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ABSTRACT
This paper presents the results of a survey administered across seventeen countries that seeks to examine quality practices, priorities and performance. The participating countries were Argentina, Australia, Belgium, Brazil, China, Croatia, Denmark, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Spain, Sweden, UK and USA. The methodology involved the use of a self-administered questionnaire to director/head of operations/manufacturing in best practice firms within the sector of firms classified by ISIC(rev.2) Division 38. There is evidence of both similarities and differences across the countries studied. Further analysis is required to explore the convergence versus "culture specific" argument.

Keywords: International, Practices, Priorities, Performance

1.0 Introduction

One of the most problematic issues confronting the researcher in quality management is the search for an appropriate definition [Fynes, 1998]. More precisely, defining "quality" as a construct is difficult given the number of possible alternatives available [Hardie and Walsh, 1994]. To this purpose, Reeves and Bednar [1994] suggest a four-way taxonomy of quality definitions that incorporates excellence, value, conformance to specifications and meeting and/or exceeding customer requirements. The diversity that these definitions embrace, they contend, implies that "the quality construct space is so broad and includes so many components that there would be little utility in any model that tried to encompass them all" [p.441]. Conversely, they argue that "the complexity and multiple perspectives historically associated with the concept have made theoretical and research advances difficult" and that ultimately the "search for a universal definition of quality and a statement of law-like relationships has been unsuccessful" [p. 441]. In addressing this problem, Flynn, Schroeder and Sakakibara [1994] argue that a crucial issue in theory development is the articulation of the distinction between *quality management practices* (input) and *quality performance* (output), which has been blurred under the broad heading of quality. More recent studies also place emphasis on *priorities* – manufacturing strategies may be articulated through competitive priorities which are then operationalised through improvement goals as well as action programs and demonstrated by performance improvement [Lindberg et. al., 1998]. This paper endorses the view that a fuller understanding of quality can be reached only by embracing these concomitant perspectives, namely *practices, priorities* and *performance.*

1.1 Relevant empirical studies of quality practices

A significant strand of the literature seeks to assess the diversity of quality practices amongst countries. In the field of comparative management research, there have been three main approaches. The empirical work has been aimed towards testing the "culture-free" hypothesis [Child and Kieser, 1979], the "convergence"

hypothesis [Form, 1979] and the "culture-specific" hypothesis [Hofstede, 1980]. The latter two are of most interest to the authors of this paper in an international comparison of quality practices, priorities and performance. The "convergence" hypothesis [Form, 1979] asserts that learning will lead managers from different cultures to adopt the same efficient management practices. Competitive pressures will eliminate those who resist convergence, consequently with the increased dissemination about good quality practices around the world, one would expect each country's respondent to embrace the same approach of their overseas counterparts. The "culture-specific" argument [Hofstede, 1980] contends that even if managers located in different societies face similar imperatives for change, deep-embedded cultural factors will still affect the way managers approach quality and react to the need for change. Both these hypothesis find equivocal support in empirical studies of quality management practices. On the one hand, the "convergence" hypothesis is supported by several empirical studies. Zhao, Maheshwari and Zhang [1995] for instance, try to examine the quality management practices of three developing nations such us India, China and Mexico and to compare them with those in developed nations. The results of their study show that the majority of the manufacturers in these developing countries are aware of the modern quality management practices and that their quality improvement efforts were not much lower than those in the developed countries. In line with this argument, Chin et. al. [2002] carry out a comparative study on quality management practices in Hong Kong and Shanghai manufacturing industries. Yet, the findings support the hypothesis that there are not any visible differences in terms of quality practices, although Shanghai companies seem to pay more attention to environmental impact while Hong Kong counterparts pay more attention to market and customer feedback. Similarly, Abdul-Aziz et. al. [2000] by comparing quality practices in the manufacturing industry in the UK and Malaysia, find that there is a common reliance on inspection and relatively low use of programmes for quality improvement. According to the authors, there are a few significant differences (e.g. the use of quality improvement teams) between the two countries and those marginal differences are related to the types of quality practices promoted by their respective governments. A similar argument has been brought forward by Ismail and Ebrahimpour [2003]. Their study examines and compares the critical factors of total quality management (TQM) across countries and their findings suggest that top management commitment and leadership, customer focus, information and analysis, training, supplier management, strategic planning, employee involvement, human resource management, process management, teamwork and others were the most commonly factors affecting quality practices and performance. On the other hand, there is a critical mass of empirical research that supports the "culture-specific" argument. Tata et. al. [2000] for instance analyse quality management practices in Costa Rica and compare them to those in the U.S. The results indicate that Costa Rican companies are still lagging behind U.S. operations in terms of human resource development, customer focus and satisfaction. According to this study, given the unique economic, cultural, and geographic variations among countries, companies can be more successful in adopting and implementing quality practices if they account for these regional differences. Similarly Corbett et. al. [1998] discuss the findings from a survey of 599 managers in five countries in the Asia/South Pacific region in an attempt to unveil how similar the practices and the resulting performance were. The results indicate more divergence by countries from the region's mean scores on practices than on performance. Hong Kong firms, for example had a distinctly different set of outcomes with quality costs influenced by high levels of inspection. Overall, the findings support the "culture-specific" hypothesis on both counts as quality is pursued and achieved. Raghunathan et. al. [1997] compare the quality management practices of three different countries – the U.S., India and China. Although quality practices were considered very important by all the respondents, the ANOVA results point to statistically significant differences among the three countries with respect to quality practices. According to the authors, these differences can be explained by the fact that in both China and India quality awareness is relatively new and quality standards may not be as high as in the U.S. Hence, the expectations or standards may be lower in these countries and hence a marginal improvement in quality can

translate to high perceptual ratings on quality practices and performance. Subba Rao et.al. [1997] analyse both quality practices and performance in India, China and Mexico. Again the results point to statistically significant differences with respect to quality practices among these countries. According to this study, top management support turned out to be a very significant factor affecting all quality practices, while information and analysis as well as quality assurance practices were affected by the length of quality experience within companies. Madu et. al. [1995] in their study of quality practices in the U.S. and Taiwan, show that there are significant differences in managers' perceptions of quality dimensions and their relationships to organisational performance across the two countries.

2.0 Methodology

Primary data from the third round of the International Manufacturing Strategy Survey (IMSS) are employed in this paper. The IMSS addresses firm strategy, competitive priorities, capabilities, operations and performance. To date three surveys have been administered (1992, 1996 and 2001). The survey covers firms in the ISIC (rev.2) Division 38 – Manufacture of Fabricated Metal Products, Machinery and Equipment covering sub sectors 381-metal products, except machinery and equipment, 382 -machinery, except electrical, 383-Electrical equipment apparatus, appliances and supplies, 384-transportation equipment and 385-professional and scientific and measuring and controlling equipment and of photographic and optical goods.

The survey was conducted using a self-administered questionnaire completed by the director/head of operations/manufacturing and the unit of analysis is the plant/business unit with sampling biased towards best practice and best performing firms. Data from each country were gathered by local institutions participating in the IMSS network who, in some cases, translated and/or assisted respondents in completing the questionnaire. Data from 17 countries are employed comprising 558 respondents. Previous work on this data by the authors has included analyses of innovation and performance particularly of Irish based manufacturing [Brennan, Crowe et al, 2002; Brennan, Crowe et al, 2003]. This paper specifically examines the role of quality priorities, practices and performance among all countries. In the questionnaire quality priorities (the importance of superior product design and quality as well as superior conformance quality) are asked in a list of ten competitive priorities based on numerical scales (1-5), that is the importance of order winners and how these have changed in the previous three years including: price, delivery dependability and speed, customer service, product range, frequency of new products, order size flexibility and environmentally sound products. The importance of quality improvement goals (manufacturing conformance and product quality and reliability) for the next three years are also given in scales of 1=not important-5=very important. Quality practices include a question on use of quality action programmes such as TQM, 6-Sigma and quality circles over the previous three and the next three years (level of use is also given as a numerical scale 1=no use –5=high use). The breakdown between preventive and corrective quality costs is given as well as allocation of costs among inspection/control (sampling, supervision, lab tests), control (e.g. scrap, losses), preventive (training, documentation, preventive maintenance) and external (e.g. warranty costs, returns). ISO9000/14000 certification and the role of quality in supplier selection and the use of computer-aided inspection are also used. Finally, quality performance improvement (manufacturing conformance and product quality and reliability) over the previous three years is given in a scale of 1=strongly deteriorated to 5=strongly improved. These quality priorities, practices and performances are compared across 17 countries, industrial sub-sectors. They are also compared by type of manufacturing operations such as process type (fabrication/assembly mix) and by type of customer orders (designed/engineered, manufactured, procured or assembled to order, produced to stock) as well as by process layout (job shop, cellular layout or dedicated lines) and by position on the value chain that is type of customer (component manufacturers, product assemblers, distributors, end-users).

3.0 Data on Quality practices, priorities and performance

3.1 Quality practices

Country comparisons are shown in Table 1.The scores of the median values for the quality practice indicate that in all countries firms tend to deploy more resources on corrective maintenance rather than preventive maintenance (60:40 overall). This is more pronounced among some countries: Argentina, Croatia, Hungary (30:70) and particularly the Netherlands (25:75). There are few exceptions, namely China, Denmark, Ireland and Norway, which deploy the same amount of resources on both types of maintenance (50:50). As for quality costs, the scores of the median values indicate that most of the resources are deployed in inspection costs (30%), with Croatia, Germany and Spain leading the chart (40% each). Median internal quality costs were particularly high in Argentina (36%) while external quality costs were high in Sweden (23%). The use of quality programs in the previous three years was quite low overall (42% firms) although more expected a high use in the next three years (59%). Quality action programs were particularly used in the USA, China and Argentina and particularly fewer firms in Denmark, Netherlands, Norway, Sweden and UK had a high level of action programs although all of these expected varying degrees of greater commitment in relation to the future implementation of quality programs. The importance of the quality of the products/services offered in the selection of the suppliers displays little variability with almost all firms (92%) giving this high importance. In terms of ISO9000 certification, countries display a varied level of compliance. While overall almost three quarters of respondents were certified some countries exhibited a particularly low rate of certification, namely Norway, Spain, Croatia and Belgium. These may reflect country specific characteristics, for example in Norway 39% of firms employ less that 10 workers and 88% less than 100 workers which is different to the overall pattern of the respondents where only 21% employ 100 workers or less. ISO9000 adoption is related to firm size with only 44% of those employing 100 workers or less certified compared to 73% overall.

3.2 Quality priorities

Overall quality rates very high in the list of priorities with 83% and 80% of firms giving very high importance to product design and quality and to conformance quality respectively. In most countries both rated similarly but both were particularly high among firms in China (71%, 70%). In other countries conformance quality was less important than product design and quality: Argentina (42%, 25%), Germany (53%, 21%) and Netherlands (44%, 30%). In the UK both were rated particularly low (29%, 38%). Whether having a higher or lower importance is a reflection of the levels of quality achievement or whether its greater importance is a reflection of greater need may be a mute point in the face of continuous improvement but its comparison to other priorities may be useful for further analysis. When the importance of quality priorities are compared to the changes in customer needs over the previous three years it can be seen that there are also some different patterns. For example quality order winners rate very high among USA firms (93%, 86%) and this has changed little over the previous three years perhaps indicating that the quality needs are being met. Despite this quality improvement continues to be an important goal for USA firms (71%, 93%). Whereas in other countries, China, Hungary and Ireland the importance is similarly high while the quality priorities increased over the previous three years. In China and Hungary quality remains and important improvement goal but fewer Irish based firms rate it as very important (84%, 81%). Among firms in both Argentina (36%, 57%) and the Netherlands (38%, 57%) fewer rate quality improvement goals as important.

3.3 Quality performance

The competitive importance of quality issues in winning orders over competitors displays also some variability. Product design and quality is perceived as being very important in Germany (97%), China (96%) and Denmark (95%). Differently Croatia, UK and Norway rate this factor as far lower. Conformance quality is also rated very high in both China (100%) and Australia (90%), while Netherlands Germany and Argentina consider this issue as being significantly less important. As for quality issues such as poor quality of supplies and internal quality and their impact on lateness, yet Norway and Germany tend to rate the former factor as quite high, while other countries such as Belgium and Brazil attach much less importance to it. Similarly in terms of internal quality as a cause for lateness, both Brazil (71%) and the USA (70%) rate this factor very high, while both Norway (22%) and Italy (23%) rate it very low. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years portray also a quite varied picture. In terms of manufacturing conformance, for example we find Argentina (79%), Germany (77%), Hungary (77%) and Brazil (76%) on one side of the spectrum; while on the opposite end Norway (37%), Croatia (41%) and Belgium (41%) report less amount of change in this criterion. As for product quality and reliability, China (96%) and Brazil (91%) lead the chart, while Belgium (47%) Norway (48%) and the UK (53%) rate this factor as significantly lower.

3.4 Firms' position on the value chain,

By considering practices, priorities and performance according to the firms' position on the value chain (component manufacturers, product assemblers, distributors, end-users, mixed) several differences also emerge (Table 2).

In terms of practices and more specifically in relation to maintenance costs, all the firms regardless of their position on the value chain tend to deploy most of their resources in corrective maintenance (40:60). The only exception is represented by component manufacturers and end-users firms that deploy equally their resources among preventive and corrective maintenance (50:50). As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. In terms of implanting ISO9000, all firms exhibit similar figures although component manufacturers display a greater degree of adherence to the scheme. The importance of the quality of the products/services offered in the selection of the suppliers displays some variability with component manufacturers, distributors and assemblers giving this high importance, while end-users and mixed firms seem to be less concerned about this issue. Finally, as for both the current and the future implementation of quality programs, product assemblers and distributors find themselves at the opposite side of the spectrum with product assemblers displaying the highest degree of implementation and distributors the lowest.

As for priorities, overall quality rates not very high in the list of priorities with 51% of end users' firms and only 29% of mixed firms giving very high importance to product design and quality. In terms of quality conformance, this factor seems to play a major role for assemblers (53%) but not for mixed firms (29%). By looking at improvement goals, firms display also a different attitude towards quality: product assemblers give high importance to both manufacturing conformance and product quality and reliability; whereas mixed firms tend to give little importance to the former and end-users firms give more importance to the latter.

By considering quality performance, the competitive importance of quality issues in winning orders over competitors displays also some variability. Product design and quality and quality conformance are perceived

as being very important factors for component manufactures. Differently end-user firms rate product design and quality as far lower. As for the impact of quality on lateness, yet poor quality of supplies is a major cause of delay for both distributors and end-users firms, while it only marginally affects product assemblers. Internal quality is a major cause of delays only for mixed firms. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years portray also a quite varied picture where distributors are more quality-driven and mixed firms are less oriented towards quality.

By comparing firms on the basis of their type of customer orders (designed/engineered, manufactured, procured or assembled to order, produced to stock, mixed) several differences also emerge (Table 2).

In terms of practices and more specifically in relation to maintenance costs, all the firms regardless of their type of customer orders tend to deploy most of their resources in corrective maintenance (40:60). The only exception is represented by produced to stock firms that deploy equally their resources among preventive and corrective maintenance (50:50). As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. In terms of implanting ISO9000, all firms exhibit similar figures although assembled to order firms display the highest degree of adherence to the scheme, whereas designed to order firms he lowest. The importance of the quality of the products/services offered in the selection of the suppliers does not display significant variability across firms. Finally, as for the current implementation of quality programs, assembled to order firms find themselves at the top of the chart with the highest degree of implementation, while mixed firms at the bottom for current use. In relation to the future implementation of quality programs, manufactured to order firms display higher commitment.

As for priorities, overall the data does not display significant variability across firms. All the firms, except mixed firms that display very high scores, display similar results in both changes of priorities of customers and improvement goals. Produced to stock firms show the lowest change in relation to quality conformance. Mixed firms display also more commitment toward improvement goals, whereas produced to stock firms the lowest.

In terms of performance, the competitive importance of quality issues in winning orders over competitors does not display significant variability. Product design and quality and quality conformance are perceived as being very important factors for all the firms. Procured to order and mixed firms rate product design and quality very high, while assembled to order firms rate quality conformance very low. As for the impact of quality on lateness, yet poor quality of supplies is a major cause of delay for both procured to order and mixed firms, while internal quality strongly affects only manufactured to order firms. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years portray also a quite varied picture where produced to stock firms and manufactured to order firms display higher change in manufacturing conformance and product quality reliability, respectively.

3.5 Degree of integration of functional strategies and their location on the supply chain

By comparing firms by type of manufacturing operations such as process type (fabrication/assembly mix) and by process layout (job shop, cellular layout or dedicated lines) several differences also emerge (Table 2).

By comparing firms by type of manufacturing operations such as process type (fabrication/assembly/ mixed), in terms of practices and more specifically in relation to maintenance costs, all the firms regardless of their type of manufacturing operations tend to deploy most of their resources in corrective maintenance (40:60). The only exception is represented by mixed firms that deploy equally their resources among preventive and corrective maintenance (50:50). As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. In terms of implanting ISO9000, all firms exhibit similar figures although assembly firms display a greater degree of adherence to the scheme. The importance of the quality of the products/services offered in the selection of the suppliers does not display significant variability across firms. Finally, as for both the current and the future implementation of quality programs, balanced firms find themselves at the bottom of the chart the lowest degree of implementation.

As for priorities, overall the data does not display significant variability across firms. All the firms, regardless of the type of their manufacturing operations display similar results in both changes of priorities of customers and improvement goals.

In terms of performance, the competitive importance of quality issues in winning orders over competitors does not display significant variability. Product design and quality and quality conformance are perceived as being very important factors for all the firms. As for the impact of quality on lateness, yet poor quality of supplies is a major cause of delay for assembly firms, while it only marginally affects fabrication firms. Similarly, internal quality is a major cause of delay for mixed firms, while it has a minor impact on fabrication firms. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years portray also a quite varied picture where fabrication firms are more driven to achieve manufacturing conformance whereas mixed firms are less oriented towards product quality and reliability.

By comparing firms by type of process layout (job shop, cellular layout, dedicated lines, balanced) several differences also emerge (Table 2).

In terms of practices, all the firms regardless of their type of process layout tend to deploy most of their resources in corrective maintenance (40:60). The only exception is represented by balanced firms that deploy equally their resources among preventive and corrective maintenance (50:50). As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. In terms of implanting ISO9000, all firms exhibit similar figures although job-shop firms display a lower degree of adherence to the scheme. The importance of the quality of the products/services offered in the selection of suppliers displays significant variability across firms, where dedicated lines firms rate this factor very high and cellular lay-out firms rate it very low. Finally, as for both the current and the future implementation of quality programs, dedicated lines firms find themselves at the top of the chart with the highest degree of implementation, while job-shop firms and balanced firms at the bottom for current and future use respectively.

As for priorities, overall the data does not display significant variability across firms. All the firms, regardless of the type of their process layout display similar results in both changes of priorities of customers and improvement goals. Job-shop firms report higher change in both respect of superior product quality and superior conformance quality, while balanced firms show lower change in relation to the former and cellular

layout firms to the latter. In terms of improvement goals, the data display higher variability in relation to manufacturing conformance than product quality and reliability.

In terms of performance, the competitive importance of quality issues in winning orders over competitors does not display significant variability. Product design and quality and quality conformance are perceived as being very important factors for all the firms. Balanced firms are more driven by product design and quality than job-shop firms. All the firms display similar ratings for conformance quality. As for the impact of quality on lateness, yet poor quality of supplies is a major cause of delay for cellular layout firms, while it only marginally affects dedicated lines firms. Internal quality is a major cause of delays only for balanced firms. Similarly, internal quality is a major cause of delay for balanced firms, while it has a minor impact on balanced firms. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years portray also a quite varied picture where fabrication firms are more driven to achieve manufacturing conformance whereas balanced firms are less oriented towards product quality and reliability.

3.6 Degree of similarity within industry sectors

Overall few differences between ISIC sub-sectors are evident (Table 1). In terms of practices, all the firms regardless of the sector they belong to, they all tend to deploy most of their resources in corrective maintenance (40:60). The only exception is represented by ISIC 383 firms that deploy equally their resources among preventive and corrective maintenance (50:50). As for quality costs, all the firms tend to spend more on inspection costs rather than internal, preventive or external costs. A particularly high rate of ISO9000 adoption among ISIC 383 firms who also spend proportionally more on preventive costs rather then corrective (50:50 compared to 40:60 overall). All firm based in Ireland was ISO9000 certified where a higher number of firms are also in this sub-sector. The importance of the quality of the products/services offered in the selection of suppliers displays significant variability across firms, where both ISIC 381 and ISIC 383 firms rate this factor very high, while ISIC 385 firms rate it very low. Finally, as for the current implementation of quality programs, 383 ISIC firms tend to be more compliant whereas ISIC 384 firms less. There are not significant differences across firms in relation to the future use of quality programs.

As for priorities, overall the data does not display significant variability across firms. All the firms display similar results in both changes of priorities of customers and improvement goals, except 384 ISIC firms that display both higher changes of priorities and improvement goals. ISIC 385 firms show the lowest change in the changes of priorities of customers related to conformance quality. In terms of performance, the competitive importance of quality issues in winning orders over competitors does not display significant variability. Product design and quality and quality conformance are perceived as being very important factors for all the firms. ISIC 385 firms are more driven by product design and quality than the other firms. All the firms display similar ratings for conformance quality, except ISIC 384 firms that consider this factor as significantly important. As for the impact of quality on lateness, yet poor quality of supplies is a major cause of delay for ISIC 383 firms, while it only marginally affects ISIC 381 firms. Similarly, internal quality is a major cause of delays only for ISIC 383 firms, while it only marginally affects ISIC 381 firms. The rankings in the amount of change in quality performance criteria such as manufacturing conformance and product quality and reliability over the past three years does not show a high level of variability across firms, except for ISIC 383 firms that tend to be more driven to achieve product quality and reliability.

Table 1: Quality Practices, Priorities and Performance by Country

	QUALITY PRACTICES										QUALITY PRIORITIES				QUALITY PERFORMANCE					
	Maintenance		Quality Costs				ISO 9000	Quality & supplier selection	Quality programs		Change of priorities of customers		Improvement goals		To win competitors		Impact on lateness		Change in performance criteria	
Country	%preventive	% corrective	% inspection	% internal	% preventive	%external	% yes	% High Importance	% Current use	% Future use	superior product quality	superior conformance quality	manufacturing conformance	product quality and reliability	Product design and quality	Conformance quality	Poor quality of supplies	Internal quality	Manufacturing conformance	Product quality and reliability
Argentina	30	70	20	**36**	18	10	71	93	**64**	**79**	42	*25*	*36*	*57*	86	*57*	33	50	**79**	71
Australia	40	60	30	12	20	10	79	92	54	58	43	43	79	85	90	**90**	34	53	72	69
Belgium	40	60	27	20	25	10	*42*	94	39	**78**	65	41	61	78	90	72	26	53	*41*	*47*
Brazil	40	60	31	15	21	10	80	91	40	71	48	36	78	**94**	85	84	25	**71**	**76**	**91**
China	50	50	28	20	20	20	90	96	**68**	**96**	**71**	**70**	77	**97**	**96**	**100**	46	39	63	**96**
Croatia	30	70	40	20	20	10	*34*	*85*	42	**84**	38	39	61	86	*55*	85	35	41	*41*	68
Denmark	50	50	25	18	20	20	84	94	*27*	*40*	*26*	33	63	74	**95**	89	34	52	61	56
Germany	40	60	40	15	10	10	91	**100**	39	58	53	*21*	61	71	**97**	*66*	**47**	47	**77**	61
Hungary	30	70	30	20	20	10	88	96	48	68	**76**	**89**	**95**	95	84	89	33	35	**77**	75
Ireland	50	50	30	20	25	6	**100**	97	57	69	**76**	**67**	67	74	84	81	25	58	71	71
Italy	40	60	30	25	20	14	83	85	46	*38*	52	53	66	80	90	83	34	23	60	72
Netherlands	*25*	**75**	33	12	13	20	79	93	*25*	46	44	30	*38*	*57*	77	*43*	32	32	64	71
Norway	50	50	20	18	20	10	*14*	94	*14*	*29*	32	*25*	70	71	*72*	71	**61**	22	*37*	*48*
Spain	40	60	40	20	10	10	*22*	*82*	42	*40*	43	*15*	*47*	90	88	81	49	39	59	77
Sweden	40	60	25	28	13	**23**	100	**100**	*26*	63	*11*	*17*	*47*	79	83	78	41	45	53	*53*
UK	40	60	27	20	15	10	89	93	*24*	50	29	38	65	83	*66*	*65*	33	49	60	69
USA	40	60	30	20	15	10	100	*86*	**79**	**77**	*7*	*7*	71	**93**	93	86	30	**70**	58	75
Total	**40**	**60**	**30**	**20**	**20**	**10**	**73**	**92**	**42**	**59**	**47**	**44**	**68**	**82**	**83**	**80**	**37**	**44**	**63**	**69**
ISIC sector																				
381	40	60	30	20	20	10	68	90	39	59	44	41	68	80	79	78	24	51	61	67
382	40	60	25	20	15	15	72	92	43	55	49	48	71	80	88	81	41	43	62	67
383	50	50	30	20	20	10	**83**	95	48	61	46	47	65	80	81	79	51	34	65	74
384	40	60	30	22	20	15	80	94	38	65	54	51	79	92	80	85	34	48	59	70
385	40	60	25	19	20	10	76	95	39	56	47	27	51	86	93	77	37	44	64	67
Total	**40**	**60**	**30**	**20**	**20**	**10**	**74**	**92**	**42**	**59**	**47**	**44**	**68**	**81**	**83**	**80**	**37**	**44**	**62**	**69**

Table 2: Quality Practices, Priorities and Performance by Sector, End Markets, Customer Orders and Manufacturing Process Type & Layout

	QUALITY PRACTICES										QUALITY PRIORITIES				QUALITY PERFORMANCE					
	Maintenance		Quality Costs				ISO 9000	Quality & supplier selection	Quality programs		Change of priorities of customers		Improvement goals		To win competitors		Impact on lateness		Change in performance % Improved in past 3 yrs	
End Markets	%preventive	% corrective	% inspection	% internal	% preventive	%external	% yes	% High Importance	% Current use	% Future use	superior product quality	superior conformance quality	manufacturing conformance	product quality and reliability	Product design and quality	Conformance quality	Poor quality of supplies	Internal quality	Manufacturing conformance	Product quality and reliability
Components manufacturers	50	50	40	23	19	10	71	90	46	63	47	42	70	78	89	88	36	27	60	61
Product assemblers	40	60	30	25	20	10	83	93	55	68	48	53	72	83	83	84	29	50	64	71
Distributors	40	60	25	20	20	10	71	95	36	53	44	39.5	70	78	85	73	41	44	69	77
End-users	50	50	30	20	20	20	69	91	39	57	51	45	67	85	79	80	41	44	57	64
Mixed	30	70	30	20	20	18	70	89	40	64	29	26	48	77	88	76	32	55	48	48
Total	**40**	**60**	**30**	**20**	**20**	**10**	**73**	**92**	**43**	**59**	**47**	**44**	**68**	**81**	**83**	**80**	**37**	**44**	**62**	**68**
Customer orders																				
Design/engineered to order	40	60	30	20	20	10	61	94	41	60	42	53	68	86	85	82	44	40	59	67
Procured to order	55	45	40	20	20	10	79	83	39	50	45	48	79	88	96	83	59	23	58	67
Manufactured to order	40	60	30	20	20	10	72	94	42	62	53	48	71	82	77	80	31	49	64	72
Assembled to order	40	60	30	25	20	15	84	95	45	55	45	38	67	81	87	76	41	43	62	59
Produced to stock	50	50	30	20	20	10	80	95	39	48	44	32	58	77	88	77	36	39	71	67
Mixed	30	70	30	20	17	15	69	89	29	60	59	59	80	86	91	86	47	34	57	69
Total	**40**	**60**	**30**	**20**	**20**	**10**	**74**	**93**	**41**	**57**	**48**	**45**	**69**	**82**	**84**	**79**	**38**	**42**	**64**	**68**
Process Type																				
Assembly	40	60	30	20	20	10	77	92	45	58	46	41	69	83	85	78	49	41	63	67
Fabrication	40	60	30	20	20	10	72	93	42	62	48	46	67	80	82	80	30	45	63	70
Balanced	50	50	25	20	25	20	64	90	28	49	46	42	70	80	86	79	36	53	56	62
Total	**40**	**60**	**30**	**20**	**20**	**10**	**73**	**92**	**42**	**59**	**47**	**44**	**68**	**81**	**83**	**79**	**37**	**44**	**63**	**68**
Process Layout																				
Job shop	30	70	30	20	20	10	67	91	37	54	50	50	72	83	81	82	37	40	54	62
Cellular layout	40	60	26	20	20	10	76	94	43	63	52	39	64	80	86	74	41	45	69	72
Dedicated lines	40	60	30	20	20	10	80	93	48	64	43	41	69	83	83	80	34	47	66	75
Balanced	50	50	30	19	20	18	80	94	39	49	39	50	60	75	90	77	39	50	74	66
Total	**40**	**40**	**30**	**20**	**20**	**10**	**75**	**92**	**42**	**59**	**48**	**44**	**68**	**82**	**83**	**79**	**37**	**45**	63	69

4.0 Conclusions and Implications

The results of a survey covering seventeen countries within the Manufacture of Fabricated Metal Products, Machinery and Equipment sector have been presented. Although the results presented provide insights across quality practices, priorities and performance on a cross country basis, statistical analysis of the data is needed to further examine the issue of quality as it pertains to the convergence versus "culture specific" debate.

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