Influence of Quality, Innovation and New Product/Services Design on Small and Medium Enterprises

Aamer Hanif and Irfan Anjum Manarvi

***Abstract*— Small and medium enterprises (SMEs) are normally required to attain dynamic success targets by improvement of their processes, products and services. One way to achieve this could be through quality initiatives and innovation in processes, products and services. In a knowledge based economy, use of quality measures alone may not bring competitive advantage due to severe resource constraints. Therefore, innovation may become a key parameter to define the strategic objectives. This paper focuses on investigating quality initiatives implemented by SMEs and its innovation. Data was collected on these parameters from 38 SMEs and eight measures of innovation were investigated for their importance and use. Pakistani, British and Portuguese SMEs were compared.**

***Index Terms*—innovation, quality, small and medium enterprises.**

I. Introduction

About 90% SMEs in Pakistan employ up to 99 persons. These contribute to over 30% of the GDP and 25% in export earnings, that may be referred an economy of SMEs [1]. Definition of SME for the purpose of this research was based upon the State Bank of Pakistan's guidelines about number of employees and financial turnover [2]. Technology and marketing innovation have been recognized as two major areas for investment. Pakistani SME policy calls for establishment of Technology Innovation Centers to improve performance through technology up-gradation [3]. Balanced scorecard (BSC) approach answers the critical question about performance improvement and creating value by innovation. A BSC based performance measurement system incorporates measures which depict health of a business across various levels including processes, people, supply chain etc. [4]. The balanced scorecard also provides the SME to reconcile its business plan with the operational activities and is effectively used in the performance measurement phase [5]. Ability to innovate, improve and learn is tied with a company's value and measures of innovation focus on a company's ability to develop products and services for the future [6].

Current performance measurement (PM) in SMEs is limited by barriers of limited resources and strategy oriented processes. These impede redesign and revision of current PM systems [7]. Any performance assessment framework is required to be based upon non financial measures and company culture of continuous improvement. However, SME managers do not spend time to lead improvement initiatives, which further necessitates innovative practices for competitive advantage [8]. A balanced scorecard based approach has been successfully used for determining the current state of knowledge related to performance measures and their implementation in SMEs in England and Portugal. Results from both surveys indicated a lack of use of measures of innovation and learning [9][10].

Innovation studies in SMEs need to consider a wider aspect of involving people and processes also rather than being limited to only technical innovation [11]. Technical expertise alone cannot drive the innovation process. It has however been accepted as a broad based strategic process covering interactions of SMEs with other organizations that support innovation. It may be dependent on external resources like funds, information and knowledge available outside SME's boundaries. Innovation support system was therefore suggested which linked SMEs with universities and research institutions in complex technological problems [12]. Knowledge and learning in SMEs formed a basis for innovation and requires full participation of employees, flatter organizational structures, training and support of top leadership [13]. SMEs normally have flat organizational hierarchies which improves level of participation of employees in a decision making process.

Present research focuses on studying various initiatives that SMEs may incorporate for achieving better quality and innovation in their products and services. Balanced scorecard was chosen for comparison with British and Portuguese SMEs. The "innovation" dimension of the BSC is explored in this research.

II. Methodology

The procedure adopted in this research is similar to one used for British and Portuguese SMEs. It employs the same questionnaire used with the permission of the authors [9]. Research questionnaire was sent to 60 SMEs however valid responses from 38 SMEs were received. Eight measures of innovation were identified in the questionnaire and data was collected on both importance and use of these measures. The respondents were asked to rate their responses on a five-point Likert scale. The Statistical Package for Social Sciences (SPSS v16.0) was used for analysis of the data [14].

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The SMEs under study had varying number of employees as shown in Fig 1.

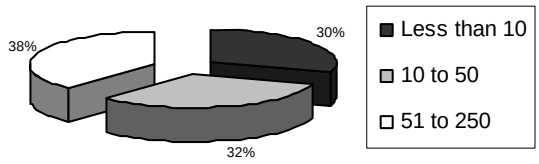

Figure 1. Number of employees in respondent SMEs

III. EVALUATION OF STRATEGIC OBJECTIVES

The responses from SMEs showed that management considered "profitability" and "quality" as of primary importance. The parameters of innovation, market share and cost could not score high grades with the respondents as shown in Fig 2.

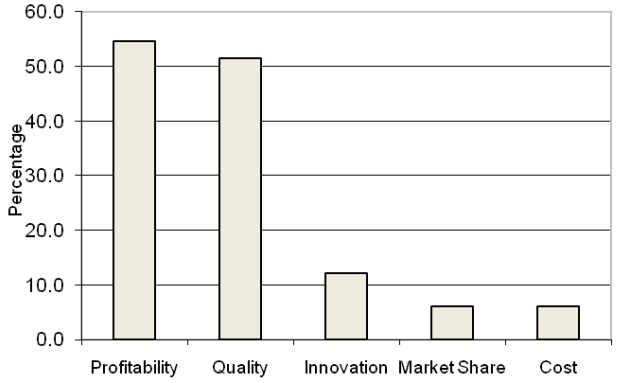

Figure 2 Parameters Defining strategic objectives

The SME management explained that in general the cost of labor was low therefore it was not much of a worry. However if the cost of material increased due to any reason, they had to focus on sale of existing stocks through improvement of quality. This increased profitability which was their major concern. The management was however unaware of their overall market share due to limited knowledge and innovation awareness was also lacking. These reasons showed the responses of SME management to be giving lower weightage to market share and innovation as in the above figure.

IV. EVALUATION OF QUALITY INITIATIVES

The research questionnaire also focused on the awareness of SMEs management on various quality initiatives. The responses showed the presence of a number of quality initiatives in these companies. These are shown in Table 1 along with the overall percentage of importance given to each measure by the respondents. A review of Table 1 showed that the respondents gave highest weightage to the following:

a) Employee involvement to improve quality
b) Customer satisfaction program
c) Setting up a quality department
d) Establishing measures of quality progress

Table I: Quality initiatives according to use

Quality Initiatives	**Percentage**
Employee involvement to improve quality	54.1
Customer satisfaction program	51.4
Setting up a quality department	40.5
Establishing measures of quality progress	37.8
Supplier involvement program	24.3
Business process improvement	24.3
Developing strategies for total quality	16.2
Applying statistical process control	16.2
Cultural change program	8.1

A comparative analysis of this result from the Pakistani SMEs with British and Portuguese showed that the first three were ranked high by the latter two as well. It could also be inferred that quality conscious work force would add value to the SMEs products and services and increase profits.

The table also showed substantial requirement of the following:

a) Supplier involvement program
b) Business process improvement
c) Developing strategies for total quality
d) Applying statistical process control
e) Cultural change program

All these factors directly or indirectly influenced the overall quality improvement of products and services of the organizations. Their response values were comparatively low because of the unfamiliarity of SME managers with the latest trends and methodologies of implementations of these parameters. At times it was attributed to limited resources as well.

The organizational cultural change program was one element with least score in current research. The respondents were of the view that it was marginal as compared to parameters discussed above. This parameter was more prominent with those SMEs which had links with multinationals in some form or another for achieving their objectives.

V. EVALUATION OF INNOVATION MEASURES ACROSS COUNTRIES

The results established through above analysis compelled the researchers to analyze the influence of innovation measures among SMEs of the other countries. Therefore, literature on British and Portuguese SMEs [][] respectively was reviewed on the basis of current data collected for Pakistani SMEs. A comparative analysis of Portuguese and British SMEs was extracted for following two parameters of innovation measure:

a) Use of innovation measures in SMEs
b) Importance of innovation measures

The relevant data from literature was rearranged to arrive at some meaningful ideas which could be used for comparative analysis of Pakistani SMEs. The comparison of British and Portuguese SMEs is shown in Figure 3.

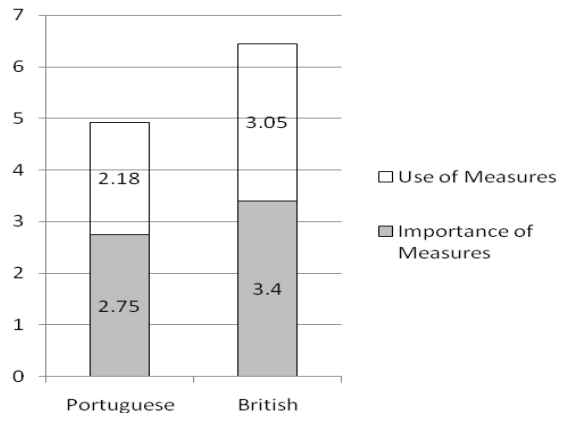

Figure 3. Innovation measures in British and Portuguese SMEs

It was observed that the British SMEs management gave 24% more importance to use of innovation measures as compared to Portuguese. The use of innovation measures was being considered 40% more by the British management as compared to the Portuguese companies. These results confirmed the commitment of academia and industry in Britain for creating awareness of innovation's importance and its continuous use among the SMEs. Another major addition could be the continuous addition to the body of knowledge through research in academia in Britain adding value to SMEs and development of an overall knowledge based economy in Britain.

Figure 4. Innovation measures in Pakistani and Portuguese SMEs

After comparative analysis of British and Portuguese SMEs, it was considered important to analyze the results of Pakistani SME responses in light of Portuguese for use and awareness of importance of innovation measures among these. This analysis is given in Fig 4. It was observed that Portuguese SMEs gave 26% more importance to use of innovation measures. This could be primarily be due to Portuguese presence close to the developed nations in Europe and unrestricted flow of knowledge due to geographical boundaries. The frequent interaction of scientists, researchers, students and business people among Portuguese, British and other developed nations could be source of creating the awareness among the Portuguese SMEs.

A comparative analysis of British, Portuguese and Pakistani SMEs was also considered important to evaluate the importance and use of innovation measures among their SMEs. It was observed that Pakistani SMEs had the biggest gap between realizing the importance of innovation and actually putting it into practice. It was followed by Portuguese SMEs and was insignificant among British SMEs as shown in Fig. 5 below.

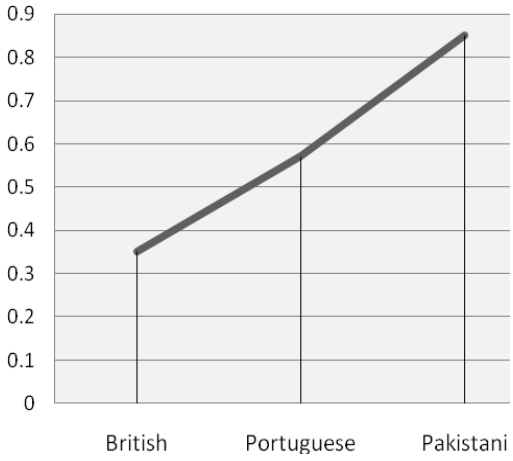

Figure 5. Difference between importance and use of innovation measures in SMEs

VI. Evaluation of Product/Service Improvement and Development

The eight measures of innovation were divided into two groups based upon their relationship with product/service improvement (Group 1: Fig 6) and new product/service development (Group 2: Fig 7). This was done to gain further insight to answer following two questions.

Q1: Can SMEs continue to improve and create value?

Q2: Can SMEs deliver new products/services with extended capabilities?

The average of use of measures in Group 1 (Fig 6) was 1.63 while that of use of measures in Group 2 (Fig 7) was 1.83. These low values showed that local SMEs were not focusing their efforts on innovation, and this was definitely not the key parameter defining their strategic objective at present. These low values could also be explained by SME manager's responses during discussion that their companies were not engaged in research and development (R&D) activities where innovation exits. However, they needed to understand the fact that innovation needed to be managed across product, service and the process dimensions to significantly improve overall business performance. The answers to both questions were in the negative in case of Pakistani SMEs. Innovation measures were also identified as the least used in Portuguese and British SMEs indicating that companies worldwide were not considering it an essential paradigm for success in the global economy.

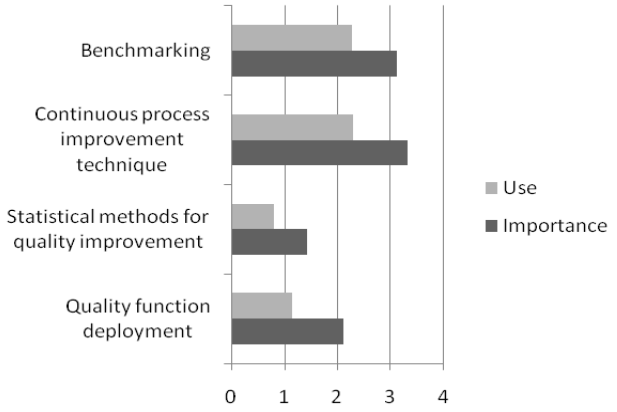

Figure 6. Measures related to product/service improvement

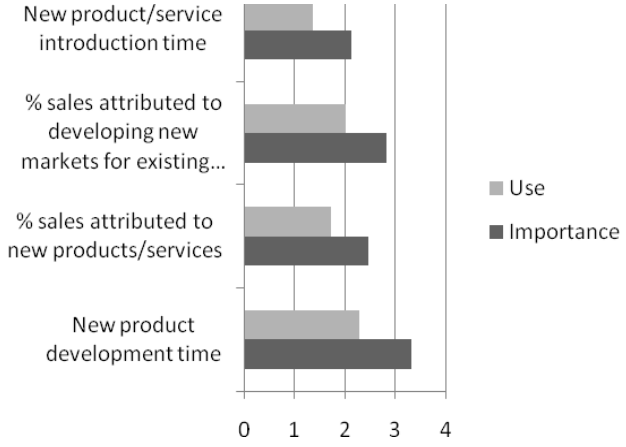

Figure 7. Measures related to new products/services

VII. Findings

The research showed that local SMEs considered profitability and quality as their key strategic parameters. Innovation was not given importance and managers did not consider new product and service development as critical success factors. This was explained by the wide gap between perceived importance and practical use of innovation measures in Pakistani SMEs. Quality improvement initiatives were being undertaken and customer satisfaction was considered important but strategies for total quality, statistical process control and change of organizational culture were considered as lesser important aspects in SMEs. Product and service improvement and design for new products/services was being misconstrued as a pure R&D department activity only. Since a dedicated R&D department did not exist in SMEs, this inhibited them from improving processes and creating value by delivering new products and services.

VIII. Conclusion And Future Work

Knowledge based economy requires use of innovation measures in addition to quality initiatives for achieving competitiveness. Innovation measures were the least used for performance measurement in SMEs. However there was awareness in SME managers to look for product and service improvement techniques since it was essential for their continued existence.

The SME's day to day working involves most of the effort directed to solve managerial problems. SMEs can only survive in current economic crises if they innovate to create new products or services and reach a market in novel ways. Further research is required to link country characteristics and national culture to performance measurement across the quality and innovation dimensions.

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