. Journal of Productivity and Quality Management*, Vol. 4, No. 2, pp. 178-198.
- (2009), “Empirical Verification of a Mathematical Model for Measuring the Required Reduction in Process Variation to Achieve Six-Sigma Quality Benchmarks”. *Int. Journal of Six Sigma and Competitive Advantage*, Vol. 5, No. 4, pp. 359-379.
- (2009), “Marketing Differentiation Synergies of High-Velocity Inventory Turns”. *Global Review of Business and Economic Research*, Vol. 5, No. 1, (2009), pp. 21-43.
- (2010), Comparative Service Quality System Analysis Using the Six-Sigma Benchmark: Evaluation of the Taguchi Robustness of Service Industry Processes, *Int. Journal of Lean Six Sigma*, Vol. 1, Iss. 4, pp. 335-337.
- (2011), “Sigma Performance and Process Quality Robustness: Analytical Results and Managerial Implications”. Submitted for Publication.
- (2011), “Taguchi Quality Specification Categories and the Computation of Six-Sigma Metrics: Analytical and Service Industry Anomalies and Their Managerial Implications”. *Int. Journal of Six-Sigma and Competitive Advantage (IJSSCA)*, Vol. 6, No. 4.
- Etienne-Hamilton, E., C., (1994), *Operations Strategies for Competitive Advantage* (Fort Worth, TX: The Dryden Press, International Thompson Publications).
- Friedman, Thomas, (2005), *The World Is Flat* (New York, NY: Farrar, Straus and Giroux).
- Garvin, D. A. (1991), How the Baldrige Award really works. *Harvard Business Review* 69 (Nov/Dec): 80-94.
- Ghoshal, Sumantra and Christopher Bartlett, (1990), The Multinational Corporation as an Interorganizational Network, *Academy of Management Review*, Vol. 4, pp. 603-625.
- Giroud, Axele, (2002), What Explains Knowledge Transfer to Local Suppliers, Working Paper (02/28), Bradford University School of Management.
- Halbach, A. J., (1989), Multinationals and Subcontracting in The Third World: A Study of Inter-Industrial Linkages, Working Paper No. 58, MNEs Program, ILO, International Labor Office, Geneva.
- Hedlund, G., (1994), A Model of Knowledge Management and N-form Corporation. *Strategic Management Journal*, Summer Special Issue 15: 73-79.
- Hermosilla, Jarvier, Carrillo and Pablo Chafra Martinez, (2003), Technology Transfer and Sustainable Development in Emerging Economies: The Problem of Technology Lock-in, IE Working Paper (WP01/03).
- Ishida, Hideo, (1986), Transferability of Japanese Human Resource Management Abroad, *Human Resource Management*, Spring 1, pp. 103-120.
- Ishikawa, Kaoru, (1981), *What Is Total Quality Control? The Japanese Way* (Upper Saddle River, New Jersey: Prentice Hall).
- Ismail, M. N., (1999), Foreign Firms and National Technology Upgrading: The Electronics Industry in Malaysia, chap. 2 in K. S. Jomo, G. Felker and R. Rasiah, *Industrial Technology Development in Malaysia: Industry and Firms Studies* (London, New York, Routledge).

- Juran, J. M. (1969), *Managerial Breakthrough: A New Concept of Manager and Job* (Cambridge: McGraw-Hill).
- Kagano, Tadao, Ikujiro Nonaka, Kiyoshi Sakakibara and Akihiro Okumura, (1985), *Strategic vs. Evolutionary Management: A U.S.-Japan Comparison of Strategy and Organization*. New York: North-Holland.
- Koike, Kazuo, (1984), *Skill Formation Systems in the U.S. and Japan: A Comparative Study*. In Masahiko Aoki, editor, *The Economic Analysis of the Japanese firm*, pp. 47-75. New York: Elsevier Science Publishers B.V. (North-Holland).
- Kujawa, Duane, (1983), *Technology Strategy and industrial Relations: Case Studies of Japanese Multinationals in the U.S.*, *Journal of International Business Studies*, Vol. 14, No. 3, 9-22.
- Kumaravadivel, A., U. Natarajan and A. Noorul Haq, (2012), *Performance Measurement and Determination of Optimal Base Stock Level Inventory System to Improve Customer Satisfaction in the Six-Sigma Environment*, *International Journal of Productivity and Quality Management*, Vol. 9, no. 3, 2012, pp. 382-403.
- Lee, Ming-Chang and To Chang, (2012), *Combination of Theory of Constraints, Root Cause Analysis and Six-Sigma for Quality Improvement Framework*, *International Journal of Productivity and Quality Management*, Vol. 10, no. 4, 2012, pp. 447-463.
- Luo, Yadong and Rosalie, Tung, (2007), *International Expansion of Emerging Market Enterprises: A Springboard Perspective*, *Journal of International Business Studies*, Vol. 38, pp. 481-498.
- Mahajan, V., S. Sharma and R. Netemeyer, (1992), *Should We expect the Baldrige to Predict a Company's Financial Success? Lessons from the Financial Performance of Successful Firms, Technological Forecasting and Social Change*, Vol. 42, pp. 325-334.
- Martin, Kenney and Richard Florida, (1993), *Beyond Mass Production: The Japanese System and Its Transfer to the U.S.* New York: Oxford Press.
- Meyer, Klaus, E., (2004), *Perspectives on MNEs in Emerging Economies*, *Journal of International Business Studies*, Vol. 35, pp. 259-276.
- Mondal, S., C., P. K. ray, and J. Maiti, (2014), *Modelling Robustness for Manufacturing Processes: A Critical Review*, *International Journal of Production Research*, Vol. 52, Issue 2, pp. 521-538.
- Mondal, S., C., J. Maiti and P. K. Ray, 2010. *Development of a Measurement Metric for Manufacturing Process Robustness*, *International Journal of Productivity and Quality Management*, Vol. 6, no. 2, pp. 156-181.
- National Institute of Standards and Technology. (1995), *Quality management proves to be a sound investment*. Press Release [On-line] 95-05 (February). Internet. Available [gopher://gopherserver.nist.gov:7346/0/docs/releases/n95-05.rel](http://gopher://gopherserver.nist.gov:7346/0/docs/releases/n95-05.rel)
- National Institute of Standards and Technology. (1996), *Malcolm Baldrige National Quality Award 1996 award Criteria*(Washington D.C.: U.S. Government Printing Office).
- National Institute of Standards and Technology. (1996), *Quality stocks yield big payoff*. Press Release [On-line] 96-05 (February). Internet. Available [www.nist.gov/qualstok.htm](http://www.nist.gov/qualstok.htm)
- National Institute of Standards and Technology. (1997), *Stock study shows quality pays*. Press Release [On-line] 97-04 (February). Internet. Available [gopher://gopherserver.nist.gov:7346/0/docs/releases/n97-04.rel](http://gopher://gopherserver.nist.gov:7346/0/docs/releases/n97-04.rel).

- Nonaka, Ikujiro, (1988), Self-renewal of the Japanese Firm and Human Resource Strategy, *Human Resource Management*, Vol. 1, 45-62.
- Ohno, Taiichi, (1988), *Toyota Production System: Beyond Large-Scale Production* (New York, NY: Productivity Press).
- Ouchi, William, (1981), *Theory Z: How American Business Can Meet the Japanese Challenge*, Reading, Mass.: Addison-Wesley.
- Perlmutter, H. (1969), The Tortuous Evolution of the Multinational Corporation, *Columbia Journal of World Business*, 4: 9-18.
- Powell, Thomas, C., (1995), (Jan). Total Quality Management as Competitive Advantage, *Strategic Management Journal*, Vol. 16, No. 1, 15-37.
- Ramchadran, Vijaya, (1993), (November). Firm Ownership and Investment in Human Capital, *The Review of Economics and Statistics*, Vol. 75, No. 4, pp. 664-670.
- Reed, Richard, David J. Lemak, and Neal P. Mero, (2000), Total Quality Management and Sustainable Competitive Advantage, *Journal of Quality Management*, Vol. 5, 5-26.
- Schilit, W. K., (1994), The Case Against Quality, *Business Horizons* (November/December): 27-34.
- Soti, Ashish, Ravi Shankar and O. P. Kaushal, (2012), Six-Sigma in Manufacturing for Micro, Small and Medium Enterprises in India, *International Journal of Productivity and Quality Management*, Vol. 9, no. 1, pp. 61-81.
- Teece, David, J., (1977), Technology Transfer by Multinational Firms: The Resource Cost of Transferring Technological Know-How, *Economic Journal*, 87, pp. 242-261.
- UNCTAD, (1999), *World Investment Report: FDI and the Challenges of Development*, United Nations, Geneva.
- UNCTAD, (2001), *World Investment Report: Promoting Linkages*, United Nations, Geneva.
- Wong, P. K., (1991), *Technology Development through Subcontracting Linkages: A Case Study*, Faculty of Business Administration, National University of Singapore, (A Study for the Asian Production Organization).