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A Framework to Diagnose the Business and Evaluate Upgrade Plans in SMEs

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Abstract
Small and medium-sized enterprises (SMEs) are facing barriers to grow due to the lack of structured procedures for upgrading and allocating the limited resources. To overcome these drawbacks and to improve business capabilities, a structured framework to conduct a comprehensive diagnostic and upgrading study is presented in this paper. The proposed framework involves four phases. First, the external and internal strategic factors, which can affect the enterprises' performance are evaluated using strategic planning and assessment tools. Second, key upgrade performance indicators are developed and evaluated using multi-attribute rating techniques to guide, evaluate, and track progress of upgrading process. Third, a set of upgrade strategies are generated and evaluated using resource allocation model. Finally, a periodic re-evaluation plan is introduced to monitor the implementation progress. The developed framework for performance evaluation and upgrading is suitable to be used as a structured know-how procedure in manufacturing enterprises and can support entrepreneurs in their strategic decisions. To validate the proposed framework, a data set was collected from a local housecore company. As a result, one package of the efficient frontier strategies that represents the best use of resources was proposed for implementation.

Keywords
strategic planning, performance management, business upgrade, SWOT analysis, resource allocation.

Introduction

Small and medium-sized enterprises (SMEs) play a crucial role in the national economy and development of society for both the developed and industrial countries. They continuously provide more job opportunities, adopt a new technological innovation, boost competitiveness among firms and provide a multicultural environment (Xiao, 2017). In addition, SMEs contribute to 95% of firms in the global and 60% of job creation in the private sector (Pérez-Gómez et al., 2018). SMEs cover different definitions and comprise different aspects in different countries and foundations. They usually define SMEs based on their own guidelines such as assets value, sales revenue, number of employees, and paid capital. The United States and China define SMEs based on the type of industry. Canada defines them based on the number of employees with less than 500, and the European Union defines them by less than 250 employees and also considers the turnover (OECD, 2004). The importance of SMEs is set to adapt new faced conditions of competition and innovation during the globalization medium. Hence, in many studies, SMEs are considered the representative of innovation systems and are essential in boosting competitiveness in many countries. This realization of the value of SMEs to the national economy and job creation increased the interest for academic researchers in small business.

Generally, low- and middle-income countries have limited number of large enterprises but have many small-sized ones. Small enterprises face barriers for developing into medium or large firms due to the tendency of large-sized companies to be the prime source for producing better quality and offering best-paid employment, incentive for innovation and products/services diversity, and future exporters (Reeg, 2013). Unfortunately, for many reasons, some SMEs fail to survive or progress after their first four years of establishment. Besides, many factors for such firms

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may lead to grow out of their control, for instance; a continuous increase in demand or a withdrawal of competitors due to business failure. Moreover, these enterprises have experienced different types of macroeconomic shocks. Therefore, a systematic upgrading plan is the best strategy that is controllable by growth through innovation (Hampel-Milagrosa et al., 2013). SMEs that use clear and structured strategy often have a higher level of performance compared to non-strategy enterprises due to the fact that strategic planning requires in-depth investigation to internal and external factors that may affect the expected performance (Baker et al., 2017). Managers who experience a shortage of utilizing resources and opportunities, desire information on their products/services effectiveness and its impact to determine what should be done to improve their practices such as exploring new markets, internationalization and how strategy configuration influence their business performance (Caiazza, 2016; Lorentz et al., 2016). However, some of the entrepreneurs and managers still facing new technological changes, requirements to speed to market, development of the core competencies or lake for the ability to make a comprehensive exploratory investigation to their firm due to time constraints. A systematic framework for such investigations would help those companies to succeed, grow, expand, innovate and provide competing products utilizing the available resources.

In this research a structured framework to conduct a comprehensive diagnostic study that represents a company's current performance and competitive position will be presented and tested. This framework involves a full-scale diagnostic study to measure the current performance of manufacturing SMEs and provides upgrading plans in eight areas; external diagnostic that is represented by business climate and competitive analysis and internal diagnostic that is represented by financial, technical, organization and human resource management, sales and marketing, Information Technology (IT) and Research and Development (R&D) business units. Highlighting strengths, weaknesses, opportunities and threats facing manufacturing firms will be done by using SWOT (strengths, weaknesses, opportunities, and threats) analysis in order to identify and evaluate the options of SMEs to upgrade into a higher value adding activities that will ultimately enhance the competitive capabilities and improve a company's management practices. The proposed upgrading strategies will be then evaluated and prioritized to better allocate the company's limited resources.

Literature review

A search of the literature revealed many studies in the field of performance evaluation and strategic planning in small and medium-sized enterprises, but a systematic understanding of how business diagnostics contributes to optimum business upgrade plan that better allocate the limited resources is still lacking. Moreover, There has been no detailed investigations about how to generate, evaluate and prioritize the upgrade strategies based on predetermined key upgrade performance indicators. The following paragraphs summarized some of these previous researches.

The study of Veskaisri, Chan and Pollard (2007) aimed to examine the factors that affect SME decision makers to use strategic planning. The result showed that the level of strategic planning is positively associated with the growth of the SME. Moreover, the results showed that certain factors, like age and education level, are significantly and positively linked to the decision to use strategic planning tools. Wu (2009) investigated the critical success factors affecting SME performance and the existing performance measurement (PM) techniques to determine a practical framework for PM and operational strategy formulation. The PM framework included measuring both performance determinants and performance results, such as capacity building; resource development and use; adaptation to the environment; strategies for formulating internal operations management; and PM on innovation and learning. Performance outcomes should include financial results to satisfy investors, customer satisfaction indicators to meet customer needs, competitive indicators to reflect competitive advantages, and cooperative measures to measure partnership.

Sheetal, Sangeeta and Kumar (2012) investigated the marketing strategies in small and medium enterprises (SMEs) from the service provider's perspective as well as the customer's perspective. The outcomes showed that small and medium enterprises are highly convinced covering their product is pricing tools. However, SMEs should converge on pricing strategies related to its impact on marketing strategies. On another hand, SMEs should realize on cutting the product cost at the marketing level by utilizing the latest management approaches.

Singh and Mahmood (2014) studied the relationship between manufacturing strategy and export performance of small and medium enterprises (SMEs) in Malaysia. Their study aimed to examine the moderating effect of the external environment on manufac-

turing strategy and export performance relationship. The outcomes showed that there is a significant and positive relationship between manufacturing strategy and export performance of SMEs. In addition, the results revealed that the external environment plays a moderating role in this relationship.

Charles, Ojera and David (2015) investigated the strategic management style that is employed by the small enterprises in Kenya. The results showed that the basic style used by small enterprise was deliberate, emergent, and reactive and that the small enterprises in Kenya adopt these styles interchangeably but depend more on the reactive mode of strategic management. The study revealed that the choice of these modes was dictated by the personal, environmental, and firm characteristics of the enterprises. Furthermore, Abosede, Obasan and Alese (2016) explained the relationship between strategic management and SMEs development that is categorized into developed countries, emerging countries and the Nigerian economy. The results showed that strategic management practices positively affect the SMEs management and growth. Moreover, strategic management tools originally developed for large enterprises could be adapted and aligned by SMEs according to their peculiarities. The strategic management of market information, ownership, choice of strategy, competitive advantage, planning, and innovativeness have an important influence on SMEs development.

Midiwo and Ombui (2018) discussed the effect of the strategic management process on the performance of SMEs in Nairobi. The results showed that environmental scanning, strategy formulation, strategy implementation, and strategy evaluation have a positive effect on the financial performance of professional service of SMEs.

Many researchers had also investigated SMEs growth through internationalization. For example Denicolai, Zucchella, and Magnani (2021) studied three key growth paths for SMEs; internationalization, digitalization, and sustainability. The study findings confirmed that artificial intelligence readiness positively influences the international performance of SMEs, and digitalization and sustainability are positively related. Falahat et al. (2020) investigated the potential determinants of SMEs' international performance. The results revealed that market intelligence, product innovation, and pricing capabilities are essential to competitive advantage of Malaysian exporting SMEs. Petrou et al. (2020) found that the procedural rationality and politicization have negative effect on accelerated internationalization and growth of SMEs. Furthermore, Eggers (2020) conducted a literature study of 69 manuscripts that studied SMEs in external crisis such as COVID-19 outbreak. The authors concluded that innovativeness and proactivness have a positive effect on SMEs performance and growth.

The current study contributes to existing literature by proposing a holistic performance upgrade roadmap for manufacturing SMEs. Up to our knowledge, this model integrates for the first time strategic analysis, multi-criteria decision making, and resource allocation models to extract and evaluate key upgrade performance indicators (KUPIs) and the associated upgrade strategies. This study suggests a new concept of KUPIs that could be used by any SME to bring a rebound from current state to future upgraded level regarding its strategic objectives, and to generate subtle performance and growth gains.

Theoretical background

SWOT analysis

SWOT analysis is a performance evaluation and management procedure that is applied to specify the external and internal factors that impact the progress of a project, person or product. It is usually used to assess a company's competitive position and to develop strategic plans by defining strengths, weaknesses, opportunities, and threats related to business competition. After determining these factors, the firm can figure out the best solutions to improve its strategy, resource allocating and avoid harmful threats. Strengths and weaknesses study the internal aspects of an organization. Opportunities and threats study the external factors (Pucihar et al., 2007).

Porter's five forces

Porter's Five Forces theory is a strategic assessment and analysis tool used to gain a thorough understanding of the potential competitors and their impact. According to this theory, the aim of corporate strategy should be to manage the competitive forces in a path that develops a better situation of the organization. Porter described these five forces as 1) Bargaining power of customers, 2) Bargaining power of suppliers, 3) Intensity of existing competitive rivalry, 4) Threat of new entrants, and 5) Threat of substitute products (Indiatsy et al., 2014). Moreover, this theory allows an organization to assess attractiveness and its competitive position within that industry through evaluating the threat of new entrants to the industry, the threat of substitute products, the power of buyers or customers, the power of suppliers (to firms in the industry), and the degree and nature of rivalry

among businesses in the industry. On the other hand, Porter's theory also extends sufficient understanding of the role of environmental scanning in the performance of the organization. Environmental scanning is concerned with the competitive analysis in the industry, which is the main thrust of the theory. In Porter's five forces model a competitive advantage is sustained when it supplies above-average returns in the end. Thus, it is important to understand the impact of the strategic planning process on the financial performance. As much as the theory has its critiques, the theory is central to understanding the relationship between strategic planning and financial performance of any enterprise (Indiatsy et al., 2014).

PESTLE analysis

It is a strategic planning tool used to assess the influence of political, economic, social, technological, legal and environmental factors might have on a business. It entails an organization taking into account the external environment before starting a business or introducing a strategy. It is a good way of ensuring one has captured all potential risks and issues (Rastogi and Trivedi, 2016; Arivananthan et al., 2015). The following points explain the PESTLE dimensions (Srdjevic et al., 2012):

- Political power represents the restricting and protecting laws and regulations.
- Economic power regulates the exchange of materials, money, and information and determines the performance of an economy which in turn affects the long-term practices.
- Social power regulates the customs, manners, and values of society.
- Technological power brings problem-solving innovations which may impact the market orientation and the operations of the industry.
- Legal power regulates laws that influence the business environment in a specific country while there are particular policies that enterprises maintain for itself. Legal analysis considers these laws and then charts out the strategies in light of these legislations.
- Environmental factors of a business involve climate, weather, geographical location, global changes in climate, ground conditions, ground contamination, nearby water sources, etc.

Methodology

The work plan for this framework is divided into four phases. In phase one, the internal and external sides of business environment are assessed based on a detailed SWOT analysis. In phase two, the general performance indicators are identified based on SWOT analysis results, and the key upgrade performance indicators are selected. Then in phase three, a set of upgrade strategies are generated and evaluated to better allocate resources. Finally, in phase four a process of periodic re-evaluation plan is prepared to control and sustain the achieved improvements and guide the next upgrade initiatives.

Phase one: Assess the external and internal business environment

In this phase, a full-scale diagnostic study of a manufacturing SME is implemented through scanning the external environment to highlight possible opportunities and threats and the internal environment for strengths and weaknesses. The full-scale diagnostic study is a comprehensive analytical study that determines the SME's present competitive position. The environmental assessment process helps to identify the potential influences of particular aspects of the external and internal environments on business operations and provide a basis for planning and prioritizing future improvements and upgrade strategies. The aim is to point out challenges, uncertainties and threats facing the business, and opportunities it could exploit. An enterprise employs its strengths and weaknesses to reduce the negative effects of environmental threats.

The environment assessment process based on SWOT analysis starts by identifying the potential environmental factors may affect the firm's business, then the impact of these factors on the business must be factored and evaluated. The external diagnosis process addresses the business environment such as political, economic, social, technological, legal, competitive analysis and other environments in which the business operates. Each of these environments creates a set of challenges and opportunities to which a business must adapt. On the other side, the internal diagnosis process addresses the internal business units that a firm contains to perform its regular activities such as human resource, finance, marketing and sales, production, information technology (IT) and research and development (R&D). To compete successfully, assessing the opportunities and threats through external diagnosis must be accompanied by internal diagnosis to identify and evaluate the strengths and weaknesses. An enterprise relies on strengths to get benefit of opportunities and resolve weaknesses to avoid threats.

Phase two:
Develop key upgrade performance indicators (KUPIs)

Step 1: Identify the key performance indicators

Performance indicators (PIs) diagnose the surrounding environment and can be captured in a variety of ways: surveys, handbooks, personal interviews, focus groups, observations, and from websites and literature review. An acceptable performance measure is first filtered based on different characteristics such as being quantitatively measurable (Meier et al., 2013), efficient in measuring the degree of reaching the organization target, can be used to compare actual to expected values (Kaganski et al., 2014), and reflect the true performance either success or failure. It represents the repeatability and reproducibility of the measuring system (Rusaneanu, 2014), and have to be easy to understand by different users (Carlucci, 2010).

Step 2: Select the key upgrade performance indicators (KUPI)

After defining the key performance indicators and testing them on a certain number of characteristics, the Key Upgrade Performance Indicators (KUPI) can be developed. As a definition, KUPI is a decisive and pivotal metric used to demonstrate a phenomenon, diagnose whys and project the outcomes for future events that can raise an enterprise to a higher rank by increasing three basic components, namely, the income, productivity and employment (Hampel-Milagrosa, 2014; Bernard et al., 2017; Tague, 2005). A candidate KUPI are ranked against the following criteria:

1. Strategic reflective means SMEs should confirm that selected KUPIs lead toward their strategic intent (Iuga et al., 2015).
2. Effective KUPI allows the right actions to be done (Kerzner, 2017).
3. To be crucially few meaning that SMEs required to focus on the crucial few but important indicators (Parmenter, 2015).
4. Improvement potential means that KUPI can lead to subtle improvement and change (Wilkinson et al., 2017).
5. A controllable KUPI enables you to forecast the outcome to a certain degree (Sampaio et al., 2011).
6. Multi-directional (Integrative); a KUPI has an impact on more than one function or processes in an SME (Parmenter, 2015).
7. Value Creative; a KUPI creates a value while benefits exceed costs (Spitzer, 2007).

The KUPI selection process can be achieved based on multi-critera decision making (MCDM) approaches that comprise both judgments and quantitative methods.

Phase three:
Generate and evaluate upgrade strategies

After assessing the entire organization, this phase consists of two steps; generate and evaluate upgrade plans. It is potential for any enterprise to suffer scarce resources with a limited budget. Thus, a set of upgrade plans are generated ranging from do nothing to the complete upgrade plans. Allocating resources to upgrade plans or strategies while there are limited resources is a decision-making problem, which necessitates matching the gained benefits against costs either with or without constraints (Goodwin and Wright, 2004).

Step 1: Generate improvement strategies

An implementation or idea creation tools are available in hand to add, change or eliminate while generating upgrading strategies using charts or techniques such as brainstorming, brain writing, affinity diagram, benchmarking, mind mapping, etc. (Tague, 2005; Taylor, 2010).

Step 2: Evaluate upgrade plans

In this step, the generated upgrade plans are evaluated and prioritized based on the cost-to-benefit ratio for every upgrade plan and processing until the budget is drained (Phillips and Bana E Costa, 2007). An upgrade plan is effective when no other upgrade plan providing more aggregated benefit with less costs.

Phase four:
Prepare periodic re-evaluation plan

Periodic re-evaluation plan investigates the quality of the upgrade plan and assesses the way it is adapted to current and future needs of knowledge. The purpose of re-evaluation is to recognize challenges faced and to suggest performance measurements which develop the quality of the upgrading strategies.

Case study

Alpha company is a small enterprise consisted of fifteen employees which was founded in 2008 as one of the leading companies in Jordan specialized in the production of household cleaners. Due to smallness and other market forces, Alpha company faces many challenges such as declining in demand due to new competitors entering the market, slow economic

growth, decreasing in customer purchasing power, and relatively high employee turnover. Alpha company was chosen for this study because they seek for evaluating and improving its current practices to a better scenario case.

Phase one:
Step one – external environment assessment

External environment assessment is an assessment process to pinpoint all external elements which may impact the enterprise's performance. The assessment entails scanning the power of threat or opportunity the external factors could represent. These factors influence the vision and mission of an enterprise. Evaluating the trends and competitiveness that may affect them revealing threats and opportunities, permits to align strategies with the enterprise's environment whilst supporting the decision-making process. In order to analyze the external environment within the household cleaners industry the PESTLE analysis was used for business climate analysis and porter's five forces (P5Fs) model for the competitive analysis. Table 1 summarizes the results of Porter's Five Forces risk analysis and list the opportunities and threats facing the firm. The significance score (with a scale

Table 1
Opportunities and threats based on Porter's five forces analysis

P5Fs	Porter force dimension	Threat risk index	Opportunity or threat
Threat of new entrants	Low Capital Requirement (Gold et al., 2003; Lee et al., 2012; Oraman et al., 2011; Rachapila, 2013)	25	Threat
	Ease to Differentiate Product (Oraman et al., 2011; Bensecilas et al., 2016)	16	Threat
	Low Switching Costs to Buyers (Lee et al., 2012)	20	Threat
	Low Restricting Government Policies (Rachapila, 2013)	16	Threat
	Access to Channels of Distribution (Indiatsy et al., 2014; Gold et al., 2003; Rachapila, 2013)	9	Opportunity
	Ease to obtain Economies of Scale	16	Threat
Bargaining power of supplier	High Buyers' (firm) Switching Cost (Rachapila, 2013)	16	Threat
	Few Number of Suppliers (Gold et al., 2003; Oraman et al., 2011)	12	Opportunity
	The difficulty of finding Substitute Input (Gold et al., 2003; Oraman et al., 2011; Rachapila, 2013)	8	Opportunity
	Degree of Substitute Input Importance (Rachapila, 2013)	9	Opportunity
Bargaining power of buyers'	Decreasing Number of Buyers Relative to Sales (Gold et al., 2003; Oraman et al., 2011)	12	Opportunity
	Acceptance of Buyer's Profit Margin (Rachapila, 2013)	9	Opportunity
	Buyer's Volume to Command Terms (Rachapila, 2013)	6	Opportunity
Threat of substitute products	Low Relative Price of Substitute (Rachapila, 2013)	12	Opportunity
	Relative Quality of Substitute (Rachapila, 2013)	16	Threat
Rivalry among existing firms	The Increasing Number of Competitors (Indiatsy et al., 2014; Rachapila, 2013; Bensecilas et al., 2016)	20	Threat
	Product Differentiation (Indiatsy et al., 2014; Rachapila, 2013; Lee et al., 2012)	6	Threat
	Exit Barriers (Lee et al., 2012; Bensecilas et al., 2016)	12	Threat
	Relative Size of Competitors (Rachapila, 2013; Oraman et al., 2011)	12	Threat

of 1–5) and the likelihood of occurrence score (with a scale of 1–5) are multiplied to find the threat risk index that determines the competitive force that is most influential to the industry. A threshold of 12.5 was set to classify opportunities and threats. A factor with threat risk index above this value is classified as a threat and, below it, as opportunity. Monitoring these factors is rabidly addressed when linking it to the responsible business units. For example, in threat of new entrants dimension, the low capital requirement factor is almost certain to occur (5) with material impact (5). This lead to a threat risk index of 25.

The use of PESTLE analysis allows the company to evaluate various macro-environmental factors, review the threats and measures to diminish from time to time, and evaluate the necessary modifications during the whole lifecycle of business (Rastogi and Trivedi, 2016). Assessing competition climate is not enough for developing complete upgrade strategies. Business climate analysis is also addressing trends out of any firm's control could bring threats or opportunities. PESTLE is an acronym to its dimensions namely, political, economic, social, technological and legal dimensions. Environmental dimension can be added and analyzed separately or jointly with legal dimension.

To assess PESTLE dimensions and factors, risk analysis approach was used to highlight threats and their impact. Instead of likelihood of occurrence factor in Porter's Five forces analysis, a priority factor was used. A score level between 5 as very high priority and 1 as unimportant, and impact level between 1 as (insignificant) and 5 as (material impact) were used. The significance score and the priority score are multiplied to find the priority index in order to determine the trend that is most influential to the industry. The trends are then sorted based on their very high, high and medium priorities and afterwards classified to opportunities and threats. Low and unimportant trends are neglected due to their insignificant impact. For instance, in legal dimension, consumer protection factor scored high priority (4) with significant impact (4), multiplied to score a priority index of 16 and then classified as a threat.

Phase one:
Step two – Internal environment assessment

Assessing the internal environment to identify strengths and weaknesses is implemented for Alpha Company to get benefited with opportunities and avoid threats. Business units' assessment is developed

Table 2
Opportunities and threats based on PESTLE analysis

PESTLE Dimension	PESTLE Trend	Priority Index	Opportunity or Threat
Political	Security and political stability in Jordan (Nurmi and Niemelä, 2018; Rastogi and Trivedi, 2016)	25	Opportunity
	The protection from the products obtained from foreign competition by customs (Nurmi and Niemelä, 2018)	16	Opportunity
	The instability within the neighbouring countries Rastogi and Trivedi, 2016)	12	Threat
Economic	The existing of international marketplace.	12	Opportunity
	Obtainable funds.	12	Opportunity
	Slow economic growth	20	Threat
	The decrease in purchasing power of Jordanian Dinar (JD).	16	Threat
	Government barriers to business growth or expanding	12	Threat
Legal	Competitive regulations	20	Opportunity
	Employment law	12	Threat
	Consumer protection	16	Threat
	Environmental regulation	12	Threat
Social	The growth in population	12	Opportunity
	The diversity and evolution of smuggling and commercial fraud methods.	16	Threat
	Brand Equity	16	Threat
Technological	The existence of the modern tools, devices and technologies.	16	Opportunity
	The existence of the internet	12	Opportunity

for six areas of improvement: finance, human resource, marketing and sales, research and development, manufacturing (production) and information technology. Historical business units' data will be compared to the actual performance and practices. The factors seen as strengths when participate in the firm's success and profit, and factors seen as weaknesses when hinder the expected progress and growth. A thorough study of each business unit revealed 61 weaknesses and 36 strengths. These weaknesses and strengths, along with the predetermined threats and opportunities constituted the base to identify the upgrade performance indicators and the upgrade strategies as explained in the following phases.

Phase two:
Step one – Identifying the Key Performance Indicators (KPIs)

After environmental scanning, SWOT analysis results were translated to a set of key performance indicators that are characterized to be measurable, represent true performance either success or failure, validity, efficient, and interpretable. For example, the strength of good market position is measured by market share, weakness of low packaging quality is measured by cost of packaging as a percentage of total product cost, the opportunity of Jordan being stable and secure is measured by FDI, and threat of smuggling is measured by rule of law index or market share. As a result, a set of 170 SWOT strategic factors were extracted and met by 210 key performance indicators.

Phase two:
Step two – Selecting the key upgrade performance indicators (KUPIs)

Each criterion is assigned a weight based on its importance following Simple Multi-Attribute Rating Technique (SMART) approach. SMART is a decision-making approach that can be used to give weights to criteria or goals (Goodwin and Wright, 2004). Table 3 shows the importance-swing-based classification of the KUPIs selection criteria.

After weighing each criterion, the KPIs must be scored on each criterion. The used scale is between 0–100. Table 4 shows an example of applying SMART methodology to rank the KPIs of Recruitment dimension within the HR business unit based on the KUPIs selection criteria.

As a result, Table 5 represents the resultant KUPIs based on the managers assessment of SMART approach. The highest KPIs ranking led to the selection of 42 KUPIs among 210 KPIs. For some business units the manager may interest in more than one KUPI.

Table 3
Swing weights of KUPIs selection criteria

Criterion	Original weights	Normalized weights
Strategic Reflective	100	26%
Effective	60	16%
Improvement Potential	80	21%
Controllable	25	6%
Multi-directional (Integrative)	50	13%
Value Creative	70	18%
Total	385	100%

Table 4
Comparing and ranking the KPIs of Recruitment Dimension using SMART

Recruitment and Selection KPIs	Strategic Reflective	Effective	Improvement Potential	Multi-Directional	Controllable	Value Creative	Score	Rank
Turnover Rate	100	100	95	80	75	75	90	1
% of Multi-Skilled Employees	50	40	20	0	0	40	31	8
Time to retirement	45	0	40	70	80	30	40	7
Percentage of people that are still in post after 12 months service	45	70	60	70	25	20	49	6
Number of employees on job rotation	70	70	40	75	20	50	58	5
Labour Flexibility	95	85	70	70	100	70	72	3
Time to recruit	45	45	70	75	70	60	58	4
Recruitment rates	0	50	0	90	50	0	23	9
Posts filled by internal sources	70	90	100	100	70	100	89	2

Table 5
Final KUPIs based on SMART

Business unit	Dimension	KUPIs
Human resource	Recruitment and selection	Labour flexibility
		Posts filled by internal sources
		Turnover Rate
	Performance Appraisal	Top Performers growth rate
		Number of times incentive granted per employee
	Training and Development.	Number of different areas which employees are trained in
	Compensation and remuneration.	Total Salaries/Sales %
Manufacturing	Manufacturing Process and Its Efficiency	Returns to sales rate
	Inventory, Supply and Logistics	Delivery complaints
		AVG. cycle time
	Technical Efficiency	MTBR
		MTBF
	Environment, health and safety	Reportable Health & Safety Incidents
		Financial penalties
Marketing and sales.	Developed Products	Sales growth.
	Sales and Distributions	Sales productivity
	Advertisement and Promotion	New customer gain
		Engagement rate.
		# Of lawsuits
IT/IS	IT Support and Department Quality.	Total cost of IT system
	System Quality.	Functional coverage of the IT/IS software
	IT Outcome Quality	Completeness of reports
	Workflow support Quality	Amount of departmental documentation that IT regularly documented in the IT system (number of reports generated)
R&D	R&D Expenditures	% of results adopted by the firm.
	Improvement R&D	Yearly technologies/ services transferred to business units from the strategy.
		First N-Years' Sales of New Products.
Finance	Liquidity	Current Ratio
		Quick Ratio
	Profitability	Profitability ratio
		Gross profit margin
	Efficiency	ROA
		Return on Fixed Assets
	Activity	Accounts receivable turnover ratios.
	Debt	The debt ratio

Phase three:
Generating and evaluating the upgrade strategies

In this phase, brainstorming, brain-writing, and bench-marking are employed for generating the potential upgrading strategies. Then, resource allocation decision making model was used to identify and choose the appropriate upgrade plan that better use the available resources with maximum benefits. The first step of resource allocation model is determining

the improvement areas, the amount of available or budgeted resources, and the expected benefits. Based on the diagnosis process, and after analysing the availability of funds, the company managers decided the followings:

- The improvement areas are the six business units under study.
- The planning strategies should cover the next three years.
- Resources to be allocated between the six business units are around JD 55000.

Next, the company staff was asked for benefits identification that are hoped to be met from the allocation of money between business units. After some discussion it was agreed that there were five main objectives:

- Strategic alignment (B1) refers to the result of linking an organization's structure and resources with its strategy and business environment.
- Potential improvement (B2), an improvement in the value to the enterprise either by increasing the trust of customers which results in improving customer's satisfaction level or by cutting unproductive costs.
- Duration or transition period (B3) is the amount of time required for execution. So, the implementation planning process in an enterprise is determined by what resources are required to implement it.
- Constrains (B4) include time not only the amount of time required to implement but also the time needed to hire an employee for example, financial concerns from inadequate budget to overhead expenditures, management needs as changing over time and regulations which can range from governmental restrictions to import and exports to environmental restrictions regulating the materials used.
- Strategic interdependency (B5) refers to strategies needed for the successful delivery of an enterprise vision and mission which affect the success of the other business units.

The following sections illustrate the steps used for applying resource allocation decisions making model.

1. Identifying the upgrade strategies for business units

Based on discussion and many meetings with the management, a decision to choose 15 strategies, based on SMART using benefits criteria as shown in Table 6, among 45 strategies presented in Table 7. The number of upgrade packages (a combination of strategies contain one strategy at least for each area) are 160 packages.

Table 6
SMART criteria for strategies selection

Criteria	Swing weights	Normalized weights
Strategic alignment (B1)	100	29%
Potential improvement (B2)	80	23%
Duration or transition period (B3)	60	18%
Constrains (B4)	50	15%
Strategic interdependency (B5)	50	15%
Total	340	100%

2. Assessing the cost and benefits of upgrading strategies in individual business unit

The figures were elicited by the manager, production engineer and one of sales force after much discussion. All the values in the analysis are measured on interval scale that ranged from 0-100 and the cost was estimated over the next 3 years of carrying out each strategy. Thus, the performance of each strategy was assessed in relation to each benefit.

So that in Table 8 the 100 score in the 'strategic alignment' column in HR, for example, means that strategy commission salary was thought to be the better of the five strategies available in the HR unit for meeting the strategic alignment.

Because the values were assessed separately for each business unit, a movement from 0 to 100 for a particular benefit in one business unit might be less or more preferable than the same movement to another business unit, this means that the group need a common scale to compare improvements in the different business units. Thus, assessing within-criteria weights presented in the following section.

3. Measuring each benefit on a common scale

For each benefit criterion, the assumption was all business units at worst value, for each criterion and the preferred movement from worst to best was assigned 100 and so on.

As an explanation, the assumption of the movement for Manufacturing unit from the worst to the best strategy for transition period was seen as almost half as important as the swing that can be obtained by changing from the worst to the best strategy in the marketing and sales. Within criteria weights are shown in Table 9.

4. Comparing the relative importance of the benefits

Apparently, the stakeholders wanted to be able to assess the overall benefit of using a particular package by combining the values for all five benefits. This meant that they now had to determine a set of weights

Table 7
SMART-based strategy classification

Upgrade Strategies	Symbol	B1	B2	B3	B4	B5	Score	Rank
Lower recruitment cost	S2	85	80	80	20	75	80	4
Develop job rotation	S3	90	55	80	55	85	74	8
Follow commission salary policy	S9	60	100	100	45	85	85	1
New Product development	S11	100	75	60	40	90	73	9
Open an outlet store	S14	65	100	65	75	40	71	11
Apply tools and technologies	S15	45	80	25	40	100	78	6
Provide incentives to pay bills	S18	90	100	65	65	45	79	5
Provide training courses	S30	35	100	95	55	55	69	13
Collect cash quicker	S33	50	75	100	90	65	65	14
Media marketing	S34	100	90	75	80	30	74	10
Handle demand shocks	S35	65	75	25	65	70	71	12
Staff productivity	S36	90	85	25	65	75	83	2
Process Improvement	S38	75	90	90	50	80	83	3
Buy new software	S43	70	90	75	50	60	75	7
Keep current documentation practices	S27	95	80	35	70	30	67	14

Table 8
Costs and benefits of strategies in individual business unit

Strategies	Cost	Benefits				
	10^3 JD	B1	B2	B3	B4	B5
HR						
Provide training courses	4	0	100	75	100	100
Commission salary	20	100	90	73	50	65
Staff productivity	2	70	0	100	60	90
Develop job rotation	4	90	70	90	70	80
Lower Hiring and firing costs	10	80	30	0	40	75
Manufacturing						
Apply tools and technologies	3	0	0	100	0	100
Handle demand shocks	3	100	100	0	100	0
Marketing and sales						
Open an outlet store	10	0	100	100	0	0
Media marketing	3	100	0	0	100	100
Finance						
Collect cash quicker	5	0	100	0	100	100
Provide incentives to pay bills	4	100	0	100	0	0
R&D						
New product development	7	100	100	100	100	0
Process improvement	6	0	0	0	0	100
IT						
Buy new software	2	0	100	100	100	100
Keep current documentation practices	1	100	0	0	0	0

Table 9
Within-criterion weights on a common scale

Business Units	Benefits				
	B1	B2	B3	B4	B5
HR	80	100	80	100	75
Manufacturing	65	80	65	40	85
Marketing and sales	90	50	100	90	80
Finance and account	100	90	60	75	75
R&D	20	20	20	30	30
IT	30	70	75	50	100

which would allow one benefit to be compared with the others. These weights could be obtained by directly assessing the relative importance of each benefit by comparing the importance of a change (or swing) from the worst position to the best position on one benefit scale with a similar swing on each of the other benefit scales. The resulting weights are known as the across-criteria weights. Each benefit has a common scale and the performance of all strategies was assessed on this scale as shown in Table 10.

Table 10
The across-criteria weights

Benefits	B1	B2	B3	B4	B5
Across Weights	100	70	50	55	85

5. Identifying the costs and benefits of the packages

Using Equity 3 software made it possible to identify the overall benefits and costs of any of the packages. As a result, the frontier packages are six and the value of benefits for the most beneficial package is 611.7 and for the least preferred package is 164.2. Based on the software it can be used to perform calculations for all the other packages and the results can be displayed on a graph such as Fig. 1. On this graph the efficient frontier links those packages which offer the highest value of benefits for a given cost (or the lowest costs for a given level of benefits).

The proposed package which appears to achieve the desired benefits within the available fund is package "D" as shown in Fig. 1 with 478 benefits as rescaled to 70%. The package consists of 'Lower recruitment cost, Staff productivity, and Develop job rotation' in HR, 'Handle demand shocks and Apply tools and techniques' in manufacturing, 'Expand to one outlet and Perform media marketing' in marketing, 'Collect cash quicker and Provide incentives to pay bills' in finance, 'Introduce a new product' in R&D and 'Keep current documentation practice referring to do nothing and Buy a new software' in IT.

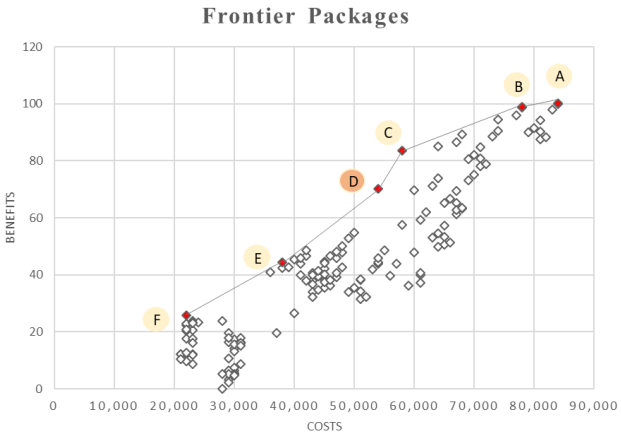

Fig. 1. Identifying the efficient frontier for Alpha company with the proposed package

6. Locating other packages on the efficient frontier

Table 11 shows a collection of strategies within frontier packages with their total costs and benefits. The involved stakeholders initially proposed package "D" which had the highest benefits and at the same time did not exceed the predetermined budget of JD 55000. The robustness of this decision was checked and evaluated by conducting a sensitivity analysis.

Table 11
Trade target with other frontier packages

Symbol	Cost	Benefit	Strategies within a Frontier Package
F	22,000	266	S30, S15, S34, S33, S11, and S43
E	38,000	353.8	All strategies except S14, S9, S2, and S36
D	54,000	478	All strategies except S30, S9 and S38
C	58,000	537.95	All strategies except S9 and S38
B	78,000	606	All strategies except process improvement (S38) in R&D
A	84,000	611.75	All strategies

7. Performing sensitivity analysis

Sensitivity analysis was firstly performed by checking the following five cases of the considered case study:

1. Strategic alignment weight is decreased by 20%.
2. Potential improvement weight is increased by 20%.

3. Duration or transition period weight is increased by 20%.
4. Constrains weight is increased by 20%.
5. Strategic interdependency weight is decreased by 20%.

Nevertheless, entering these new values into Equity 3 software showed that no variation in the upgrading strategies proposed by the efficient frontier packages. These results indicate that the used model is robust to changes in the values elicited by the group, meaning that we do not have to be concerned whether the assessments are precise and accurate. In such cases while there are different point of views about the elicitation values, it is not bringing a big deal. Otherwise, if these different views lead to diverse frontier packages, then it is substantial that these differences have to be debated.

Also, as the uncertainty of the amount of money would in fact be available, the decision makers thought that it is worthy to identify the best package if the company had more funds. The company consider the packages to the right of package "D" on the efficient frontier. Package "C" is the same as the proposed package, except 'providing training courses' in HR business unit. This lead to maximize the values of benefits by 59 points, but involve an increase in total costs by JD 4000 as shown in Fig. 1. The company mangers agreed that this level of expenditure is justifiable with the increased level of benefits. Based on that, the mangers decided to choose and implement package "C".

Phase four: Preparing periodic re-evaluation plan

A periodic re-evaluation plan was prepared to monitor and control the implementation of chosen upgrade package. This plan included the recommended strategies and their action plans, the required budget, finance resources, time framework, responsible business units, and the associated KUPIs.

Conclusions

The aim of this study is to develop and validate a structured framewrok to diagnose, measure, improve, and upgarde the performance of small and medium-sized manufacturing enterprise based on strategic planning and assessement tools. The main contribution of this study is proposing a holistic upgrade and growth roadmap for manufacturing SMEs by integrating strategic analysis tools, multi-critera decision making, and resource allocation models to generate subtle performance and growth gains. The conclusions of this research are as follows:

- Strategic planning tools such as SWOT analysis, Porter's five forces, and PESTLE offers a data-rich assessment of the business environment and helps in developing the appropriate upgrading strategies and indicators.
- New concept for strategic performance measures called Key Upgrade Performance Indicators (KUPIs) is defined in this work to guide, evaluate, and track progress of the upgrade process. These specific indicators are proposed in this study to help bring a rebound from current state to future upgraded levels.
- Upgrading strategies that are generated for each KUPI provides a unique opportunity for SMEs to gain subtle movement from their static position to a growth business. Resource allocation models that are employed in this framework helps in maximizing the benefits while making the best use of limited resources.
- In the case study, the assessment process has suggested thirty five KUPIs that are distributed among six business units. The efficient frontier packages of upgrade strategies imparts more flexibility in choosing the appropriate investment based on the managers' planning budget.

The limitations of this study highlight potential topics to be researched in future work. First, the current study introduced a diagnosis and upgrade framework for manufacturing SMEs, which limits the generalisability of results. Further research must be conducted on other service and nonmanufacturing sectors. Additionally, further empirical research is needed to confirm the study results by considering more than one case study. Second, the study had a national focus on Jordanian SMEs. To validate and generalize the findings, the study must be extended to include different countries with different economic conditions. Finally, future researchers should conduct a business impact analysis for the considered SME to predict the consequences of not upgrading the enterprise at appropriate times, and to justify the investment in upgrading strategies.

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