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How to Involve Operations Managers in the Strategic Planning Process

R. Cigolini, G. Grillo

Abstract

This paper suggests an organizational practice for strategic planning aimed at filling the gap between financial-oriented models conceived by researchers and real-life applications in field, where the need for a deep involvement of operations managers emerges as a key-issue. The proposed practice is based on a model that considers strategic planning as a process triggered by the product cost structure, the product flow analysis and the supply chain. As a result, the focus of planning is shifted from the company's strategic apex to the personnel involved in operations management.

After a review of the most popular approaches to strategic planning, the proposed model is introduced through a 6-step methodology and the competitive histograms are presented. Finally, the model is applied to the real-life case study of the European flexible packaging market.

1. Introduction

Company's success is often within the management control, and business failure is many times the result of poor judgement at the top. For this purpose, strategic planning represents a roadmap to drive companies on the way to their mission. The development of models for strategic planning thrived during the 60s and 70s, as a response to a twofold need: (i) the need to manage a portfolio of various activities and to make them easy to compare by using financial-based methodologies; (ii) the need of a framework capable to rationalise top managers decision making process, when facing a dynamic environment.

As a result, the pioneering model of Learned *et al.* (1965) consists of an exhaustive listing of variables and it starts from the idea that "nothing is forgotten". Later, the so-called portfolio approach focused on some specific variables and it was designed to support companies that manage a relevant number of different activities. In the recent years, the growth of web-related technologies and the cutting-throat time-based competition, made the portfolio approach alone too poor (Kalakota and Robinson, 1999): top managers of leading-edge companies ask for agile models that can be transferred to and used by operations managers (Stadtler and Kilger, 2000), while the classical matrix-based portfolio models leave out operations managers from the strategic planning process.

The standpoint of the model presented here lies in that the strategic planning process should be triggered by operations managers, starting from the product cost structure, the product flow analysis and the supply chain: in this way the focus of strategic planning is shifted from the company's apex to the personnel involved in the operations management. The suggested approach should start from the lowest factory level (e.g., machines, shifts etc.) at which reliable data are available from the accounting process. The paper is arranged as follows: section 2 is devoted to a review of the most popular approaches to strategic planning; section 3 introduces the new methodology and the competitive histograms, while in section 4 the model is applied to the European flexible packaging market; finally, section 5 reports some concluding remarks and suggests future research directions.

2. Review

When dealing with companies' strategy, long term planning is the most common and early recognised planning process (Fayol, 1976). Later, Ansoff (1979) introduced the separate view between strategic and operational planning: strategic planning suggests top managers the main directions to modify, improve and consolidate company position vis-à-vis its competitors,

while operational planning translates strategic aims in day-by-day activities, by involving operations managers. Even though the application of the strategic and operational planning is various in different industrial environments, 2 main approaches can be highlighted, i.e. the integrated and the differentiated strategic planning.

Under the integrated strategic planning, introduced by Lorange (1980), both strategic and operational levels are linked through a 5-stage process, based on vertical relationships between the strategic apex and the operations managers. This planning pattern appears as an extension of the long term planning: the portfolio of activities is defined at the corporate level and operations managers determine the courses of actions for all the controlled activities (Chakravarthy and Lorange, 1991, Markides, 1997). However, this approach suffers from 2 main drawbacks: (i) it shifts the emphasis from effectiveness to efficiency in objectives setting, i.e. instead of asking whether we are doing business in the proper way, the question to pose is whether we are in the right business; (ii) it pushes towards a premature involvement of operations managers, which tends to bring a partial business vision (Ittner *et al*., 1996).

Under the differentiated strategic planning, strategic and operational planning are developed independently and the strategic plan represents a constraint in designing operational plans. This aims to gain a greater insight into strategic fields, as well as to let decision makers have a wider range of choices, since strategic planning is not constricted by the budget management control systems (Emmanuel *et al.*, 1990). Within the integrated and the differentiated strategic planning, the interest of both academic researchers and industrial practitioners has been attracted by portfolio models, e.g. Boston Consulting Group (BCG), Arthur D. Little (ADL), McKinsey (MCK) matrix.

BCG matrix is the oldest one and it operates according to the principle that the objective of strategy lies in the optimal allocation of resources among different business areas to improve the overall competitive position. BCG suggests 2 strategic variables, i.e. the business area growth rate and the company's market share in the considered business area: only growing activities enable the creation of long-lasting competitive advantages and, from a mere financial viewpoint, the growth rate represents the amount of liquid assets required by the different business areas. On the other hand, company's competitive position can be measured by its position on the learning curve and so by the ratio between the company's market share and the market share of the main competitor. From a financial viewpoint the market share represents company's profitability and so the amount of resources available for investments.

ADL matrix starts the analysis from the business area's maturity and the company's competitive position: the notion of maturity extends that one of growth rate and it provides a clearer indication towards financial requirements[1]; the level of maturity also gives an indication of the business risk: e.g., starting up areas are usually prone to the risk of new regulations, of technological innovations. The competitive position is tightly linked to the company's profitability and it is measured according to a qualitative judgement (i.e. dominant, strong, favourable, weak, marginal) about the key success factors of the business area looked at.

Also MCK matrix operates according to 2 variables: (i) the competitive position which is calculated – similarly as under ADL – as the weighted average of the scores obtained by the company according to the complete set of key success factors; (ii) the value of the sector which takes into account the appeal of a business area by combining the inherent business value with the relative value of the company. This relative value illustrates the company's subjective viewpoint in that it depends on the interest generated by the considered activity for the company, which in turn is connected to e.g. the synergy among activities within the company, the value of activities in terms of care experience, possibility of creating entry barriers, etc.

The common approach of portfolio models lies in graphically representing the company's business area to support the strategic planning in the resources allocation, in the business strategy formulation, and in the financial analysis (Hedley, 1977). Haspeslagh (1982) pointed out that portfolio models remarkably improved the strategic thought: (i) they provided a framework and a simple method for comparing different activities; (ii) they increased the quality of complex strategies,

[1] They are usually high during the start-up and growth phase and remarkably diminish during the maturity and decline phase.

both at the corporate and at the operative management levels; (iii) they encouraged a thorough and selective distribution of resources.

However, portfolio models also suffer from some limits: (i) they are basically similar both in the logic and in the variables, so differences can be found only in the evaluation pattern (Betis and Hall 1983); (ii) among the considered variables, they accord great importance to financial-related factors, whilst relevant studies pointed out the role of manufacturing and production-related issues in corporate strategy (e.g., Hayes and Wheelwright, 1979, 1984; Skinner, 1969); (iii) the deconstruction of activities into homogeneous and independent units constitutes a delicate operation, given the capability of managers to handle up to a maximum of 15 to 20 different areas (Coate, 1984), so that diversified companies are forced to split the deconstruction process into several and complex levels of aggregation and refinement (Walker, 1984); (iv) the geographic dimension is not explicitly considered (Wind and Mahajan, 1982, 1984), even though it is just as important to be acquainted with the competitive position on a global level as it is to be with that one of the different markets, these being likely to have very different competitive structures; (v) portfolio models are designed for growing activities, which leads to overlook stable areas (Hax and Majluf, 1984[1]; (vi) they implicitly assume free competition, which is seldom experienced in practice (Luehrman, 1997a, b; Stewart and Horowitz, 1991): sometimes competition is almost non-existent (e.g., monopoly), or it is distorted (e.g., protectionism and/or public orders) or even it is corrupted by law braking practices (e.g., patent infringements and/or industrial espionage) etc.

To overcome some of the weaknesses recalled above, and to improve the overall decision-making process, in recent years, fuzzy-based approaches (e.g., Liang and Wang, 1993) and artificial intelligence techniques have been introduced (Doukidis, 1988; Holloway, 1983, Turban and Watkins, 1986, Stout *et al*., 1991). Some of these techniques are based on the analytic hierarchy process (Saaty, 1980, 1990; Saaty *et al*., 1991; Weber, 1993), whose important benefit when applied to project selection and budget allocation (Zahedi, 1986) lies in taking into account inconsistency in preferences (Partovi and Burton, 1993). In addition, since strategic planning involves co-operation among several actors to propose a global plan of consistent actions, the distributed artificial intelligence approach seems promising (Moraitis, 1994), even though very few studies specifically addressed the potential intersection, or even the convergence, between distributed intelligence and strategic planning (Chi and Turban, 1990).

Another area is the one of the strategic decision support system proposed by Pinson *et al.* (1997), which is based on the model of Greenley (1989), and which aims to support top managers in creating strategic scenarios, and in assessing the planning feasibility and consistency: the system decomposes the process into several intelligent and co-ordinated agents working at 3 levels of decision, i.e. strategic, decision-centre and specialist level (Thietart and Bergadaa, 1988). This path has been followed also by Brandolese *et al.* (2000), who proposed a multi-agent based framework for strategic decisions: multi-agents models well suit to modelling task decomposition; they allow to satisfactorily model problems inherently ill structured; finally, they provide an adequate structure to represent multiple and complex interactions, originated by diverse knowledge sources and decision-centres in defining a global and consistent strategy.

3. Proposed model

The new approach to differentiated strategic planning presented here follows a 6-step methodology, briefly summarised hereafter. Step 1 deals with studying along 3 dimensions (i.e. customers, products and locations) of the company's activities, to give rise to the so-called value added grid. In step 2, demand and supply for each business sector are analysed. Step 3 consists in identifying the key economic levers (e.g., scale, technology, market access, image). Step 4 deals

[1] The last remark above helps to explain the new strength of small and medium enterprises: hardly concerned by portfolio models – which basically unfit their general position – these companies focused on the operational management, thus acquiring a distinctive skill, which later will become a key success factor in the economic scenario (Cigolini and Zavanella, 1999; Rangone, 1997). In addition, whenever the growth slows down, portfolio models place almost all activities in the cash-cow zone, whilst the key problem lies in finding activities able to survive the crisis, rather than that one of activities renewal (Porter, 1996).

with the implementation of the competitive histograms for each business sector. In step 5 the competitive structure of each business sector is evaluated through a matrix. Finally, step 6 considers strategic segmentation and strategic options.

The heart of the methodology lies in steps 4 and 5, where competitive histograms are introduced and used to provide the strategic positioning of each player on the marketplace. In this way, both competitors' and company's strategic positioning is represented through a snapshot. The related approach allows operations managers to be involved in the strategic thought at the basic level.

3.1. The value added grid

To set up the decisional environment where the strategic planning process will take place, the supply chain of each product should be firstly analysed: each step of the supply chain has to be placed in the value added grid (Figure 1), i.e. a 3-dimensional chessboard where the considered dimensions refer to the products, the customers and the locations; the cubes (in the grid) represent the products sold in a given location to a specific customer type.

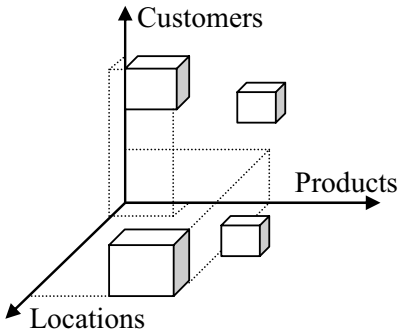

Fig. 1. Value added grid

Conceived as described above, the value added grid can help to re-design the organisational structure of fast growing small and medium enterprises, which are still keeping a functional framework (Cigolini and Secchi, 2001). Alternatively it simply pushes to analyse the business areas from a different viewpoint: common steps of the supply chain among different cubes can be identified, as well as the ones that need to be separated.

3.2. The demand and supply analysis

Demand and supply analysis are equally relevant to define the company activity segmentation: a strategic segment is characterised by a set of key success factors (e.g. price, quality, service, innovation, technical assistance), with a defined group of competitors and a core know-how (Hill, 2000). From the perspective of demand, the company sells products (and/or services) in different markets, where customers have to be studied in terms of needs and behaviours. In the recent years, customers' behaviour has been started to be considered as a source of significant potential revenue (Baghai *et al*., 1999): big consumer-oriented groups (e.g., P&G, Pechiney, Alcatel, American National Can) have launched large-scale projects in the sales area (Doorley and Donovan, 1999).

From the perspective of supply, the study of direct competitors in terms of size, strategy, culture, strengths and weaknesses helps to understand the boundaries between different strategic segments: each competitor's profile allows for a better understanding of differentiation sources and establishes a set of reference points for the economic analysis.

3.3. The identification of key economic levers

The objective of identifying key economic levers lies in outlining and understanding the complete cost structure, which is composed of several items each of them having its own specific value creation lever: e.g. raw materials and direct manufacturing cost, plant overheads, R&D costs, G&A costs, sales costs, packaging and distribution costs.

3.4. The implementation of competitive histograms

Competitive histograms represent a synthesis of demand and supply analysis: each histogram is built on the basis of operations managers' experience and competitors interviews. On the abscissa (Figure 2) the cumulative volume sold is represented (e.g., number of pieces, square meters, tons): each bar corresponds to an actor, the width being proportional to the volume, so to appreciate the market shares. On the ordinate, the overall cost per unit (e.g., € or $ per unit) is represented for each actor, together with the average market price, so to highlight the estimated margin of each actor.

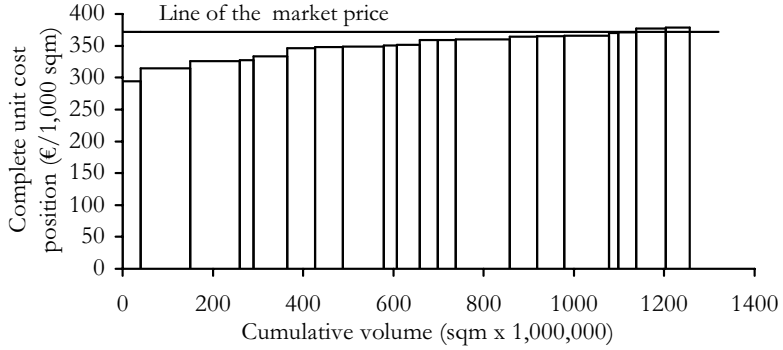

Fig. 2. Competitive histogram referred to the European flexible packaging market for chocolate bars

When implementing competitive histograms in real-life manufacturing environments the main issue lies in extrapolating the competitors' overall cost, since calculating the cost position for an internal division is relatively easy. For this purpose, for each cost item, the relative weight in the total cost structure is to be estimated: for discontinuous levers (e.g., technology, equipment, premium image), each player is to be studied case by case on the basis of the balance sheets; for continuous levers (e.g., raw materials purchased, plant size) the learning curve model can be employed, by mapping data coming from balance sheets.

E.g., Figure 3 refers to the G&A cost item for the companies within the European flexible packaging market. The resulting curve slope is 75% (i.e. doubling the company size, G&A unit cost decreases by 25%), which has been also recently validated in field, since Danisco and Sidlaw cut off the merged G&A costs by about 33% (Cigolini and Grillo, 2003). Combining the cost structure with the slopes connected to each cost item, all the competitors' bars (e.g., the ones represented in Figure 2) can be built. The cost structure evolves over time, as companies strengthen or weaken their positions, thus causing more or less relevant gains (or losses) connected to each cost item, according to the slope and the weight in the overall unit cost structure.

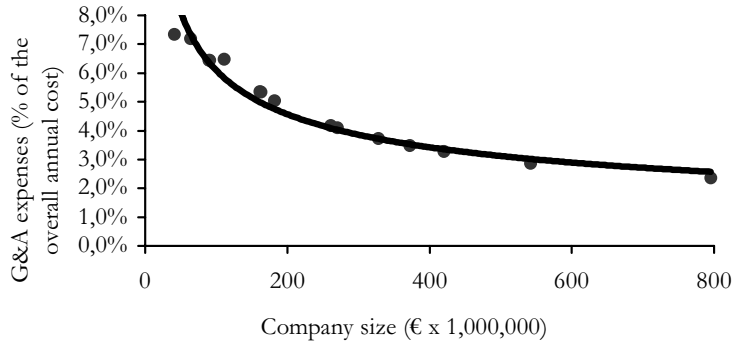

Fig. 3. G&A expenses in the European flexible packaging market; each point represents a company

Notice the organizational impact: market, plant, operations and manufacturing managers are directly concerned with the model implementation, since for each cost item, the product flow throughout all the operational units of the company is to be studied. For continuous levers the slopes are to be validated either by having to resort to a benchmarking on historical data or by focusing on the performance of the same kind of equipment in different plants. Often R&D and operations managers are sufficiently skilled, but this information has to be completed through the market and economic analysis (e.g., labour and energy cost evolution, national laws, strike share, image, degree of integration), which has to be led by sales forces, usually better acquainted with the competitors commercial strength.

Finally the last phase of the competitive histograms implementation deals with building the differential cost structure. For this purpose, the best and the worst position among all the players for each lever on the histogram are to be identified: the theoretically worst player will have a cost structure sum of the worst cost items (i.e. the highest raw materials cost is, the highest labour cost will be etc.); the theoretically best player will have a cost structure sum of the best-cost items. By making the difference between the best and the worst position for each cost item (e.g., the difference between the highest and the lowest raw materials cost), the differential cost structure can be built.

Not all the gap pointed out by the differential cost structure is available for strategic improvements, since by merely summing up the best and the worst cost positions, the trade-offs between items cost are overlooked. However, the differential cost structure helps top managers to understand where profit can be gained compared to competitors. E.g. referring to the European flexible packaging market (Figure 4), the highest differentiation lever is site location (i.e. labour cost), followed by manufacturing (i.e. technology and equipment) and group size (i.e. scale effect, basically on G&A and R&D). The impact pointed out by the differential cost structure is not connected to the relevance of the considered item cost within the cost structure: e.g., raw materials purchasing has only a 1% impact, while it represents about 50% of the overall cost.

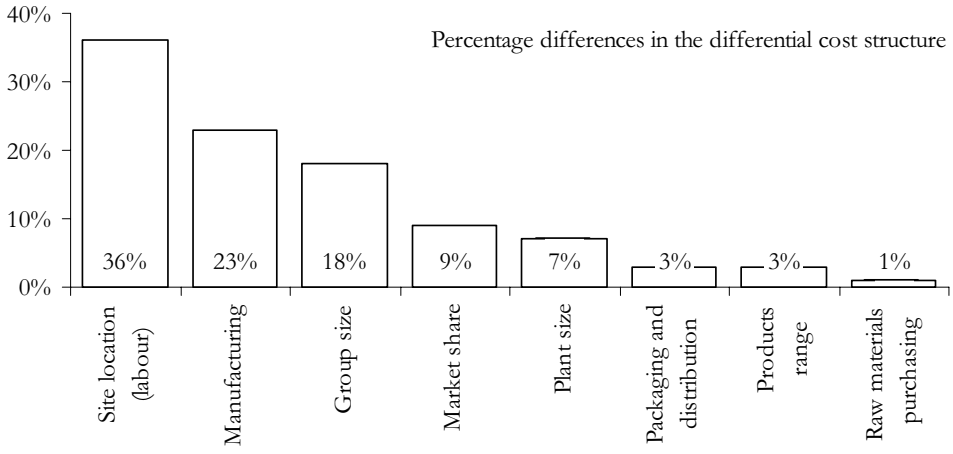

Fig. 4. Differential cost structure for the European flexible packaging market

3.5. The evaluation of the competitive structure

Histograms can help strategic planners to build a matrix (similar to a classical portfolio matrix), in which the competitive position of an actor and the attractiveness of a given sector are considered. The competitive position is linked to the abscissa of the competitive histogram and it can be represented by considering the traditional 3 positions (i.e. weak, medium and strong): e.g., referring to Figure 2, the first 5 companies on the left (accounting for the first 400 million square metres) can be considered to have a strong positioning and – going to the right side of the histogram – the next 7 companies can be considered to have a medium positioning etc.

The attractiveness of a sector is more complex to define, as it depends on 5 factors: (i) the possibility of differentiation, expressed through the difference between the ROI[1] of the best and the worst actor, since this difference could come from manufacturing process, labour costs, assets quality etc.; (ii) the entry barriers, either technological or coming from customers' behaviour (i.e. high switching costs) or even based on a specific know-how; (iii) the competitive concentration, since e.g. within markets where a dominant player exists, the pressure on prices is very low, while fragmented markets exhibit aggressive commercial behaviour among players, which adds strong pressure to prices; (iv) the customers vs. suppliers relationship, in that bargaining power is favourable to suppliers when the customers base is fragmented, while it is unfavourable when the market is concentrated with 3 or 4 large customers; (v) the capacity regulation, which depends on the market growth rate (the higher the growth is, the lower the over-capacity risk appears to be) and on the average capacity that each new machine brings.

The standpoint for evaluating the attractiveness lies in considering scarcely attractive a competitive structure in which only 1 (out of 5) factor is not favourable. For this reason, each factor is provided with a specific weight and the product of the weight and the favourableness represents its mark. The total score (i.e. the estimated attractiveness) is calculated as the geometric average of the marks of all the factors. The set of weights used in analysing a given market (e.g., the European flexible packaging one) should come from a large number of interviews, validated also by the internal strategic apex. By changing the business type, the set of relative weights should be reassessed before re-implementing the portfolio evaluation. E.g. set setting reference to the European flexible packaging segment of chocolate bars, whose competitive histogram is reported in Figure 2 and whose set of weights is represented in Table 1.

Table 1

Set of weights used to describe the competitive structure of the European flexible packaging market

Competitive structure	Judgement and relative weight			
Possibility of differentiation	Very high = 4	High = 3	Medium = 2	Weak = 1
Entry barriers	Very high = 3	High = 2	Medium = 1,5	Weak = 1
Competitive concentration	Very favourable = 4	Favourable = 3	Medium = 2	Low = 1
Customers vs. suppliers relationships	-	Favourable = 3	Neutral = 2	Not favourable = 1
Capacity regulation	Excellent = 5	Good = 4	Neutral = 2	Bad = 1

The differentiation is very high (i.e. score = 4); entry barriers are medium (i.e. score = 2) since there is some specific know-how (related to the technique for using oriented polypropylene and cold seal), without proper technological barriers and some customer barriers are also present; the concentration is medium (i.e. score = 2), given that 15 players on the marketplace have been identified; the customers vs. suppliers relationship is neutral (i.e. score = 2) because there is a wide range of customers that really value service and do not change suppliers very quickly; capacity regulation is mediocre (i.e. score = 2) because the technology used for bars packaging is also employed for biscuits and confectionery market, thus making a switch easy, and the market grows at 2-3% per year, which prevents from high risk. As a result the competitive structure scores $(4 \cdot 2 \cdot 2 \cdot 2 \cdot 2)^{1/5} = 2.297$. According to Table 1, the scale ranges from a minimum of 1 and a maximum of $(4 \cdot 3 \cdot 4 \cdot 3 \cdot 5)^{1/5} = 3.728$, and 2.297 corresponds to a medium[2] sector attractiveness.

As a result, given the competitive histogram coupled with the indication about sector attractiveness coming from the calculus above, the segment of chocolate bars can be represented on the port-

[1] It is the acronym of Return On Investment (i.e. on the invested capital in a project).

[2] Low attractiveness corresponds to scores ranging from 1 to 1 + (1/3) (3.728-1) = 1.909; medium attractiveness corresponds to scores ranging from 1.909 to 1 + (2/3) (3.728-1) = 2.819; high attractiveness corresponds to scores ranging from 2.819 to 3.728.

folio matrix of the considered company through the classical bubble proportional to the turnover. Figure 5 presents an example of the portfolio of activities for a company where all the sectors of the European flexible packaging market are considered (i.e. biscuits, bread, chocolate bars etc.).

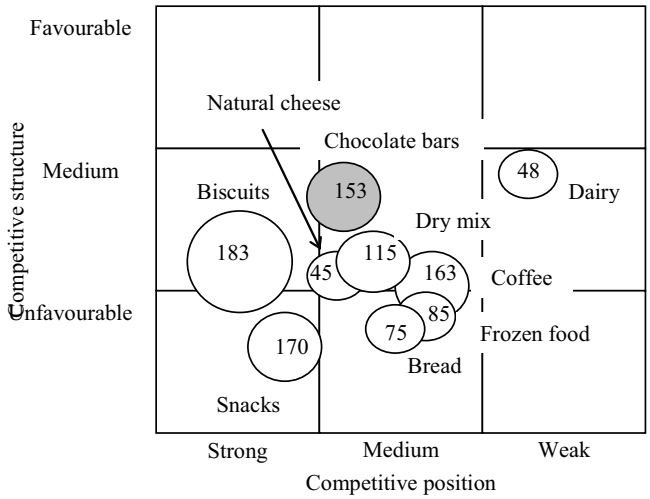

Fig. 5. Portfolio of activities for an actor within the European flexible packaging market

The portfolio matrix, calculated as suggested above can be fruitful also when an additional analysis of the whole marketplace (e.g. the whole European flexible packaging market) is required. For this purpose the notion of portfolio's centre of gravity has to be introduced: in a similar way as in Mechanics, the portfolio's centre of gravity represents the point around which the turnover of all the segments (i.e. the bubbles in Figure 5) is evenly distributed along the competitive position (on the abscissa) and the competitive structure (on the Y axis). In this way, each company is provided with its own portfolio's centre of gravity.

By building the portfolio matrix and by calculating the centre of gravity for all the actors belonging to a given market, a representation of the whole market is available (Figure 6[1]). In this way, the actors can be easily compared and the market's centre of gravity can be calculated to allow comparisons among different markets.

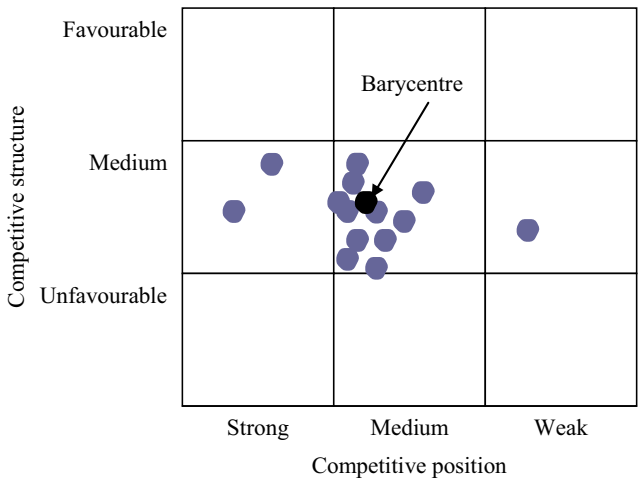

Fig. 6. Overall view of the actors in the European flexible packaging market

[1] Companies have not been labelled since these are considered confidential data.

3.6. The strategic segmentation and strategic options

A strategic segment is defined by products (or services), which require similar competencies, with similar success factors and competitors. Strategic segmentation is aimed at delivering a battlefield representation, by either separating or grouping different items in an appropriate manner: e.g. products and/or services sold to different customers types (e.g., by sex, age, lifestyle, distribution channel) should be put in different segments, while different products that satisfy similar customers needs can be grouped in the same segment. Different technology is often a relevant factor in separating 2 segments (e.g., injection and extrusion for the plastic bottle manufacturing in the European flexible packaging market), as well as 2 products can be grouped together when the common costs are relevant.

Finally, competitive histograms can be useful for an early evaluation of strategic options: e.g., cost reduction programs, merging & acquisitions that change the players' relative positions; also capacity extensions (which usually come from left-side player, to increase extra supply and to worsen the competitiveness of badly positioned players) can be quantified and represented on the competitive histogram by using the differential cost structure (Figure 7). However the importance the competitive histograms should have within a decision process that includes e.g. discounted cash flows indexes, goes beyond the scope of this paper.

4. Model application

The objective of this section lies in applying the model outlined in section 3 to the real-life case study of the European flexible packaging market. This market – as intended here – refers to the sales value of converted films, foils and papers used for primary product packaging, retail packaging and in niche segments, such as medical and pharmaceutical packaging. It excludes all the uses of polyethylene in shrink and stretch films for secondary packaging, pallet wrap, carrier bags, silage bags, refuse sacks etc. and it also excludes plastic bags usually provided in supermarkets for consumers.

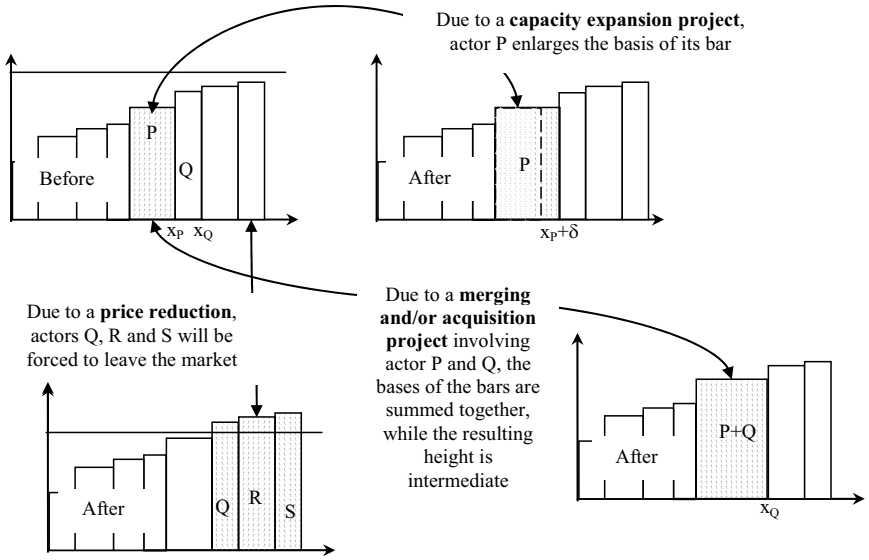

Fig. 7. The use of competitive histograms to evaluate strategic options

Different technologies co-exist in the market under study, i.e. adhesive lamination, extrusion lamination, co-extrusion cast and blown; films can be simple, duplex or triplex, so that over 30 different segments have been identified. The study presented here refers to the European flexible packaging market for food – which accounts for about 70% of the overall market – and it is

focused on 25 players. Competitive histograms have been implemented at the plant level for 5 segments with a significant aid provided by operations managers, who demonstrated enthusiasm while working actively on strategy. In particular, the most valuable support of operations managers came in benchmarking the different technologies and in gathering competitive data on each actor's equipment.

In the following, the implementation of 5 (out of 6) steps of the methodology is summarised[1]. For the value added grid building purposes (step 1), the market should be considered on a European basis, in that imports from other regions are not significant, while exports to neighbour countries are relevant mainly for Italian converters (to North Africa and Middle East) and German ones (to Eastern Europe, notably: Poland, Hungary and the former Czech Republic). Furthermore, materials employed in the market range from polyethylene (PE, by for the largest material employed as film aver wrap and laminates) to bi-axially oriented polypropylene, to PVC, to PET, to cellulose films and to aluminium foils (Alu).

For the demand analysis (step 2), 3 types of customer needs have been considered: (i) needs related to product and concerning the protection, i.e. barrier against moisture, oxygen, flavour, fats, light etc.; (ii) needs related to customers and concerning the so-called product workability, i.e. tensile strength, dimensional stability, heat resistance; (iii) needs related to final users in terms of both appearance, i.e. transparency, gloss, printing quality etc., and user friendliness, i.e. easy handling, re-close etc. This results in more than 200 different structures, basically belonging to 2 market segments: (i) stable products for which the optimal structure seems to be reached and competition is based on the manufacturing cost; (ii) products with a potential for substitution, for which competition is based on the structural differentiation often originated from a change in technology, e.g. the use of standards films instead of multi-layer ones.

From the supply side, the market is very fragmented: the industry is becoming global following customer base developments, mainly the food industry. So there is a huge pressure on companies towards consolidating forces on strategic markets, exploiting economies of scale and expanding geographic reach to follow customers. However, small local specialists still represent a large part of the market: a very small portion of the market requires manufacturers able to provide the full range of products, while the major emphasis is put on supplier's ability to effectively manage a specific technology. Table 2 provides a taxonomy of the 15 major players in the market together with their main activities.

The main economic lever (step 3) of converters in the value chain lies in technology, i.e. in cutting and printing simple or complex films, either through adhesive-lamination or through extrusion-lamination. More in detail, 3 types of competitive levers emerge in the European flexible packaging market: (i) using the lowest cost structure and technology, whose impact can be relevant whenever there is a potential for shifting from an over-quality structure to a simpler (and cheaper) one; (ii) the machines obsolescence (which depends on the age and conditions of existing equipment) impacts for about 5% of the overall cost; (iii) optimizing the product mix (which is tightly linked to the equipment's focalisation) accounts for 2% of the total cost.

To implement the competitive histograms (step 4), the 1st phase consists in identifying the right structure (i.e. simple or complex film) and, for each product structure, the appropriate cost breakdown. Cost breakdown is made up from 6 components, i.e.: (i) raw material cost (including spoilage); (ii) machine operation cost (or running cost), including personnel cost for mounting and cleaning cylinders, handling, packaging and sending, managing the workshop, quality control, planning and methods, operators training and maintenance cost; (iii) set-up cost; (iv) packaging standard cost; (v) transportation standard cost; (vi) a portion of fixed cost (e.g. sales, G&A, R&D costs) allocated by appropriate drivers determined in co-ordination with plant controllers.

[1] The evaluation of strategic options has been omitted since these are considered confidential data.

Table 2

The major players in the European flexible packaging market and their main segments

Actors	Segments	Bread	Cereals	Biscuits	Coffee	Snacks	Dry Mix	Chilled Dairy	Cheese	Bars / Ice Creams	Frozen Food	Meat	Tobacco	Pharmaceuticals	Healthcare
European generalists	Actor 1		X	X	X	X	X	X	X	X	X		X	X	X
	Actor 2	X		X	X	X	X	X		X		X			
	Actor 3				X	X	X	X	X					X	
	Actor 4			X	X	X	X			X					
	Actor 5					X	X	X		X				X	
	Actor 6			X	X	X	X			X		X			
	Actor 7			X	X	X	X	X							
	Actor 8			X	X	X	X	X	X	X			X	X	
Local generalists	Actor 9	X			X			X	X	X				X	
	Actor 10		X		X		X	X	X			X		X	X
Market specialists	Actor 11													X	X
	Actor 12				X										
	Actor 13				X										
Technology specialists	Actor 14								X			X			
	Actor 15								X			X			

E.g., for the coffee triplex (i.e. PET/Alu/PE) printed structure, raw materials account for more than 50% of the overall cost. The continuous lever that impacts raw material cost is the quantity globally purchased. Taken as reference the internal cost structure and considering the relative weight of each material in the structure analysed, the other players' raw material unit cost has been extrapolated. To estimate the other players costs, manufacturing cost has been divided in processing and set-up cost and for each cost component a manufacturing ratio has been calculated for each player so that each player's cost is derived as:

$$MC_X = MC_{REF} \cdot \frac{RSU_X}{RSU_{REF}}, \quad (1)$$

where *MC* represents the manufacturing cost either of the considered player (subscript *X*) or of the reference player (subscript REF), i.e. the player whose cost structure has been studied in detail; *RSU* represents the sum of the running cost and the set-up cost.

The impact of country labour cost has been taken into account at the end of the model, because this parameter affects both manufacturing cost and sales and G&A costs. Plant fixed costs depend on plant size; therefore the competitive lever considered is plant turnover and an empirical curve (reported in figure 8) that allows to link the fixed cost as a function of the plant size has been used (Gaster 1997). G&A and R&D fixed costs depend on the group size: sales costs depend on the player segment size, which means that a focused player (e.g. on the coffee market) will enjoy scope economies and has a lighter impact of sales costs on the overall cost per unit.

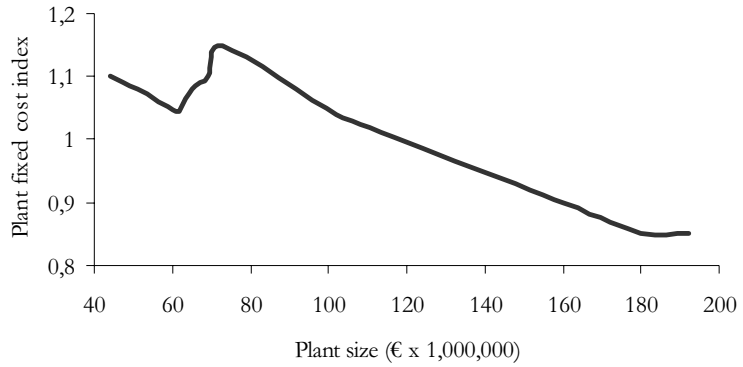

Fig. 8. The empirical curve that links the fixed cost to the plant size (adapted from Gaster, 1997)

Country labour cost impacts salary costs both for plants and headquarters. Data source employed in this area comes from the institute of German economics (Table 3). The impact of the country labour costs changes according to the cost item: the manufacturing cost, plant fixed cost and sales cost depend on plant location (sales people are dedicated by plant), and G&A and R&D salary depend on the headquarters location.

Table 3

The country labour cost index (source: Institut der Deutschen Wirtschaft, 2000)

Country	Labour cost index	Country	Labour cost index	Country	Labour cost index
Switzerland	154%	Luxembourg	114%	Italy	99%
Germany	146%	Denmark	110%	USA	88%
Austria	126%	Japan	108%	Spain	80%
Finland	124%	Sweden	103%	Ireland	74%
Belgium	123%	France	102%	Greece	47%
Netherlands	118%	U.K.	101%	Portugal	33%

Average UE = 100%

With reference to the evaluation of the competitive structure of the market (step 5), notice that – inherently due to process (i.e. 2 vs. 3 layers) and equipment performances (i.e. differences between old and new machines) – the differentiation is high, with a difference in terms of ROI between the best and worst player of 15%. Entry barriers are medium, since there are only some specific know-how (i.e. technical expertise) and some customer barriers. The competitive concentration is average, with 11 direct competitors on the considered segment. The relationship between customers and suppliers is neutral, since customers range from some specialised very small producers to big multinational ones. The capacity regulation is neutral, since the triplex market is growing and each piece of equipment accounts for about 5% of market. The competitive structure is medium and the estimated ROI of the best player is more than 20%.

As a conclusion, the analysis performed through the competitive histograms pointed out that European flexible packaging market mainly consists of many (on average) medium-favourable segments: (i) differentiation is usually very high and many levers allow cost improvement; (ii) capacity regulation is good due to the small size of each piece of equipment compared with the large size of relevant markets; (iii) there is a large number of competitors and entry barriers are relatively low. Within this scenario, ROI of a few favourable niche segments (e.g., cheese and pharmaceutical blister foil) with high entry barriers and concentrated suppliers accounts for more

than 20% for the best players; on the other hand, some segments (e.g., coffee duplex and snacks) are unfavourable, due to downstream environment and customers relationship.

The keys of the market's overall good competitive position can be highlighted by means of the cost per unit analysis. In particular 3 main levers are relevant: (i) having the right technology to serve customer needs (e.g., oxygen and moisture barrier): this depends on material know-how (technical products), product development and on the right set of technologies; (ii) focusing the equipment on reliable products, tightly linked to the market share by product type, thus benefiting also from good machine performance; (iii) maximising scale economics to optimise G&A costs and raw materials costs (purchasing scale, market share and global size). Customer mix is a minor issue as markets are moving towards homogeneous purchasing behaviour and price; plant location is not a crucial issue for most customers, since purchasing is performed according to a European price, while a high labour cost country is a handicap. As a consequence, the best actors combine the quality of workforce (in terms of technical know-how) and work environment with the lowest labour cost.

5. Concluding remarks

The organizational practice proposed in this study tries to fill the gap between the strategic planning models found in literature and the real-life applications in field, where the need for a link between strategic planning and operations managers emerges as a key-issue. For this purpose the proposed practice suggests an integrated planning process, while also supporting business strategy formulation through the competitive histograms. To improve the user friendliness in field, the model introduces a simplified analytic hierarchic process to estimate business attractiveness, while preserving strong quantitative performance data; the model also takes into account the synergy effect among activities – as under classical matrixes – and it represents some manufacturing-related impacts sometimes overlooked due to the hurdles of expressing them in monetary units.

Given that strategic decisions are biased when deliberations are limited to strictly financial impacts (Tufano, 1996), the proposed practice provides a general outline to operations and top managers, by explicitly inviting them to study the competitive environment and the customers needs and behaviours: the power of competitive histograms lies in enabling operations managers to pass their knowledge to top managers, by also stimulating inter-functional communications, since the overall cost per unit includes raw materials, manufacturing, sales, distribution and logistic, R&D and G&A cost.

Moreover, the leading actor of the planning process is the market segment and implementing histograms allows operations managers to gain a deep understanding of competitiveness and competitive outcomes, i.e. companies gaining or loosing market shares, new entrants, technology changes, capacity extensions etc. Competitive histograms – through the competitive structure vs. competitive position matrix – summarise (in a quantitative manner) all the required information in one chart for each player. Finally the proposed methodology is designed to go beyond the strategic diagnosis: it explains what makes a company more profitable than another one and the differential cost structure shows the levers that can create a real and sustainable competitive advantage.

The research line of the model presented here seems to be worth being deeper investigated, both to improve the model itself and to prevent the users from some potential weaknesses. The future research paths should involve at least 3 directions of analysis: (i) a potential weakness of the model lies in the reliability of data coming from field and in their inherent structure required; for this reason, an additional evaluation of the methodology using one or more different detailed field studies (e.g., biotechnology, semiconductors) – especially in terms of key levers, cost structure and technologies – is desirable; (ii) another potential weakness of the competitive histograms to evaluate strategic options lies in the way the new cost structure of 2 (or more) added bars is calculated: a more powerful tool than the differential cost structure should be required to evaluate the synergies in a merging or acquisition phase; (iii) besides the traditional manufacturing environments, competitive histograms should be applied either to service-based companies or to web-based businesses, where a flat histogram (i.e. equivalent cost positions despite highly different cost structures among players) should require some model refinements.

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