APPENDIX

ANALYTICAL IMPLEMENTATION OF THE CR-CSF ALLOCATION

Possible Research Problem #1: HOW SHOULD THE FIRM DISTRIBUTE THE CRITICAL RESOURCES AMONG PROJECTS ASSOCIATED WITH THE CSFs IN ORDER TO MAXIMIZE THE FIRM'S UTILITY?

Objective: Max $Z = R_1(CR_1) + R_2(CR_2) + \ldots\ldots + R_n(CR_n)$

subject to the following constraints

1) $CR_1 + CR_2 + \ldots\ldots + CR_n <= T$

2) $CR_1, CR_2, \ldots\ldots, CR_n >= 0$

where, *$R_1, R_2, \ldots, R_n$ = Returns from various projects associated with the $CSFs_j$ (j=1..m)

* $CR_1, CR^2, \ldots, CR_n$ = Critical resources allocated to various firm projects.

* T = Total amount of resources available in the firm (determined by the economic returns of past solutions or projections of future ones).

Possible Research Problem #2: A PROJECT j ASSOCIATED PRIMARILY WITH CSFj, CAN BE ACCOMPLISHED USING A VARIETY OF FIRM RESOURCES (CR1, ... CRm) EACH HAVING A PARTICULAR CHARACTERISTIC AND PRICE. ASSUMING THAT WE WANT TO MAXIMIZE THE VALUE (OR UTILITY, OR BENEFITS, OR PROFITS) FROM PROJECT j, WHAT IS THE OPTIMAL SOLUTION IN TERMS OF SELECTION OF THE MOST «PROFITABLE» (value - costs) COMBINATION OF CSFs-CRs?

Objective: max $Z = \Sigma_i\Sigma_j R_{ij}F_{ij}$,

where ($R_{ij}F_{ij}$) represents the value (total profit) generated from allocating (Ri) amount of resource -i to a project -j that has as a purpose to perform well if measured under CSF (Fj), i.e., (F_j) = operationalization of CSFj = (Pricej -Costj)

CRITICAL RESOURCES CR (i) i=1..m					
	1x1	1x2		.....	1xn
	2x1	2x2		.....	2xn
	mx1	mx2		.....	mxn

CRITICAL SUCCESS FACTORS CSFJ, J=1..N

CASE I: THE «HONDA EFFECT» REVISITED

Pascale (Pascale, 1984) reports on how Honda managed to «redefine» the US and World motorcycle industry:

> «The Japanese are somewhat distrustful of a single 'strategy' for in their view any idea that focuses attention does so at the expense of peripheral vision....They regard any propensity to be driven by a single-minded strategy as a weakness...». In 1975, Boston Consulting Group (BCG) identified two key factors [*something like critical failure factors*] for the decline of the British Motorcycle Industry, (a) market share loss and profitability declines and (b) scale economy disadvantages in technology, distribution, and manufacturing...
>
> The success of the Japanese manufacturers originated with the growth of their domestic market during the 1950s...however, the Japanese have developed huge production volumes in small motorcycles in their domestic markets, and volume-related cost reductions had followed. This resulted in a *highly competitive cost position* which the Japanese used as a springboard for penetration of world markets with small motorcycles in the early 1960s»

In this example, Honda used its *experience* in the domestic Japanese market and then applied it to the global markets successfully. Honda has used the «knowledge about itself» (experience and superiority in specialized production systems, balancing engineering and market requirements, and cost efficiency and reliability of suppliers, and the knowledge about the external environment (markets and competitors) to develop its initial strategy process. Thus, technology and market know-how (technological capability) together with organizational learning and experience (organizational capability) in the domestic environment have been identified by Honda as Critical Resources, and matched adequately with the CSFs in these same environments (i.e., cost sensitivity, scale, process technology, quality, etc.).

After identifying its major strengths in terms of existing or additional organizational resources (CRs) Honda continued to innovate and penetrate other markets using the same simple concepts it used in the motorcycle industry: paying attention to the «human factor», experimenting with various strategies (thus learning more about the environment's reactions), and thinking in terms of «strategic accommodation» or «adaptive persistence» (i.e., being

able to move information and ideas from bottom to top and back again in continuous dialogue as Pascale observes).

Honda's competitive advantage is based on resources that have the attributes of rareness (managerial talent: «...senior managers are humble enough not to take their initial strategic position too seriously ...» (Pascale, 1984), imperfect imitability (interpersonal relations between top management and employees allowing room for new ideas and increased productivity, firm's reputation), and limited substitutability (Honda's vision for the future). Now, Honda has moved to the stage of sustainable competitive advantage where it enjoys its «invisible assets» such as reputation for quality in motorcycles, cars or lawnmowers. Itami also mentions (Itami, 1987): «Honda used its basic technology in small engines sequentially, first in motorcycles, then in cars, and later simultaneously in the US in such varied products as generators and lawnmowers....only invisible assets can be simultaneously used in several areas.» (p.13).

Honda focused on the competitive and market CSFs early on its development as a motorcycle manufacturer in Japan and thus acquired the experience and information needed to survive (Scouting Stage): it then identified its CRs and applied them towards the goals of effectiveness and efficiency, as well as managed to improve its technology-organization-strategy fit (strategic validity); that enabled Honda to maintain its position in the global market (Maintenance Stage); finally, it continued to leverage its CRs by innovating to sustain its competitive advantage both domestically and globally (Dominance Stage).

CASE II: MOTOROLA INC.

Motorola Inc. spends an estimated $1 million annually on competitor intelligence activities. In addition, it focuses on a few key factors to outperform its competitors: «The company embraced such Japanese tactics as driving relentlessly for market share, sharply upgrading quality, and constantly honing manufacturing processes to pare costs. And it continues to pour billions into research and development, training, and capital improvements—$1 billion, or 19% of revenues...» (Business Week, 1989).

Moreover, Motorola has emphasized the education of its employees to an extreme, spending $120 million annually in it. At «Motorola University»

employees learn basic skills of reading, math and statistics, financial and risk management, as well as «relational skills» such as customer satisfaction, effective meetings, negotiations, and effective presentations (Wiggenhorn, 1990). According to the SMDA model, Motorola has successfully gone through the first stage of Scouting by focusing on a few CSFs (quality, efficiency, education, R&D) and by learning more about its competitors (especially the Japanese) via benchmarking.

But Motorola has not been satisfied by merely managing to keep its market share in the radio communications and semiconductors industries where it initially started to establishing its reputation. Now Motorola has also entered very successfully the cellular electronics industry (mobile communications), as well as the microprocessors market. The company used its excellent technological infrastructure in radio communications and semiconductors as a base (technological capability) to develop its expertise in mobile technology. By identifying which factors were important in the young mobile market (e.g., size, weight, performance) and which unique or limited substitutable resources it possessed (e.g., expertise in communications technology, sharp focus on design, quality reputation), Motorola managed to design products that are smaller, lighter, and with more options than its rivals' (Financial Times, 1990).

> «First came the MicroTac cellular phone, a Star Trekky unit that slips into a coat pocket and flips open for use. It is far sleeker and a third lighter than the next closest portable phone, from Japan's Matsushita Electric Industrial Co....with this product lineup, Motorola should grab 50% of new US cellular phone sales by 1990, says Herschel Shosteck, president of a Silver Spring (Md.) consulting firm» (Business Week, 1989) .

The combinations of certain market-driven CSFs and organization-based CRs have given Motorola an advantage and lead difficult to be followed by rivals. It is best exemplified by the adoption of Motorola's microprocessor from Canon Inc. of Japan for its best-selling EOS 35mm camera. «It's there [at the heart of the camera] says Canon, because Motorola provides superior design expertise and service, along with equal quality»(Business Week, 1989). Thus Motorola successfully managed to go through the Maintenance stage too.

However, what distinguishes Motorola from its rivals is the fact that it «builds for the future» heavily, focusing on strategic planning and strategic global alliances (e.g., has ties with Toshiba in Japan). In addition, competing

with the «best-in-class» Motorola managed to take the lead in another niche market, the pager technologies. It has introduced the wristwatch pager, thus advancing at least two years ahead of the competition. By using its organizational resources such as expertise and quality focus (organizational capability), and by innovating Motorola has managed to sustain its competitive advantage in more than one domestic and global markets (strategic capability).

> «That's because Motorola didn't rest on its laurels. It knew competitors would be burning the midnight oil, and Fisher [the CEO] didn't want to wind up with a me-too product because 'follower positions are secondary financial positions'...Over a three-year period, with Timex Corp. as a partner, engineers shrank the numbers and size of parts until they could all be squeezed into a watch» (Business Week, 1989).

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