



An empirical investigation on the relationship between business and maintenance strategies

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Abstract

All manufacturing companies choose to compete in the market based on some competitive priorities like cost, quality, flexibility and other priorities, depending upon their manufacturing capabilities. Equipment maintenance being an integral part of manufacturing, can influence these competitive priorities and hence the business strategy directly in a negative or positive way. Over a period of time, there had been significant developments in the field of manufacturing and maintenance. These are in the areas of technology, concepts, methodologies, and philosophies. Examples are Advanced Manufacturing Technologies (AMT), JIT, Total Productive Maintenance (TPM), and Outsourcing. Maintenance, directly influenced by these developments, has risen from a mere tactical to a more strategic level. Hence, there is a growing need to study the relationship between business and maintenance strategies. The paper is supported by a survey conducted in a sample of about 150 companies within Belgium and to some extent in the Netherlands. In this paper, our empirical study investigates whether companies with different competitive priorities pursue different maintenance strategies. The results indicate that quality competitors have more pro-active maintenance policies, better planning and control systems, decentralized maintenance organization structures when compared to others. They manage maintenance much more effectively when compared to others. There is also a difference in the distribution of AMT usage, automation, maintenance personnel (management/supervision and technicians), expenses and budget figures. Quality competitors have more AMT usage, automation, maintenance personnel and spend more on budget, followed by cost and flexibility competitors.

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1. Introduction

All manufacturing companies invest a substantial amount of capital in procuring physical assets. One of the important factors that influence the

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return on investments is maintenance of these assets. However, when it comes to maintaining these assets, maintenance is being treated as any other budget line item. On the other hand, many developments have taken place in terms of technology, concepts, and philosophies both in production and maintenance. Some examples can be Advanced Manufacturing Technology (AMT), JIT, Total Productive Maintenance (TPM), and Outsourcing. These developments influence directly or indirectly some of the maintenance elements like organization structure, human resource policies (training, recruitment, etc.), maintenance policies and concepts. For instance, AMT and automation require continuous training programs for craft workers and supervisors to enhance their technical expertise. It also requires recruitment of professional staff to raise the level of technical expertise in maintenance department (Swanson, 1997). Also, with the introduction of AMT and high automation, the nature of maintenance has become increasingly complex and costly. According to Maggard and Rhyne (1992) and Mobley (1990), 15–40% of production costs can be attributed to maintenance costs. With the onslaught of more automation, robotics and computer-aided devices, maintenance costs are likely to be even higher in the future (Blanchard, 1997; Niebel, 1985). According to a study conducted in 1989, the estimated cost of maintenance for a selected group of companies increased from \$200 billion in 1979 to \$600 billion in 1989 i.e. three-fold in just 10 years (Wireman, 1990). On the other hand, the Overall Equipment Effectiveness (OEE) for a typical factory is only 45% (Kotze, 1993). OEE is a function of Equipment availability, Performance efficiency and Quality rate of products. It is the performance metric often used for TPM (Nakajima, 1988).

The above paragraph indicates that if maintenance is tapped effectively there is a scope for improving the profits and productivity of a company. For maintenance to make these improvements it should be recognized as an integral part of business strategy or the competitive strength equation (Hora, 1987). In particular, there is a growing need to understand the relationship between a company's business and maintenance strategies.

Lack of understanding this relationship and only cutting down the costs of maintenance can effect the company's competitive strength equation and its ability to compete in the market.

1.1. Strategy

Strategy can have various definitions depending upon different contexts. However, the elements within it can provide us more insight in understanding the type of strategy and its content. Strategy at any level, say at business level or functional level will provide the company a sense of direction, integrity and purpose. In general, Hax and Majluf (1991) provide a comprehensive definition. According to them "Strategy is a coherent, unifying and integrative pattern of decisions; determines and reveals the organizational purpose; selects the businesses the organization is in or is to be in; attempts to achieve a long term sustainable advantage in each of its businesses, engages all the hierarchical levels (corporate, business and functional) of the firm and; defines the nature of the economic and non-economic contributions it intends to make."

1.1.1. Business strategy

Porter (1985) identifies three generic choices of strategies at business level. They are cost leadership, differentiation, and focus. Cost leaders compete in the market based on the low price of their products. Differentiators compete based on certain distinct competence like quality, customer service, image, etc. Focus players compete by serving the needs of a particular market or product segment. Hax and Majluf (1991) define business strategy in terms of three elements: the mission of the business, the attractiveness of the industry in which the business belongs, and the competitive position of the business unit within that industry. They view Porter's generic choices of strategies as generic competitive strategies, which determine the competitive position; the business unit will adopt in order to gain a sustainable competitive advantage. According to Mintzberg et al. (1995), locating, distinguishing and elaborating the core business is more relevant for a business-level

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