BENCHMARKING OF GROWTH MANUFACTURING SMES: A REVIEW

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ABSTRACT: *This paper aims to describe the benchmarking implementation in small medium-sized manufacturing enterprises (SMEs) as useful in order to determine the factors for improving efficiency, performance production, and operations of managers in small scale manufacturing firms. The proposed determinants are gathered by extensive review of literature regarding the concept of benchmarking, efficiency, and performance production in manufacturing SMEs. This research is based on case studies, corporate experience, and the views of international funding agencies on manufacturing SMEs. The researchers studied about (67) contemporary publications in the relevant area. Literature review revealed that benchmarking of efficiency and performance production of manufacturing SMEs depend on internal factors. The internal factors are management skills, degree of skilled labor, and size of capital investment, ICT capability, and strength of supply chain, smooth energy, and water supply. This study has only focused on manufacturing SMEs firms for benchmark the performance and potential growth of its production output.*

Keywords: Manufacturing SMEs, benchmarking, efficiency performance, Growth SMEs, Operation Management.

1. INTRODUCTION

This paper presents a literature review on the benchmarking of growth manufacturing SMEs that attempts to identify and explain the benchmarking of small and medium size manufacturing enterprises, and SMEs; has strictly targeted to identify the benchmarking model to be used in achieving sustainable growth of this sector. In particular, the researchers' interest is to make the results useful for the floor level managers involved in day-to-day production and operations and for benchmark growth elements in the inputs and outputs of manufacturing SMEs. This study starts with reviewing literature published on the benchmarking in SMEs which covers both operations management and economy.

However, the conceptual framework of this study is influenced by productions and operations a management literature which is based on the engineering concept of production, function, and manufacturing. Information on the opportunities and bottlenecks in managing SMEs was collected from research studies.

Nowadays, SMEs has drawn much attention of researchers in the field of economy because its growth is essential for economic development. Particularly, manufacturing SMEs is essentially important for developing countries like Libya. The contemporary research on SMEs has mainly focused on the economic development with many aspects. However, the growth of SMEs is based on benchmarking in lieu of its success. Such studies are scarce. Further, work has been done in favour of the benchmarks setting [1][2]. They argued that benchmarking would contribute to speed up the growth in all areas of SMEs including productivity, labor skills, R&D capability, capacity utilization, and ICT capability.

In light of the above, the researchers conclude that previous studies did not emphasize in terms of evaluation of the growth of SMEs in the perspective of benchmarking in line with the operations and management of production, and therefore a gap exists in this sector. The fact is that in the last few decades many research activities are done in SMEs development. However, these works concentrated on economic development without benchmarking of operations management. Therefore, it indicates that a gap exists in this domain. This review work is designed to meet this gap by addressing the issue of the SMEs growth factors which previously could not get the right attention.

However, the literature review plan is made to reveal successful cases of manufacturing SMEs in order to set benchmarks for developing empirical growth model for input-output manufacturing SMEs. This paper is divided into four main sections. In the first section, introduction on the research background is discussed in brief. In the next section, a review on some existing conceptual of research on benchmarking manufacturing SMEs and potentials of growth is presented. Section three offers findings of the literature. Final section contains ultimate comments with future study direction.

2. LITERATURE REVIEW

2.1 Definition of Benchmarking

Benchmarking is the process of measuring an organization's internal and external processes that identifies, considers, and adopts outstanding practices from other organizations considered to be the best in the class. Operational benchmarking is defined as "the search for industry best practices that lead to superior performance" [3]. Development of benchmarking is on the grounds of comparison of an organization process or products with those identified as the best practice. The best practice of compare is the mean of establishing achievable goals aimed at obtaining organizational superiority [4]. Benchmarking is the practice of continually comparing performance of firms on critical customers' requirements against those of the best in the industry direct competitors or class companies recognized for their superiority in performing certain functions to determine what is supposed to be improved. Hence, benchmarking is relevant to the satisfaction of internal and external customers. The objective of benchmarking is to meet or exceed the benchmarking standard by adopting the appropriate superior practices and which overrun industry boundary. Achieving this objective, results in continuous improvement of the elements of the process which could be rapidly and/or leapfrog [5]. Benchmarking is definitely one of the criteria for measuring process of products and service processes in the

most leading companies. Benchmarking provides necessary insights to help you to understand how your organization compares with similar organizations, even if they are in different businesses or have a various group of customers [6]. Similarly, others have defined benchmarking as comparisons between the performances of different organizations or programmers generally with a view to establish a perfect practice to determine problems and strength points in their fields [7]. Benchmarking gives the organization or the programmers the external references and the best practices as the basis on which it carries out evaluation and designs its working processes.

It has also been proposed that the multiple definitions which were proposed, stated diverse stages in the evolution of benchmarking, and based on the definitions, they had concluded that benchmarking had passed through four important stages of evolution [8]. It has also been identified that the data analysis aspect of the benchmarking process was an area which needed further refinement [9]. They raised the following questions: how can it be proven that the best practices realized are essentially the best? How can the relation of best practices be assessed by an organization? And finally, what is the best technique for determining the best practices? As a solution to the above-mentioned problems, they have utilized and validated the decision-based analysis tool of multi-attribute utility theory for the benchmarking gap analysis process.

2.2 Concept of Benchmarking in the Perspective of SMEs Growth

Benchmarking is a tool to increase performance, efficiency, and competitiveness of institute in the stages of business life. It has also extended its scope from large firms to small businesses as well as in public and private sectors [10, 11]. Benchmarking has collectively been denoted as a management tool that can be defined as the systematic process of searching for greatest practices, innovative ideas and efficiencies that show the way to continuous improvement [12]. The word benchmark indicates to a metric unit on a scale for measurement. Benchmarking has also been defined as measuring the product of continuous, systematic process for evaluating products and work processes of organizations that are recognized as the best practices for the purpose of organizational continuous improvement [13]. Benchmarking is the first tool for improvement, achieved during comparison with other organizations recognized as the best inside the area [14]. It was also proposed the multiple definitions which were expressed different stages in the evolution of benchmarking in order to support the definitions [15]. They also have concluded that benchmarking passed through four important stages of evolution: (1) concretizing the passage of a priority given to the benchmarks to a priority given to the action, the benchmarking, (2) concretizing the passage of a products/services performance evaluation to an evaluation of process, (3) and more recently conveying the transformation of an evaluation rather based on financial indicators towards an evaluation integrating measurements in connection with the satisfaction of the internal or external customers, (4) conveying the passage of a comparative evaluation of process (operational benchmarking) to a comparative evaluation of strategies benchmarking.

Furthermore, Benchmarking is intended to be a mean towards the end of achieving a more desirable organizational state of affairs. Benchmarking may identify the changes which are necessary to attain that end. The concept of change seems to be ingrained in benchmarking [16]. It is an activity that looks outward to find the best practice and high performance and then measures actual business operations against those goals.

Moreover, the concept of benchmarking is clarified in Fig.1. It is a close loop where benchmarking is utilized to a particular business process. That can be expressed in terms of increased customer satisfaction and/or best performance by enhanced production output, leading to improved quality products, processes, and services while the organizations starts a new business with a focus on the same or other business process. There are four distinct characteristics of the process: it is a systematic approach; it has a cyclical nature; it is about goal setting and achieving; and it requires commitment at all levels [17].

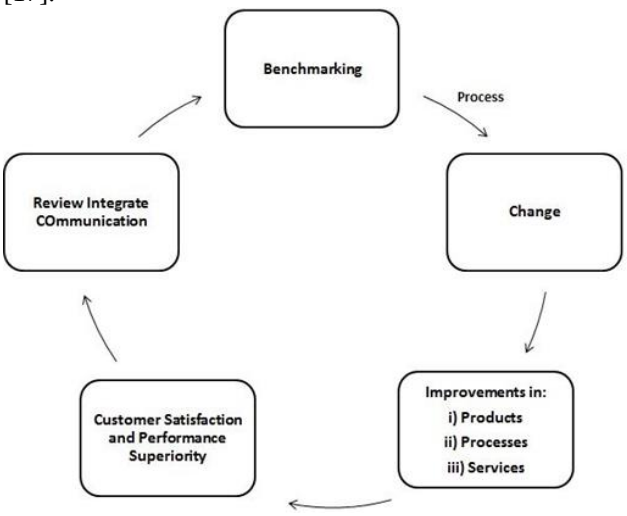

Fig. 1 Cycle of Benchmarking. Source: [17]

2.3 Classification and Types of Benchmarking

Benchmarking is classified according to the foundation of the type of partner selected. In accordance with some of the reviews, different benchmarking process models reveal the same most common steps such as the identification of benchmarking partners, identification of the benchmarking process, and identification of the benchmarking subject or ganization, groups, system, process i.e. it may be from the same firm or from varied organization [18]. Benchmarking partners may undergo more than one type of benchmarking. Elsewhere it was recommended that the typical nature of benchmarking has received insufficient attention [19]. It is important to classify different types of benchmarking. As practicing, benchmarking is still in its infancy phase; the formation of an effective classification of benchmarking types requires more practical applications information. After an initial review, based on the approaches, benchmarking is classified as: Internal Benchmarking compares the performance of internal business units involved in similar operations, or which operate in different regions [20].

Classification and types of benchmarking are provided in Table 1. It has been emphasized that selecting a particular

benchmarking type, organizations is supposed to adopt a

contingency approach for the selection of benchmarking types [25]

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Table1. Summary classification and types of benchmarking source: [25]

Classification	Type	Meaning
Nature of referent other	Internal	Comparing process within one organization about the performance of similar units of production or processes
	Competitor	Comparing with direct competitors, catch up or even best their overall performance
	Industry	Comparing with firm in the same industry, including non-competitors
	Generic	Comparing by means of an organization which extends beyond industry limitations
Content of benchmarking	Global	Comparing by an organization where its geographical location extends beyond country limitations
	Process	Pertaining to discrete work processes of work and operating systems
	Functional	Function of the process benchmarking that compares particular business functions at more than two organizations
	Performance	Regarding to outcome characteristics, quantifiable in terms of price, speed, reliability, etc.
Purpose for the relationship		Concerning assessment of strategic rather than operational matters
	Strategic	Evaluation for gaining superiority over others
	Competitive	Assessment for developing a learning atmosphere and sharing of knowledge
	Collaborative	

Competitive benchmarking is defined as comparing performance to industry standards or that of competitors [21]. Generic or Best Practice Benchmarking compares one's own organization with other companies in different industries, representing the best-in-class companies for particular aspects of the selected business operations [22, 23]. Three types of benchmarking have been suggested which are normally done in organizations [24]:

Internal benchmarking: In Internal benchmarking multiple plant organization sets companywide standards for each of the sites to follow, and then charts each site's performance related to those standards.

Industry benchmarking: In Industry benchmarking, a company's performance is measured against those of other organizations in the same industrial sector.

Best practice benchmarking: In Best practice, benchmarking performance is measured against those of other companies considered to be the leaders in that industry regardless of the end product or provider service of that particular business.

2.4 Benchmarking Aims

Benchmarking aims are to improve, generally operating performance of organization. In the perspective of engineering management, it has a few specific functions which can be presented in the following equations:

Improve customer satisfaction $=f$ (product quality, lower costs, on-time delivery) (1)

Improve performance of finance = f (Growth of businesses, return on investments, profitability, return on assets) (2)

Improve efficient business processes = f (cycle time, production cost, productivity) (3)

Improve competitiveness = f (product cost, product selling price) (4)

Improve committed human resources = f (employee satisfaction, safety, effectiveness, health, and absenteeism) (5)

These benchmarking goals might differ from one firm to the other and depend on the firm objectives in performing the benchmarking efforts of organization [26]. Benchmarking success depends on several key factors including education, understanding one's own internal processes, improved customer services, setting superior goal setting, and quality improvements [22, 27]. Although the Benchmarking may be the root of growth in potential manufacturing SMEs, there should be a basic change in the culture of an organization and working over a period of time. Their organization may become too adept at seeking change inside the firms for growth. Also, the firms could be better if they look outside its walls for potential areas of growth. An outward looking company also tends to be a future oriented company. This often leads to a more enhanced organization and increased profits [28].

2.4 Benchmarking Manufacturing SMEs

The benchmarking is a way of improving manufacturing SMEs. Benchmarking could be an effective management tool for measuring growth of SMEs. It can work as a tool to measure an activity adopted by many firms to improve their performance. Further, it is an interesting strategy for organizational learning and improvement [1]. It has also also emphasized that benchmarking activities developed for SMEs can oblige to specify the environment and constraints of organizations if the implementation of the practices identified by such activities is to succeed and result can be increased in performance [2]. In this regard, it has been showed that a small business can better gain from benchmarking, notably in making of the owner-manager feel less isolated by providing with information on firms that can be truly comparable [29]. Whereas, the benefits of benchmarking in both large and small firms are recognized in theory, there are few empirical studies which are actually demonstrated to the small business owner-managers that such an activity could lead their firms to increase performance. These studies present evidence that is mostly anecdotal showing the attainment of a number of benefits resulting from a benchmarking endeavor and attempting to show that the implementation of certain practices found in business excellence models has had satisfactory outcomes in operational and financial terms [30]. Though benchmarking in SMEs has not received sufficient attention. For example, in a research, about (59 %) SMEs

claimed to have benchmarking almost nearly half of them 45 percent benchmarked their financial performance, a quarter 25 percent have conducted in both financial and process benchmarking, and about a third 30 percent performed internal benchmarking [29].

However, SMEs have the majority to gain potentially from both internal and competitive benchmarking. Accordingly, in theory, they have a wealth of examples to show what they may achieve of well resourced successful firms using the leading techniques which may be prepared to be more open with relatively small firms [29]. Furthermore, it is indicated that the barriers facing SMEs to develop their performance measurement systems related to larger firms are considerable [31]. SMEs are far-fetched to be in a position to call in the category of consultancy resource which has yet dominated the "best practice" books and guides. A Few numbers of new workers enter SMEs firms with knowledge of the latest techniques gained from large companies' experience.

2.5 The Benchmarking Models Using for Manufacturing SMEs

The Benchmarking Models Using by Manufacturing SMEs must be clear and fundamental. This is due to emphasizing logical planning and organization and establishing a protocol of behavior and outcomes [28]. The process models of benchmarking are to characterize the steps that should be carried out while performing benchmarking. While the essence of various benchmarking approaches is similar, most of the authors have adopted their models or methodology based on their own experience and practices [32]. Several options have been considered and decided to use the European Business Excellence Model as a backdrop [33]. It seems that this model includes: People satisfaction, Policy and strategy, Resources, Process, Customer satisfaction, Impact on society, Results of business, People management, and Leadership. Each of the enterprises in allowing comparisons to be made at different levels with other companies offers benchmarking opportunities for SMEs. The remote value is acknowledged for SMEs, of models developed for large firms and the fact that their practices and performance standards do not apply usefully to SMEs [2]. The different goals of strategy are a more intricate business environment. A limited number of resources are all factors contributions to the justification of SMEs specific benchmarking. Accordingly, on the basis of empirical data and analysis previous maturity models are to be compared with the characteristics' manufacturing SMEs. It has been indicated by a conceptual framework of benchmarking implementation dedicated to the automotive manufacturing SMEs [26]. In their study with comparing the characteristics of SMEs and large organizations, they have divided the differences of SMEs into four categories: structure, systems and procedures, culture and behavior, human resources, and also market and customers. Other researchers have evaluated benchmarking of manufacturing SMEs firms using 'Quick View' method [34]. This method for benchmarking on managerial level better understands the problems and opportunities confronting their operations. Quick View is a valid tool to use on non-US SMEs to help build local databases containing local companies.

Moreover, an information system to include data of SMEs of different clusters in the same or different industries has been suggested [35]. According to their approach, a benchmarking information system designed for use within a cluster comprises two parts: the database itself and a web application for remote access to the database, which is developed respectively in SQL Server and Active Server Pages. They believed that the adoption of the concepts and practices of benchmarking to carry out joint actions among companies of a cluster can aid to consolidate cooperation linkages and information exchange among companies as well as develop a culture of continuous innovation, thus contributing to the development of the collective efficiency of the cluster. Furthermore, others have used the PDG (Performance Development, Growth), "bird's eye view'' as a tool to evaluate SMEs [36]. That is from an external perspective and on a comparative basis in order to produce a diagnosis of its performance and potential complement with pertinent recommendations. They examined results with hundreds of SMEs and showed that benchmarking allowed SMEs to improve performance of their operations. A way for benchmarking practices have been proposed [37]. Based on the literature review and empirical research, they have gathered further information by means of workshops and interviews from experts, and have developed their tool into five stages: preliminary analysis, defining the model, developing the tool, testing and refinement, and diffusion. They indicated that testing and diffusing of the tool had very positive results. Thus, models and tools are used for benchmarking by SMEs firms that suffer from weaknesses and need improvements of factor in SMEs such as structures, processes, resources, and culture in order to achieve increased radical and innovative transformation in organizations. Therefore, according to literature, there appears to be a gap regarding practical improvement tools that could support growth of manufacturing SMEs in the process of identifying the main weaknesses of their performances.

3. METHOD OF LITERATURE REVIEW IN BENCHING FOR MANUFACTURING SMES GROWTH

The benchmarking method for manufacturing SMEs growth process is used to further illustrate the implementation process for the internal and external benchmarking technique to measure inputs and outputs of the process. Therefore, every effort should be made to conduct steps as thoroughly as possible. During the steps, the SMEs need to decide and select the processes it wants to benchmark, analyze the processes in detail, calculate the process metrics and define their performance gaps, identify comparative best practice partners, determine data collection method, and collect data. The person who is responsible for drafting the benchmarking implementation steps should have a certain level of knowledge, experience and technical know-how in benchmarking concepts, its practical implementation, and application [26]. The methodology simplified theoretical principles and practical guidelines to carry out benchmarking implementation and adoption, which could enhance the chances of success that are easy to understand, efficient and can be implemented at a reasonable cost and time. In addition, it is important to have a framework as a guideline to adopt benchmarking technique as a tool for continuous improvement activities. A general benchmarking methodology is indicated

by [26] which encompasses four steps; planning, analysis, integration, action shown in Figure 2.

Fig.2: General benchmarking methodology

Furthermore, some have proposed a methodology comprising of six steps as planning, concept development, detail design, testing and refinement, production ramp-up [38]. The development of the benchmarking software had made it possible to encompass step planning until step detail design within the program itself. An assessment test was carried out with 30 percent to understand the usability, practicability and effectiveness of the computerized benchmarking program. Moreover, the key elements of growth manufacturing SMEs to ensure that benchmarking results in achieving best benefits to the organization are: the strategic plans of organization must be referred to discover its key success factors and the identified development needs for improvement; use existing knowledge of strengths and weaknesses to pinpoint performance targets which are not being achieved and processes with improvement potential; select the processes which are at the most in need of improvement; and look for benchmarking partners willing to share their expertise in relation to these processes [3].

4. DOSSIER OF BENCHMARKING FOR SMES GROWTH

4.1 Benchmarking of ICT

Benchmarking of Information and communication technology (ICT) levels is dependence change in adoption by SMEs to improve their efficiency and performance. Hence, ICT plays the role of marketing and export usages in helping SMEs to create growing and sustainable business opportunities. ICT is becoming a common denominator in the growth of manufacturing SMEs and competitive stance of today's organizations [39]. The construction industry has focused on the use of ICT and SMEs [40]. They suggest that benchmarking process is an iterative process and has divided benchmarking into four stages: Bench Learning, Bench Measurement, Bench Monitoring, and Bench Action. It could be implemented at organization and industry levels. A contingency framework has been developed for reviewing benchmarking and ICT simultaneously in terms of use of comparing practice and performance with respect to ICT within small firms [41]. They have found that those ICT benchmarking tools were available focusing on the detail, scale, scope, integration, and availability of ICT. The adoption of ICT for SMEs (which includes SMEs from all sectors) is concerned with the diffusion and absorption of innovation by contributing and providing the theoretical foundation for these issues. Firms should integrate information systems in their business strategy plans for innovation [42].

4.2. Benchmarking of Supply Chain Management

Benchmarking of supply chain management (SCM) performance enables comparison between peer's supply chain and competitor's supply chain in manufacturing SMEs. This stimulates continuous improvement and hence allowing key performance indicators such as speed of delivery, quality, enhanced product, service and experience to be re-positioned and re-valued over time subject to market forces and dynamics [43]. However, the practice of supply chain benchmarking emerging as a leader in the industry can provide a firm with opportunities of increased sales. Benchmarking the supply chain performance against the best practice in the industry would provide incentives for further improvement that will eventually lead to increased sales [43]. It is indicated that supply chain operations within an organization should be constantly reviewed to identify where improvements can be made or to determine the weaknesses [44] [45]. One scheme to help accomplish this is to perform a series of benchmarking tests on their processes of supply chain. Benchmarking or goal setting allows a firm to assess the opportunities; they can have for improving a number of areas in their supply chain including productivity. Also, benchmarking might support organization's key business processes such as delivery, productivity, responsiveness to customer needs to achieve higher customers' satisfaction and business competitiveness. Moreover, compared with the previous research in benchmarking that focused mainly on the intra-company level, this study promotes a benchmarking scheme at the inter-company level which involves joint activities of the participating members in improving their SCM processes. The fundamental argument is that supply chain benchmarking should address the level of firm activities that incorporate collaborative enablers and collaborative performance metrics in order to allow the chain members to achieve better SCM performance as a whole [46]. In addition, the development of a self-assessment tool, enabling SMEs to measure its own capability in key business practices is described together with case studies of how the tool is applied in SMEs individually and in groups. The tool allows firms to compare its own performance against widely the supply chain management requirements and then to define a program of work that would guide to growth of Manufacturing SMEs [47].

4.3. Benchmarking quality management

The quality of the products produced by SMEs is the main factor of competitiveness. Quality is an important aspect to measure the performance of an organization. It refers to the ability of a product or the quality of the product produced by manufacturing SMEs and this is the main factor of competitiveness. Quality is an important aspect to measure performance of an organization [48]. It indicates to the ability of a product or service to consistently meet or exceed customer expectations [49]. According to [50] quality is as one of the most important disciplines/strategies or competitive priority for an organizations of growth manufacturing SMEs

and development. The quality management tools and techniques are practical methods, skills, resources or mechanisms that could be applied to particular tasks to facilitate positive changes and improve performance of a process [51]. It is also suggested that benchmarking is a helpful exercise concerned with quality issues paving the way for the growth of SMEs [29]. It is observed that the quality management (QM) practices in SMEs to improve their general performance by a collection of "hard" QM factors [52]. For example these factors are Benchmarking and quality measurement, continuous improvement, efficiency and performance of organization. The "soft" QM factors are consisted of senior management philosophy and workers' training, supplier support, and increased interaction with employees and customers. However, compared with large organizations, SMEs have been slow to adopt quality management tools such as total quality management (TQM) [53]. Furthermore, in a study in Malaysian SMEs practices of TQM at the SMEs level, it has been found that these are the logic and structure of high performance businesses and the application of (TQM) as the award winning companies perform better over their closest rivals [54]. Benchmarking generally measures quality systems, quality assurance, flexibility, just-in-time, zero defect, information and performance measurement, continuous improvement, R&D and innovation, strategic planning, process management, process control, and for design of product/service [55].

4.4. Benchmarking R&D and Invention

Benchmarking is widely used in successful firms; it remains a comparatively underused tool in the field of R&D and innovation [56]. Benchmarking in broad sense is used to compare the area of R&D and innovation in various SMEs firms. It could also be used to compare their different activities. Benchmarking is a method for comparing firms. It is a continuous process and provides a useful tool for allowing a firm to compare its performance, relative to an average or to other firms. Benchmarking leads to better understanding of the organization's current practices and it makes use of a systematic comparison of practices and performance with those of others in order to develop improvement actions which would bring performance levels [57]. Due to the importance of company innovativeness for long-term growth, benchmarks should be used for assessing firm's innovativeness in terms of the required activities of firms to innovate in practice [58]. Furthermore, there are only three fundamental steps for benchmarking R&D such as process making, choice of benchmarking partner, and identification of best practices. 1) The first step towards benchmarking is identification of activities to be benchmarked [59]. A weak link between R&D and industry could be the result of many other organizational failures. 2) Once processes and sub-processes are identified the next task is to identify practices to compare and measure them with the benchmarking partner. The easiest way is to choose the best in the business. 3) Choice of partner, however, has implications on methods for selecting the best practice. The best organization is known when the benchmarking replaces wherever possible its existing practices with the practices of the best organization.

The comparing technologies and knowledge necessary to move from one technical state to another will involve benchmarking. Benchmarking could be defined as a system which allows a company and institution or an individual to compare some of their activities with those of the ''best in class'' [3]. The approach could contribute to improve benchmarking of product developers who wish to monitor their prowess in terms of innovation, and re-use of the methodology to review its position and to improve inherent innovation in terms of process, product, and management [60]. Importantly, an initial innovation register and profile is obtained. The produced innovation profiles product benchmarks for manufacturing SMEs in specific sectors that indicate the optimum position for an SMEs of similar topology and defines attributes or properties that an SMEs has to have in place to reach that position. However, some of SMEs have many difficulties in converting R&D into effective innovation that leads to potential growth [61].

4.5. Benchmarking labor productivity

Benchmark labor productivity is comparing internal and external performance on monthly basis of SMEs with other organizations. Labor productivity measures the output per unit of labor. The unit of labor can be worked per hour or simply per worker. Benchmarking can be used as a way to increase SMEs knowledge of their performance. Managers must believe that their firm's survival depends upon its productivity [62]. The use of benchmarking increases the proportion of employer involved in discussing workplace issues and having a union raise all productivity of labor in the manufacturing sector [63]. Moreover, they find some evidence that those manufacturing employers who provide profit sharing plans for their non- managerial employees have higher labor productivity. Benchmarking provides an opportunity to merge theoretical standard with an understanding of the social construction of the firm and determines what makes the employees to work. There is a valid need for firm members to interact more in order to present new perspectives and stimulate future investigation and propose practice experiments. SMEs can develop the exchange of generic benchmarking which could overcome the potential restrictions on labor productivity in relation to identification of strategic issues in SMEs growth [64].

4.6. Benchmarking Energy Management

Benchmarking is useful for manufacturing SMEs to compare a facility of energy and cost of energy management that is used in a similar sector in order to assess opportunities for improvement and energy saving. It has been reported that there are several practical and tested tools to support the cycle of continuous improvement of energy efficiency in the company such as sector specific measure lists, checklists, templates for auditing and energy conservation plans [65]. Also a key trigger for companies is the possibility for SMEs to benchmark unknown their energy situation against others of the same sector. Accordingly, expanding the number of participating SMEs of different sectors is currently being developed. Energy monitoring and benchmarking are, in fact, critical success factors to all other activities that are related to energy efficiency measures. SMEs in particular are reluctant to focus on energy management or to invest in energy efficiency measures. In this respect, there are still many opportunities for improvement in SMEs and there are many good examples which prove that the right approach to invest

in energy efficiency can very well be combined with the priorities of companies like cost effectiveness and product quality. Furthermore, energy management is stated to be an important means of reducing industrial energy costs and reducing negative environmental impact [66]. However, it is indicated that energy management in industry may be considered as a scarcely researched subject because SMEs have limited resources to work with energy efficiency, and energy management [67].

5. Summary and gaps identified from the literature

This study attempts to review the literature on benchmarking potential growth of manufacturing SMEs related to its competitiveness and sustainable growth. Major areas considered in the framework for this study are areas of SMEs including productivity labor skill, R&D capability, capacity utilization, and ICT capability. Emphasis is given on production and operations management issues. In this regard, more than 70 research papers have been reviewed. We have studied relevant publications which include 42 reviews after the year 2000 and 28 reviews before. The references corresponding to each particular area and major findings have been summarized in Table 2.

Most of the research papers have focused on measuring activities of SMEs in the specific aspect of outcome such as quality management, ICT, technology management, competitive priorities, market conditions, strategy development, leadership issues, constraints, and challenges for growth. On the basis of literature review listed in table 2, the findings and gaps on benchmarking for the growth of manufacturing SMEs are deduced below.

• There is a lack of empirical research on benchmarking for growth strategy related to competitiveness, efficiency, performance, and economic sustainability. Most of the contemporary literatures on manufacturing SMEs and benchmarking are mainly addressed the growth barrier, relationship of particular strategic issue with certain financial parameters but not with overall performance or growth with regard to production and operations management. In particular, the current and previous researches on benchmark concentrated on supply chain, utilization of combined resources, product distribution network, R&D and invention, skilled labor, TQM implementation, ineffective government policies, competencies, decision support system for making investments, and Advanced Manufacturing Technologies.

• As per the fundamental understanding of growth and benchmark, setting for achieving targeted goals need to setting-up a standard in respect to successful cases. In light of literature review discussed above, it appears that different dimensions of the inputs related to production and products outputs are not benchmarked with respect to a successful case of manufacturing SMEs. Moreover, majority research work is not followed the holistic approach; rather they have focused on specific benchmarking on input variables. In order to keep manufacturing SMEs in a sustainable growth path, benchmark for each input elements with respect to successful SMEs is essential which is missing in the current and previous research. In practical view point, simple, systematic and empirically tested frameworks for benchmarking of growth are lacking in the current and past literature.

Table.2 Summary of review literature review

Benchmarking	Reference(s)
Concept of Benchmarking	Ball, (2000); McAdam and Kelly, (2002); Bogan and Callahan, (2001); Talluri and Sarkis, (2001); Bhutta and Huq, (1999); Maire et al. (2005); Moriarty, (2008); Booth, (1995).
Definition of Benchmarking	Camp, (1989); McGeorge and Palmer, (1997); Vaziri, (1992); ReVelle, JB, (2004);Vlăsceanu et al. (2004); Maire et al. (2005); Collins et al. (2006).
Classification and Types of benchmarking	Anand and Kodali, (2008); Cox et al. (1997); Bowersox et al. (1999); Claycomb et al. (1999); Bagchi, (1996); Dence, (1995); Queen (1999); Fong et al. (1998).
Benchmarking Aims	Baba Md et al. (2006); Bagchi, (1996); Rogers et al. (1995); Elmuti, and Kathawala,(1997).
Benchmarking manufacturing SMEs	Pierre and Raymond, (2004); Cassell et al. (2001); Monkhouse. (1995); Oakland, (1999); Micklewright, (1993)
The Benchmarking Models Using for Manufacturing SMEs	Elmuti and Kathawala (1997); Partovi, (1994); Cassell et al. (2001); Deros et al. (2006); Capinetti and Oiko. (2006); Ochoa-Laburu et al. (2005); Pierre and Delisle (2006); Pilcher, (1999); Garengo et al. (2005).
Method of Literature review in Benching for SMEs Growth	Ulrich and Eppinger (1999); Camp's (1989); Baba Md, et al., (2006).
Benchmarking of ICT in Manufacturing SMEs	Fleet, (2012); Ahuja, et al. (2010); Wainwright et al. (2005); Levy et al.'s (1998).
Benchmarking of Supply Chain in Manufacturing SMEs	Lenny Koh, et al.(2007); Brah et al. (2000); Simatupang, and Sridhara, (2004); Barclay. (2005); Chin et al. (2001).
Benchmarking quality management	Kasul and Motwani, (1995); Fotopoulos and Psomas, (2009); Stevenson, (2005); Monkhouse (1995); Abdullah (2010); Sharma and Kodali, (2008); Gaddene and Sharma, (2009); Lewis et al. (2006).
Benchmarking R&D and Invention	Guimaraes and Langley (1994); Ahmed, and Zairi (1999); Maravelakis, (2006); Nath, and Mrinalini, (2000); Camp. (1998); Regan et al. (2006).
Benchmarking Labour skill	Black and Lynch, (1995); Mole, (2002); Dangayach and Dangayach, (2005).
Benchmarking Energy Management	Worrell, et al. (2009); Thollander, et al. (2010); Wajer, B, et al., (2007).

• This study concludes that the holistic approach is not taken to study the benchmarking of inputs and outputs in order to achieve competitiveness and sustainable growth. In this regard, a gap is observed between existing benchmarking procedures and benchmarking actually needed to achieve the targeted growth. Therefore, this study suggests in depth research in the aspect of operation management to fill up the identified gap in benchmarking for growth with respect to successful case of manufacturing SMEs.

6. CONCLUDING REMARKS AND FUTURE RESEARCH DIRECTION

There are considerable developments in the area of benchmarking in manufacturing SMEs in recent years. The evidence of increasing published literature on the contribution of SMEs to economic growth justifies the need of benchmarking techniques for further development of manufacturing SMEs. However, it is observed that manufacturing SMEs face obstacles to use benchmarking for its growth and the problems are associated with diversified inputs and outputs of this sector. This problem is still existed and has to be resolved effectively. Although, a few benchmarking studies are conducted to compare the performance and efficiency of this sector, manufacturing SMEs also need comprehensive framework to develop their productions and operations strategies and quantify their competitiveness as well. This study tries to identify benchmarking model with respect to the key inputs elements could not find and included in the relevant literature. It means that a gap exists in the research area of benchmarking for the growth of manufacturing SMEs. On the basis of gaps identified, a holistic approach is needed for strategy development in input-output based benchmarking. Therefore, further research is needed to address this important issue.

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