

Quality dimensions between foreign and domestic Vietnamese mechanical firms: A comparative study¹

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Abstract

Mechanical industry is one of the most important economic domains which have great impacts on the national economy of Vietnam. However, customers widely believe that product quality of domestic mechanical firms is lower than that of foreign firms. The research is to investigate the perceived differences in eight product quality dimensions of foreign and domestic mechanical firms in Vietnam under firms, not customer, perspective. There are total 25 mechanical firms participated in responding to the questionnaire, in which there 18 domestic firms and 7 foreign firms. We found that there is no evidence showing the difference in product quality dimensions between domestic and foreign firms in Vietnam.

Keywords: quality dimension, domestic mechanical firm, foreign mechanical firm

1 Introduction and background

Quality is an integral part of business that helps to create loyal customer base. There is a link among market orientation, product or service quality and competitive advantage (Ishrat, 2013). Therefore, it is important to understand the basic dimensions of quality of a product or service which are performance, feature, reliability, conformance, durability, servicability, aesthetics, and perceived quality. How about product quality dimension of Vietnamese technical firms in comparison with that of foreign firms?

Mechanical industry is one of the most important economic domains which have great impacts on the national economy of Vietnam. Mechanical industry provides all of the other economic sectors with machinery and equipment. In fact, there are not any countries which can implement the industrialization and modernization without the development of mechanical industry. It is not only the foundation but also the motivation for other economic industry to flourish.

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Vietnam is now on the way to achieve industrialization and modernization and mechanical industry plays an important role in supporting other industries to reach the higher stage of development. However, this is also the moment of globalization and association. There has been a dramatic increase in the number of foreign competitors who want to expand their business in Vietnam. Vietnamese mechanical industry used to grow strongly and meet 50% of the national economy demand. However, due to the origin of agricultural economy, facilities and technology are backward and human resource still lack of skills and experience. That's why domestic products are often of low quality, with monotonic models, have low value added and cannot meet the standards of the world's mechanical industry. As a result, domestic mechanical firms have to face with a lot of difficulties in competing with foreign ones (FDI firms hereafter for short) in Vietnam.

Mechanical industry plays an important role in supporting and motivating the development of other industries. According to the statistic of Vietnam Association of Mechanical Industry, overall in Vietnam there are about 3,100 mechanical firms including 405 SOE (State Owned Enterprises); 1,250 mass production bases and 156 proprietary trading firms. About 50% of mechanical production bases specialized in manufacturing and resembling. The total capital of SOE industry is about 360-380 million US dollar, Total FDI capital is approximately 2.1 billion US dollar in which 50% is invested in auto and transportations resembling and other consuming products. However, Vietnamese mechanical industry is still not able to meet the requirements of other industry in terms of price and quality of products. Productivity and quality of domestic mechanical firms are lower than FDI mechanical firms. According to the General Statistics Office (2014), the value of mechanical industry (Machinery, Auto, Transportations and Electrical manufacturers) is only over 700,000 billion VND which account for just equal 20% of Vietnamese industry's production value. Export value in 2013 of mechanical industry reaches 13 billion US dollar, which six folds the number in 2006 (Ministry of Industry and Trade, 2014). However, this number cannot reflect completely the current capacity of mechanical firms in Vietnam and cannot meet the demands of domestic market. Specifically, in 2013, Vietnamese mechanical industry is able to meet only 34.5% of market requirement. Also, the General Statistic Office (2014) indicates that up to preliminary 2013, the percentage of FDI industrial production value is 50.1% of the total value. Thus, the rest of almost 49.9% includes the value of the national segment, non-national segment and local segment. I believe that the statistical number above has shown the current situation of the mechanical firms in Vietnam apparently. Actually, the General Statistic Office has raised our concern about the quality management in mechanical industry in our country. More than a half of the total production value of the industry belongs to FDI segments which somewhat indicates the higher productivity and quality of FDI firms in Vietnam including FDI mechanical firms in comparison with domestic firms.

This research is to find the gap between two kinds of mechanical organization in term of product quality dimensions. The paper is to answer two research questions: *Is there a gap in quality dimensions between domestic and FDI mechanical firm's products in Vietnam? What can be done to improve product quality of domestic mechanical firms in*

Vietnam? The center aim of the paper is to assess the differences in quality management implementation between domestic and FDI mechanical firms in Vietnam. And based on the result, we would like to give some solutions for the domestic firms so that they can improve their quality management in the future.

2 Theoretical framework

2.1 Concepts of Quality

People use the term “quality” for hundreds of times without being sure whether they understand the term or not. According to Oakland (2004), “Quality then is simply meeting the customer requirements”. However, standing on different background, there are also many ways of defining quality, coming from different perspectives, as shown in Table 1.

Table 1: Different definitions of quality

Authors	Definition
Juran, an early doyen of quality management.	“Fitness for purpose or use”
BS 4778: 1987 (ISO 8402, 1986) <i>Quality Vocabulary: Part 1, International Terms.</i>	“The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs”.
Deming, another early doyen of quality management	“Quality should be aimed at the needs of the consumer, present and culture”.
Feigenbaum, author of “Total Quality Control”	“The total composite product and service characteristics of marketing, engineering, manufacture and maintenance through which the product and service in use will meet the expectations by the customer”.
Crosby, an American quality management consultant famous in the 1980s	“Conformance to requirements”.
ISO (EN) 9000:2000 <i>Quality Management Systems – fundamentals and vocabulary</i>	“Degree to which a set of inherent characteristics fulfils a need or expectation that is stated, generally implied or obligatory”.
The Concise Oxford Dictionary	“A degree of excellence”.
American Society for Quality (ASQ)	"Quality denotes an excellence in goods and services, especially to the degree they conform to requirements and satisfy customers."
Goetsch and Davis (2010)	“Quality is a dynamic state associated with products, services, people, processes, and environments that meets or exceed expectations and helps produce superior values”.

(Source: Oakland, 2004, Knowles, 2011)

Most of the authors above implied that quality is meeting customer's stated requirement, fitting the purpose of purchasing that product. A problem may arise here. For example, if both cars can fit the purposes of customers, they are considered to have the same quality. As a result, the differentiation in quality or the features of the products are not quite important. The idea of Goetsch and Davis (2010) makes a difference. They take into consideration the roles of departments which contribute to meet the expectations of the customers such as marketing research, customer service, distribution channels... However, it is worth figuring out whether meeting customer expectations is a higher level of achievement than distribute a product that fits for purpose or not. And expectations certainly include both declared purposes plus other undeclared purposes. Although the customers may not speak out when they purchase but that nevertheless form a legitimate part of their expectations (Knowles, 2011). As a result, the definition of quality should associate with achieving or exceeding expectations of customers, meeting the requirements that may not be stipulated but once offered become expectation of every customer.

According to Knowles (2011), "quality is defined by customer, and as such will change over time, often in unpredictable ways. It is associated with creating customer values. A quality good or service must meet or exceed the whole range of customer expectations, some of which may be unspoken". As a complex concept, quality can be only addressed by the whole organization working together. By continuously meeting customer requirements and expectations, many organizations have gained reputation of "excellence" and customer loyalty (Oakland, 2010), and this is the goal of almost all organizations. They are competing with each other, are striving every day because of customer loyalty.

2.2 Dimensions of quality

Garvin (1984) suggests that there are 8 dimensions of product quality. He states that "A product or service can rank high on one dimension of quality and low on another—indeed, an improvement in one may be achieved only at the expense of another". Below are his ideal on these dimensions:

➤ *Performance*: Performance of a product refers to its primary operating characteristics (Garvin, 1984). For example, the performance of a television is the quality of the picture, sound and longevity of the picture tube. For the service such as fast food service, performance can be prompt service. This dimension of quality involves measurable attributes, so brands can usually be ranked objectively on individual aspects of performance (Garvin, 1987). The performance of a product has great influences on the profitability of the organization or its reputation. There is a question arising that whether the differences in performance indicate quality differences or not. Garvin (1987) believes that it depends on specific preferences but preferences based on functional requirements. For example, customers usually judge the quality of a whitening skincare product by its ability to whiten the skin and to leave the skin with irritation free. In another case taken by Garvin (1987) that a 100-watt light bulb provides greater candlepower than a 60-watt bulb, yet few customers would regard the difference as a measure of quality. Therefore, the factors which determine whether

performance differences make quality differences are the functional requirements (mostly of the customers). Some performance standards are based on subjective preferences, but the preferences are so universal that they have the force of an objective standard. It is believed that products made by FDI firms are of higher quality than that of indigenous firms. We come to Hypothesis 1:

Hypothesis 1: There is a significant difference in product performance between domestic and FDI mechanical firms in Vietnam

➤ ***Features:*** David Garvin (1984) indicates that “features are additional characteristics that enhance the appeal of the product or service to the user. Features are the “bells and whistles” of products and services, those characteristics that supplement their basic functioning”. Examples can be found everywhere including free water in a restaurant, a spoon in the instant noodles pack, and automatic tuners on a color television set. In the opinion, features are sometimes the ones that go beyond the basic requirements and expectation of customer which act as motivators to provoke customer’s purchasing.

Hypothesis 2: There is a significant difference in product feature between domestic and FDI mechanical firms in Vietnam

➤ ***Reliability:*** Reliability is a dimension which indicates the probabilities of a product malfunctioning or failing in a specified time (Garvin, 1984). It can be seen that, the most common measures of reliability are the average time to first failure, the mean time between failures, and the failure rate per unit time (Juran, 1974, p.8–12). The problem is those measures ask for a specified time of being used, it is quite difficult to assess the dimension of reliability of an instant-used product. For most customers, reliability can be the main factor decides the quality of a product.

Hypothesis 3: There is a significant difference in product reliability between domestic and FDI mechanical firms in Vietnam

➤ ***Conformance:*** “The dimension of conformance depicts to what extent a product’s design and operating characteristics meet established standards” (Garvin, 1984). This dimension owes the most to the traditional approaches to quality pioneered by experts like Juran. In the factory, conformance dimension refers to “the incidence of defects, the proportion of all units that fail to meet specifications, and so require rework or repair” (Garvin, 1984). Besides, data on conformance are often difficult to collect, and proxies are frequently used in the field. It can be seen that, conformance is a relatively objective measure because it does not depend on the individual preferences. Instead, it counts on actual defections or failures.

➤ ***Hypothesis 4: There is a significant difference in product conformance between domestic and FDI mechanical firms in Vietnam***

➤ *Durability*: Garvin (1984) says that durability measures the length of a product's life. Thus, the problem becomes very complicated if the product can be repaired. Estimating durability is more difficult. Thus, technically, durability can be defined as the amount of use one gets from a product before it is malfunction and preferable to be replaced. It is suggested that durability and reliability are closely linked. The product that often fails or malfunctions during its lifetime which indicates unreliability also is alerted to be not durable. The customers are more likely to buy the ones of the other competitive brands. Moreover, this approach implies that durability figures should be interpreted with care (Garvin, 1984) because an increase in product life may not be the result of technical improvements or the use of longer-lived materials but the changes in underlying economic environment.

Hypothesis 5: There is a significant difference in product durability between domestic and FDI mechanical firms in Vietnam

➤ *Serviceability*: Garvin (1984) agrees that serviceability includes speeds, courtesy and competency of repair. For example, serviceability involves the consumer's ease of obtaining repair service (access to service centers and/or ease of self-service), the responsiveness of service personnel (ease of getting an appointment, willingness of repair personnel to listen to the customer), and the reliability of service (whether the service is performed right the first time). As a customer, I can see that, customers do not only worry about the problem occurred but also the time it takes to restore or solve the problem, the attitude of the customer personnel or whether the service can solve the problem or not. The un-appropriate responsiveness or negative attitude toward the customer' complaint will become the "grenade" which destroy the reputation and customer satisfaction rank of the organization. The degree of satisfaction with complaint resolution closely correlated with consumers' willingness to repurchase the offending brands (Springfield, Va.: National Technical Information Service, U.S. Department of Commerce, 1979). Of course, profitability is likely to be affected as well.

Hypothesis 6: There is a significant difference in servicability between domestic and FDI mechanical firms in Vietnam

➤ *Aesthetic*: Aesthetics as defined by Garvin (1984) refers to how the product's appearance, feels, sounds, tastes or smells. That's why aesthetics is based on personal opinion and a reflection of individual preferences. Also Garvin believe that the aesthetics dimension differs from subjective criteria pertaining to "performance" because of the fact that aesthetic criteria are not the same around the world for the reason of differences in cultures, religions, policies or personalities. Not all people prefer sweet taste of Coca-Cola, the taste is changed toward the habits of the countries marketed. Companies therefore have to search for a niche.

Hypothesis 7: There is a significant difference in product aesthetics between domestic and FDI mechanical firms in Vietnam

- *Perceived quality*: Consumers do not always have complete information about a product's or service's attributes; Garvin (1987) believes that indirect measures may be their only basis for comparing brands. The reliability or durability may be not their choices to depend on. They may use the belief at the first sight as the packets, the colors or the name of the product by just watching advertisings on television or magazine. Also, the most popular factor that affects the decision of customer is reputation. The reputation comes from the satisfaction of previous customers and their words of mouth.
- **Hypothesis 8**: *There is a significant difference in perceived quality between domestic and FDI mechanical firms in Vietnam*

3 Research methodology

3.1 Logical framework

The logical framework is presented in figure 1 below:

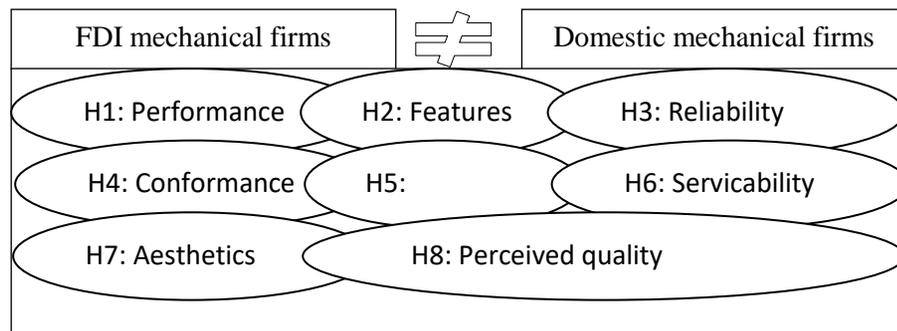


Figure 1: Logical framework of the paper

3.2 Questionnaire design

Table 2 illustrates the questionnaire of the paper. The questions are taken from the Code book of the High Performance Manufacturing Round 4 project. All questions were asked using Likert scales (i.e., 1: strongly disagree; 2: disagree; 3: Neutral; 4: agree; and 5: strongly agree). Respondents can be plant manager, process engineer, production, control manager, quality manager and supervisor.

Table 2: Questionnaire of the paper

Variable	Dimensions	Statements
Dimensions of quality	Performance	Primary product performance characteristics
	Features	Secondary options or features; characteristics that supplement the basic functioning of the product
	Reliability	Reliability of the product; probability of failure in a specified time
	Conformance	Conformance to established standards
	Durability	Durability; amount of use before the product deteriorates or needs to be replaced
	Servicability	Serviceability; ease of repair
	Aesthetics	Aesthetics; how the product looks, feels, sounds, tastes or smells
	Perceived quality	Overall product quality perceived by customers

(Source: Code book – Round 4 of High Performance Manufacturing project)

3.3 Sample Design

In order to investigate quality dimensions in mechanical industry, the sample includes three main groups:

- Machinery manufacturers: manufacturers of precision machine, manufacturers of assembly equipment, manufacturers of process equipment, manufacturers of metal cutting tools, manufacturers of measuring instruments, etc.
- Transportation suppliers: automobile manufacturers, manufacturers of automobile components such as screws, connectors, batteries, and car audio, train manufacturers, manufacturers of train components, airplane manufacturers, manufacturers of airplane components, etc.
- Electronics manufacturers: audio/visual equipment manufacturers, manufacturers of audio/visual equipment components, IT equipment manufacturers, manufacturers of IT equipment components, electrical parts manufacturers, electronics parts components, contract manufacturers, etc.

Below is the summary of samples selected:

Table 3: Number of samples selected

	Machinery manufacturers	Transportation suppliers	Electronics manufacturers	Total
FDI	0	4	3	7
Domestic	7	4	7	18
Total	7	8	10	25

(Source: Descriptive Frequencies)

It can be seen from the table 3 that most of the samples are domestic firms. Also, the number of electronics manufacturer accounts for 40% of the total mechanical firms selected.

4 Findings and discussion

4.1 Descriptive statistics

The paper studies on quality dimensions of 25 mechanical firms in Vietnam which is both domestic and FDI firms. Table 4 and Table 5 illustrate the descriptive statistics of the sample.

Table 4: Firms categories frequencies

		INDUSTRY			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Auto	4	16.0	16.0	16.0
	Electrical	10	40.0	40.0	56.0
	Machinery	7	28.0	28.0	84.0
	Transportation	4	16.0	16.0	100.0
	Total	25	100.0	100.0	

(Source: Descriptive statistics)

As can be seen from Table 5, the number of auto and transportation firms accounts for 32%, meanwhile, electrical and machinery firms are of 40% and 28% of the total sample, respectively. The number of domestic firms accounts for 72% of total firms, FDI firms account for 28% of total number.

Table 5: Groups categories frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Domestic firms	18	72.0	72.0	72.0
	FDI firms	7	28.0	28.0	100.0
	Total	25	100.0	100.0	

(Source: Descriptive statistics)

4.2 A comparison between Domestic and FDI means for each group

After computing the means of domestic and FDI mechanical firms for each group, the results are concluded in the below table 6:

Table 6: Means of domestic and FDI firms for each group

	Domestic' mean	FDI's mean
Dimensions for quality	4.3304	3.7250

(Source: Independent sample t-test)

Table 6 reveals an interesting finding, showing domestic firms obtain higher means in terms of dimensions for quality than FDI firms. In other words, on average, domestic firms perform better than FDI firms in terms of quality. Independent sample t-test in Table 7 shows other details.

Table 7: Independent sample t-test for Dimensions of quality group

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
DIMEN	Equal variances assumed	0.452	0.510	1.936	17	0.070	0.60536	0.31273
	Equal variances not assumed			2.085	8.198	0.070	0.60536	0.29031

(Source: Independent sample t-test)

Table 7 indicates that there are difference between mean of FDI and domestic firms in term of dimensions of quality. It can be seen from the table that the mean of domestic firms is of 4.3304 which is much higher than the mean of FDI firms of 3.7250. Since the sig. of Levene' Test is insignificant ($p=0.510$, > 0.05), equal variances are expected. Because of a large *p-value* ($p= 0.07$), there is not a significant difference in dimensions of quality between FDI and domestic mechanical firms in Vietnam. Independent sample *t*-test for each element in eight dimensions of quality is conducted to shed more light into the issue.

Table 8: Independent sample t-test for each item in quality dimensions group

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	Df	Sig. (2- tailed)	Mean Diff.	Std. Err Diff.
Performance	Equal variances assumed	0.415	0.526	0.247	23	0.807	0.079	0.321
	Equal variances not assumed			0.254	11.61	0.804	0.079	0.313
Features	Equal variances assumed	5.041	0.036	0.248	20	0.806	0.083	0.336
	Equal variances not assumed			0.326	17.177	0.748	0.083	0.255
Reliability	Equal variances assumed	0.010	0.920	1.418	23	0.170	0.357	0.252
	Equal variances not assumed			1.242	8.731	0.247	0.357	0.288
Conformance	Equal variances assumed	0.502	0.486	1.771	22	0.090	0.613	0.346
	Equal variances not assumed			1.606	9.314	0.142	0.613	0.382
Durability	Equal variances assumed	0.111	0.741	1.616	23	0.120	0.587	0.363
	Equal variances not assumed			1.518	9.764	0.161	0.587	0.387
Servicability	Equal variances assumed	4.892	0.038	2.523	21	0.020	1.020	0.404
	Equal variances not assumed			1.950	6.228	0.097	1.020	0.523
Aesthetics	Equal variances assumed	2.568	0.123	1.222	23	0.234	0.516	0.422
	Equal variances not assumed			1.610	20.974	0.122	0.516	0.321
Perceived quality	Equal variances assumed	1.720	0.203	2.616	23	0.015	0.675	0.258
	Equal variances not assumed			2.889	13.666	0.012	0.675	0.234

(Source: Independent sample t-test)

Table 8 shows that there is only one (out of eight) item has a significant result. The difference in perceived quality of the two groups (i.e. domestic and FDI firms) is statistically significant. Indigenous firms consider their products are of higher quality than that of FDI. As Zeithaml (1988) said that perceived quality is “the consumer’s judgment about a product’s overall excellence or superiority.” Zeithaml (1988) emphasized that perceived quality is “different from objective or actual quality, a higher level abstraction rather than a specific attribute of a product, a global assessment that in some cases resembles attitude, and a judgment usually made within a consumer’s evoked set”. Therefore, perceived dimension may or may not reflect the actual quality of a product because it based mostly on the attitude and the subjective judgment of the domestic firms staff toward a product.

Although this is an unexpected result, it can be explainable. Vietnamese people tend to protect their image and reputation in all circumstances, therefore, they might exaggerate the score of quality, making it biased upwardly. Meanwhile, people coming from the West, and Vietnamese people working for foreign firms long enough, tend to evaluate quality dimensions frankly and objectively. Therefore, the result of this factor seems to be biased. Table 9 shows the total results of the independent sample t-test.

Table 9: Results of Independent sample t-test

Hypothesis	Statement	Reject/Accept
H1	<i>There is a significant difference in product performance between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H2	<i>There is a significant difference in product feature between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H3	<i>There is a significant difference in product reliability between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H4	<i>There is a significant difference in product conformance between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H5	<i>There is a significant difference in product durability between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H6	<i>There is a significant difference in servicability between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H7	<i>There is a significant difference in product aesthetics between domestic and FDI mechanical firms in Vietnam</i>	Rejected
H8	<i>There is a significant difference in perceived quality between domestic and FDI mechanical firms in Vietnam</i>	Accepted

(Source: Independent sample t-test)

5 Conclusion

The research is to investigate the perceived differences in eight product quality dimensions of FDI and domestic mechanical firms in Vietnam. There are total 25 mechanical firms participated in responding to the questionnaire, in which there 18 domestic firms and 7 FDI firms. We found that there is no evidence showing the difference in product quality dimensions between domestic and foreign firms in Vietnam. The reason for the interesting result may come from the differences in cultures, communication styles and the sample size of the research.

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