LINKAGE STRUCTURE AND TRADE-OFFS OF COMPETITIVE MEASURES

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Objectives

A wellknown generic manufacturing strategy indicates " focused " orientation in strategic resource allocation decisions. This is true in the general sense that they have to make optimal decisions under resource constraints such as capital, human resource, time, etc.. We can find an assumption underlying the orientation that there exist trade-off relationships between competitive measures like cost, quality etc.. (Skinner, 1978) Our research objectives are to seek for insights into the trade-off relationship. Is it an unavoidable lot to every company?

The analysis on the Japanese world class companies hints there is high degree of freedom for any company to make it more competitive free from the relationship. It is more important for actual companies to exploit such freedom than assuming the relationship as a lot.

Our research objectives include modeling a hypothetical strengthening competitiveness process based on the results extracted from the positive analysis of the structure of competitive measures. Such task may give us implications to build up competitive companies.

Extracted Structure of Competitive Measures

Fig.1 shows the structure in terms of correlation coefficients between eight competitive measures of the Japanese world class manufacturing factories, which has been extracted by the cluster analysis(Ward method) of the measures. The measures are perceptually evaluated by plant manager. One important fact is there is no negative correlation coefficient in the structure, that hardly suggests the existence of competitive trade-off in general.

The structure is interpretable in the relationships between the measures. We can take two measures as basis of competitiveness. They are Quality of Product Conformance and Production Cycle Time. Quality gives favorable effects on Manufacturing Cost, Speed of New Product Introduction, Product Capability and Performance, Customer Support and Service and On-Time Delivery. Production Cycle Time reduces Manufacturing Cost by way of low inventory, for example, and realizes Fast Delivery and On-Time Delivery. Fast Delivery also supports On-Time Delivery. On-Time Delivery enhances Customer Support and Service. Speed of New Product Introduction quickens product improvement and then raises Product Capability and Performance, as well as decreasing the product development cost which will bring about the reduction of manufacturing cost by way of efficient and effective facility and equipment planning and tooling, etc..

One significant implication is that we are able to exploit the opportunity of such linked lift up process of the measures. The problem is what factors determine the linked upward process. One important factor we are going to propose is the communication linkage structure which holds through whole communication phases of the firm from operation to strategic aspects as shown in Fig. 2. (Morita,et.al., 1995) Each phase has activated communication level to form a linkage structure of achieving tasks in terms of positive correlation between the communication levels. The aspects work in positively cooperated way to attain the firm's goals. The linkage structure is divided into the two basic broad aspects, that is, the strategic aspect and the

operation aspect, which consist of relevant individual aspects respectively.

The levels of activation of communication in the two aspects explain the levels of the competitive measures. Fig. 3 exhibits the explanatory power of the communication level of the aspects. The higher the communication levels in the aspects, the more competitive the measures in parallel form.

Management Implications

When we think of strengthening competitiveness, before taking the trade-off concept of the measures into consideration, we should think of the substratum of building up them. It is the linked structure of communication. It makes it possible for the firm to enhance the communication level in each communication phase necessary to achieve firm's goals and then to realize the linked lift up process of the competitive measures. Technical relationships between various tasks or functions require good communication and cooperated behaviors based on it. The communication linkage and well cooperated behaviors move the firm toward exploiting the opportunity of the systematic linked lift up process.

When it comes to the trade-off relationship, we will be able to say that if the firm remains only at a particular communication linkage level, it will face the trade-offs at the level. But if it moves up in the level, new opportunity to take advantage of the lift up process is endowed. The firm has to improve the quality of the substratum in terms of the communication linkage if it wishes to avoid the doom of the trade-off which will weaken the firm's competitive position relative to rivals. Mere direct focus on a particular measure will decreases the effectiveness and efficiency of efforts as well as the possibility to make a strategic change in the firm.

Modeling The Process

The model of strengthening competitiveness gives us some opportunities to know more about management. Firstly it gives an occasion to construct management perspectives covering a broad range of activities of the firm as well as dynamics of development of competence. A lot of people know management consists of complex matters and their interactions. But there is less availability of concepts to make such complexity as a model. The communication linkage of representative activity phases provides with such concepts. The relationships of them with the firm's competitiveness as output give meaningful modeling for management.

Secondly the model, if completed, provides with the ability to design competitiveness of the firm. A piecemeal approach to a particular competitiveness like quality can be combined with other efforts toward competitiveness to make a comprehensive plan for total competitiveness of the firm. Efforts like TQC movement, Suggestion System, Concurrent Engineering, etc. will be introduced into the model in the form of relationships with the communication linkage, which can be related with competitiveness. Some of them are more effective than others due to their size of impact on the communication linkage and the technical relationships between the measures. These working processes are far beyond grasping without the model.

In order to complete the model, we needs also knowledge on communication processes within the firm. Behavioral and motivational factors should be examined to understand the communication process and its activation dynamism. Normative model, however, where only the relationships between the communication linkage and the measures are picked up, may be possible as the first step. It will give a reference process of building up competitiveness.

REFERENCES

Morita, M., Tanaka, N., Mori, H. and Takahashi, U., Communication Network Systems for Competitiveness: Tha Japanese World Class Manufacturing Case, Shimada,T. and Saeed, K(eds.) , *Proceedings of the 1995 International System Dynamics Conference, Vol.1, Tokyo*, 1995, pp150-169

Skinner,W., *Manufacturing in the Corporate Strategy*, Wiley, 1978

Fig.2 Construction of the Communication Aspects

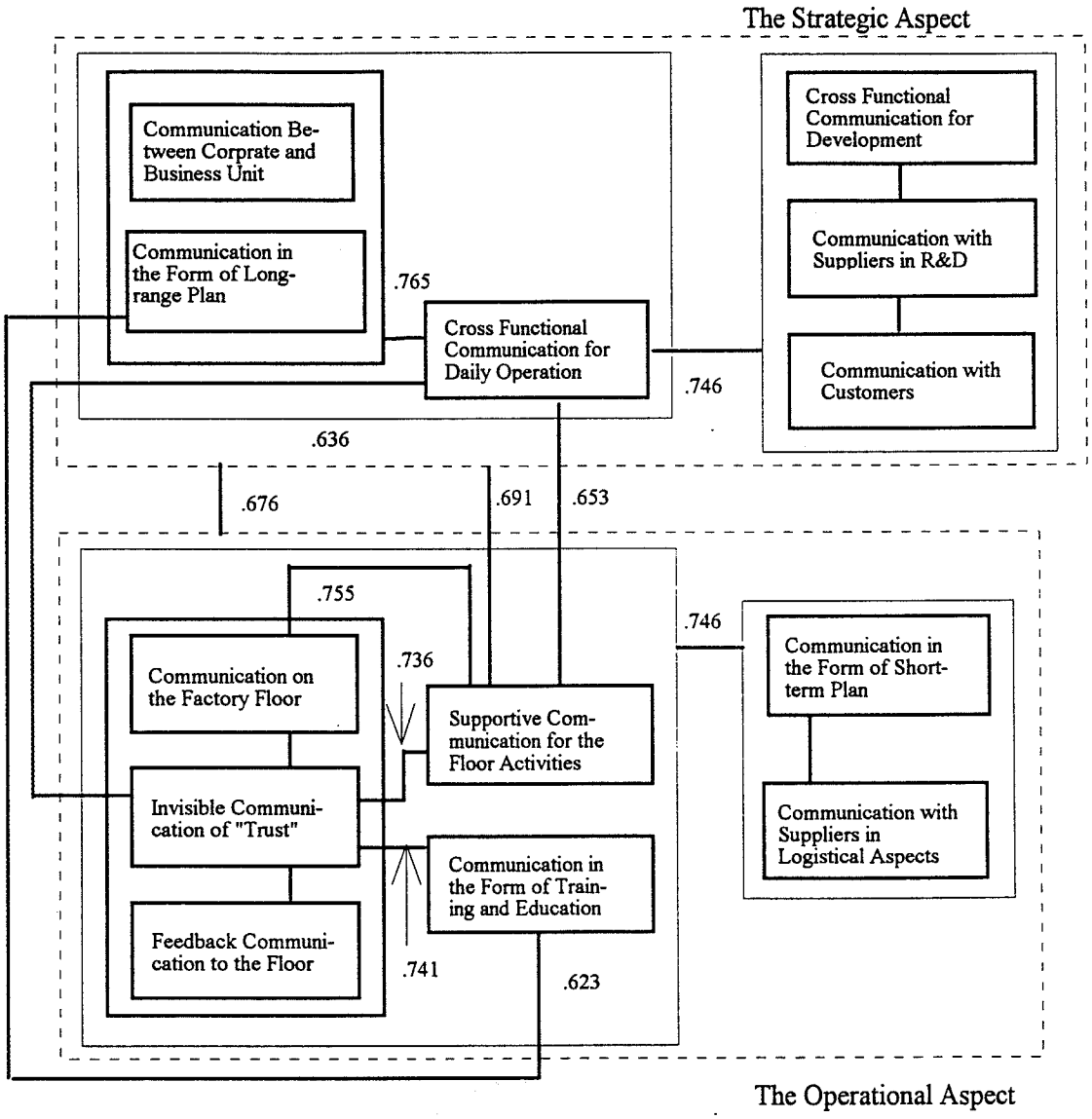


Fig. 1 Construction of Competiveness(WCM)

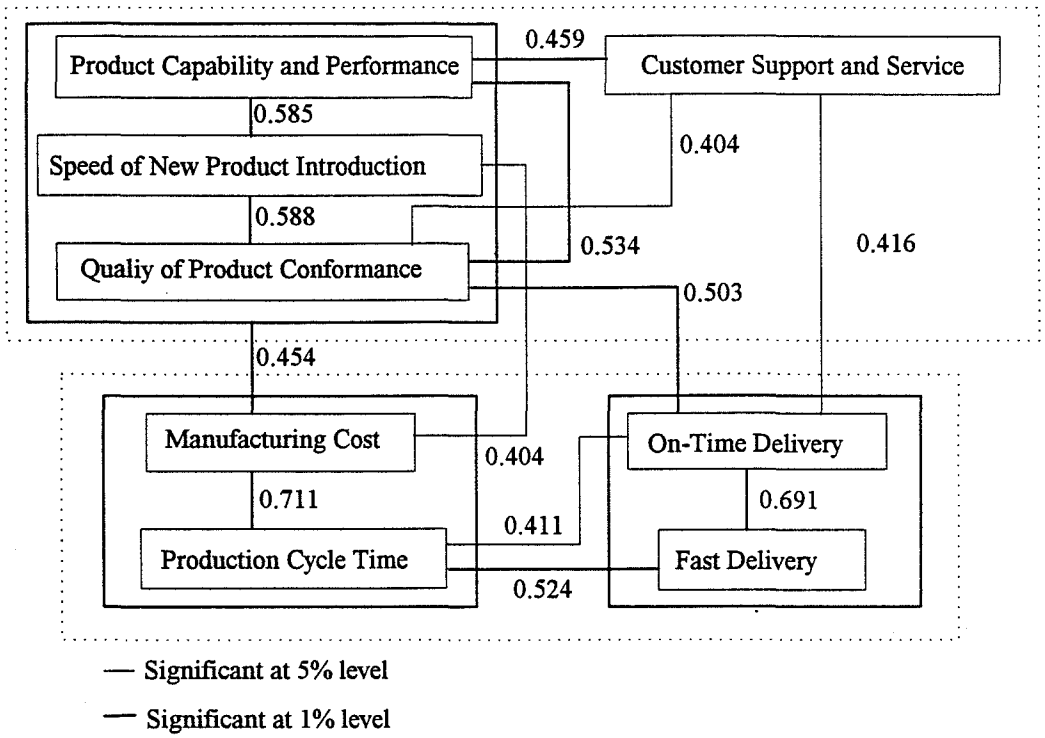
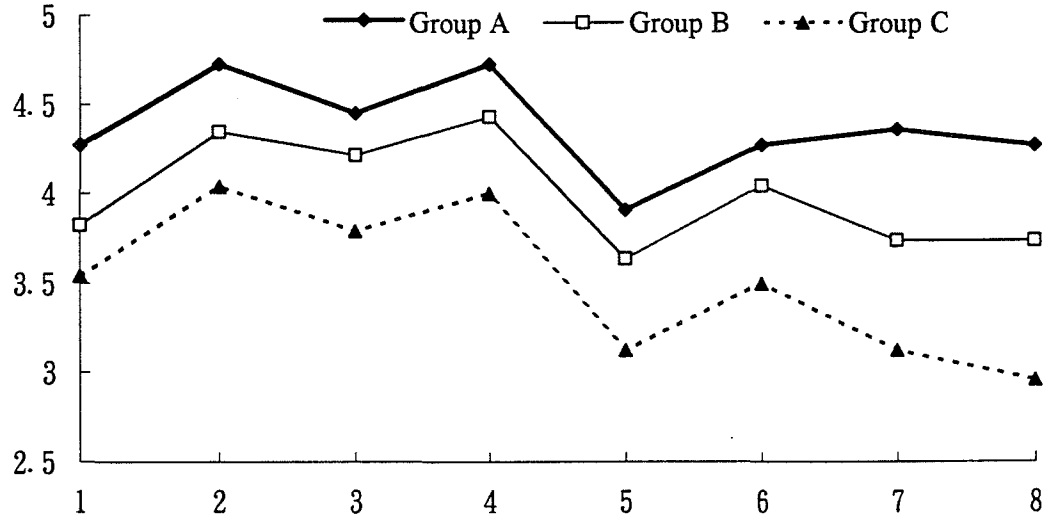


Fig. 3 Competive Measures and Degree of Communication Level
(including the random sampled)



1: Customer Support and Service
2: Quality of Product Conformance
3: On-Time Delivery
4: Product Capability and Performance
5: Manufacturing Cost
6: Fast Delivery
7: Speed of New Product Introduction
8: Production Cycle Time

Group A: Operational and Strategic Aspect are above average.
Group B: Either Operational and Strategic Aspect is above average.
Group C: Operational and Strategic Aspect are below average.
(Higher Score toward 5 means higher connfident)