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# Suppliers' Quality Practices in Six Countries and Regions: China, Taiwan, India, Korea, Mexico, and Costa Rica

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# SUPPLIERS' QUALITY PRACTICES IN SIX COUNTRIES: CHINA, TAIWAN, INDIA, KOREA, MEXICO AND COSTA RICA

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## ABSTRACT:

In this paper we report suppliers' quality practices in six countries —China, Taiwan, India, Korea, Mexico and Costa Rica. The practices include suppliers' education, technical assistances, involvement in product development and bng-term relationships. India, China, Korea and Taiwan are four major countries in Asia that have shown substantial economic growth over the years. Mexico is a member of NAFTA. Cost Rica is a growing country in Central America. Differences in terms of quality results are explored as well. In general, supplier quality practices are related to the overall quality management practices. Supplier quality practices affect the internal and external quality results. However, the length of quality experience in the organizations turns out to be a discriminating factor for choosing particular supplier quality practices. The implication of these results confirms that supplier quality practices are important practices for both internal and external quality results.

## INTRODUCTION:

Many cases studies and other empirical research on quality practices have been conducted over the years [4] [5] [6] [7]. Through theoretical and empirical analyses these researchers have provided better understanding of quality practices. One of the important practices identified has been supplier quality practices. Increasingly, supply chain management includes a worldwide network of suppliers. Effective supply chain management includes strategic, operational and tactical decisions in relation to suppliers' quality practices. In the global market economy, sourcing decisions are important and the quality of products depends upon the supplier's quality and supplier quality practices [1] [2] [3]. The countries of Asia like China and India with their large populations and sizeable burgeoning mobile classes are candidates for the products of the industrialized countries as well as the locations for production and supplier sources. Understanding the quality and supplier practices in the context of these and other developing countries is necessary for the producers in the industrialized countries. We find that there are not many studies in this area. There is a need of research in this area since many conceptual and practical questions about supply chain management (i.e., global chain network) need to be answered.

## ANALYSIS

Data was collected in six countries (Korea, Taiwan, China, Mexico, Costa Rica and India) as part of an ongoing study on International Quality Practices at the university of Toledo. Statistical analyses, which explore the supplier quality practices and their relationship to quality results, are presented in this paper. "Supplier quality practices" was one of the constructs of this study [5]. Table 1 provides industry classification of the organizations responding to the survey. In all six countries, the top or middle managers responded except Costa Rica. Workforce median age is between 31-37. The majority of respondents are from small or medium size companies except Korea and India. The status of ISO 9000 suggests that China and Mexico are relatively new while Korea and Taiwan are more experienced in implementing quality management practices according to the international standards.

**TABLE 1: Characteristics of the study sample**

| | Korea | Mexico | Taiwan | China | India | Costa Rica |
|---|---|---|---|---|---|---|
| Title of Respondents (%) | | | | | | |
| Top Manager (%) | 30 | 39 | 29 | 33 | 69 | 55 |
| Middle Manager | 60 | 34 | 52 | 47 | 30 | 12 |
| Other (%) | 10 | 27 | 19 | 20 | 11 | 33 |
| Workforce Age (median) | 31 | 30 | 33 | 35 | 37 | N/A |
| Number of employees | | | | | | |
| Fewer than 500(%) | 35 | 70 | 41 | 43 | 19 | 42 |
| Between 500-1000(%) | 30 | 8 | 31 | 9 | 18 | 28 |
| More than 1000(%) | 45 | 22 | 27 | 48 | 63 | 30 |
| ISO 9000 certified (%) | 65 | 10 | 54 | 6 | 34 | 30 |

Table 2 shows the mean, standard deviation of quality management constructs of six countries. In all constructs, China's score is consistently high compared to all other nations. This might be due to the perceptual differences related to their experiences of quality management practices. Countries with longer experiences with quality management practices tend to be a little more

modest in their assessment. In the case of China, with strong initial enthusiasm of implementing quality practices, they seem to respond quite positively about their overall quality management experiences.

**TABLE 2: Mean, standard deviation of quality management constructs**

| Construct (# of items, Reliability*) | Country | Mean | Standard Deviation | Construct (# of items, Reliability*) | Country | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|
| Leadership (7, 0.95 ) | Korea | 3.8545 | 0.6468 | Suppliers' Quality (6, 0.87) | Korea | 3.4321 | 0.5715 |
| | Mexico | 3.5461 | 1.1063 | | Mexico | 3.1799 | 1.5379 |
| | Taiwan | 3.9055 | 0.8427 | | Taiwan | 3.5941 | 1.2022 |
| | China | 3.9726 | 0.8275 | | China | 4.3262 | 1.8621 |
| | India | 3.9429 | 0.6345 | | India | 3.2712 | 0.8325 |
| | Costa Rica | 3.9337 | 0.8352 | | Costa Rica | 3.8981 | 1.5504 |
| Strategic Quality Planning (4, 0.92 ) | Korea | 3.6743 | 0.7042 | Customer Focus and Satisfaction (8, 0.87) | Korea | 3.6365 | 0.6530 |
| | Mexico | 3.6150 | 1.0111 | | Mexico | 3.5498 | 0.9956 |
| | Taiwan | 3.9275 | 0.9201 | | Taiwan | 3.9905 | 1.0530 |
| | China | 3.7899 | 0.8241 | | China | 3.9839 | 1.1790 |
| | India | 3.8389 | 0.7662 | | India | 3.6952 | 0.6813 |
| | Costa Rica | 3.8700 | 0.8820 | | Costa Rica | 3.9722 | 1.0713 |
| Quality of Information Analysis (3, 0.86) | Korea | 3.4343 | 0.6797 | Quality Citizenship (4, 0.86) | Korea | 3.5573 | 0.7341 |
| | Mexico | 3.3510 | 1.0791 | | Mexico | 3.2035 | 1.4766 |
| | Taiwan | 3.7888 | 0.9228 | | Taiwan | 3.9828 | 1.1377 |
| | China | 3.6738 | 1.0323 | | China | 3.9176 | 1.6360 |
| | India | 3.6851 | 0.8056 | | India | 3.6925 | 0.9889 |
| | Costa Rica | 3.7407 | 0.9695 | | Costa Rica | 3.9828 | 1.1377 |
| Quality of Information Use (3, 0.92) | Korea | 3.4495 | 0.6780 | Benchmarking (4, 0.92) | Korea | 3.6307 | 0.6860 |
| | Mexico | 3.1445 | 1.1170 | | Mexico | 2.9912 | 1.3705 |
| | Taiwan | 3.5318 | 1.0142 | | Taiwan | 3.8473 | 1.1625 |
| | China | 3.8688 | 1.2493 | | China | 3.7793 | 1.1305 |
| | India | 3.2449 | 0.8690 | | India | 3.3153 | 0.9743 |
| | Costa Rica | 3.6726 | 1.1282 | | Costa Rica | 3.8244 | 1.1355 |
| Employee Training (4, 0.80) | Korea | 3.4060 | 0.7199 | Internal Quality Results (5, 0.87) | Korea | 3.5259 | 0.6106 |
| | Mexico | 2.9159 | 1.0772 | | Mexico | 3.0956 | 1.4378 |
| | Taiwan | 3.5744 | 0.9368 | | Taiwan | 3.7405 | 1.0094 |
| | China | 3.5452 | 1.4434 | | China | 3.9383 | 1.6174 |
| | India | 3.3310 | 0.9040 | | India | 3.2485 | 0.9336 |
| | Costa Rica | 3.5978 | 1.2188 | | Costa Rica | 3.7405 | 1.0094 |
| Employee Involvement (5, 0.87) | Korea | 3.1648 | 0.6258 | External Quality Results (4, 0.83 ) | Korea | 3.6147 | 0.5769 |
| | Mexico | 2.8655 | 1.1459 | | Mexico | 3.3584 | 1.5225 |
| | Taiwan | 3.2183 | 0.9140 | | Taiwan | 3.8798 | 0.9968 |
| | China | 3.4894 | 1.4174 | | China | 3.7713 | 1.0787 |
| | India | 3.0345 | 0.8204 | | India | 3.5056 | 0.9282 |
| | Costa Rica | 3.3316 | 1.1562 | | Costa Rica | 3.9278 | 1.2085 |
| Quality Assurance of Products and Services | Korea | 3.7596 | 0.6814 | Note: | | | |
| | Mexico | 3.3646 | 1.1443 | | | | |
| | Taiwan | 3.9252 | 1.0004 | [1] # of items are all the same for all countries. | | | |
| | China | 4.2340 | 1.6234 | [2] Reliability (α) is from USA data, representative of similar results of other countries.) | | | |
| | India | 3.5563 | 0.8427 | | | | |
| | Costa Rica | 4.0542 | 1.3032 | | | | |

Table 3 shows correlation between supplier quality practices and the other quality management practices constructs for which the correlation coefficient is 0.5 or higher suggesting considerable relationship. In Table 4, the results of stepwise multiple regressions with internal quality results as the dependent variable are shown. Table 4 shows similar results with external quality results as the dependent variable. In four countries (Korea, Mexico, China, and India) supplier quality is shown as a significant predictor of internal quality results. However, supplier quality is a significant predictor in Taiwan, Mexico, India, and Costa Rica for external quality practices and not in Korea and China. This is a little surprising and it needs further investigation. Further examination of the size of the regression coefficients shows that the coefficients of external quality results are smaller compared to those for internal quality results except in the case of Taiwan. A plausible explanation may be the export orientation of Taiwanese companies to other countries. However, this also needs further analysis. To examine the differences among the effects of the individual supplier quality practices on internal quality results and external quality results, stepwise regression analyses were carried out. Table 5 shows the results of such an analysis for internal quality results as well as external quality results. In Korea, Taiwan and Cost Rica, supplier selection is a common important practice for both internal quality results and external quality results. In Taiwan, China, India, Mexico and Costa Rica, clarity of specification to suppliers is important for both internal quality results and external quality results while in Korea providing technical assistance to suppliers appears to be important for external quality results.

**TABLE 3: Correlation of supplier quality practices and quality management practices**

| Country | Quality Assurance of Product and Services | Customer Satisfaction | Internal Quality Results | External Quality Results |
|---|---|---|---|---|
| Korea | 0.625** | 0.641** | 0.657** | 0.619** |
| Mexico | 0.537** | 0.331** | 0.559** | 0.563** |
| Taiwan | 0.528** | 0.408** | 0.491** | 0.498** |
| China | 0.647** | 0.598** | 0.755** | 0.499** |
| India | 0.732** | 0.704** | 0.688** | 0.559** |
| Costa Rica | 0.611** | 0.476** | 0.491** | 0.617** |

** All correlation is significant at the 0.01 level (2-tailed)

## CONCLUSION

In general, supplier quality practices are related to the overall quality management practices [1] [2]. Supplier quality practices affect the internal and external quality results. However, the length of quality experience in the organizations turns out to be a discriminating factor for what particular supplier quality practices are emphasized. Organizations with longer experiences tend to focus on careful supplier selection and providing technical assistance while organizations with shorter history of quality practices regard clarity of specification for quality work. The implication of these results confirms that supplier quality practices are important practices of overall quality results. From a practitioner point of view, the results of this study suggest that companies planning to locate facilities, or enter into supplier partnership in these countries should consider their experiences of quality practices and design supplier quality program accordingly to avoid the pitfalls in supplier development [3] [8].

**TABLE 4: The effects of quality management practices on internal and external quality results**

| | Internal Quality Results | Coefficients | External Quality Results | Coefficients |
|---|---|---|---|---|
| **Korea** | Supplier Quality | 0.236** | Customer Focus and Satisfaction | 0.201** |
| | Benchmarking | 0.260** | Strategic Quality Planning | |
| | Quality Assurance of Products and Services | 0.262** | Benchmarking | 0.263** |
| | Quality Citizenship | | Quality Citizenship | 0.243** |
| | | 0.160** | | 0.217** |
| **Taiwan** | Customer Focus and Satisfaction | 0.329** | Customer Focus and Satisfaction | 0.256** |
| | Quality Information Use | | Quality Information Use | |
| | Quality Citizenship | 0.367** | Quality Citizenship | 0.339** |
| | | 0.347** | Supplier Quality | 0.233** |
| | | | | 0.178** |
| **Mexico** | Quality Assurance of | 0.178** | Employee Involvement | 0.288** |
| | Products and Services | | Quality Assurance of Products and Services | 0.253** |
| | Employee Involvement | 0.293** | Supplier Quality | |
| | Supplier Quality | 0.258** | Customer Focus and Satisfaction | 0.240** |
| | Benchmarking | 0.260** | | 0.231** |
| **China** | Supplier Quality | 0.375** | Customer Focus and Satisfaction | 0.433** |
| | Employee Training | 0.319** | Employee Training | |
| | Quality Assurance of Product and Services | | Employee Involvement | 0.513** |
| | | 3.423** | | -0.331** |
| **India** | Supplier Quality | 0.338** | Supplier Quality | 0.392** |
| | Employee Involvement | 0.257** | Quality Information Analysis | 0.309** |
| | Quality Citizenship | 0.195** | | |
| | Quality Information Analysis | 0.154* | | |
| **Costa Rica** | Customer Focus and Satisfaction | 0.355** | Customer Focus and Satisfaction | 0.256** |
| | Quality Information Use | | Quality Information Use | |
| | Quality Citizenship | 0.321** | Quality Citizenship | 0.339** |
| | | 0.296** | Supplier Quality | 0.233** |
| | | | | 0.178** |

** All significant at the 0.01 level (2-tailed)

**TABLE 5: The Effects of particular supplier quality practices on internal and external quality results**

| | Internal Quality Results | Coefficients | External Quality Results | Coefficients |
|---|---|---|---|---|
| **Korea** | F1 (Supplier selection based on | 0.393** | F1 (Supplier selection | |
| | quality) | 0.254** | based on quality) | 0.445** |
| | F2 (Reliance of fewer suppliers) | | F4 (Providing technical | |
| | F4 (Providing technical assistance to suppliers) | 0.267** | assistance to suppliers) | 0.334** |
| **Taiwan** | F1 (Supplier selection based on | 0.264** | F8 (Clarity of specification | 0.358** |
| | quality) | | to suppliers) | |
| | F8 (Clarity of specification to | 0.270** | F1 (Supplier selection | 0.325** |
| | suppliers) | | based on quality) | |
| | F4 (Providing technical | 0.169** | | |
| | assistance to suppliers) | | | |
| **Mexico** | F5 (Suppliers involvement in | 0.361** | F5 (Suppliers involvement | 0.358** |
| | product development) | | in product Development) | |
| | F8 (Clarityof specification to | 0.268** | F8 (Clarity of specification | 0.245** |
| | suppliers) | | to suppliers) | |
| **China** | F8 (Clarity of specification to | 0.567** | F8 (Clarity of specification | 0.791** |
| | suppliers) | | to suppliers) | |
| | F2 (Reliance of fewer suppliers) | 0.347** | F7 (Long-term relationships | -0.336** |
| | | | with suppliers) | |
| | | | F2 (Reliance of fewer | 0.194** |
| | | | suppliers) | |
| **India** | F4 (Providing technical assistance | 0.337** | F1 (Supplier selection based on | 0.302** |
| | to suppliers) | | quality) | |
| | F8 (Clarity of specification to | 0.251** | F8 (Clarity of specification to | 0.265** |
| | suppliers) | | suppliers) | |
| | F7 (Long-term relationships with | 0.238** | F4 (Providing technical | 0.157* |
| | suppliers) | | assistance to suppliers) | |
| **Costa Rica** | F1 (Supplier selection based on | 0.264** | F1 (Supplier selection based on | 0.315** |
| | quality) | | quality) | |
| | F8 (Clarity of specification to | 0.270** | F8 (Clarity of specification to | 0.371** |
| | suppliers) | | suppliers) | 0.144* |
| | F4 (Providing technical assistance | 0.169** | F2 (Reliance of fewer suppliers) | |
| | to suppliers) | | | |

** All significant at the 0.01 level (2-tailed)

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