



Quality Management Practices, Innovation and Profitability of SMEs: Evidence from Argentina

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Key words: Quality management practices, innovation, profitability, SME, Argentina, questionnaire

Abstract: This research aimed to study the diffusion of quality management practices and the attention to the innovation of Argentine SMEs also evaluating the relationship between innovation, quality management practices and profitability. To achieve the objectives of this study, we used a sample of SMEs head quartered in the province of Buenos Aires, following a stratified random sampling technique. This approach has the advantage of improving the efficiency of the estimates and the representativeness of the extracted sample. The data were collected through a questionnaire structured in 3 sections. Out of a sample of 1000 companies, 397 companies completed the questionnaire and were therefore, analyzed. The results show that only 23.2% of SMEs have introduced at least one quality management practice. The high training and consultancy costs represent the main obstacle to the introduction of tools and techniques for quality management. Culture, training, and organizational context are the main factors capable of promoting the development of these practices within companies. The results show that the stimulus for innovation which mainly concerned the product, the process and to a lesser extent the organization, comes mainly from the company's know-how and human resources but also from the stimuli coming from the competitive environment. Finally, the analysis of the causal relationships that link the propensity to invest and innovate, the introduction of quality management practices and profitability with the other explanatory variables of business management have shown that SMEs that have made investments in innovation and have introduced at least one quality management practice are more likely to achieve operating profits.

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Page No.: 328-336

Volume: 14, Issue 9, 2020

ISSN: 1993-5250

International Business Management

Copy Right: Medwell Publications

INTRODUCTION

Small and Medium-sized Enterprises (SMEs) are the backbone of economies around the world^[1-3] and they play a fundamental role in promoting economic growth, employment, innovation and social well-being. This role which assumes great importance, especially, in emerging economies has also been recognized by governments through financial and non-financial support policies. The current dynamism of the competitive environment^[4], characterized by increasing globalization and liberalization of the markets has created many commercial and development opportunities for companies of all sizes. However, at the same time, these processes have increased competitive dynamics, increasing the intensity of competition and the demand for superior quality products and services at competitive prices^[5].

Flexibility, innovation, attention to quality have become crucial factors for competing in local and international markets. In this regard, some scholars have highlighted that very often SMEs do not pay particular attention to these factors, becoming in fact more vulnerable than other companies^[6]. Other researchers have highlighted that SMEs capable of innovating have higher productivity, growth and performance levels than companies of the same size^[4, 7, 8].

However, often in SMEs, the lack of managerial skills of adequately qualified human resources or financial resources can lead to a strategic approach inconsistent with the dynamism of the competitive environment.

In the context briefly outlined, this study aims to investigate the spread of quality management practices and the attention to the innovation of Argentine SMEs, trying to answer the following research questions:

- Are quality management tools and practices applied?
- What are the factors that hinder the introduction of quality management practices?
- In the opinion of the owners and managers of Argentine SMEs what are the critical success factors necessary for the survival and development of their businesses?
- Are product, process, organizational or other innovations introduced?
- Does innovation and quality management practices affect business profitability?

The literature suggests that for SMEs, the orientation towards innovation and the development of quality management systems such as Six Sigma, represent fundamental tools for being competitive in global markets and facing competition^[9-14].

In this regard, studies on innovative and quality management practices in Argentine SMEs are rather rare. Therefore, this study intends to fill this literature gap by providing empirical evidence about such practices in the context of an emerging economy. Furthermore, the results of this research can offer useful indications to policymakers to create an environmental context conducive to the development of innovative and quality management practices, increasing the competitive capacity of Argentine SMEs.

To answer our research questions, we used a sample of Argentinian SMEs headquartered in the province of Buenos Aires, following a stratified random sampling technique. This approach has the advantage of improving the efficiency of the estimates and the representativeness of the extracted sample^[15]. The data were collected through a questionnaire structured in 3 sections. Out of a sample of 1000 companies, 397 firms completed the questionnaire and therefore were the subject of this analysis.

The results show that only 23.2% of Argentine SMEs have introduced at least one quality management practice. The high training and consultancy costs represent the main obstacle to the introduction of tools and techniques for quality management. Culture, training and organizational context are the main factors capable of promoting the development of these practices within companies. The results show that the stimulus to product, process and organizational innovation comes mainly from the company's know-how and human resources but also from the stimuli coming from the competitive environment. Finally, the analysis of the causal relationships that link the propensity to invest and innovate, the introduction of quality management practices and profitability with the other explanatory variables of business management has suggested that SMEs that have made investments in innovation and have introduced at least one quality management practices are more likely to achieve operating profits.

Literature review: The literature that has investigated the influence of quality and/or innovation management practices on the competitive capacity and profitability of companies is quite extensive and varied. However, the literature has rarely jointly analyzed the influence of these factors on the competitive ability and performance of businesses. Furthermore, the research mainly concerned companies in the most industrialized countries^[11, 16-18], among others). In this regard, the literature has highlighted that the reference context can significantly influence the competitive capacity and performance of companies^[4, 19-21].

The results of these studies have shown that SMEs in emerging economies have a series of limits, often also linked to the environmental context of reference which make innovation and the introduction of quality management practices more difficult and complex^[22, 23] among others). Consequently, although, many companies perceive the importance of these logics, most of them they face the current dynamism of the competitive environment with inadequate tools.

Quality management practices: Quality management practices Deming^[24] and Garvin^[25] represent a crucial factor in the current competitive system and involve the whole company and its stakeholders in improving business processes^[16, 26, 27].

Over the past few years, several studies have investigated the effects of introducing quality management practices on business performance^[28-30] on sustainability^[31] on the supply chain^[32, 33] on organizational performance^[17, 34] or on QM as a single factor^[34, 35].

The increase of competitive dynamics, the growing relevance of technology, the growing demand for qualified personnel have highlighted the importance of quality management practices for improving the company's competitive capacity and achieving a competitive advantage sustainable.

The literature has identified several quality management practices. In this study, we focus attention on the following factors: management leadership, people management, process management, product design and management, quality data analysis, quality management in the relationship with suppliers and customer focus. We have chosen to pay attention on these factors as they represent the most critical elements for QM^[34, 36] and they are also mostly used by literature^[37]. The logic of continuous improvement has been included in all these factors because it necessarily requires the involvement of all the elements just mentioned^[38]. Therefore, it did not make sense to consider this factor independently.

Innovation: In recent decades as already highlighted, the globalization of markets and technological progress have favored the development of commercial exchanges, reducing the constraints to innovation processes.

The reduction of the life cycle of products and services^[39] requires companies to continuously improve the output of the production combination, introducing products and services in line with the dynamic needs of the market. Like quality management practices, innovation also plays a fundamental role in competing in local and international markets as widely suggested by the literature^[7, 8].

Innovation produces a positive impact on productivity on competitive capacity and on the development of enterprises as amply highlighted by the literature^[9, 40-43]. However, this positive impact may have different effects depending on the production sector and the reference context of the company^[44, 45].

Some researchers have highlighted that innovation can concern products, processes and organizations but also the collaboration with other companies or institutions^[46], the management of relationships with customers and suppliers and a number of other factors^[47].

In the context briefly outlined, innovation^[48] in its various meanings, therefore represents a crucial factor for the competitive ability and performance of companies.

Research design and sample: The study aims to investigate the quality management and innovation practices of SMEs head quartered in the Province of Buenos Aires. The choice of the sample of SMEs to be subjected to the analysis was carried out in a probabilistic way following a stratified random sampling logic^[49]. This approach has the advantage of improving the efficiency of the estimates by guaranteeing the representativeness of the extracted sample^[15]. In the stratification process, we took into consideration geographical and economic criteria. The geographical criterion made it possible to take into account the differences existing between the various territories of the province in terms of population density and weight of businesses. The economic criterion made it possible to include a sufficiently different number of SMEs in terms of size, number of employees and turnover. We set a sample of 1000 companies with the aim of guarantee an error $|d| \leq 0.055$ with a probability of 0.95 based on the following (Table 1).

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

where, N is the population size and n_0 is given by:

Table 1: General sample information

Sectors	No	Percentage
Primary	79	19.9
Industry	212	53.4
Services	106	26.7
Age		
<5	49	12.3
>5<10	73	18.4
>10<20	131	33.0
>20	144	36.3
Gender		
Male	298	75.1
Female	99	24.9
Studies		
No university	276	69.5
University	121	30.5

Table 2: Ownership, employees, turnover and profitability

Founder of the company	Percentage
Current owner	53.2
Parents of the current owner	22.5
Current owner group	12.2
Grandparents of the current owner	5.3
Other founders	4.1
Other answers	2.7
Company members/shareholders	
1	12.5
2	39.6
3-5	42.7
6 or more	5.2
Number of employees	
1-19	20.9
20-49	32.3
50-99	25.4
100-200	14.5
>200	6.9
Average turnover (US dollars)	
<2 millions	36.9
>2<10 millions	32.7
>10<50 millions	25.6
>50 millions	4.8
Profitable companies (past 3 years)	
2018	65.7
2017	63.8
2016	65.4

$$n_0 = \frac{z^2 (0.975p(1-p))}{\epsilon^2}$$

For the determination of the level of p, we assumed a maximum level for the variability of any hypothetical dichotomous variable, reached for p = 0.5. Therefore, the sample error has been set as $|\epsilon| \leq 0.05$ with a 1- α probability = 0.095.

All data were collected through the use of questionnaires. In the first phase of the research, the questionnaire was tested on a small sample of companies to evaluate its effectiveness compared to our research questions and to avoid distortions in the data.

After completing the test phase, we sent an email to all 1000 SMEs included in the sample, explaining the purpose of the survey. The e-mails were followed by a phone call aimed at raising the awareness of the owners and managers of companies on the importance of research. Overall, 454 companies agreed to participate in the survey (45.4% of the sample) and therefore received the questionnaire. We used a questionnaire that included closed answers. This approach has facilitated the collection of quantifiable data and has increased the quality of the analysis of the results. In addition, some questions in the questionnaire included the possibility of grading the answers on the basis of a 5-point Likert-type scale (from 1 = no influence to 5 = very high influence) and quality initiatives (from 1 = never to 5 = always). This approach allows respondents to quantify the importance of choices and facilitates the work of researchers^[50, 51].

Table 3: QM practices

Parameters	Values
Introduction of QM practices (1 or more) (%)	
Yes	23.2
No	76.8
Type of QM practices (%)	
Customer focus	45.7
Supplier quality management	43.3
Product design and management	32.4
Quality data analysis	29.8
Management leadership	11.2

The questionnaire was divided into three sections. The first section aimed to collect general data on the company such as year of foundation, the composition of the corporate structure, governance systems, performance. The second section included questions related to innovation, quality management practices and critical success factors. Finally, the last section contained a series of control questions aimed at verifying the consistency of the answers provided in the first two sections.

At the end of the survey, 397 Argentinian SMEs completed the questionnaire (equal to 39.7% of the sample). An analysis of the literature^[37, 52, 53] on other similar studies have shown that the response rate is generally between 11.5 and 25.2%, therefore, the response rate to our survey was higher than that of previous studies.

Overview of SMEs characteristics: This study shows the main characteristics of the companies in the sample that replied to the questionnaire.

The companies belong mainly to the industrial sector (53.4%) have been founded for over 10 years (66.3%), the owner/manager is male (75.1%) and has a non-university culture (69.5%). Table 2 shows the company's founder, the number of shareholders, the number of employees and the performance of the past 4 years (understood as the number of companies that have recorded profits in the past 3 years).

The data show a prevalence of first-generation entrepreneurs (53.2%) and a certain presence of family businesses (27.8%). The ownership is concentrated in the hands of a few partners (52.1% 1 or 2 shareholders) who in general cases also take on the role of company manager. Most companies (53.2%) have fewer than 50 employees and <\$10 million in revenue (69.6%). Over the past 3 years, most businesses have reported profit.

Quality management practices: Table 3 shows the companies that have introduced quality management systems and the type of practices developed.

As is evident, most companies (76.8%) do not use quality management practices. However, the companies (27.2%) that have introduced 1 or more quality management practices have mainly invested in tools aimed at implementing the relationship with customers

Table 4: Motivations for not implementing quality initiatives

Motivations (more than one answer)	Percentage
High consultancy and training costs	52.4
Difficulty collecting and organizing data	34.3
Unknown tools	25.6
Complex tools	23.5
Long time	18.4

Table 5: Factors driving quality practices

Factors	Ranking
Education and training	3.92
Organizational infrastructure and culture	3.81
Motivation of team members	3.73
Cultural change	3.71
Customer relationship	3.62
Supplier relationship	3.57

*(Scale from 1-5; 1 very low; 5 very high)

Table 6: Critical success factors

CSF (>1 answer)	Percentage
Products quality	58.2
Value for money	57.1
Specialization level	36.4
Punctuality of deliveries	34.3
Brand	18.7

Table 7: Investments and innovation

Parameters	Values
Investments in the past 5 years (%)	
Yes	73.1
No	26.9
Type of investments (%)	
Plant, machinery and equipment	39.6
Vehicles and trucks	16.4
Infrastructure	16.2
Business information systems and software	11.9
Research and development	3.8
Others	12.1
Purpose of investments (%)	
Increase in production capacity	26.1
Increase in product lines	19.3
Market share increase/entry into new markets	15.3
Regulatory adjustments	10.5
Investments required by customers	10.3
Investments required by suppliers	9.3
Competitors	9.2
Innovation (%)	
Product innovations	37.2
Process innovations	26.8
Organizational innovations	12.7
No innovation	23.3
Factors driving innovations (%)	
Internal know-how and resources	36.7
Sources of information (conferences, fairs, trade magazines, etc.)	28.6
Customer requests	11.1
Suppliers	10.5
Competitors	10.2
Universities and research centers	2.9

(45.7%) and with suppliers (43.3%). Table 4 shows what are the motivations why companies have not invested in quality management practices.

The prevalence of companies (52.4%) believes that the main obstacle to the introduction of quality management practices is represented by high consultancy

and training costs while 25.6% of companies do not know these tools. Table 5 shows which factors are considered important for the introduction and implementation of quality management initiatives in the SMEs of the sample.

Education and training, organizational culture and change of mentality are the main factors capable of pushing companies towards the introduction and implementation of quality management practices and tools. However, also the growing competitive dynamics create a further push to introduce these practices.

Finally, Table 6 highlights which are the main SCFs for the survival and development of the company according to the opinion of the entrepreneurs interviewed. As is evident, product quality and value for money are the most important factors in successfully competing.

Investment and innovation: Table 7 shows the investments and innovations made in the last 5 years and the objectives pursued.

The prevalence of companies has made investments (73.1%) in plants, machinery and equipment (39.6%), vehicles and trucks (16.4%) and logistics infrastructures (16.2%). The investments were aimed at increasing production capacity (26.1%), product lines (19.3%) and market share (15.3%).

Like what was previously found for quality management practices, a significant share of investments (28.8%) was determined by stimuli from the competitive environment (customers, suppliers and competitors). The innovation mainly concerned the product (37.2%), the process (26.8%) and to a lesser extent the organization (12.7%). The driving force behind innovation comes from the company's know-how and human resources (36.6%). In line with what has been noted for investments, the players of the competitive environment (31.8%) provide an important boost to innovation. The role of universities and research centers is instead limited (2.9%).

QM practices, innovation and profitability: This study examines the causal relationships that link the propensity to invest and innovate, the introduction of quality management practices and profitability with the other explanatory variables of business management present in the questionnaire. The description of the variables is shown in Table 8. In the analysis, the three variables (variable 1, variable 6, variable 8) represent the dependent variables while the others are considered to be explanatory variables.

Profitability (variable 1) takes value 1 in the case of profit and 0 in case of loss. The propensity for innovation (variable 6) assumes value 1 if the company has made product and/or process innovations while they assume value 0 otherwise. Finally, the QM Practices (variable 8) takes value 1 if the company has introduced at least one quality management practice and 0 in all other cases. In

Table 8: Variables analyzed

Variables	Description	Types
1	Dummy operating result (1 = Loss;0 Profit)	Binary
2	Age	Discrete
3	Turnover	Continuous
4	Gender (1 = male; 0 Female)	Binary
5	Owner Education Level (1= graduate)	Binary
6	Product or process innovations (>1)	Binary
7	Investments in the past 5 years (>1)	Binary
8	QM Practices(>1)	Binary

Table 9: Logistic regression variable 1 (profitability); estimates (βi) and p-values (p(βi))

Variables	β ₀	β ₁	p(β ₀)	p(β ₁)
2	0.0641	-0.0074	0.8381	0.6194
3	0.0992	0.0000	0.6739	0.0901
4	0.0089	-0.0624	0.9756	0.9051
5	0.0261	-0.5746	0.9111	0.3803
6	-0.0943	0.0534	0.7567	0.8891
7	0.6931	-1.2403	0.0491	0.0058
8	-0.0927	0.0564	0.7781	0.8907

Table 10: Logistic regression variable 6 (innovation); estimates (βi) and p-values (p(βi))

Variables	β ₀	β ₁	p(β ₀)	p(β ₁)
1	0.1681	0.0551	0.5712	0.8883
2	-0.1939	0.0191	0.5411	0.2034
3	-0.0479	0.0000	0.8125	0.2691
4	0.2415	-0.1301	0.7137	0.8016
5	0.0677	0.9078	0.7601	0.1947
7	-0.6892	1.4215	0.0351	0.0008
8	-0.6584	1.4423	0.0372	0.0009

Table 11: Logistic regression variable 8 (QM practices); estimates (βi) e p-values (p(βi))

Variables	β ₀	β ₁	p(β ₀)	p(β ₁)
1	1.0979	-1.2298	0.0010	0.0058
2	0.5231	-0.0091	0.1107	0.5163
3	0.1781	0.0000	0.4251	0.1821
4	-0.1201	0.4057	0.8601	0.4579
5	0.3601	-0.1781	0.0942	0.7911
6	-0.3362	1.4121	0.2489	0.0009
7	-0.3299	1.4134	0.2503	0.0008

line with previous research^[15], this study uses a logistic regression model based on the following function which can take values from zero to 1^[54, 55].

Let $Y_i = \{0,1\}$ be a dichotomous variable that assumes the following Bernoulli distribution, conditioned to a set of covariates X_{ij} with $j = 1, \dots, p$ and $i = 1, \dots, n$:

$$(Y_i | X_{1,i}, \dots, X_{p,i}) \sim B(1, \pi_i)$$

where the conditional distribution function is given by:

$$p(Y_i | X_{1,i}, \dots, X_{p,i}) = \pi_i^{Y_i} (1 - \pi_i)^{1 - Y_i}$$

And:

$$\pi_i = \frac{1}{1 + e^{-(\beta_0 + \sum_{j=1}^p \beta_j X_{j,i})}} = \frac{1}{1 + e^{-X_i \beta}}$$

with $X_i = (1, X_{1,i}, \dots, X_{p,i})$ $\beta = (\beta^0, \beta_1, \dots, \beta_p)'$ and is a vector of regression parameters that can be estimated by means of maximum likelihood estimators. Table 9 shows the estimates relating to profitability where the dependent variable is represented by the profitability dummy (variable 1).

Profitability analysis shows that SMEs that have higher turnover have made investments in innovation and have introduced at least one quality management practice are more likely to achieve operating profit. Table 10 shows the estimates relating to innovation where the dependent variable is represented by the innovation dummy (variable 6). Firms that have invested in the past 5 years and have introduced quality management practices are more likely to innovate than other firms. This result confirms the consistency and reliability of the results analyzed previously. Table 11 shows the estimates relating to QM practices where the dependent variable is represented by the QM dummy (variable 8). SMEs that have introduced quality management practices tend to invest more and are more likely to earn an operating profit.

CONCLUSION

This study aimed to study the diffusion of quality management practices and the attention to the innovation of Argentine SMEs headquartered in the province of Buenos Aires. Likewise, this study aimed to investigate the relationship between innovation, quality management practices and profitability.

To answer our research questions, we used a sample of Argentinian SMEs, following a stratified random sampling technique. This approach has the advantage of improving the efficiency of the estimates and the representativeness of the extracted sample^[15]. The data were collected through a questionnaire structured in 3 sections. Out of a sample of 1000 companies, 397 companies completed the questionnaire and were therefore subject to this analysis.

The results show that only 23.2% of SMEs have introduced at least one quality management practice. Among these, Customer focus (45.7%) and Supplier Quality Management (43.3%) are the most used techniques. The prevalence of companies believes that high training and consultancy costs represent the main obstacle to the introduction of tools and techniques for quality management. Culture, training and organizational context are the main factors capable of promoting the development of these practices within companies. According to entrepreneurs, product quality and value for money represent the main SCFs to compete effectively in the current competitive context.

In the past 5 years, most companies have made investments (73.1%) to increase production capacity

(26.1%), product lines (19.3%) and market share (15.3%). In line with the findings for quality management practices, a significant share of investments (28.8%) was determined by stimuli from the competitive environment (customers, suppliers and competitors). The innovation mainly concerned the product (37.2%), the process (26.8%) and to a lesser extent, the organization (12.7%). The driving force behind innovation comes from the company's know-how and human resources (36.6%).

Finally, the analysis of the causal relationships that link the propensity to invest and innovate, the introduction of quality management practices and profitability with the other explanatory variables of company management have highlighted further relevant aspects. In particular, the profitability analysis showed that SMEs that have higher turnover have made investments in innovation and have introduced at least one quality management practice are more likely to get operating profits. With reference to innovation, the results suggest that companies that have made investments in the past 5 years and have introduced quality management practices are more likely to innovate than other companies. This result confirms the consistency and reliability of the questionnaire results. Finally, with reference to QM practices, the results show that the companies that introduced such practices tend to invest more and are more likely to get an operating profit. The results of this study offer a significant contribution to the literature on innovation and the development of quality management practices in the Argentine context, highlighting the state of the art in an emerging economy. In addition, the results may be useful in raising entrepreneur's awareness of the advantages in terms of competitiveness and performance, deriving from innovation and the introduction of quality management practices. Finally, given the obstacles suggested by entrepreneurs, they can provide useful indications to policymakers on the actions to be taken to encourage the competitiveness of Argentine companies.

ACKNOWLEDGMENTS

The researchers would like to thank all BeLab researchers for their valuable help in administering and processing the questionnaire data.

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