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Business and Manufacturing Strategies: a Model for Alignment

(Case Study: Iranian Automative Industry)

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Abstract. Production and operation strategy is one of the functional level strategies of the organization, which needs to be linked to business strategy and other functional strategies. Current literature divides production and operation into two main branches: manufacturing and service. The role and importance of manufacturing strategy in the successful performance of organizations was initially emphasized by Wickham Skinner's work in 1969. In the following years, various studies have been conducted in this field, which could be divided into two main streams: (i) Content studies, which includes research on the reason and purpose of the subject (i.e. why manufacturing strategy?); (ii) Process studies that deal with the methodology of formulating manufacturing strategy (i.e. the know-how of planning manufacturing strategy). In this paper, after a literature review on various researches on manufacturing strategy, including its relation to strategies at corporate and business levels and various models for its formulation, a model has been developed and introduced to empower the linkage between manufacturing strategy from one hand and Business and corporate strategy from the other hand. The developed model then Combined to a decision Table and align the manufacturing strategy with Business Strategy. To validate the model developed by the researcher, it was introduced to experts in the automotive industry of Iran, who supported the model descriptively and analytically.

Keywords: Production & Operation Management - Strategic Planning-Manufacturing Strategy-Strategic Alignment

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1. Introduction

One of the most important achievements of management knowledge has been the simultaneous attention to both internal & external environments of organizations. This approach, known as strategic management, provides a suitable response to ever increasing complexities in organizational competition. Production and operation as one of organizations functions make up each organization's main activities. In addition all functions should be in interaction with each other in such a way that results in an augmentation to achieve the organization objectives. What the objectives are in essence relates to the organization strategic decisions. Therefore the main question is how to provide the organization with businesses which meat the organization objectives in different aspects and then to transform each business decision and plan to different functions of the organization.

2. Literature Review

Organizations strategic decisions are mainly defined in three levels: corporate strategy, business strategy and functional strategy. These three levels should be employed at the same time and the relationship among them should also be mentioned. (Harrison & John, 1998-wheelen & Hunger, 2ooo).

2.1 Business Level Strategy

Michael Porter has stated that organizations, in search of competitive advantage, have two ways: 1. Introduce a product or service different from other competitors, or 2.Produce standard products or service with the lowest cost. Porter has combined these two advantages base with the domain of the market in which the organization is competing in, and has formed Generic strategies, cost leadership, differentiation and Focus. (David, 1999) But Thompson & Strickland, by the extension of this model and adding another strategy (Best cost providing strategy), have developed 5 generic competitive strategies and reviewed their distinctive

characteristics. (Thompson & Strickland, 2003)

2.2 Production and Operation strategies

Some authors believe that the functional level should be limited to: marketing, operation and finance and all other functions can be put into another level.(i.e. forth level) For example, the function of technology, capacity, R & D, human resources, controlling systems and the like can be considered as subdivisions of operation function and put into the forth level. (Samson, 1991). As such: "Operation strategy is a strategy for the operations function that is linked to the business strategy and other functional strategies, leading to a consistent pattern of decision making and competitive advantage for the firm". (schearoder, 2010).

2.3 Manufacturing strategy

In 1969, Skinner studied this subject under the title of "manufacturing - Missing Link in corporate strategy" (Skinner, 1969). Various definitions have been presented for manufacturing strategy but all of them emphasize on some key features. Being related and consistent with Business level strategy is another important issue for the manufacturing strategies (chin- Fu, Ho, 1996-Garvin, 1992). There are two distinct fields of study as appeared in manufacturing strategy texts, which are content and process." Content of manufacturing strategy comprises of the specific decisions and actions which set the operations role, objective and activities and process is the method that is used to make the specific content decisions "(Slack et al, 2001).

2.4 Manufacturing strategy Process

"Process" deals with the formulation and Implementation of strategy and it makes use of the models developed for manufacturing strategy. Various models have been introduced in this field, 3 among of them are: a) HP Model: Beckman et al, in 1990 designed this model at Hewlett - Packard which provides a simple format for strategy formulation. (Beckman et al , 1990) b) QFD Model: quality function de-

ployment tool, which is a quality engineering instrument. This method translates the requirements of customers and organizations which are reflected in corporate and Business strategies and other functional strategies like marketing, to manufacturing language (Crow & Cheng, 1996). c) Miltenburg Model: He introduced a complete method using all the parameters affecting strategy formulation including: types of production systems, production outputs, competitive analysis, production capabilities level, and production levers (other functional sub-systems). This method other than explaining the organization current situation of these parameters and favorite situation of the organization, presents a model to formulate appropriate manufacturing strategies. In this model, to formulate a manufacturing strategy, the appropriate production system should be recognized, and then other parts of strategy can be built up. (Miltenburg, 1995). Production systems matrix, which has been used by many researchers, including Miltenburg, has been developed in 1979 by Hayes and Whellwright. Explaining seven known production system on the basis of four dimension of: types of products, volume of each, material flow and the machine layout, shows the situation of each system and at the same time, removes impossible and contradictory forms. This configuration is known as PV-LF Matrix.

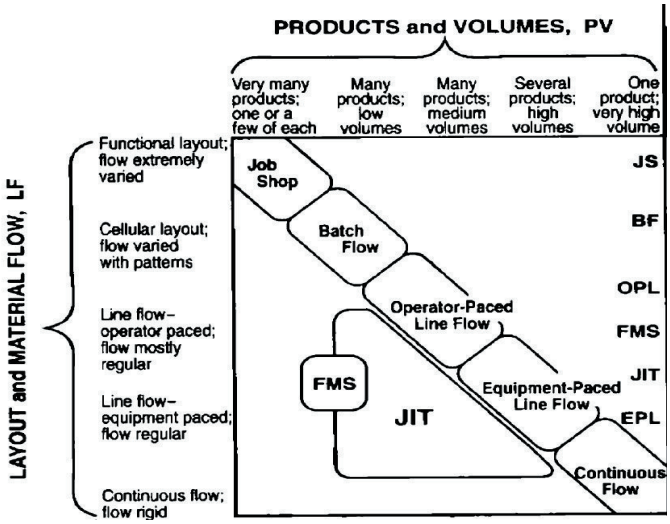

Figure1: PV-LF matrix.

Therefore, the six known outputs of each production system can be put in relation to these seven productions systems. (Fig.2). this figure shows which outputs and in which level each system produces.

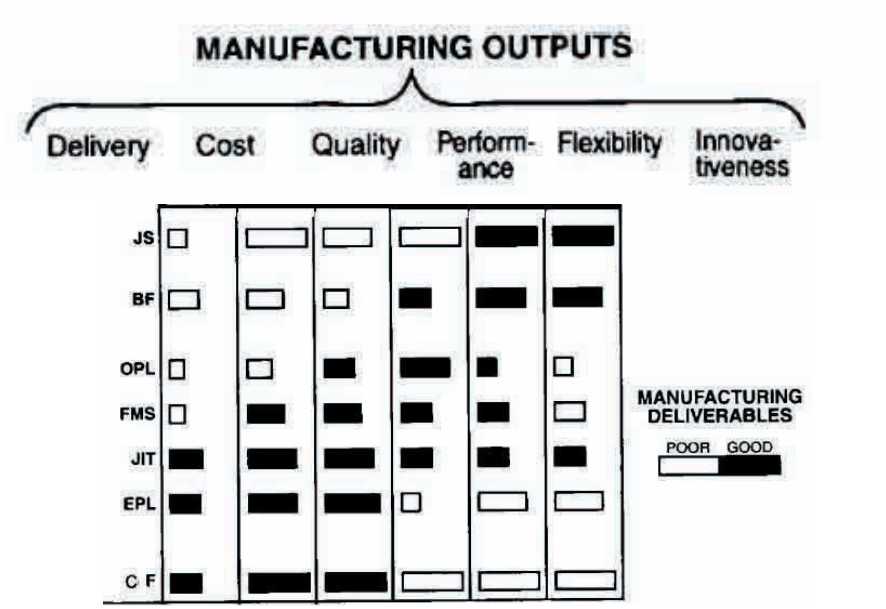

Figure2: Production outputs each system provides.

2.5 Production outputs classification:

"The market Qualifying and order winning outputs" that Terry Hill proposed in 1989, is based on the idea that no production system could provide all manufacturing outputs, stated in figure 2. Above, at the highest level expected. Therefore each organization needs to determine the outputs to be provided at the highest level and leave the other outputs for the lower levels. (Hill, 1993) The market qualifying outputs Are outputs that provide expectation of the customers? The order winning outputs Are outputs that provide better standards than prevailing in the market? The first task of production system is to produce an out put at the market qualifying level .Having done this; the producer should try to provide the output at the level of order winning. So, each production system either ignores output standards or chooses to produce at one of the above mentioned levels.

3. Proposed Conceptual Model:

The conceptual model proposed in this article tries to define a clear relationship between business level strategies and their suitable manufacturing strategy. Business level strategies selection: The six generic business level strategies, as proposed by porter's generic competitive strategies, can be set forth in a matrix in interaction with the manufacturing outputs. The six selected strategies are as follows:
1. Cost leadership: i.e. providing the lowest price in the whole market.
2. Quality Differentiation-broad: i.e. providing the best quality in whole market.
3. Product Differentiation: i.e. providing the most diversified products in the whole market.
4. Cost Focus: i.e. providing the lowest price in a niche market.
5. Quality Differentiation -Focus: i.e. a distinctive quality for a niche market.
6. Best cost providing: i.e. high quality and fair price at the same time.(value for money)

Table 1: relationship between manufacturing outputs and l business Strategies

Outputs / Business level strategies	Delivery	Cost	Quality	Performance	Flexibility	Innovativeness
Cost leadership	M	O	M	–	M	–
Differentiation in quality	–	M	M	O	M	–
Differentiation in product	M	M	M	–	M	O
Cost Focus	M	O	M	–	–	–
Differentiation Focus on quality	M	–	M	O	M	O
Best cost providing	M	O	O	–	M	–

Reference: This study

The findings of this research, indicates that each business strategy corresponds to a combination of outputs as well as their levels in the classification them stated earlier. For instance, cost leadership plays the main role in competition for cost as the order winning output, and it has

no emphasis on Innovativeness and performance. Concepts and their attached meanings used in this matrix are mainly borrowed from the works of Harisson & ST.John 1998, Strickland & Thompson 2003, and Wheelen & Hunger, 2000. This matrix shows the relationship between manufacturing outputs and business strategies in three different modes: (M) For market qualifying,(O) for order winning and(-) for no relationship. Further steps in this research were to combine table1 above with figures 1 and 2 of Hayes & wheelwright production systems which were presented earlier. The resulting table 2 indicates that each business strategy corresponds to which out puts and at what levels and which production system could provide those out puts

Table 2: Making the production system proportionate to business strategy.

NO	1	2	3	4	5	6
Business strategy	Cost leadership	Differentiation in quality	Differentiation in product	Cost Focus	Differentiation Focus on quality	Best cost providing
Production System	EPL	OPL or FMS	JIT	EPL	JIT	CF or EPL

To support the 6 * 6 matrix proposed in table 1, a questionnaire was designed to elicit the ideas of the managers and strategists of Automotive Industry in Iran on the importance and classification of each manufacturing output for each business level strategy using Likert spectrum and a ranking scale. The questionnaire was sent for a limited number of experts to be modified for its validity. To evaluate the reliability, measure of internal consistency using Cronbach alpha coefficient was used. Then the modified questionnaire was sent for 110 respondents and consequently74 of them were respected back to the researchers. In this study the six manufacturing outputs were assumed to be independent variable with ranking scale, whereas business strategies were assumed to be the dependent variable with nominal scale. To find out the relationship existing between the dependent and independent variables of the study, the statistical method of discriminant analysis was employed.

The analysis showed that the first variable which inters the model is cost variable and then variables of quality, innovativeness, delivery time; flexibility and performance inter the model respect. This order recites the importance of each of the variables in determining the business strategy.

Table 3: order of variables

Variables Entered/Removed [a,b,c,d]

Step	Entered	Wilks' Lambda				
		Statistic	df1	df2	df3	Sig.
1	cost	.519	1	5	438.000	.000
2	quality	.376	2	5	438.000	.000
3	innovativeness	.315	3	5	438.000	.000
4	delivery time	.304	4	5	438.000	.001
5	flexibility	.294	5	5	438.000	.005
6	performance	.288	6	5	438.000	.014

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

a. Maximum number of steps is 34.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

4. Conclusion:

The strategic decision making model presented in this paper, provides the necessary basis for the selection of the suitable production system for each business strategy, considering internal and external circumstances. As indicated, in case the impossible making factor can be removed, suitable production system can be selected. Selecting a suitable production system specified the, machine layout; materials flow, product variety and volume, consequently, decisions about the needed human resource, financial resource, policy of inventory control, organization structure, control and other functional sub-systems will be made significantly better. Selection of an appropriate production system is an introduction for formulating the production and operation strategy. So, having selected the appropriate production system, the Miltenburg and other models can be

useful to continue strategy formulation .miltenburg has used functional view to determine the current situations of sub-systems, whereas value chain method and performance measurement models like EFQM, could also be used. Using these different models in determining the current subsystem situation, could also facilitate devising plans to improve the required subsystems.

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