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# Flexibility, inside the process of production – A study on Taiwan's precision machinery industry

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## Abstract

Nowadays, the progress of science and technology (S&T) is speedy at an astonishing rate in nations, and also the business uncertainty and risk are increased in enterprises. Therefore, the flexibility inside the process of production is becoming more important for manufacturing industries. Since the characteristics of production in Taiwan's manufacturing industries, especially for small and medium enterprises (SMEs), are unique, this study adapts the method of decision systems analysis (DSA) to analyze the strategic decision process of manufacturing process on Taiwan's precision machinery industry. This study finds that based on the quantitative method of DSA, the flexibility inside the process of production in Taiwan's precision machinery industry is classified as internal flexibility, external flexibility and cooperation network to respond immediately and cope with uncertainty and emergencies.

*Keywords:* flexibility, internal flexibility, external flexibility, cooperation network, decision systems analysis (DSA).

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## 1. Introduction

In the 21<sup>st</sup> century, the environment and development of technology has become more diverse, the time for new products to reach market is shorter, the required quality of products is higher and the cost of products is lower. For the past years, Taiwan has achieved many economic miracles and records in business export. Flexibility plays an essential role in the economic growth. Most enterprises of machinery manufacturing in Taiwan are SMEs. In order to compete with this speedy change, SMEs constantly improve technology skills and perused high quality and productivity. Flexibility is a necessary ability to deal with this environmental uncertainty which also leads to the inevitable situation of the flexibility in the process of production. In this study, we utilize the DSA to study strategic decision process of manufacture process on precision machinery industry.

At the very beginning, we do the literature review to support our study. Then, we interviewed industry professionals using DSA to structure flowcharts. Through the flowcharts, the decision process of manufacture on precision machinery industry is obvious. Finally, we surveyed whole process to discover what makes Taiwan's existing flexibility more realistic for the precision machinery industry.

## 2. Literature Review

### 2.1 *The characteristic in production organization of Taiwan industry*

The basic industrial structure of Taiwan is composed of SMEs (Small and Medium Enterprises). It differs from other societies of East Asia radically (Hamilton ed., 1996). If the order is unable to be produced and totally digested from the factory within the regular work hours, it will be outsourced to OEM (original equipment