EVALUATING THE IMPACTS OF WASTE AND DEVELOPMENT ON ORGANIZATIONAL PERFORMANCE FOR SMALL TO MEDIUM ENTERPRISES IN MANUFACTURING

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Abstract - Nowadays Small and Medium Enterprises (SMEs) are required to compete in turbulent markets. A necessary condition to achieve high performance standards is being able to effectively measure and to monitor company's performance. The purpose of this investigation is to understand the relationships that exist between different factors of performance measurement that lead to operational and business sustainability performance. Therefore, in this investigation, a model is been formed to represents an original attemptthat the criteria for performance measurement was broken down into more practical practices with holistically view that can be used to reasonably evaluate the performances of SME's. The presented framework attempts to recognize existing activities as well as their influence on performance measurement, and it is developed upon four basic constructs: production, delivery, customer service and leadership, which are further associated with manufacturing SME's i.e. quality, cost, delivery and agility. In addition.The study examines the performance of tenSME's within the UK context.A questionnaire survey was conducted in manufacturing sector including 100 valid questionnaires were analyzed by using SPSS (V.23). In this study, it is considered to find the relationship between the key factors (such as waste and development) that have investigated by other researchers with new an approach. Finally, this paper presents a conceptual framework and analysis process to development a performance measurement model for SMEs' sustainability.

Keywords - Performance measures, Small to Medium-sized Enterprises, sustainability, key performance indicators

I. INTRODUCTION

Small and medium-sized enterprises (SMEs) account for over 95% of all businesses and 85% of all new jobs in developed economies (Wheelen and Hunger, 2002). They are perceived as the main drivers of economic growth, product innovation and job creation in the UK and makeup 99% of all business in UK, account for 12% of firms engaged in exports and 11% of firm's engaged imports (Stanworth and Purdy, 2003 and Ward and Rhodes, 2014). Although they are the main part of economies in UK and other countries, SMEs are still confronted with a huge failure rate (Fatoki 2014) giving rise to the question as to why this failure rate persists even today?
In addition, the structure of today's business context is changing quickly, generating a great deal of uncertainty. This environment forces firms, particularly SME's, to be cautious about their processes and practices in order to survive on the market. This means that they must keep a close eye on their performance (Kennerley and Neely, 2003;Cocca and Alberti, 2010).

Therefore performance measurement systems (PMSs) are considered as a means to gain competitive advantages and continuously react and adapt to external changes (Cocca and Alberti, 2010). According to Neely et al. (2002), "A Performance Measurement System is the set of metrics used to quantify the efficiency and effectiveness of past actions" and "it enables informed decisions to be made and actions to be taken because it quantifies the efficiency and effectiveness of past actions through the acquisition, collation, sorting, analysis and interpretation of appropriate data". Performance measures establish the quantitative backbone of a PMS, by which the actual performances are measured. Globerson (1985) and Maskell (1989) are amongst the early studies that worked on the main characteristics of performance measures, in which a set of guidelines was developed to elaborate on the characteristics of performance measures. Following them, many authors have underlined the importance for all major businesses of evaluating and modifying performance measures in order to adapt to the rapidly changing and highly competitive business environment (Eccles, 1991; Kennerley and Neely, 2003). However, there is a significant immaturity of studies in the literature on the PM in SMEs (Brem et al., 2008, Taticchi et al., 2010). In a review study, Garengo et al. (2005) spotted five common issues with the existing PM projects in SMEs, namely:

- A significant gap between theory and practice of PM in SMEs.
- Lack of SMEs involvement in performance measurement projects.
- Incorrect use of PM models _i.e. ignoring the appropriateness of the method for the size of business (Carpinetti et al., 2008).
- Rare attention to a 'holistic approach'.
- Informal, un-planned and unstructured effort.

Besides the above existing disadvantages in the SME's studies, with reference to performance measurement, SMEs are still relying mainly on

accountancy information and financial measurement (Carpinetti et al., 2008); focus on technical aspects and production (Hong and Jeong, 2006) usually leads SMEs to a misconception about performance measurement, often considered as a wasting-time activity (Garengo et al., 2005). Therefore, one purpose of this investigation is to show that it is possible to obtain a PM tailored to the specific needs of SMEs when financial information is combined with non-financial information.

Considering the above discussion, it is evident that in order to perform a complete review of a PMS it is therefore necessary to assess not only the effectiveness of the measures but also the effectiveness of the system as a whole. For this purpose, performance metrics must be developed to express operational strengths and weaknesses in a holistic manner (Sedehi, 2015).

In general, this study aims to develop a model to evaluate the employment of performance measurement in manufacturing SME's within the UK context to recognize existing activities as well as their influence on performance management. This research highlights some activities of firms including waste management and development, leading to more successful processes and better performance. This research aims to provide a model that comprises factors that may influence UK manufacturing SMEs' performance including delivery, quality, cost and agility.

II. RESEARCH METHODOLOGY

2.1. Holistic Data Collection

It is considered an important step forward for SMEs to identify which parameters are to be measured with respect to the conditions and projected measures of their business flow at any given time. For this to become possible, the employed requirement gathering method is intended to hold the following features:
First, it should be comprehensive to cover in-depth list of inputs from resources, operations, and outcome measures. And the number of metrics used in performance measurement must be sufficient to provide a comprehensive representation of process(Sedehi, 2015). This will also encourage all SMEs to find the nature of the input information they are most concerned in their day-to-day business (St-Pierre and Delisle, 2006).Second, quantifiabledefinition should be taken into account to be able to provide quantitative measure of the importance of each input parameter. Finally, the data Frequency is important to provide quantitative measure of the required frequency of the measurement of every input parameter(Sedehi, 2015). The above features are expected to generate effective clarification for every SME to enable them to plan based on the most efficient PMS. To be able to define a performance modelling tool that could cope with complexities of process definition and stochastic events such as the reactions to unprecedented market changes, stochastic modelling tools reported to be a good candidate (Son and Wysk, 2001). Application of this technique for performance modelling and performance evaluation (Komashie et al, 2008) supports the assumption of stochastic behaviour of performance measures and not just the input information. This can be interpreted as event-based measurement systems look at both input and output of the system as events.Connection of these discrete events to a PMS would require an understanding of the stochastic behaviour of flow of products or information within the process of an SME.

2.2. Conceptual Framework

The overall view of the conceptual model in the methodology of this thesis is shown in Fig.1. The constructs in this study were devised from the relevant literature and adapted to the framework of manufacturing SME's in developed countries (i.e. UK) where required. The framework is developed upon four basic constructs: production, delivery, customer service and leadership, which are further associated with manufacturing SME's i.e. quality, cost, delivery and agility. The SMEs' operations are responsible for internal and external performance outcomes, which leads to the organizational objectives.

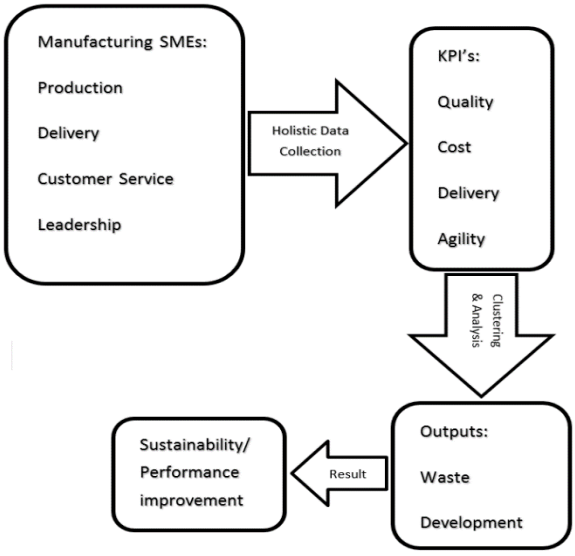


Fig.1. Conceptual framework

III. DATA COLLECTION AND ANALYSIS

3.1. Data Collection

Based on the literature reviewregarding performance measurement research approaches and SME's analysis, the researcher has decided to opt for quantitative research method as the most suitable method for this research, to contribute to the field. Therefore, two type of survey questionnaire have been prepared for the study. Ten Manufacturing

SME's hasbeen participated. The first questionnaire was needed to be complete just once, in order to gather general information about the firm. Itincluded two sections, Section I (company profile) Section II (financial profile), with total 14 questions.

The second questionnaire was an excel file that needed to be filled once a month; and data was gathered for nine months. Fig.2 demonstrates the age and size of the participated companies.

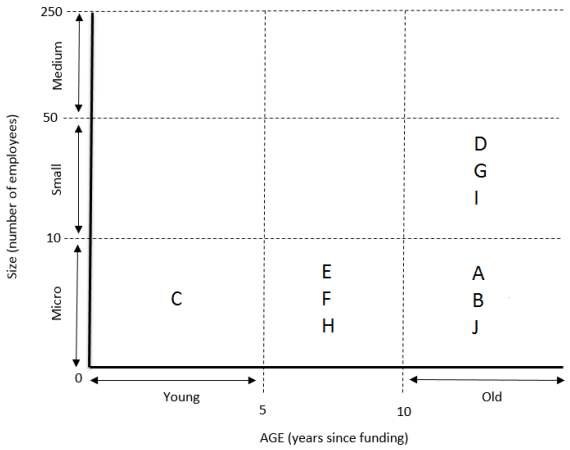


Fig.2. Comparing young-small SMEs to old-large SMEs across SME's under study.

3.2. Clustering Method

As it is mentioned, the aim of the research is to examine the associated evolution of performance measurement and metrics for manufacturing SME's and propose a model for performance measures to improve the SME's monitoring performance. For this purpose, it is essential to understand the nature of the SMEs that may be acting similarly. In this investigation, despite the fact that all case studies are in manufacturing sector, their performance needs to be categorized in order to study them further in details. This performance analysis has been done based on the success factors (Cocca and Alberti, 2010) identified in the literature review along with the questionnaires collected from them. In addition, the measure of the cost of the SMEs due to the implementation of the outcome of this approach is sought to be among the main measures of the success of this work.

3.3. Data Analysis

After clustering the SME's in three groups, the different models and tests used in the study.The model for this study was developed from related literatures and is examined through multiple regression analysis, a statistical technique used when the purpose of research is to test the relationship between variables. This analysis is used to find the relationship between dependent and independent variables. This study investigates the impact of waste and development on the manufacturing SME's performance in UK. In the first step the reliability test is implemented to measure consistency. Table 1 demonstrates that the reliability values of factors in most cases are more than 0.70.These values indicate the high reliability of the study.

Table1: Reliability Test in SPSS by Cornbach Alpha.

Type of Classified Factors	A	B	C	D	E	F	G	H	I	J
Speed/Time	0.869	0.713	0.895	0.779	0.953	0.746	0.710	0.929	0.912	0.926
Effectiveness/ efficiency	0.814	0.695	0.776	0.576	0.759	0.788	0.759	0.649	0.852	0.791
Consistency and waste	0.692	0.718	0.701	0.625	0.694	0.666	0.600	0.693	0.661	0.678
Cost	0.750	0.886	0.750	-	-	-	-	0.750	0.750	0.703
Leadership and Development	0.763	-	-	0.705	0.714	0.701	0.704	0.708	0.731	0.720

CONCLUSIONS

This study represents an original attempt that the criteria for performance measurement was broken down into more practical practices with holistically view that can be used to reasonably evaluate the performances of SME's within the manufacturing sector.The presented framework attempts to recognize existing activities as well as their influence on performance measurement. Following activities has been done for this project; first, literature review indicated the advantage and disadvantage of the existing PMS models. Second, the main effective factors have been recognized in literature review, and in order to have an effective model a wide range of factors have been considered in this investigations. And finally, data analysis is in progress and the reliability test has been successful.The study will continue to focus on the model testing and the different hypothesis relationships within the model.

ACKNOWLEDGMENTS

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