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The application of Operation and Technology Roadmapping to aid Singaporean SMEs identify and select emerging technologies

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Abstract

In order to aid Singaporean SMEs identify and select emerging technologies for business benefit, a modified process of the Cambridge T-Plan methodology has been introduced and applied to a pilot sample of 30 companies in a variety of manufacturing sectors. This fast and simple process takes the company through five key steps to enable them to create their first Operation and Technology Roadmap (OTR). The paper explains the background to the approach and focuses on the initial benefits identified by a survey of the pilot companies.

Keywords: Roadmapping; SMEs; Product development; Business strategy; Operational improvement

1. Introduction

The use of technology roadmaps came to the forefront with Motorola in the late 1970s [1]. Since then, the technique has been widely applied in many different industry sectors, such as the international technology roadmap for semiconductors [2], specific companies including both MNCs and SMEs, and national sectors, e.g., Foresight Vehicle Technology Roadmap [3]. In order to understand the different types of roadmap now in existence, the taxonomy described by Kappel [4] has been used splitting roadmaps into four key areas: science/technology roadmaps, industry roadmaps, product/technology roadmaps and product roadmaps.

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At the company level, it is felt that key factors determining the type of roadmap produced are the company's size and dominance in the industry. Large companies with multinational status tend to roadmap in separate divisions along product and product group lines while their R&D centres may start to dominate in science/technology roadmaps [5]. Additionally, dominant companies, in particular industries, start to produce de facto Industry Roadmaps. At the other end of the spectrum, SMEs roadmapping in the UK with the Cambridge T-Plan [6] approach typically employed several hundred to a few thousand people and normally produced company centric product/technology roadmaps.

In terms of this paper, the key focus is on the use of a form of product/technology roadmap within SMEs in Singapore. Product/technology roadmaps are specifically company centric and seek to align decisions with trends, schedule product and/or service introductions and create a plan that integrates market and customer needs, product evolution and the introduction of new technology [7].

2. Previous work roadmapping in the SME environment

In general, the evolution of roadmapping techniques in each quadrant has been led by management practice rather than management theory. One exception would be the development of the T-Plan approach by Cambridge University [6], which provides a quick and systematic approach for the creation of company-specific product/technology roadmaps for SMEs within the UK. This methodology aims to make maximum use of the time committed by a company's senior management/participants to rapidly produce a first-cut technology roadmap that clearly links technology development and acquisition to business drivers and strategy. Although customizable, the basis for each company is four modules each involving a half-day session where standard brainstorming, theming and prioritizing techniques are used to address the three key layers of the roadmap: Market Environment and Objectives, Product Offering and Technology.

2.1. Session 1—market environment and business objectives

The first session involves a facilitated brainstorming session to identify and agree key dimensions of product and company performance, market (external) and business (internal) drivers. The team will work through a number of exercises to establish the above for different market segments as well as establish some simple grouped themes and allocate priorities. The general strategic context is considered and key knowledge gaps are identified for initial investigation prior to the next session.

2.2. Session 2—product/service offering

Key product features are identified and grouped, and their impact on market and business drivers is assessed. Alternative product development strategies are considered and key knowledge gaps are identified for further investigation. The emphasis of this session remains firmly on the dimensions of the product offering that the company staff believes necessary to compete in the defined markets for a number of years.