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AN ANALYSIS OF THE THAI AUTOMOTIVE PARTS SMALL-MEDIUM ENTERPRISE (SME) PRODUCTIVITY DEVELOPMENT PROCESS

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ABSTRACT

Thailand ranks 12th in the world in vehicle production and first in Southeast Asia. Thailand also hosts over 50% of the world's top OEM automotive parts suppliers, with approximately 1,800 Tier 2 and Tier 3 auto parts manufacturers' which are classified as small-medium enterprises (SMEs). Given Thailand's significant contribution to the global automotive industry, a study was undertaken to determine the effects of the variables' financial factors (FF), supply chain management (SCM), and quality management (QM) on the Thai auto part SME productivity development (PD). Multi-stage cluster sampling was used to select the 402 individuals used in the sample. The research instrument used was a 42 item questionnaire for Part 2's 5-level Likert type agreement scale questionnaire, whose data were analyzed by use of SPSS Version 23 software and the AMOS module. Study results determined that there were negative influences from Thai organizational culture, as well as the role that SCM can play in smaller SMEs that have no relationship with a large partner. However, the variance of factors influencing Thai auto parts SME productivity development (R^2) was determined to be 60.5%. Furthermore, factors influencing a Thai auto part SME PD were FF, SCM, and QM, with values of 0.775, 0.532, and 0.337, respectively.

1. INTRODUCTION

Thailand has become a significant manufacturing base in Southeast Asia, especially in the production of auto parts, with the automotive sector has become Thailand's third-largest industry. Ever since the early 1960s, Thailand's officials have stated that automotive policy is a critical pillar in developing the Kingdom's economy and creating new local labor, with the ever-changing governments always recognizing the importance of attracting new investment and expansion within the sector.

Additionally, the Organisation for Economic Co-operation and Development (2018a) has stated that Thailand works to maintain strong supply-chain support for domestic organizations involved in manufacturing and production, especially those companies that have been recognized as small-medium enterprises (SMEs). At the end of 2018, Thai officials stated that there were approximately three million SMEs (Christianty, 2018), 400,000 of which were in the manufacturing sector. Moreover, these SMEs were growing at an annual rate of 6%, which is 2018, represented 42.8% of the Kingdom's total gross-domestic-production (GDP) ("DIP undertakes "Change to SHIFT" mission", 2018).

Furthermore, within the Thai SME sector, Thai automotive manufacturers and parts suppliers represent approximately 1,800 companies, most of which are automotive parts suppliers (Yongpisanphob, 2019). Of these, approximately 1,100 are Thai owned SMEs being classified as either Tier 2 or Tier 3 suppliers.

Also, according to Petcharit et al. (2020), Thailand's automotive parts exports are destined to over 100 countries and are ranked 13th globally. Moreover, the Thai automotive industry represents 10% of Thailand's GDP and is the 12th largest automotive producer in the world (Maikaew, 2019), the sixth-largest global commercial vehicle producer, and the second-largest manufacturer of one-ton pickup trucks (Board of Investment, 2016).

However, in 2019 and 2020, the Thai automotive industry has undergone a dramatic upheaval due to a US-China trade war (Maikaew, 2019), and the global COVID-19 pandemic. Results from which have contributed to a dramatic drop in local demand, major supply chain disruptions, and a significant decrease in overall production output. Statistics from 2020 report a 38.76% decline in production in the first nine months of 2020, when compared to the same period in 2019 (Agwan, 2020), with only 963,066 units having been produced. Weak overseas demand from the impact of COVID-19 has been stated as the prime reason, with the cumulative first three-quarters of 2020 production for both domestic sales and exports declining by 40.13% and 37.49%, respectively, from the 2019 production level of 2.01 million units.

However, before the COVID-19 impact on Thai automotive and parts production, the automotive sector employed an estimated 850,000 workers (Maikaew, 2019). By value, the OEM (original equipment manufacturer) vehicle assembly process market represents 30 – 40% of the total auto parts

market in Thailand, with automobiles averaging 80% local content, pickups 90%, and motorcycles nearly 100% composed of Thai-produced parts (Yongpisanphob, 2018). Additionally, the replacement equipment manufacturers (REM) market takes the remaining 60% – 70% of the market for auto parts.

To better understand the Thai auto parts markets, one needs to understand its growth has tracked with the growth of Thailand's domestic vehicle sector, which has been significant, rising from 9.74 million accumulative registered automobiles (the REM market) in 2008 to 16.24 million in 2016 (Yongpisanphob, 2018). The numbers for motorcycles were equally as impressive, rising from 16.43 million in 2008 to 20.48 million in 2016. Even more staggering is the fact that Thai drivers registered 1,614,576 vehicles from January to June 2018 ("More than 1.5 million new vehicles registered", 2018).

Entrepreneurial SMEs also play a major part in the production of auto body parts replacement, as well as in the upstream to the downstream process. One reason for their success has been out-of-warranty vehicles within the Kingdom increased to 14 million vehicles in 2020 (with more than 5 million vehicles between 3 – 8 years old). Finally, over half of the Tier 1 suppliers are automotive part companies as well, with 54% producing parts for automobiles, 28% parts for motorcycles, and 18% doing both (Yongpisanphob, 2019). Finally, Thailand hosts 50% of the top 100 auto parts manufacturers in the world.

In 2018, the Kingdom ranked 1st in ASEAN (Association of Southeast Asian Nations) for the export of all types of auto parts and 14th globally for auto parts, and seventh for motorcycle parts (Yongpisanphob, 2019). During the first three months of 2020, Thai produced auto parts exported to ASEAN nations reached a value of approximately \$1.49 billion, while in the same quarter, total auto parts exported globally reached around \$6.27 billion (Statista Research Department, 2020).

Another element critical to this sector is the financial factors (FF) involved in Thai auto parts SME PD. This includes easy access to credit and equity finance, as finance is a necessity in any SME's development. However, numerous SMEs in developing economies with limited credit sharing capabilities encounter considerable difficulty in obtaining lines of credit, especially when compared to larger, international firms (Harvie et al., 2013).

Additionally, in an analysis of total quality management (TQM) practices within ASEAN automotive industries, it was stated that the motivation for TQM comes from a highly competitive automotive market and customer pressure (Punnakitikashem et al., 2010). However, Tier 3 suppliers are far less likely to implement TQM unless their suppliers get involved. Also, according to Petcharit et al. (2020), often time the terms Kaizen (used by Japanese firms) and TQM are used interchangeably, but in reality, they are different concepts. This is important to understand, as a large number of Thai auto parts firms are either owned or substantially influenced by Japanese companies. Moreover, in the highly competitive, ever-expanding, global marketplace, consumer quality

demand is emerging as one of the most crucial elements in a firm's success and eventual survival (Curkovic et al., 2000; Garvin, 1988; Zakuan et al., 2009).

It has also been observed that supply chain management (SCM) is also a crucial element in enhancing a manufacturing plant's financial results, with Barrak et al. (2017) contending that as inventory increases relative to sales, manufacturing efficiency decreases. Therefore, efficiency is calculated as an *allocation fill rate* (AFR), with the SCM process striving for an AFR of 95.5%, while also maintaining minimal stock levels. Therefore, the automotive parts supply chain efficiency operates using the concepts of *just-in-time* (JIT) delivery of *lean manufacturing* to maintain access to a wide variety of parts without having to keep them in inventory (Botha et al., 2017). Additionally, according to Krugman (1997, p. 11), "Productivity isn't everything, but in the long run, it is almost everything." (Krugman, 1997, p.11), as a nation's ability to increase its living standard is significantly dependent on the nation's ability to increase its output per worker.

In Singapore, productivity (P) development has been a key theme across all sectors of the economy and its top-ranked educational system, with P being defined as the relationship between output (O) and input (I) (Woon & Loo, 2018). Output relates to the type of products which are the goods produced or services delivered. Input is composed of the resources (R) used in producing the products, with the primary resources being labor and capital (e.g. machinery and equipment). P is, therefore, an indication of how well the resources are used to produce the products, with a higher ratio indicating higher productivity.

Productivity output is also expressed in monetary terms, with a common measure being a value-added (VA), where $VA = \text{revenue } (Re) \text{ minus the bought-in materials and services required for production } (MSP)$. This measure is applicable at the enterprise, sector, and economic levels, whereas at the economic level, it is known as the gross domestic product (GDP) (Woon & Loo, 2018). The growth of GDP over time is referred to as economic growth.

When labor is used as the input in the output-input ratio, the productivity measure is known as labor productivity (LP) (Woon & Loo, 2018). The elements used to access LP are VA , L , and the total work hours (TWH). According to the use of this formula by the Singapore government, the number of workers is used as obtaining the data for the number of hours worked comes at great expense and difficulty. At the economic level, the labor productivity measure is GDP per worker or GDP per hour worked. This increased productivity from year to year is known as labor productivity growth, which is the most common measure of productivity.

Total Factor Productivity (TFP) is a combination of labor and capital (Woon & Loo, 2018, p.5), which has three elements including VA , workers (W), and capital (C). TFP is thereby equal to VA divided by W plus C , with TFP measuring how efficient labor and capital are used to produce products. Once again, according to Krugman (1997, p.12), increasing productivity is the only method in which long-term, sustainable; living standard growth can be

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