
by

Pornnapa Makapunyo

A Thesis Proposal of the 12-Credit Course SCM 2201 Thesis
Submitted in Partial Fulfillment Of the Requirement for the Degree of Master of Science in Supply Chain Management Assumption University

October 2007

By:

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October 2007
Graduate School of Business
ABAC School of Management
Assumption University

Form signed by Proofreader of the Thesis


Ms. Pornnopa Makapong

and hereby certify that the verbiage, spelling and format is commensurate with the quality of internationally acceptable writing standards for a master degree in supply chain management.

Signed

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ABSTRACT

The purpose of this study is to fill a gap in the supply management literature with respect to supply management performance antecedents such as strategic supply management skills, supplier integration, and the supply management function's perceived status. The sample used for this supply consists of 70 supply management functions within the Thai Automotive industry. Confirmatory factor analyses provided evidence of adequate model fit and convergent and discriminate validity for the underlying variables and their respective factors in the model. The conceptual model and the hypothesized relationships are tested using Structural Equation Modeling (SEM).

Keywords: Supply Management, Thailand, Performance, Structural Equation Modeling (SEM)
From: Om Gupta <omgupta@aims-international.org>
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Eighth International Conference on Operations and Quantitative Management

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Paper Title: AN EMPIRICAL INVESTIGATION OF THE SUPPLY MANAGEMENT PERFORMANCE: THE CASE OF THAILAND

Dear Prof. Pornnapa Makapunyo:

I am pleased to inform you that your above referenced paper has been accepted for presentation at the Eighth International Conference on Operations and Quantitative Management (ICOQM-8). We thank you for submitting the abstract. Should you inquire about your submission, please identify it using the Abstract Reference Number as well as the title of the paper. It will help us expedite the matter.

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ACKNOWLEDGMENTS

This thesis is the end of my long journey in obtaining my degree in Supply Chain Management. I have not traveled in a vacuum in this journey. There are some people who made this journey easier with words of encouragement and more intellectually satisfying by offering different place to look to expand my theories and ideas.

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This thesis is dedicated to my beloved family, for always being able to count on your never-ending love, compassion, and support.

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To my grandmother, who is always with me in spirit.

Thanks to you all.
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Chapter 1
Generalities of the Study

1. **INTRODUCTION OF THE STUDY**

1.1 **GLOBAL CONTEXT** (GENERAL BACKGROUND)

The wake of globalization and keen competition in international markets have been encouraging firms to start recognizing the importance of supply chain management (SCM). Today’s firms are pursuing a variety of SCM practices to improve product and service performance while simultaneously reducing costs (Davis, 1993). In addition, it is becoming more and more important for firms to strengthen the coordination and functional activities between supply chain members (Ballou, et al, 2000; Foggin and Mentzer, 2003). SCM aims to reduce the production, delivery and distribution costs, and inventory, to secure manufacturing flexibility, and to drive for higher productivity. Also, it synchronizes manufacturing processes in a supply chain, enhances suppliers’ interaction and higher participation in supply chain networks, to achieve bottom-line results (continuous cost improvement and better asset utilization).

To attain and sustain competitive advantage, many companies turn their interest and emphasis onto effective supply management decisions and practices which provide value in the areas of cost management and asset utilization (Carr and Pearson 2002). Thus, supply management decisions are expected to have the most influential trend in shaping the function in future (Carter and Narasimhan 1996). There are a number of research studies that examine the impact of supply management decisions on a firm’s financial performance measured in terms of return on investment, profits as percentage of sales, firm’s market value and net income over a specified period (e.g., Anderson and Katz 1998, Carr and Pearson 2002; Tan, Kannan, and Handfield 1998), as well as some documentation on the strong correlation between supply management and firm’s performance. However, the study of supply management performance antecedents such as supply management skills, level of supplier integration and the supply management function’s perceived status have been overlooked. By understanding these key antecedents this should lead to improved supply management performance, which, in turn, will elevate the bottom line performance of a firm, as well as assist supply management professionals in rationalizing their investments decision in various inter- and intra-departmental decisions, for example, in selecting the right skills in the supply
management function, recruiting, and assessing, designing training and developing necessary types of suppliers relationships, finally, it is also critical in determining how much to invest in developing the supply management knowledge base to further enhance performance.

The main objective of the research is intended to concentrate the study on the relative and/or combined determinants within the automobile industry that contribute to the supply chain management function's performance and in pursuance of performance improvement.

Global Industry Background
Much has been written in the literature on the theory and practice of Automotive Supply Chain Integration. This is partly because the automotive industry is seen as a flagship sector frequently regarded as a barometer measuring the current wealth of the economy (Childerhouse, 2003). In an important review paper, Helper (1991) stated that:

"The auto industry is an important sector because automobile production is a large and varied industry. It directly employs more than 8 percent of US manufacturing workers, who make everything from semiconductors to interior trim. Also the auto industry traditionally provides important lessons for firms in other industries. Because of their early exposure to the Japanese challenge, US automakers have been working longer than most other US firms to adopt the kinds of close supplier relationships used by their Asian rivals."

Helper (1991) then argued that the extreme complexity and long lead times of automobile manufacture, and the automakers' use of an extremely adversarial supplier relations strategy in the past, have made the transition to new methods more turbulent for them than for most.

Volatility in the Automotive Sector
The performance of the automotive sector is well documented in the literature by Womack et al., 1990. Their particular contribution to knowledge is a powerful wakeup call concerning the need to move towards "Lean Production" based on "Pull"
philosophies. This wake up call was substantially influenced by their study of the Toyota Production System (TPS) (Ohno, 1978).

Hence in theory there is a wealth of experience ready made for inter-company transfer. According to Batchelor (2000), the automotive industry presents a popular image of itself as leading the way in demonstrating the efficiency gains associated with the implementation of just-in-time (JIT) “Customer Pull” techniques. But she continues by saying that the reality of vehicle production within Europe is one of a JIT “Push” system in contrast to a pure JIT environment, where resources are only pulled through the value chain in response to a direct customer order. The reality is that most of the major automotive manufacturers operate some form of fixed allocation system whereby dealers are obliged to place a set number of orders each month, often many months in advance of production and more often than not, before they have real customers for these vehicles.

Given these facts, it is surprising but true, to find that suppliers still have to respond to extremely volatile manufacturer schedules changed at the last minute and with little adherence to the original plan (Harrison, 1997). However, in top performing manufacturers, the schedule variability imposed on first-tier suppliers can be three times lower than that observed from other vehicle manufacturers (Oliver et al., 1996). Such disturbances generally magnify as they pass upstream in real world supply chains (Childerhouse, 2002).

1.2 The Thai Automotive Industry Background
Bangkok was once known as the ‘Venice of the East’ because of its intricate canal network and accompanying slow paced lifestyle. While travel and transport on rivers and canals is still possible and at times advantageous, the automobile has become the primary mode of transportation for Thais and an object of considerable affection. The formerly sleepy Bangkok has awakened, and the automobile era has irrevocably changed the face of the city (http://www.thailand.com/exports/html/industry_auto.htm).

Thailand is now aspiring to be known as the ‘Detroit of the East’, and benefiting from its position as the vehicle assembly and export hub of Southeast Asia. The trend began in 1962 when the Board of Investment (BOI) first promoted automobile assembly, which
lured Nissan to enter the market. Over 15 different makers now assemble cars in the Kingdom, including all the leading Japanese makers as well as BMW, Mercedes Benz, General Motors, Ford, Volvo and Peugeot along with their legions of suppliers. The automobile industry has emerged as one of the pillars of the economy and a leading attractor of foreign investment (http://www.thailand.com/exports/html/industry_auto.htm).

1.2.1 ‘Detroit of Asia’ Plan & the Industry Growth

“Following the crisis of 1997 that affected the entire region, the industry has rebounded and Thailand is now the largest auto assembler in South East Asia. Clearly, we are well on our way to achieving our goal of becoming the “Detroit of Asia.” Indeed, over the last 12 months, there have been numerous announcements that support this position, including the recently-announced decision of Ford to make Thailand its regional headquarters for Asia”. (http://www.boi.go.th/english/download/business_sectors/6/AutoOctober2003.pdf).

Thai auto exports have more than tripled from 1998 to 2002, and that trend is certain to continue, as assemblers such as Toyota, BMW, Honda and Daimler-Chrysler expand export production or shift regional production into Thailand. These companies have found that the combination of cost-effective skilled labor and the ability to source parts and components locally is the key to their global competitiveness. This expected growth in export markets, as well as revitalized domestic sales, which increased by more than 35% in 2002 and surpassed 500,000 in 2003, translates into opportunities for parts and component manufacturers, not only for OEM, but also for replacement parts. (http://www.boi.go.th/english/download/business_sectors/6/AutoOctober2003.pdf). The volume of car exports has increased every year since 1997, and in proportion auto exports cover more than one-third of the total production, or accounted for 35.7%, on average, between 1998-2004. In 2004 Thailand exported 332,053 vehicles, valued approximately 150 million Baht and 2006, it is expected to reach 522,000 units. (Royal Danish Embassy, Bangkok, “Sector Overview The Automotive Industry in Thailand”, 2006)
Table 1.1 Thailand’s 2005 Total Automotive Production Capacity

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<tr>
<th>Company</th>
<th>Vehicle Units / Year</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Toyota</td>
<td>350,800</td>
<td>27.94</td>
</tr>
<tr>
<td>Isuzu</td>
<td>200,000</td>
<td>15.93</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>170,200</td>
<td>13.56</td>
</tr>
<tr>
<td>Auto Alliance</td>
<td>135,000</td>
<td>10.75</td>
</tr>
<tr>
<td>Honda</td>
<td>120,000</td>
<td>9.56</td>
</tr>
<tr>
<td>Nissan</td>
<td>102,000</td>
<td>8.16</td>
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<tr>
<td>General Motors</td>
<td>100,000</td>
<td>7.96</td>
</tr>
<tr>
<td>Hino</td>
<td>28,800</td>
<td>2.29</td>
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<tr>
<td>Daimler Chrysler</td>
<td>16,300</td>
<td>1.30</td>
</tr>
<tr>
<td>YMC Assembly</td>
<td>12,000</td>
<td>0.95</td>
</tr>
<tr>
<td>BMW</td>
<td>10,000</td>
<td>0.80</td>
</tr>
<tr>
<td>Volvo</td>
<td>10,000</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,255,100</strong></td>
<td><strong>100.00</strong></td>
</tr>
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Source: The Thai Automotive Industry Association, 2005

1.2.2 Market Growth

Thailand’s Automotive Industry exceeded expectations by manufacturing 928,081 vehicles in 2004, 24% more than in 2003, according to the Thai Automotive Industry Association (TAIA). Domestic demand grew by 17% to reach 626,026 units. Exports, accounting for one-third of production, exceeded 300,000 units, posting a 41% increase over 2003. The Automotive and auto parts industry, worth 700 billion baht (US$ 17.5 billion), generated the country’s second highest level of export revenue in the year 2004 after computer and electronic parts, representing approximately 12% of GDP. The overview of Thai Auto market growth is presented in figure 1.2 below:

Figure 1.1 Thailand's Automotive Market Growth
1.2.3 Industry Trend

By gathering production plans from all members, the Federation of Thai Industries (FTI) projects that auto production in 2005 will reach 1.1 million units or an 18.4% increase from last year, about 700,000 units or 10% growth would be for domestic sales while the remainder would be for export. The Ministry of Industry recently announced its target to have auto exports reach 1 million units in 2010, previously targeted at 800,000 units. The government is hoping the free trade agreements between Thailand and other countries will help the country reach its export target. Thailand’s Automotive Institute proposed a budget of 8.7 billion Baht to the government aiming to achieve a target of doubling capacity by 2010 to 1.8 million units (KGI Securities, March 2005).

The Vision 2011 By BOI

“Thailand is the Automotive Production Base in Asia that adds value to the country with a strong domestic supplier base.”

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<th>Five Key Projects under the Detroit of Asia development plan</th>
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<td>Human Resources Development Programme</td>
<td>1.5</td>
</tr>
<tr>
<td>Automotive Experts Dispatching Programme</td>
<td>0.5</td>
</tr>
<tr>
<td>Establishment of Research and Development Centers</td>
<td></td>
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<tr>
<td>- Auto Parts Testing Centers</td>
<td>1.5</td>
</tr>
<tr>
<td>- Car testing tracks</td>
<td>4.5</td>
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<tr>
<td>Information technology (IT) Center</td>
<td>0.5</td>
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<tr>
<td>Automobile Export Promotion center</td>
<td>0.2</td>
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<tr>
<td><strong>Total Budget</strong></td>
<td><strong>8.7</strong></td>
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*Source: [http://research.kgi.com](http://research.kgi.com), March 2005*

Figure 1.2 Investment plan to achieve target of 1.8 mill units in 2010

1.2.4 Building a Strong Auto Parts Production Base

The automobile parts manufacturing sector in Thailand is considered to be the most capable in South East Asia. According to the Japan Automobile Manufacturers Association (JAMA), the quality of automotive parts in Thailand is rated as the best among ASEAN countries. The local part manufacturers supply approximately 80% of all parts used for the assembly of pick-up trucks, approximately 55% for passenger cars and nearly 100% for motorcycles. Locally produced or assembled parts include engines, suspension control and springs, axles, hubs, propeller shafts, brakes, clutches, steering...
systems, body parts, electronic parts, air conditioning, tyres, wheels, internal and external trim components, and glass. Also, many new overseas joint venture companies have come into operation in recent years to supply the local assembly lines operated by the international manufacturers. While much of the output from the independent Thai companies goes to the original equipment manufacturer (OEM) market, the greater volume goes to the replacement equipment (REM) market. With over 700 OEM auto parts suppliers and 1,000 in supporting industry together employing more than 217,000 workers, Thailand enjoys a reputation for having a strong supply base. Still, there exist many opportunities for foreign investors, and increasingly the BOI has focused on attracting high-technology investments geared towards taking Thailand to the next level as the “Detroit of Asia” (Renee Santo, BOI, March 2005).

By continuing to establish their main suppliers and key parts production in Thailand, multinational auto assemblers can reduce production and logistics costs, and drive Thailand’s auto sector from its leading position within ASEAN to become a major Asian production hub. The BOI, however, sees tremendous potential in the auto parts industry. Over a thousand parts make up a typical car, each of which requires a high level of know-how and skill in order to attain international standards of quality (Renee Santo, BOI, March 2005).

To encourage foreign companies to invest in parts and components and to bring with them the latest technology used in the auto industry, the BOI offers 3 to 8 year corporate income tax holidays and import duty reduction or exemption on machinery. And, while there are many first and second-tier producers here already, with the expected growth of the industry over the next few years, there is plenty of room for newcomers (Renee Santo, BOI, March 2005).

Thailand has now become the world’s largest producer of one-ton pickup trucks and the second largest market in the world after the United States, and is moving closer to realizing “Detroit of Asia” status with unexpectedly strong 2004 market results. Many Automakers have announced that they would have Thailand as their production base for exports including Mitsubishi, Toyota, Nissan, and Hino (http://research.kgi.com, March 2005).
Figure 1.3 Automakers moving their Production Bases to Thailand due to the availability of the Auto-parts Suppliers locally.

Japan's largest automobile company, Toyota Motor Corp (TMC), plans to invest another 37 billion baht to expand its vehicle production capacity in Thailand over the next two years. The investment, expected to be completed in 2007, will raise Toyota's annual production capacity to 550,000 units from 350,000 units and make Thailand the firm's third largest production base after Japan and the United States. Toyota has already spent 30 billion baht since 2002 under its IMV programme, doubling production capacity of pickup trucks at its Samrong plant in Samut Prakan to 250,000 units per year and also expanding its parts manufacturing facilities. The new plant will have a production capacity of 100,000 pickup trucks per year to complement output at the Samrong plant. Construction of Toyota's first new plant of this century is tentatively set to begin within months, with completion scheduled in 2007. Toyota's total vehicle exports will increase to 250,000 units in 2007 from 150,000 units this year, generating additional export earnings of 60 billion baht within two years (Santan Santivimolnat, 2005).

1.3 Strength, Weakness, and Competitiveness of the Industry

Strengths
The Automotive Industry situation in Thailand is ready to be the Detroit of Asia for the following strengths (Aimorn Limsavarn, 2003).

- Thailand is presented to be the car producers' hub of the world. It now has 14 auto plants (total capacity 1.21 million units), 5 motorcycle plants (total capacity 2.5 million units) and auto parts factories which are the main support of the industry.
• Advantage in geography especially compared to the Southeast Asian Countries.
• The Regional market is big enough to absorb current production capacity.
• Accumulation technology makes high-quality fundamental production.
• Thailand is the Asian car assembly base.
• Sufficient capacity to back up the industry expansion.
• The skills of labors are accepted.
• Political stability.

Still some Weaknesses
• Research and development problems.
• Higher labor cost compared to Chinese workers.

Competitiveness
Figure 1.4:
THE APPLICATION OF PORTER’S DIAMOND MODEL IN THAI AUTOMOTIVE INDUSTRY

Source: Aimorn Limsavarn, 2003
1.3 Why Thailand?

While there is a steady trend towards investment in developing countries, there are many problems that can beset profitable industries. As addressed by Mr. Torok, Executive Vice President of Mitsubishi Motors, in 2003, “One of the often observed pitfalls of development is that when you get an industry that is successful and supported by favorable policies and the right economic climate, it starts to be seen as a source of revenue and the solution to all the government’s funding problems. The excise tax goes up, the usage taxes go up, and various value-added taxes begin to appear.”

The relative advantages of Thailand over other countries in the region, according to Mr. Torok in 2003, are political stability, the minimal chance of nationalization and the country’s history of welcoming foreign business. He also added that “Thailand is a case study for how to successfully launch an industry. What are the elements that have come together to make the automotive sector so competitive and successful in Thailand? I think it is a rare combination of government policy and investment strategies, local economic conditions and addressing manufacturers’ needs”.

Mr. Torok further stated in 2003 that Mitsubishi continued its operations through this time by concentrating on exports. In this way, companies could avoid the pitfalls of supplying to an unpredictable domestic market. Mr. Torok acknowledges the important lessons learned from the past; particularly the 1997 economic crisis, a time when many auto companies were forced to reduce operations by 70%. “The infrastructure that was in place and the economic policy that drove the business was fundamentally sound, so as the economy recovered after the crisis, the sector was able to recover with it,” said Mr. Torok in 2003.

1.3.1 The Building Blocks

The auto industry in Thailand can be represented as a pyramid. At the top of the pyramid are the 16 assemblers; the brand name manufacturers such as Hyundai and Toyota. The average car contains 3,800 components, and assemblers outsource to first tier manufacturers. In turn, the first tier companies either manufacture the parts themselves, or purchase parts and raw materials from the second tier companies. From the production of the simplest nozzle to high technology electrical components, it is these SME’s that are the basis of the auto industry (Pendlebury, 2003).
Governments’ Strategic Initiative in Improving Quality
In the past the Thai government took measures to protect these companies, and the fledgling manufacturing industry, with local content requirements; laws which dictated that assemblers based in Thailand purchased a certain percentage of parts locally. In 2000, this condition of operation was abolished. Parts manufacturers were then forced to improve quality control and cost reduction measures in order to compete globally. From this date, assemblers continued to source from the Kingdom’s estimated 1,637 SME auto-parts manufacturers on their own initiative (Pendlebury, 2003).

Localization – Good Economic Sense
Due to the competitive nature of the international car industry, loyalty to Thailand cannot be a major factor behind this decision. According to Mr. Torok, localization is bottom line rationality. “At Mitsubishi we have seen localization rise from 15% in 1993 to 85% in 2003, and during this same time we have seen our material costs reduced by some 21%. We have localized because localization makes good economic sense.” Although the assemblers may source most parts locally, the supply chain dictates that in order for a variety of local SME’s to profit, the first tier suppliers must also purchase goods locally.

Generally for logistics and the procurement of goods, it is logical for a company to source locally as much as possible, Mr. Yongkriat further explained in 2003 that purchasing domestically avoided the risk of a fluctuating exchange rate and increased the efficiency of operations by having the parts close at hand, particularly with model or design changes occurring regularly. The government sponsored industrial areas – estates established to support the clustering of manufacturers and suppliers within short distances from each other – are an improvement in logistics efficiency, and a strategy that has become a hallmark of the Thai auto industry (Pendlebury, 2003).

Organizational Efficiency
The industrial estates aside, the automobile industry as a whole is a model of first-class organization. Methods to increase efficiency include bus services to ensure staff punctuality and the provision of company bicycles for workers to move around the plant. Considering that many factories operate 24 hours, and some assemblers demand
deliveries eight times a day, these initiatives to maintain a reliable workforce and improve efficiency are essential (Pendlebury, 2003).

**Impressive Infrastructure**

These concerns aside, the development of the necessary infrastructure to move cars in and out of the Kingdom with speed is impressive. “You can have the right investment climate and the right structure, but if you can’t get the product to market then you have a real problem. The infrastructure investment to develop the road system and the power networks to support the industry come together to make these plants not only possible, but cost efficient and a model of lean operations. Thailand has the ability to get the vehicles out to market quickly that, frankly, we could use in Japan today,” said Mr. Torok in 2003.

1.3.2 Long Term Considerations

**Improving Performance by Improving the Quality of the Parts**

Assemblers and suppliers both have a vested interest in maintaining a long-term association. “Toyota’s relationship with its supplier is termed a lifetime partnership. We have set up elaborate schemes, for instance the Toyota Production System (TPS), to ensure our suppliers continue to modernize and improve their quality. We realize that to improve our own performance, we must constantly improve the quality of our parts,” said Nikorn Prasertson, General Manager of the Purchasing Department at Toyota, 2003.

The industry consensus is that issues are best avoided by carefully evaluating a potential supplier’s manufacturing capabilities before a contract is signed. Mr. Nikorn explained Toyota’s policy of choosing a supplier; widely known in industry circles as the five pillars; quality, cost, delivery, engineering, and management (QCDEM).

Auto assemblers impose extremely stringent quality requirements on their suppliers. This year Toyota aims to lower the accepted number of substandard parts from 35 to 20 parts per million (≤20 PPM). If the number of unacceptable parts exceeds this ratio, Toyota will bring the matter to the attention of the manufacturer, and they may also examine the production lines. These efforts are made to maintain a relationship, and Toyota may offer technical assistance to improve quality control measures (Pendlebury, 2003).
1.3.3 Ensuring Future Competitiveness

**Ability to follow Trends**

Due to the rapidly evolving auto industry, a manufacturers' ability to follow the latest trends and keep abreast of developments in technology is crucial for competitiveness. According to Elise Pendlebury (2003), the lifecycle of a model was five to six years even before 2003, but that range has already changed to three or four years. To align itself with constant change, a supplier must have the ability of self-adjustment, particularly with the potential of alternative energies such as hybrid fuels, bio-fuel and fuel cells. Even with 110,000 people employed in 2003 in Thailand's auto industry, the relatively cheap but skilled labor force is central to Thailand's competitiveness (Pendlebury, 2003).

**Increased Technical Involvement by Suppliers**

According to Mr. Torok, Executive Vice President of Mitsubishi Motors, in 2003, the required skills are related more to R&D, and assemblers are requiring increased technical involvement from their suppliers. The development of personnel to cater for this demand, particularly engineers with skills to develop sophisticated technology, is one of the most pressing issues for Thailand's industry. He also added that "True competitiveness means indigenous research and development; that means having skilled people and engineers. The level of development of the people, including education and technical training with an emphasis on science will be a critical success factor for the ASEAN region".

What assemblers and suppliers are hoping to improve upon by increasing R&D is termed by Toyota as Value Analysis Value Engineering (VAVE). "VAVE is clever designing; engineering a part so that it is easy to assemble, while keeping the cost low. For example, designing a car seat that is both aesthetic and functional, and that uses a minimum amount of leather with minimal waste," said Mr. Nikorn in 2003. As even small manufacturers may require some amount of engineering assistance, an opening is created for consultants in specific fields. "Technical assistance is already common in this industry. The manufacturer obtains advice in a specific area of interest, and a fee is paid," said Mr. Charn, Summit Auto Seats Industry Co., Ltd., in 2003.
Developing Skilled Personnel

While a significant challenge for the local industry is the shortage of qualified Thai personnel to fulfill this increased demand for engineers, the issue is currently being addressed by educational institutions, automotive associations, private industry and the government. International alliances such as STEER may also increase the Kingdom’s engineer resource pool in the near future (Pendlebury, 2003).

Expansion, Stability, and Regionalization of the Market

All participants in the Thai auto industry are banking on the local domestic market’s ability to expand, the stability of the economy, and the trend towards regionalization to continue. In this regard, Mr. Torok expressed confidence in Thailand’s future. “This is our largest investment within Asia outside of Japan. We talk about China and we are doing a lot there, we talk about Australia and we are doing a lot there, but when it is all said and done, where we have put our money, and where we have committed ourselves in the long term is Thailand.”

Improving Supply Chain Infrastructure and Cost Competitiveness

Each assembler’s investment facilitates Thailand’s goal of becoming a global center for automotive production. In return for this commitment, the automotive sector has evolved to become a model of lean and efficient operations. To ensure that partnerships between local suppliers and multinational assemblers are successful, companies must evolve with future technology, improve infrastructure and delivery, and observe quality while maintaining cost competitiveness. If this is successful, Thailand can expect long term benefits at every level of the supply chain (Pendlebury, 2003).

1.4 Criteria for Industry Selection

For the purpose of the current study, the Thai Automotive industry has been selected due to two important reasons: First, according to the Thai Automotive Industry Association in 2005, the Automotive Industry is the second largest export industry after computers and electronic parts, representing approximately 12% of GDP in 2004, with continuous foreign investment in the sector. Second, despite all the efforts, the industry is facing tremendous competition from China. Southeast Asian economies are losing attractiveness compared with China and the region’s automotive industries are no exception. Many participants at the regional conference, held by Automotive News
International, pointed to China as a threat to ASEAN's auto industry. The Asean market is not only small, but it is also fragmented as a result of varying excise taxes. S&P predicts Asean's share of the global auto market will increase to 4.4 percent in 2010, compared to 1.3 percent in 1999, but this remains smaller than China's forecasted share of 6.6 percent, and tiny compared to worldwide figures.

Hence, when all these are put together, the industry is strategically at a critical and competitive position, which thus presents itself as a suitable candidate for research.

2. STATEMENT OF PROBLEM
To improve a firm's performance, a firm needs to know or evaluate its Supply Chain, both externally and internally. As Thailand's Automotive Industry is one of the largest in the region and represents a vast supply management, the participating firms in the industry need to emphasize their strategic supply management and the cultivation of enhanced perceived status to stay competitive in the sector through improving its performance. The firm needs to know the current integrative situation of their respective Supply Chain with their business partners or within their own firm to evaluate the degree to which they could benchmark themselves and improve their operation to achieve the highest degree of supplier integration.

The following research questions are expected to contribute to the understanding of the relationship between strategic supply management, supply management perceived status through supplier integration in pursuit of improvement in supply management performance.

1. What is the impact of strategic supply management skills on supply management performance?
2. What is the impact of supplier integration on supply management performance?
3. What is the impact of strategic supply management skills on the degree of supplier integration with the buying firm?
4. What is the impact of supply management perceived status on supplier integration?
5. What is the impact of strategic supply management skills on supply management perceived status?
6. What is the impact of supply management perceived status on supply management performance?

These research questions lend themselves to an empirical research strategy, utilizing the causal study domain. This design will be discussed at length in the research methodology chapter.

3. RESEARCH OBJECTIVES:
The primary goals of this research are as follows:

1. To study the impact of strategic skills on supply management performance.
2. To understand the relationship of strategic supply management skill and/or supply management function's perceived status through supplier integration on supply management performance.
3. To study the impact of supply management perceived status on supply management performance.

4. SCOPE OF THE RESEARCH
The study concentrates on the key factors which contribute to supply management performance in the automobile industry. The study is mainly focused on the automobile industry. Data was collected during a 1-month period. From the Supply Chain Management perspective, data gathered from the supplier, manufacturing and distribution channels seem reasonably well supportive of the significance of the sample group used in the study.

5. LIMITATIONS OF THE RESEARCH
This research paper has the following limitations:

1. The sample population cannot cover all companies in the industry due to time constraints and limitations of the data sources.
2. Samples were drawn from only one industry. Consequently, the generalizability may be restricted in industries which have a different environmental context.
3. Supply chain research in Thailand is rare, which may lead to a lack of understanding and cooperation; hence, it might cause difficulties in data collection.
4. Theories on supply management used in this study context of SCM were gathered from previous studies conducted in North America or Europe. Hence, it is expected that there might be variations in the way Supply Management is practiced in Asia and particularly in Thailand.

5. In the Automotive Industry, many of the firms source their raw materials from the same suppliers and sell to the same buyers; hence, some of the firms in the sample of this study would belong to more than one supply chain.

6. **SIGNIFICANCE OF THE STUDY**

This study contributes to the body of knowledge and research in the supply management area in a number of ways:

- The study serves to fill a gap in the supply management literature with respect to supply management performance antecedents such as strategic supply management skills, levels of supplier integration, and the supply management function's perceived status.
- The exploration of key antecedents of supply management performance and relationships should lead to elevate the bottom line performance of the firm.
- Assist supply management professionals in rationalizing their investments in various inter-and intra-departmental decisions such as developing the appropriate types of supplier relationships and recruiting, assessing, and selecting the right skills in the supply management function.
- To guide managers in determining how much to invest in developing the supply knowledge bases to further enhance performance.

7. **DEFINITION OF TERMS**

**Competitive Advantage:** Competitive Advantage is described by Porter (1985) as the value a firm is able to create for buyers that exceeds the firm's cost of creating it.

**Strategic Supply Management Skills:** The performance of supply management duties, such as securing material availability, managing inventories, and supply management, which are essentially based on human competence of the supply management staff.

**Supply Management Function Perceived Status:** Supply management function perceived status refers to the esteem in which the department is held by others (Cavinto 1987b).
**Supplier Integration:** Supplier integration is a pivotal supply management activity and can be defined as the combination of internal resources of the buying firm with the resources and capabilities of selected key suppliers through the meshing of inter-company business process to achieve a competitive advantage (Wagner, 2003).

**Supply Management Performance:** Supply management performance is the accrued benefits to the firm that reflect operational tangible and intangible costs resulting from the firm’s operations decisions.

8. **Summary**

The purpose of this chapter was to provide an overview of this dissertation. This research is descriptive, and causal and fundamental in nature. It represents a natural extension of the theory testing research stream with respect to the fundamental aspects of supply chain management.
In this chapter, the researcher searched through a range of literature in attempting to investigate and understand the theory and model formulation of supply management and the resources that can be used to strengthen the current competitiveness of the firm and improve overall supply management performance. The resource-based theory of the firm is explored in greater detail in order to establish a theoretical foundation for the study. Furthermore, a brief history of model relationships not specifically examined in the study hypotheses is included. This literature review is not intended to be exhaustive, rather it aims to be a review pertaining to the performance benefits of strategic supply management skills, supplier integration, and supply management function perceived status.

2.1 Strategic Supply Management
The terms SCM and supply management have been used interchangeably; it is noted that SCM encompasses all aspects of delivering products to customers, whereas, supply management focuses on the inter-organization relations, also widely known as buyer-supplier relationships (Leenders, Fearson, Flynn and Johnson 2002). The growth in importance of supply management has led to an increasing recognition of the strategic role of purchasing, which has (1) evolved into a strategic function, (2) been recognized as a critical driving force in the strategic management of the suppliers and (3) been relied upon to create value-added service (Napolean 1994, Carr and Smeltzer 1999). Shin et.al (2000) examined the impact of supply management orientation on suppliers and buyers’ performance. Supply management is particularly essential as the key intermediary between the external suppliers and internal customers who provide products and services for external customers and (2) rightly viewed as one of the primary boundary-spanning functions of strategic supply management (Novack and Simco 1991; Cousion 1999).

2.2 Overview of Resource-Based Theory
The Resource-Based Theory of the firm has been highlighted as a basis for explaining firms’ competitive advantage (e.g., Barney 1991, Lepak and Snell 1999; Hamel and Prahalad 1994; Wernerfelt 1984). Of which, supply management
literature used both resource-based and knowledge-based theories in drawing theoretical foundation for understanding the processes of knowledge and skills generation and transfer.

**Table 2.1:**

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Major contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penrose (1959)</td>
<td>Firms as bundle of resources, firm's growth based on firm's resources and limited by managerial resources</td>
</tr>
<tr>
<td>Lippman and Rumelt (1982)</td>
<td>Causal ambiguity as a key requisite to superior performance</td>
</tr>
<tr>
<td>Wernerfelt (1984)</td>
<td>Firms as bundles of resources</td>
</tr>
<tr>
<td>Rumelt (1984)</td>
<td>Strategic theory of the firm based on the idea of firms as resource bundles</td>
</tr>
<tr>
<td>Barney (1986a)</td>
<td>Characteristics of the factors market determine possibilities for a firm to earn rents</td>
</tr>
<tr>
<td>Rumelt (1987), and Cool (1989)</td>
<td>Dierick Summary article on imitability barriers (e.g. causal ambiguity and isolating mechanisms like asset interconnectedness, asset stock efficiencies, etc.) that impede (or make very costly) imitation from other competitors</td>
</tr>
<tr>
<td>Day and Wensley, (1988), Aaker (1989), Grant (1991), Wernerfelt (1989)</td>
<td>Strategic formulation models that have firm resources as the central concept and as the sources of sustainable competitive advantage</td>
</tr>
<tr>
<td>Prahalad and Hamel (1990)</td>
<td>Core-competences as the drivers of corporate strategy and diversification. Business should exploit and leverage core competences. Corporations should diversify in related businesses which can make use and enhance the core competences of the organization</td>
</tr>
<tr>
<td>Hansen and Wernerfelt (1989), Rumelt (1991)</td>
<td>Empirical studies that support the hypothesis that firm-specific resources or organizational factors are more important than industry variables for explaining firm superior performance</td>
</tr>
<tr>
<td>Barney (1991)</td>
<td>Key strategic resources can be sources of SCA if they are scarce, difficult to imitate, non-substitutable, and valuable</td>
</tr>
<tr>
<td>Peteraf (1993)</td>
<td>An integrative resource-based framework of SCA. Proposes that firms obtain superior performance, by earning rents from scarce and efficient resources and/or from market power in the product markets</td>
</tr>
</tbody>
</table>
Table 2.1: (CONT.)

Key works of the resource-based theory of the firm

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Major contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day (1994)</td>
<td>Capabilities framework of SCA. Distinguish between outside-in, spanning and inside-out capabilities. Suggests that market-driven organizations possess better outside-in capabilities, particularly market-sensing and customer linking, which influence the rest of the organization. Logistics and customer-order fulfillment capabilities are included in the framework.</td>
</tr>
</tbody>
</table>

Source: Olavarrieta, Sergio and Ellinger, Alexander (1997)

According to the RBT, firms are bundles of resources (Wernerfelt, 1984). Firms' resources include all inputs that allow the firm to work and to implement its strategies (Olavarrieta, 1996). Resources can be both tangible and intangible (Hall, 1992), based on the assumption that knowledge comprises of information, know-how, and skills, it is acquired and retained within an individual, in which it is a key productive resource of the firm in terms of contribution to value added and strategic significance (Grant and Fuller, 1995). The main concentration of the theory emphasizes addressing unique firm-specific resources (FSRs), rather than industry structure, and focuses on both competitive advantages and strategies intended to exploit such advantages (Tallman and Fladmoe-Lindquist, 1994). In resource-based theory, a firm is viewed as a collection of productive resources (Penrose 1959, Wernerfelt 1984). The key to resource-based theory understands the relationship between resources capabilities, competitive advantage, and profitability; in particular, an understanding of the mechanisms through which competitive advantage can be sustained over time.

Grant (1991), also, identified a key distinction between resources and capabilities. Resources are the basis for profitability, and are inputs into the production process. In addition, the cooperation and coordination in productive activity are required of
terms of resources. Meanwhile, a capability is the capacity for a team of resources to perform some task or activities. In conclusion, resources are considered as the sources of a firm’s capabilities, and capabilities are the main source of its competitive advantage. Consequently, a resource-based approach is concerned with maximizing rents over time by exploiting resources through capabilities.

However, resource-based theory has a greater relevance when it comes to understanding how some supply management skills and practices can act as a source of competitive advantage. Hence, in developing a theoretical foundation for this research, a resource-based approach is a primary key in this literature to draw a framework of the impact of strategic supply management skills, supplier integration, and supply management function perceived status on supply management performance.

The RBT suggests a firm’s pool of human capital can be leveraged to provide a source of competitive advantage (Barney 1991, Wright et al. 1994). There are 4 key requirements for a resource to be a source of competitive advantage;

1) **Valuable**: A Resource is considered valuable if it enables a firm to conceive of or implement strategies that improve performance, exploit market opportunities or neutralize impending threats (Barney, 1991; 1995).
2) **Scarce**: A Resource is rare. Access must be restricted to the firm itself or to the firm and a few competitors, which allows the firm to exploit it to the disadvantage of its competitors.
3) **Imperfect Imitability**: Lippman and Rumelt (1982) presented the theory of causal ambiguity, suggesting that one of the major barriers to imitation (or benchmarking) is the lack of understanding by competitors, and even by successful firms, of the links between the resources they control and their performance advantages. For example, tacit knowledge which is the knowledge that can not be articulated, lies in the collective “mind” of the firm and is embedded in the processes and capabilities of the company (Nelson and Winter, 1982).
4) **Lack of Substitutability**: A resource should not be easily substituted; otherwise, the advantages of a firm that possesses them will be rapidly eroded.
Another primary key in a Resource-based view is Competitive Advantage. Competitive advantage is the value that a firm creates for its customer through cost leadership and/or meaningful differentiation (Porter 1985). In this research, supply management skills, supplier integration, and supply management function's perceived status are considered as key resources that could potentially improve supply management's competitive advantage.

2.2.1 Reason for choosing RBVF
Day (1994) pointed out that resource based theory presents two sources of competitive advantages that contribute to a firm's performance: Firm assets and Firm capabilities. Day (1994) also stated that distinctive capabilities are "complex bundles of skills and accumulated knowledge, exercised through organizational processes that enable firms to make use of their assets and functions like key success factors". He also believes that these capabilities may provide a firm with a competitive advantage through a focus on customer value creation.
Resource based theory predicts that competition in the future will be based on core competencies, which can also be thought of as higher second-level aggregations of capabilities (Del Canto and Gonzalez 1999). Core competencies enable firms to outperform competitors and represent competitive advantages for firms and potentially comparative advantages for nations. (Kogut, 1985). In this research, the researcher intended to evaluate how resources and capabilities leading to core competencies that are either demand-oriented or supply-oriented are related to supply chain integration and thus to the levels of operational performance.

2.3 Supply Management Performance
2.3.1 Performance Measurement
Performance Measurement is defined as the process of quantifying the effectiveness and efficiency of action (Neely et al, 1995). Performance measurement systems are describes as the overall set of metrics used to quantify both the efficiency and effectiveness of action, in which, effectiveness is the extent to which customer requirements are met and efficiency means how economically a firm's resources are utilized when providing a pre-specified level of customer satisfaction (Neely et al, 1995). Neely et al, (1995) also identify a number of approaches to performance measurement, including: the balanced scorecard (Kaplan and Nortan, 1992); the
performance measurement matrix (Keegan et al., 1989); performance measurement questionnaires (Dixon et al., 1990); and criteria for measurement system design (Globerson, 1985)

2.3.2 Measures of Supply Management Performance
Frolich and Westbrook, 2001, have suggested four tentative conclusions:

First, the outward-facing supply chain strategy is associated with the largest rates of significant operational performance improvements. Better coordination in the supply chain reduces uncertainty throughout manufacturing networks (Davis, 1993; Lee et al., 1997). Tighter coordination helps eliminate many non-value-adding activities from internal and external production processes including the seven classic wastes of Shigeo Shingo: overproduction, waiting, transportation, unnecessary processing steps, stocks, motion, and defects (Hall, 1987). In terms of supply chains, better coordination directly translates into reduced variability (Metters, 1997; Lee and Tang, 1998; Grout, 1998) which in turn leads to greater efficiency along with faster delivery of finished goods.

Second, manufacturers may be seriously jeopardizing performance by continuing to follow the inward-facing strategy. Schmenner and Swink’s (1998) theory of swift, even flows postulated that the most successful operations smoothly move raw materials and subassemblies through processes and into finished goods. Raw materials, work-in-process, and finished goods only move swiftly if there are no flow impediments in the way, and productivity rises proportionally to the speed that materials move through processes (Schmenner and Swink, 1998). By extension, manufacturers failing to integrate upstream and downstream in their supply chain have little hope of ever completely achieving swift, even flows. Theory thus predicts that performance for relatively isolated operations will suffer, as was the case for the inward-facing manufacturers in the study by Frolich and Westbrook, 2001.

Third, results for the supplier- and customer-facing strategies suggested that focusing only on the inbound or the outbound sides of the supply chain gained little more for manufacturers than adopting the periphery or inward-facing strategies. Inbound and outbound logistics are often separated in practice with a disproportional emphasis on the supply side (Eloranta and Hameri, 1991). Lee and Billington (1992) and Hammel and Kopczak (1993) reached similar conclusions concerning the
dangers of fragmented supply chains. Lee and Billington (1992) in particular argued that common pitfalls of supply chain management included incomplete supply chains, poor coordination, inaccurate delivery status data, inefficient information systems, and ignoring the impact of uncertainties. Conversely, "going beyond the internal supply chain by including external suppliers and customers often exposes new opportunities for improving internal operations" (Lee and Billington, 1992).

Once again, the work of Schmenner and Swink's (1998) on operational theory gives us insight into why the supplier- and customer-facing supply chain strategies had lower performance improvement rates than the outward-facing group. Their theory of "Performance Frontiers" holds that every manufacturer has an operating frontier based on a unit's current performance and an asset frontier defined as the maximum performance that can be achieved. The more completely a manufacturer aligns their operating policies with the theoretical capabilities of its assets the greater the eventual operational performance (Schmenner and Swink, 1998). Findings in the study of Frolich and Westbrook (2001) suggest that supplier and customer-facing manufacturers were not making full use of their potential by focusing on only one side of their supply chains. If this theory is correct, and performance improvements come from altering manufacturing policies in ways that move or change the shape of operating frontiers, then broad upstream and downstream supply chain integration appears to be the optimal strategy to follow. Similarly, supplier- and customer-facing manufacturers are unlikely to achieve their theoretical levels of performance improvement until they take the final step and evolve into the outward-facing supply chain strategy.

Finally, according to the study of Frolich and Westbrook, 2001 most of the samples were in the periphery-facing group. This suggests that periphery-facing may be the supply chain's natural "equilibrium point" in terms of integration. Many manufacturers have no doubt recognized the dangers of adopting an inward-facing strategy and have evolved into the broader periphery-facing perspective. From there, manufacturers may or may not continue evolving into the supplier, customer, or outward-facing strategies (Frolich and Westbrook, 2001).
2.4 Strategic Supply Management Skills

Strategic supply management is defined as the process of planning, evaluating, implementing, and controlling highly important and routine sourcing decisions (Carr and Smeltzer 1997; Carr and Pearson 2002). The main criterion of whether a skill is of a strategic nature is whether it has an integrative role in formulating and implementing the firm's supply management strategic plan (Ammer 1974; Carr and Pearson 2002; Reck and Long 1988). Strategic supply management skills involve mastery over preparing a formal business plan, reviewing and adjusting plans to match changes in company plans, consistently providing input to top management on future supply needs and constraints, and developing supply management strategies to support company strategies (Carr and Pearson 2002). Giunipero and Pearcy (2002) described the strategic dimensions of the skill set required for the world-class supply management professionals as: (1) strategic thinking, (2) supply base research, (3) structuring supplier relationships, (4) technology planning, and (5) supplier cost targeting.

How strategic supply management skills fit within a firm's resource endowment or interact with a firm's other resources can deter their mobility (Rungtusanatham, Salvador, Forza, and Choi 2003). More specifically, the interaction of strategic supply management skills with the function's other resources within a complex social network makes these skills difficult to replicate; due to social complexity. The increased social complexity of strategic supply management skills is a direct result of the growing trend of team decision-making in the supply management function, especially in the case of more strategic decisions (Giunipero, and Handfield 2004). The success of teams that interact within a firm with other departments and suppliers decreases the likelihood of such teams being successful in other contexts (Wernerfelt 1989). Strategic supply management skills are difficult to substitute for because firms that do not possess these skills cannot obtain equivalent resources or skills; as a direct consequence of a capability gap (Barney 1991; Coyne 1985). This is caused by a variety of factors. For example, strategic supply management skills are usually used in exceptional circumstances or interdependent arrangements and they tend to require more tacit knowledge and capabilities that are more difficult to substitute for than any other asset (Lepak and Snell 1999).
In this literature, Supply management skills is the performance of supply management duties, such as securing material availability, managing inventories, and supply management, which is essentially based on human competence of the supply management staff. A fundamental managerial problem is to develop human competence at work in a way that enables an organization to remain viable (Sandberg 2000). However, in order to manage training and development of the supply management staff efficiently, managers need to understand what skills constitute successful performance at the supply management function. Without such an understanding, performance improvement cannot be managed effectively and, therefore, effectiveness in organizations cannot be achieved. The following discussion provides an overview of supply management skills that were posited by literature to be prerequisites for the achievement of supply management goals.

A "skill" is the ability gained by practice or knowledge (Carr and Smeltzer 2000; Kolchin and Giunipero 1993). Generally, the employees skills' impact on organizational performance has been the focus of numerous research studies and writings (Borman 1991). Specifically, supply management skills were found to influence the effectiveness of firms' performance (e.g., Carter and Narasimhan 1996; Landeros and Monczka 1989). The following discussion provides an overview of the supply management skills addressed by previous research.

Kolchin and Giunipero (1993) used a sample of 131 supply management executives from large U.S. organizations to identify the skills that are essential for supply management professionals. They identified 18 skills: interpersonal communication, customer focus, ability to make decisions, negotiation, analytical, managing change, conflict resolution, problem solving, influence and persuasion, computer literacy, leadership, understanding general business, tactfulness in dealing with others, creativity, planning, managing internal relations, organizational skills/time management, and investigative nature. The authors divided their list into four categories of skills: 1) technical, 2) management, 3) interpersonal / group, and 4) individual.

Carr and Smeltzer (2000) reported a list of 35 supply management skills. These skills were subsequently divided into three categories: (1) technical skills such as drafting
and computer skills, (2) behavior skills such as people skills and ability to follow up, and (3) skill techniques such as time management and organizational skills. Murphy (1995) illustrated that there is a continuing search for the "ideal" skill set that supply management professionals should possess. The author listed four general skills that were identified in a poll of purchasers as important to their job function. The skills identified were: (1) negotiation, (2) management, (3) computer literacy, and (4) mathematics.

A survey of corporate recruiters, conducted by Down and Liedtka (1994), revealed the seven most critical skills that recruiters looked for in supply management professionals. These skills were identified as: (1) communication skills, (2) interpersonal skills, (3) self-motivation and initiative, (4) professional presence, (5) leadership (potential or actual), (6) analytical/problem-solving skills, and (7) academic achievement.

The results of the factor analysis by Giunipero and Pearcy (2000) suggested seven broad categories of skills. The skill set is as follows:

1. **Strategic Skills** that include the skill set required for the world-class purchaser such as (1) strategic thinking, (2) supply base research, (3) structuring supplier relationships, (4) planning, and (5) supplier cost targeting.

2. **Process Management Skills** that entail the effective accomplishment of: (1) organization/time management, (2) tactfulness, (3) written communications, (4) problem solving, and (5) conflict resolution.

3. **Team Skills**. This dimension consists of teamwork, leadership, managing change, managing internal customers, and salesmanship.

4. **Decision-making Skills**. This dimension consists of only two skills - ability to make decisions and computer literacy.

5. **Behavioral Skills**. They describe the conduct of the supply management manager in the course of his or her duties. This dimension is composed of interpersonal communication, risk taking/entrepreneurial, creativity, and inquisitiveness.

6. **Negotiation Skills**. They consist of four key skills: (1) negotiation, (2) customer focus, (3) influencing and persuasion, and (4) understanding business conditions. Negotiation skills are necessary for purchasers in dealings with multiple constituencies.
7. Quantitative Skills. The quantitative dimension is composed of four skills: (1) computational, (2) technical, (3) blueprint reading, and (4) specification development. Given the move toward more service-related environments and the access to technical help, these dimensions represent three of the four lowest-rated skill items.

In the same study, the sampled supply management professionals rated the five most important skills as: (1) interpersonal communications, (2) ability to make decisions, (3) ability to work in teams, (4) negotiations, and (5) customer focus. These skills are reflective of the dynamic, interactive nature of the supply management function and its role as a boundary spanner. Contemporary supply management organizations require interfaces both externally with suppliers and customers and internally with others in the organization (Giunipero and Pearcy 2000).

Killen and Kamauff (1995) described the necessary characteristics of a good buyer and supply management manager. The authors grouped the characteristics of a good buyer into four general areas: (1) product knowledge, (2) principles of supply management and management, (3) personal attributes, and (4) interpersonal skills. They felt that these characteristics applied to all nonmanagerial buying positions. The authors also identified key characteristics required for a supply management manager. These included: (1) technical knowledge, (2) analytical ability, (3) interpersonal skills, and (4) managerial skills. The authors asserted that the supply management manager must possess all the qualities of a good buyer plus those of a good business manager.

Cavinato's (1987a) research revealed the seven technical skills top managers wanted to see improved in their organizations' supply management departments. The skills were: (1) knowledge of materials; (2) production systems and technologies; (3) materials management, inventory systems, and JIT; (4) quality systems and options; (5) contract manufacturing relationships; (6) computers, MIS, and automated supply management systems; and (7) costing.

Strategic skills such as strategic thinking, supply management skills analytical, supplier relations, and supplier selection skills were more frequently mentioned than other skills categories. This reflects that literature considers developing these skills to
be vital to the success of firms in today's environment. Additionally, there is a transformation in the way literature views supply management. Supply management is moving from the earlier clerical role it played two decades ago (Ammer 1974) to play a more strategic one today. The high frequency of mention of strategic supply management skills in previous literature mirrors the increased reliance on supply management as a source of competitive advantage in today's environment.

Supply management skills can be classified as core or peripheral assets. Core assets, in particular, are vital to the competitive advantage of an organization and often require continual internal development (Porter 1985). Consequently, it is vital to examine the core supply management skills among the wide variety that were addressed by previous literature.

2.4.1 The Need for Strategic Supply Management Skills:
Strategic supply management is defined as the process of planning, evaluating, implementing and controlling highly important and routine sourcing decisions (Carr and Smeltzer 1997, Carr and Pearson 2002). The major criteria of whether the supply management function is characterized as strategic function is whether it has an integrative role in the firm's strategic planning process (Ammer 1974, Carr and Pearson 2002; Reck and Long 1988). Supply management strategic skills enable directing all activities of the supply management function toward opportunities consistent with the firm's capabilities in order to achieve its long-term goals (Carr and Pearson 2002). Hence, a strategic supply management function aims to increase the firm's ability to be competitive. The example below illustrates how the shift in supply management practices to be of a more strategic reflects with a shift in a firm's capabilities and long-term goals today.

The above discussion highlights a shift in supply management practices necessitated by the nature of competition in today's business environment. This shift implies the need for a new, more strategic, skill set that aids supply management professionals in handling the new strategies. The following discussion highlights that the common denominator in the shift in supply management practices is the need for strategic supply management skills to handle today's challenges and identifies how they can
aid supply management professionals in handling their job tasks in today's business environment.

Strategic supply management skills include the ability to research the supply base, identifying which suppliers are the best, and the appropriate relationships that will be established with these suppliers. Technology will help the supply management organization to implement these strategies. The access to and availability of technology will determine the type of information exchange with particular suppliers. For example, if a firm has an Enterprise Resource Planning (ERP) system in place, this can be tied into a front-end electronic commerce system. Further, the alternatives and benefits should be greater than those for a firm that does not possess this technology. Purchasers should possess the ability to implement cost analysis models, which serve as the basis for continual improvement in supplier costs. Strategic thinking can lead to structuring mutually beneficial relationships with suppliers that will significantly improve the supply management function's contribution to the firm.

2.4.2 Strategic Supply Management Skills on Supply Management Performance
According to Carr and Pearson (2002), a strategic supply management function can help a firm to sustain its competitive advantage in a number of ways. First, it provides value in the area of cost management. Effective management of the cost of inputs to production saves the firm dollars that go straight to the firm's bottom line profits. Second, it provides the firm with valuable information concerning supply trends that will enable the firm to make better decisions and achieve its goals. Third, it establishes close relationships where appropriate with suppliers to improve the efficient quality and delivery of materials. Thus, a strategic supply management function is one that meets the needs of the firm and strives for consistency between its capabilities and the competitive advantage being sought by the firm.

The increased reliance on supply management as a source of competitive advantage necessitates the active integration of the supply management function in major supply decisions. The trend towards adopting strategic alliances and strategic sourcing imply the elevation of the supply management functions' status to be more involved in integrative relationships with suppliers, wherein the needs of both parties
are satisfied. This evolution impacts the ideal skill set required for excellence in the supply management profession, the nature of the supply management job, skills requirements, training courses offered, and the performance measurement metrics.

Literature provided evidence that supply management knowledge and skills have a positive correlation with, and a positive impact on, supply management risk-taking (Carr et al. 2000). Supply management risk-taking activities may occur more often as supply management increases its knowledge base and develops its strategic skill level. Companies that possess the required supply management strategic skills are more willing to incur the risk of developing close inter-firm integration that is essential in strategic partnering, which can contribute to the competitiveness of the supply chain relationship. Additionally, the increased competitiveness of today's business environment raises expectations from the supply management function and its ability to leverage firms' performance.

As companies attempt to shift the direction of their supply management functions from a clerical to a more strategic organization, they must recognize the importance of updating the body of supply management knowledge. Supply management professionals are required to possess general management skills and technical skills (Stuart 1993). When the supply management function is part of the firm's strategic planning, it becomes interested in accomplishing both current and future goals, partnering with suppliers, and creating relationships that are not easily imitated and, thus, enables their firm to obtain competitive advantage. Supply management strategic skills allow the supply management function to develop its strategies and practices that could be used as a valuable inimitable input to the firm's planning process and, hence, are a source of competitive advantage. Continuously upgrading the level of supply management strategic skills is a prerequisite for supply management professionals to interpret changes in the supplier market and offer technical assistance in developing suppliers, which will produce valuable supplier relationships that cannot be imitated by competition (Lester 1999; Pearson and Gritzmacher 1990).

Hence, In order to assist the supply management function move from its earlier clerical task orientation to a more planning, analytical, and strategic orientation, there
is a greater reliance on the use of information and on information technology, such as EDI, to support supply management and supply management decision-making. Supply management professionals are no longer responsible for non-value-adding activities and paperwork processing (Burt et al. 2003). The internal end user of an item or service is now empowered to place orders through the use of Internet directly to the suppliers. The release of this tactical responsibility allows supply professionals to focus on value-adding activities, including early involvement in the development of requirements and strategic sourcing or supply base managements (Burt et al. 2003).

The new capabilities require the supply management professionals to focus on enhancing strategic skills such as the ability to develop what is called "scope boundaries" (Laseter 1997). Laseter defined "scope" as the breadth of material content and associated responsibilities assigned to a supplier. The traditional arm's length transactional relationship, when supply management used to be more of a clerical nature, entailed that suppliers had a very narrow well-defined scope. However, with the increased strategic importance of the supply management function, long-term and loose scope boundary supplier relationships provide opportunities for value creation through the integration with the supplier, such as the cases of JIT and integrated quality assurance arrangements. In order to attain the increased supply chain value resultant from these processes, the supply management function needs to use technology that will closely align the firm's operations with its suppliers.

2.5 Supply Management Function perceived status
Supply management function perceived status is expected to indirectly contribute to supply management performance. Supply management function perceived status refers to the esteem in which the department is held by others (Cavinato 1987b). Generally, the status of an organizational function refers to whether the individuals employed in that function perceive themselves to be a making a strategic, value-adding contribution to the firm (Goebel et.al, 2003). A function's status is defined by various spoken and unspoken indications from top management to others in the organization. Previous literature posited training as one of the important unspoken
indicators of supply management status and that it is the impetus necessary to move supply management to a high status. For example, Giunipero and Flint (2001) referred to the importance of how top management views supply management's training budget to supply management status, and Cunningham and Hyman (1999) pointed to the perception of control over it by the supply management functions as reflecting their perceived organizational status.

Supply Management Function Perceived Status is known from other literature under various name, e.g. status and recognition of purchasing, purchasing status, and purchasing foresight (Bowen, Cousins, Lamming, and Faruk 2001; Carr and Smeltzer 2000; Cavinato 1987b; Pearson, Ellram, and Carter 1996) using various self-report items. It refers to whether the individuals employed in that function perceive themselves to be making a strategic, value-adding contribution to the firm (Goebel et al, 2003). A function's status is defined by both spoken and unspoken indications from top management to others in the organization (Cavinato, 1987b). Among those indicators, the purchasing training budget is one of the important unspoken indicators of supply management status because training is posited as the impetus necessary to move supply management to a high status level (Giunipero and Flint, 2001).

Additionally, Monczka et.al. (2002) explained that the design and structure of the new supply management organization is being altered substantially in a way that reflects its perceived status. The characteristics of the new supply management organization include:

- Smaller professional staff
- Minimal involvement with day-to-day operations or transactions.
- Greater responsibility for non-traditional purchasing
- Involvement with cross-enterprise negotiations
- Manage integrative activities with suppliers and the rest of organization
- Supply management professionals act as internal consultants and problem solvers
- Supply management professionals responsible for managing alliances and other critical relationships
Supply management professionals become process managers that oversee strategic and tactical responsibilities. These characteristics imply a change in the status of the supply management function. This change, in turn, implies that supply management is now expected to define a firm’s competitive strategy.

2.6 Supply Chain Integration
Integration has been defined and described in many ways. Integration is a process of decision making among interdependent parties. It involves joint ownership of decision and collective responsibility for outcomes. (Stank, 2001). In addition, Schrage defines it as “affective, volitional, mutual shared process where two or more departments work together, have mutual understanding, have a common vision, share resources, and achieve collective goals”, in which key dimensions are a cross-department (or organization) scope, a commitment to working together, and some common bond or goal. Bititci, Martinez, Albores and Joniarto have collected and summarized the definitions of Integration from various authors:

- Taken to imply a very positive form of working in association with others for some form of mutual benefit (Huxham, 1996).
- A distinct mode of organizing, which implies a positive, purposeful relationship between organizations that retain autonomy, integrity and distinct identity, and thus, the potential to withdraw from the relationship (Huxham, 1996).
- A number of companies linked to create and support a service or product for its service life, including final disposal (Jordan and Michel, 2000).
- A focus on joint planning, coordination and process integration between supplier, customers and others partners in a supply chain. Also involves strategic joint decision making about partnership and network design (McLaren et al., 2000).
- A process in which organizations exchange information, alter activities, share resources and enhance each other’s capacity for mutual benefit and a common purpose by sharing risks, responsibilities and rewards’ (Himmelman, 1992 cited in Huxham, 1996).
- Supply Chain Integration can be defined as two or more independent firms jointly working to align their supply chain processes, with the purpose of creating value to end customers and stakeholders with greater success than acting alone. (Horvath, 2001; Simatupang and Sridharan 2002).
Integration is referred to as the driving force behind effective supply chain management and may be the ultimate core capability (Sanders and Premus, 2005). Enterprises engage in inter-firm collaborative arrangements in order to spread risks and rewards in pursuing overall cost-reduction and enhance performance improvement. The objective is to secure higher performance than would be achieved by operating individually (Lambert et al., 1999).

The advent of supply chain integration shifts the focus of benchmarking from a single company level to an interorganizational level (Simatupang and Sridharan, 2004a). Supply chain integration implies that the chain members become involved in coordinating activities that span boundaries of their organizations in order to fulfill end-customer needs (Bowersox, 1990). This integration shifts the focus of supply chain management away from simply looking at the four walls of the individual member to how the chain members interact with each other to create an agile supply chain which contributes to competitive advantage. There are three key assumptions underlying the study of supply chain collaboration. First, the supply chain performance is explained by how the chain members manage across their boundaries. Earlier studies provide empirical evidence that supports this first assumption (Bowersox, 1990; Lee et al., 1997; Spekman et al., 1998; Stank et al., 1999). Second, the key to effective supply chain integration depends on the careful selection of the levels of coordination structure that drive supply chain performance (Simatupang and Sridharan, 2005). The chain members need to choose interorganizational design variables that mostly contribute to overall performance. Earlier literature recommends that the chain members need to design the supply chain strategy that fits to various levels of demand uncertainties (Fisher, 1997; Lee et al., 1997). Third, interorganizational settings across boundaries of the chain members change over time because of competitive and environmental changes.

2.6.1 Why do we need to integrate in the Supply Chain?
Firms strive for integration in order to increase value by reducing waste, excessive work delays and redundancy. The objective is the lowest total cost without sacrificing superior service. Integration provides many benefits to regarding partners in the chain, in summary;
To share and reduce Cost (Mclaren et al, 2002; Lewis, 1990; Parker, 2000; Horvath, 2001)

To increase asset utilization (Mclaren et al, 2002; Lewis, 1990)

To enhance skill and knowledge (Lewis, 1990)

To enhance responsiveness to market need (Mclaren et al, 2002)

Economies of scale (Carrie, 2000; Nolan, 2002)

Supply Chain Capabilities that include better demand planning (McCarthy and Golicic, 2002), inventory visibility (Sabath and Fontanella, 2002; Stank et al., 2001, 1999) and new knowledge and skills (Verespej, 2005)

Supply chain efficiency measured in reduced inventory and cost saving (Sabath and Fontanella; Stank et al., 1999)

Supply chain effectiveness including improvements in customer responsiveness (Sabath and Fontanella, 2002) and better access to target market segments (McCarthy and Golicic, 2002)

Also, Li-Ling Hsu, (2005), concluded the benefits in integrating supply chain in “SCM system effects on performance for interaction between suppliers and buyers” as shown below:

- Helps reduce the production, delivery and distribution costs and inventory, secures manufacturing flexibility and drives towards higher productivity
- SCM synchronizes manufacturing processes in a supply chain; suppliers are able to participate in the product R&D (Lamming, 1993; Mason-Jones and Towill, 1997; Dyer et al., 1998; Christopher and Juttner, 2000) and reduces the lead-times and cost in R&D.
- Streamlines manufacturing processes across functional or organizational boundaries, and posseses up-to-date production schedule of suppliers and avoids the bullwhip effect, and finally promotes the product and service quality (Yu et al., 2001)

2.6.2 Type of Supply Chain Integration

Four primary types of integration are often described in Supply Chain Integration (Fawcett & Magnan, 2002).

1) Internal or Cross-functional process integration was identified as the crux of supply chain initiatives (Fawcett & Magnan, 2002).
2) **Backward integration** with valued first-tier suppliers was identified as the most common form of supply chain integration. Of course, a natural extension of this form of integration involved more extended efforts that involved second-tier suppliers (that is the suppliers’ suppliers) (Fawcett & Magnan, 2002).

3) **Forward integration** with valued first-tier customers was also identified as supply chain integration. The early discussions revealed little tendency toward integration to the customers’ customers (Fawcett & Magnan, 2002).

4) **Complete forward and backward integration** was also associated with supply chain management. This notion was expressed as integration from the “suppliers’ supplier to the customers’ customer”. Such extended integration was perceived as very rare – more of a theoretical ideal than a reality (Fawcett & Magnan, 2002).

The four primary types of Integration figured in 2.6 by Stanley and Magnan (2002), support the literature of Fawcett & Magnan in (2002) as shown below:

![Figure 2.1: Four Types of Supply Chain Integration](image_url)
2.6.3 The Arc of Integration and the Measures of Performance

There are two interrelated forms of integration that manufacturers regularly employ. The first type of integration involves coordinating and integrating the *forward* physical flow of deliveries between suppliers, manufacturers, and customers (Saunders, 1997; Trent and Monczka, 1998). The other prevalent type of integration involves the *backward* coordination of information technologies and the flow of data from customers to suppliers (Martin, 1992; Trent and Monczka, 1998). Information technologies allow "multiple organizations to coordinate their activities in an effort to truly manage a supply chain" (Handfield and Nichols, 1999).

If this need to develop shared operational activities is accepted, then the strategic issue becomes one of direction and degree — in which direction (towards customers and/or towards suppliers) and to what extent (degree of integration) should such shared activity be developed? Taking this pair of decisions as the key dimensions for representing a strategic position, the researcher can illustrate them graphically as an arc, with the direction of the segment showing whether the firm is supplier or customer leaning, and the degree of arc indicating the extent of the integration. This has more visual immediacy than a plot on a line graph for this type of investigation. Hence, in this paper the researcher characterize the strategic position of each respondent with respect to supply chain development as that firm's "Arc of integration".

As suggested by Figure 2.2, all manufacturers implicitly make strategic decisions concerning the extent of upstream and downstream integration that they want to undertake (Frolich and Westbrook, 2001). Some manufacturers decide to engage in relatively little integration with suppliers or customers and thus have a relatively narrow arc of integration. Other manufacturers extensively integrate their organizations with upstream suppliers and downstream customers by pursuing a strategy with a broad arc of integration.
Growing evidence suggests that the higher the level of integration with suppliers and customers in the supply chain the greater the potential benefits (Stevens, 1989; Lee et al., 1997; Metters, 1997; Narasimhan and Jayaram, 1998; Lummus et al., 1998; Anderson and Katz, 1998; Hines et al., 1998; Johnson, 1999). Tan et al., (1998) noted that when companies "integrate and act as a single entity, performance is enhanced throughout the chain". Handfield and Nichols (1999) argued that now manufacturers must not only manage their own organizations but also be involved in the management of the network of upstream and downstream firms. So, by extension, manufacturers with the broadest arcs of supply chain integration should have the highest levels of performance improvements (Frolich and Westbrook, 2001).

### 2.6.4 Operationalization Arcs of Integration

Arcs of integration were operationally as shown in Figure 2.3. Five mutually exclusive groups were defined that conceptually represented the major different integration strategies that manufacturers could undertake in relation to suppliers and customers (Frolich and Westbrook, 2001). In Figure 2.3 the factor score for supplier integration
was used to classify each manufacturer into either the upper, middle, or lower quartiles. Similarly, each manufacturer’s customer integration score was used to classify the case into the correct quartile.

**Inward Facing:** Companies that were in the bottom quartiles of integration with *both* suppliers and customers were classified as “inward-facing” (Frolich and Westbrook, 2001).

**Periphery-Facing:** Manufacturers who reported integration levels above the lower quartiles in at least one direction (upstream with suppliers or downstream with customers) but that fell below the upper quartiles for suppliers and customers were categorized as “periphery-facing” (Frolich and Westbrook, 2001).

**Supplier-Facing:** Companies that reported extensive integration with suppliers (in the upper quartile), but that had customer integration below the upper quartile were categorized as “supplier-facing” (Frolich and Westbrook, 2001).

**Customer-Facing:** Manufacturers that reported extensive integration with customers (in the upper quartile) but remained below the upper quartile for suppliers were categorized as “customer-facing” (Frolich and Westbrook, 2001).

**Outward-Facing:** Finally, Companies that reported high levels of integration in the upper quartiles for both customers and suppliers were labeled “outward-facing” (Frolich and Westbrook, 2001).

**Figure 2.3: Operationalization of Arcs of Integration**

*Source: Frolich and Westbrook, 2001*
2.6.5 Supplier Integration

Consistent with the purpose of this research, we will concentrate on an Upstream Integration by focusing on the supplier integration. Supplier integration is a pivotal supply management activity and can be defined as the combination of the internal resources of the buying firm with the resources and capabilities of selected key suppliers through the meshing of inter-company business processes to achieve a competitive advantage (Wagner, 2003). It is the process of incorporating or bringing together different groups, functions, or organizations, physically or by information technology, to work jointly and often concurrently on a common business-related assignment or purpose (Monczka, Trent, and Handfield, 2002). In this study, supplier integration is addressed as a more comprehensive concept that seeks to achieve competitive advantage through the meshing of inter-company business processes with these of selected key suppliers.

2.6.6 Supplier Integration on Supply Management Performance

The supply-chain-management literature reports a number of studies on the operational performance benefits that a firm derives from linking with suppliers and with customers. Armistead and Mapes (1993), for example, found that information exchanges among supply-chain entities lead to improved quality consistency, delivery lead time, ability to change volume quickly, and price. Berry et al. (1994) showed that practices underlying supply chain integration (e.g. electronic data interchange) dampens demand amplification effects along the supply chain, consequently reducing inventory-carrying costs and improving delivery performances.

A case study by Carter and Ellram (1994) found that supplier involvement in product design has a positive impact on defect rate in the later manufacturing stage. Kalwani and Narayandas (1995) reported that when a firm engages in a long-term relationship with its customers, the firm can reduce demand uncertainty, improve its servicing of customer needs, and lower inventory holding and monitoring costs. Forza (1996), using data provided by 43 Italian plants, concluded that supply chain interactions improved plant performances along a number of competitive dimensions.
Narasimhan and Jayaram (1998) similarly demonstrated that by managing suppliers strategically, a firm could improve its operational performance, in terms of dependability, flexibility, cost, and quality. Furthermore, in Groves and Valsamakis (1998), the strength of the partnership between a supplier and a buyer explained significant differences in the timeliness of delivery both from suppliers to the firm and from the firm to its customers. Most recently, Salvador et al. (2001) reported that when firms interact with suppliers and with customers on issues related to materials flow and quality, firms can expect better time-related operational performances in terms of speed and delivery punctuality.

Bowersox and Closs (1996) argued that to be fully effective in today’s competitive environment, firm’s must expand their integrated behavior to incorporate customers and suppliers. This extension of integrated behaviors, through external integration, is referred to by Bowersox and Closs (1996) as supply chain management. Gentry and Vellenga (1996) argue that it is not usual that all the primary activities in a value chain – inbound and outbound logistics, operations, marketing, sales, and service – are performed by any one firm to maximize customer value. Thus, forming integration with channel partners such as suppliers, customers, or intermediaries (e.g., transportation, and/or warehouse services) provides competitive advantage through creating customer value (Langley and Holcomb, 1992).

Stank, Keller, and Daugherty (2001) found that SCM practices tended to improve internal collaboration which, in turn, positively affect firm performance. Brewer and Speh (2000) examined how the balanced scorecard could be used to leverage a firm’s supply chain into a source of competitive advantage. Higher level of integration with suppliers and customers in the supply chain is expected to result in more effective competitive advantage (Johnson, 1999; Hines, et al., 1998; Lummus, et al., 1998; Narasimhan and Jayaram, 1998).

Having established the existence of a positive relationship between supply chain integration and operational performance and having elucidated the key tenets of the RBVF, the researcher now intend to discuss two broad arguments to describe and explain why supply chain integration and a firm’s operational performance are positively related. Within this scope, the first argument posits supply chain integration
as a resource that provides operational performance benefits to a firm, and the second argument posits supply chain integration as a capability to acquire a resource that, in turn, yields benefits to the firm's internal operations (Rungtusanatham, Salvador, Forza, and Choi, 2003).

**Supplier Integration as a Resource**

According to the RBVF, when a firm controls resources that are VRINN, the firm gains a sustainable competitive advantage. When a firm creates linkages with suppliers and with customers, the resulting connections, to the extent that these links exclude competitors from forming the same connections with the same critical suppliers and/or customers for the same purpose, should provide competitive benefits to the firm. Because of these connections, Supply Chain Integration, facilitate the management of the flow and/or quality of materials into (i.e. raw materials) and out of (i.e. finished goods and services) the firm, the benefits should accrue directly to operational performance (Rungtusanatham, Salvador, Forza, and Choi, 2003).

For example, by involving critical suppliers in the product design stage, a firm can get an early commitment from these suppliers to ensure an uninterrupted supply of critical parts to the firm. Furthermore, as concluded by Carter and Ellram (1994), the involvement of suppliers in the design stage can reduce quality problems during the manufacturing stage.

Likewise, exclusive sourcing arrangements in which a firm commits to purchasing a large percentage of a supplier's output or when a customer accounts for a large percentage of a firm's output erects barriers that, in turn, prevent competitors from accessing the same supplier and, hence, the same sourced part (Rungtusanatham, Salvador, Forza, and Choi, 2003).

**2.7 Summary**

In this chapter, supply management, performance, strategic supply management skills and supply chain integration are summarized and discussed to create an understanding of the importance of the relationship between strategic supply management skills, supplier integration, and supply management perceived status.
and supply management performance in respect to resource-based theory. From this review, two conclusions may be drawn:

First, the increased competitiveness of today's business environment raises expectations from the supply management function and its ability to leverage firms' performance. During the last three decades, supply management practices have undergone unprecedented changes that are likely to shape the skill set required of the supply management/supply management professional. These changes have challenged the complexity of the external business environment, thus requiring the firm to expand context of supply management knowledge upon which these skills are developed (Pearson and Gritzmacher 1990). Supply management strategic skills allow the supply management function to develop its strategies and practices that could be used as a valuable inimitable input to the firm's planning process and hence, are a source of competitive advantages. Lester (1999), Pearson and Gritzmacher (1990) suggested upgrading the level of supply management strategic skills is a prerequisite for supply management professionals to interpret changes in the supplier market and offer technical assistance in developing suppliers, which will produce valuable supplier relationships that cannot be imitated by competition.

Secondly, much of the literature posited the relationship between supply chain integration and performance. Stank, Keller, and Closs (2001) suggested that improved supply chain integration relates to better performance. The literature is also seeking the benefits and reasons why integration is significant and represents a key source for competitive advantage over competitors, and thus the primary objective is to compete on total cost against optimal sacrificing superior service. There are 4 main type of integration (Fawcett & Magnan, 2002); Internal or cross-functional process integration, backward integration, forward integration and complete forward and backward integration. In this research, as the topic implied, we tend to focus more on the backward integration which values first-tier suppliers as the main contributors. Also, in the type of supply chain integration, we are looking at the arc of integration to further identify the direction of physical flow of product – forward integrated between supplier, manufacturers, and customer (Saunder, 1997; Trent and Monczka, 1998), as well as information flow - backward coordination of data flow from customers to suppliers (Martin, 1992; Trent and Monczka, 1998).
Again, the emphasis is on upstream integration of the supply chain only as a referral to “Supply Management”.

The existence of an empirically supported model that describes the relationship between strategic supply management skill, supplier integration and supply management performance is critical to both academicians and managers. The results document the overall magnitude as well as the relative importance of specific competencies to competitively superior performance (Stank, Keller, and Closs, 2001).
Chapter 3  
Research Framework

In this chapter, the researcher constructs the conceptual framework using sources that were carefully selected from various texts and journals described in chapter 2. The chapter will include operational concepts, operational definitions and statements of hypotheses.


The Conceptual model of this study is presented in figure 3.1 indicating the relationships among Supply Management skills, Supply Management Perceived Status, Supplier Integration as a mediator, and Supply management performance. The theoretical framework proposed shows the relationship between supply management skills and supply management perceived status as the determinants of Supply management performance, which is mediated through supplier integration. Overall this study explores the relationship between supply management skills as the determinant of Supplier Integration and Supply Management Performance. (Frolich and Westbrook, 2001; Schemenner and Swink, 1998). Also, Supply Management Perceived status is as the determinant of Supplier Integration and Supply Management Performance. (Cavinato 1987; Giunipero and Flint, 2001; Monczka et.al, 2002). Finally, Supplier Integration is as the mediator of both supply management skills and supply management perceived status on Supply Management Performance. (Wagner, 2003; Trent and Handfield,2002). These relationship are primarily based on a theoretical consideration and model from a previous study by Reham A. Eltantawy (2005). The model is portrayed in the figure on the next page. In light of the evidence presented in chapter 2 and the model developed, the following research questions are proposed to contribute to an understanding of the relationship between strategic supply management skills, supply management perceived status, supplier integration and supply management performance. The findings are also expected to enhance and deepen an understanding of the relationship between strategic supply management, supply management perceived status through supplier integration in pursue of improvement in supply management performance.

Consequently, the following research hypotheses could be set out:
Figure 3.1: Conceptual Model: Model of Supply Management Performance
3.2 Research Hypotheses

3.2.1 What is The Impact of Strategic Supply Management Skills on Supply Management Performance?

Supply management literature evolved along two separate paths that eventually merged into a common body of literature. The traditional path emphasized the tactical objectives of supply management in assessing its performance, such as increasing productivity and reducing inventory and cycle time (e.g., Hult et al. 2000; Sharland et al. 2003). However, the evolution of supply management from a tactical to a strategic function was reflected by the emergence of a second path of research that extended best practices in supply management to include strategic suppliers management and the logistics functions (Tan 2002). Eventually, both streams of research merged due to the advent of information technology and intense global competition that motivated many world-class manufacturers and service providers into adopting an integrated strategic approach to defining the performance of supply management. The strategic goals of supply management are to increase customer satisfaction, market share, and profits for all members of the virtual organization (Tan 2002).

There is an increasing awareness that supply management performance is reflected by strategic indicators, such as suppliers’ quality control and customer satisfaction, rather than tactical measures, such as non-value-adding activities such as receiving and inspection (Inman and Hubler 1992). Most of the recent supply management literature addresses the supply management process, emphasizing that it is a basic strategic business process, instead of a supporting role to overall business strategy (Tan 2002). The strategic role of supply management now involves managing the relationships with trading partners in order to attain effectiveness and efficiency for supply chain members (Harwick 1997). The emphasis now in measuring suppliers is on strategic aspects, mainly supplier integration, customer satisfaction, and business results (Tan 2002).

Meanwhile, there are two main research streams that address the importance of strategic supply management skills. The first stream follows a descriptive approach of the current status of the supply management function. This research emphasized the increased importance of strategic skills in shaping the supply management function in future (e.g., Carter and Narasimhan 1996; Ellram and Carr 1994; Giunipero and Pearcy...
2000; Johnson et al. 1998). However, most studies that tackled supply management strategic skills from this perspective are case studies or conceptual pieces and did not empirically examine the impact of strategic supply management skills on firms’ performance.

The other research stream addressed firm-specific strategic supply management skills as nontransferable and unique assets (Carr and Pearson 2002; Lepak and Snell 1999). The theoretical basis of the second research stream relied on a similar argument to the one used in this study; because strategic supply management skills are both valuable and unique, they can be viewed as core assets that could serve as a source of competitive advantage (Barney 1991). This stream of research examined the role of supply management in contributing to the firm’s value growth, supplier responsiveness, and firms’ financial performance (Anderson and Katz 1998; Carr and Pearson 2002; Carter et al. 1998). Firms’ financial performance is measured usually in terms of return on investment, profits as a percent of sales, firms’ market share, and net income before taxes over a given time period (e.g., Anderson and Katz 1998; Carr and Pearson 2002; Carter et al. 1998; Tan et al. 1998). However, the direct impact of supply management skills on the competence of the supply management function in contributing to the firm and its supply chain members’ objectives has been largely overlooked.

The resource-based view of the firm emphasizes the importance of "competing for the future" as a dimension of competitive advantage (Hamel and Prahalad 1994), which could be a neglected dimension when we focus on the impact of supply management skills on a firm’s financial performance. According to the resource-based view of the firm, the firm must be concerned not only with profitability in the present and growth in the medium term, but also with its future position and source of competitive advantage (Carr and Pearson 2002). Therefore, firms need supply management skills that enable the function to develop the strategic plans that will determine how the firm will compete when its current strategy configuration is either copied or made obsolete. By definition strategic supply management skills enable the firm to address the current and future implications of the strategic decisions that the supply management function undertakes. Both research streams asserted that supply management skills shape corporate revenue realization, competitive cost position, and impact profitability. However, the relationship
between the level of strategic skills of purchasers and their performance has been largely overlooked by previous research. As mentioned earlier, supply management skills, like other organizational assets, can be classified as core or peripheral assets. Hence, it is essential to determine the core supply management skills, among the wide variety that were addressed by previous literature, that actually shape corporate revenue realization as well as competitive cost position.

Hart's (1995) framework posited that all human resources of the firm, including strategic supply management skills, fit within the resource-based view theory to explain the firm's ability to compete. Previous research documented that the more strategic skills each supply management function possesses, the more valuable the function is as a resource to the firm (Carr and Pearson 2002). Strategic supply management skills enable the function to perform activities, which are strategically oriented toward the accomplishment of a firm's goals and help the firm to sustain its competitive advantage (Ramsey 2001). Strategic supply management skills can help improve supply management performance in a number of ways. First, it provides value in the area of cost management. Effective management of the cost of materials and various inputs to production saves the firm and its partners in the supply chain dollars that go straight to the firm's bottom line profits. Second, it provides the supply management function valuable information concerning supply trends that will enable the firm to make better decisions and achieve its goals. Third, it helps the supply management function to establish close relationships, where appropriate, with suppliers to improve the efficient quality and delivery of materials (Hogan and Armstrong 2001).

Generally, strategic supply management skills enable the supply management function to design strategies that are aligned with the firm's strategic plans and, therefore, enhance supply management performance. The first research question relates to the following hypothesis:
H1. Higher levels of strategic supply management skills have a significant positive impact on the supply management function's performance.

Figure 3.2 Illustration of the conceptual model of Hypotheses 1

3.2.2 What is The Impact of Supplier Integration on Supply Management Performance?

The second research question examines whether supplier integration contributes to supply management performance. The increased reliance on supply management as a source of competitive advantage necessitates integrating suppliers' operations with those of the supply management function in major supply decisions (Carter and Narasimhan 1996; Ellram and Carr 1994; Giunipero and Pearcy 2000; Johnson et al. 1998). Actions, such as suppliers' participation in cross-functional teams and proactive support for the product development process are indicators of supplier integration in the procurement process. Supplier integration can be defined as the combination of internal resources of the buying firm with the resources and capabilities of selected key suppliers through the meshing of intercompany business processes to achieve a competitive advantage (Wagner 2003). It is the process of incorporating or bringing together different groups, functions, or organizations, physically or by information technology, to work jointly and often concurrently on a common business-related assignment or purpose (Monczka, Trent, and Handfield 2002). Michael and Tan (2001) indicated that effectively selecting suppliers and managing their involvement are thought to be capabilities that enable firms to achieve customer satisfaction. In the same study, the authors reported that supplier integration is a source of meaningful competitive advantage because it enhances responsiveness, flexibility, and timesaving capabilities.

When suppliers are involved in supply management processes, contributions to higher quality, greater sharing of cost savings, closer cooperation to achieve target costs, and reduced time-to-market of new products can be attained (McGinnis and Vallopra 1999). More frequent supplier integration leads to greater coordination and receptiveness to
their ideas, and results in suppliers becoming involved before the concept and design phases of the process development/improvement project have been finalized (McGinnis and Vallopra 1999).

Teague et al. (1997) reported that, when surveyed, the readers of Design News and Supply management indicated that more than 70% of supply management professionals involve their suppliers earlier in the design process than they did ten years ago. Major drivers of this trend are the resultant improvements in supply management performance variables, such as, shorter design cycle time and lower design/development cost. Neal (1993) examined more than sixty leading companies in the United States, Europe, and the Far East to identify the leading practices that lead to cycle-time reduction. Findings indicated that the use of small decision-oriented teams that include suppliers, leads to cycle time improvements.

According to Birou and Fawcett (1994), when implemented appropriately, the advantages of the supplier integration are numerous. Previous research pointed out the many benefits of supplier integration, such as reduced development lead times with fewer costly redesigns; better communication and a subsequent reduction in duplicated efforts; substantial cost savings from higher productivity and lower maintenance; and more reliable products with fewer recalls and enhanced customer satisfaction; and improved financial performance (Birou and Fawcett 1994; Carr and Pearson 2002; Dowlatshahi S. 1998; McGinnis and Vallopra 1999). However, most of these performance measures are tactical in nature. The strategic impact of supplier integration on the performance of supply management, as a value adding function to the members of the supply chain, was overlooked.

Results pertaining to the impact of supplier integration on performance are mixed. As mentioned earlier, involving suppliers in the procurement process is important and may help firms to increase their performance. However, when examined by Carr and Pearson (2002), the influence of supplier integration accounted only for 9% of the variance associated with the financial performance. The small percentage of the variance could be explained by arguing that involving suppliers in strategic sourcing decisions does not directly influence financial performance. Instead, supplier integration is expected to influence financial performance through its impact on supply management performance.
In other words, supplier integration is not the only supply management-related factors that impact the financial performance (Carr and Pearson 2000). Therefore,

**H2: Higher levels of supplier integration have a significant positive impact on supply management performance.**

![Figure 3.3 Illustration of the conceptual model of Hypotheses 2](image)

### 3.2.3 What is the Impact of Strategic Supply Management Skills on the Degree of Supplier Integration with the Buying Firm?

As mentioned earlier, when the supply management function integrates its decisions and operations with suppliers, the resulting connections, to the extent that these links exclude competitors from forming the same connections with the same critical suppliers for the same purpose, should provide competitive benefits to the firm (Rungtusanatham et al. 2003). Therefore, most successful companies seek to integrate their processes and decisions with their suppliers, when possible. However, supplier integration is a complicated project that requires certain supply management capabilities.

The increased emphasis on supplier integration implies expanding the role of the supply management function to include setting technical and cost objectives and coordinating supplier integration. It is expected that strategic supply management skills will enable managers to plan, develop, and implement supplier integration projects for their major products, where both supply chain members have their needs satisfied.

The fourth research question concerns the relationship between supplier integration and supply management strategic skills. Handfield et al. (1999) pointed out that supplier relationships are most successful when there is a formalized process that evaluates supplier capabilities. This formalized process of supplier evaluation is more likely to occur when top management perceives the supply management function to possess certain strategic skills. Also, supplier integration is more likely to occur when supply
management is part of a team that provides input to designing and manufacturing the components for new products. This can take place only if top management trusts that supply management has the necessary strategic skills to properly align the right suppliers with design and operations personnel.

Thus, supply management strategic skills enable supply management to play a role in suppliers' integration. The suppliers can help companies speed up the product development cycle and offer valuable insights on the design of the new product. In sum, strategic skills allow supply management professionals and suppliers to work together from product conception to final design, which can elevate a firm's performance, reduce cycle times, and allow the firm to be first to market. Thus:

\[ H3. \text{Higher levels of strategic supply management skills have a significant positive impact on supplier integration.} \]

**Figure 3.4** Illustration of the conceptual model of Hypotheses 3

### 3.2.4 What is The Impact of Supply Management Perceived Status on Supplier Integration?

Pooley and Dunn (1994) reported that there would be a shift in the mix of clerical and professional supply management employees. Clerical employees tend to require a higher level of supervision than professional employees. Growth in computer technology over the last three decades has eliminated some clerical functions and may have led to fewer clerical employees. If there has been a reduction in supply management clerical positions over the last three decades, then most of the growth in supply management staff must be professional employees. Because professional employees tend to be self-motivated, firms may have responded by not changing the emphasis placed on human resource skills and duties.
In an attempt to conduct a comprehensive job analysis of the supply management and supply management function, Muller (2001) used a sample of 2416 supply management managers and employees to obtain up-to-date information about the present state and future direction of the supply management/supply function in a variety of industries, and organization sizes types. The author reported that:

1. Tasks of a strictly procurement nature – identifying requests, preparing solicitations, supplier analyses, negotiations, contract execution, implementation, and administration – are still a component of the work of most supply management professionals.
2. Tasks dealing with maintaining positive relations with entities that are internal and external to the organization, such as suppliers, customers, and internal users, were also relevant to the work of purchasers in a majority of sectors.

However, it is expected that the elevation of supply management status could lead to a greater emphasis on the integration aspects of the supply management job; “dealing with maintaining positive relations with entities that are internal and external to the organization.” Therefore, the perceived importance of supply management is expected to have a substantial impact on supplier strategy. McGinnis and Vallopra (1999) posited that perceptions of higher supply management status are associated with (1) a greater role of supply management in process development/improvement, (2) a greater likelihood that suppliers will be included in the procurement process, and (3) better supplier integration in process development/improvement.

Supply management is more likely to play a major role in involving suppliers in the procurement process when the importance of supply management status is considered to be ‘high’ The elevated status of the supply management function means that the function has access to vital information that allows managing supplier integration and making better involvement decisions that are aligned with the firm’s strategic goals. Having access to vital information about firm’s strategic goals, cost structure, and forecasts equips the supply management function to understand and evaluate the implications of supplier integration in the procurement process.

Higher status enables the supply management function to take supplier involvement decisions that require being more proactive on the part of the supply management staff when it interacts with others within and outside of the firm (Carr and Pearson 2002).
Firms may elevate the supply management function to a strategic level due to the relatively critical and high dollar value of materials and/or services procured by the firm. Thus:

\[ H4. \text{Supply management perceived status has a significant positive impact on supplier integration.} \]

**Figure 3.5 Illustration of the conceptual model of Hypotheses 4**

3.2.5 **What is The Impact of Strategic Supply Management Skills on Supply Management Perceived Status?**

The structure and status of the supply management organization is expected to change in order to adapt to the strategic tasks required. The role of supply management, as emphasized in the supply management literature, continues to evolve towards a strategic level to support the firm's competitive position, and its role expands to include: supplier coordination, supplier development, supplier market research, cost analysis, sourcing strategy formulation, benchmarking, make or buy decision, and supplier capability analysis (Carr et al. 2000). This evolution implies an elevation in the status of the supply management function, which is expected to define the firm's competitive strategy. Supply management can contribute to the company's strategic planning effort by monitoring supply market trends, interpreting the meaning of these trends, identifying the materials and services, and developing supply options. These findings support the premise that the skill set that is more valued now in the supply management function is more of a strategic nature and that the supply management function is moving from a tactical orientation to a strategic one that is of more elevated status.

A supply management function that is perceived by the firm to possess strategic skills is strategic in nature, proactive with respect to the firm's goals, integrative, and has a long-term focus (Carr and Pearson 2002). A supply management function that possesses strategic supply management skills is viewed by top management as an important
resource of the firm (Keough 1994) and is usually involved in the firm’s strategic planning process. Additionally, it is treated as an equal to other major functions in the firm (Freeman and Cavinato 1990), and proactively seeks opportunities to provide inputs that will have a significant impact on the quality of a firm’s product and future growth of the firm. The supply management professionals employed in a strategic supply management function are considered resources of the firm. In a strategic supply management function, supply management professionals possess the strategic supply management skills to perform at a strategic level and receive professional development training to enhance their skill level (Carr and Pearson 2002), which implies an elevated status of the function in the firm.

A supply management function that is not perceived by the firm to possess strategic skills; non-strategic, is clerical in nature, reactive to other functions, non-integrative and focuses on short-term issues. In a non-strategic supply management function, little to no professional development training is offered to increase the skills of supply management personnel (Carr and Pearson 2002). Furthermore, top management views supply management activities as nonvalue-added. A non-strategic supply management function has low visibility and low relevant supply management skills with respect to strategic planning and managing the firm’s suppliers. Therefore, supply management personnel provide minimal input to the firm’s decision-making process.

In summary, the lack of strategic supply management skills minimizes supply management’s ability to perform at a strategic level (Pearson and Gritzmanner 1990). A non-strategic function implies that supply management is not an important activity in the firm. When the firm has a non-strategic supply management function, supply management has a low status relative to other major functions in the firm (Ammer 1989; Carr and Pearson 2002), and conducts routine activities that require no more than a reaction by the supply management staff to the demands of others in the firm. Thus, the fifth research question relates to the following hypothesis:
H5. Higher levels of strategic supply management skills have a significant positive impact on perceived supply management perceived status.

![Diagram](image)

Figure 3.6 Illustration of the conceptual model of Hypotheses 5

3.2.6 What is the impact of supply management perceived status on supply management performance?
Lester (1999), Pearson and Gritzmacher (1990) suggested that upgrading the level of supply management strategic skills is a prerequisite for supply management professionals to interpret changes in the supplier market and offer technical assistance in developing suppliers, which will produce valuable supplier relationships that cannot be imitated by competition.

H6 Higher levels of Supply management perceived status have a significant positive impact on supply management performance.

![Diagram](image)

Figure 3.7 Illustration of the conceptual model of Hypotheses 6

3.3 Conclusion
This chapter explained the research framework, proposed hypotheses, and models. Strategic Supply Management skills, Supply Management perceived status; Supplier integration and Supply management performance were demonstrated and explained.
Chapter 4
Research Methodology

This chapter will guide the readers through the research methodology. The section will include the data collection method, the sampling designs, and determination of the sample size and data analysis techniques.

4.1 Methods of Research Used
The research uses quantitative data analysis to test the impact of strategic supply management skills and/or supply management perceived status on supply management performance. The researcher decided to gather and use the data from the questionnaire survey to test or simulate or evaluate the hypothetical relationship between strategic supply management skill and perceived status with supply management performance through supplier integration.

4.2 Respondents and Sampling Procedures

4.2.1 Target Population:
A group of Local Auto-Parts Supplier companies and Automakers are the target population in the study. According to the Thai Auto Parts Manufacturers Association (TAPMA) there are more than 700 local OEM direct suppliers to Automakers. As there are a huge number of companies in the car and pickup truck manufacturing industry and sufficient for the sampling procedure, we decided to exclude the motorcycle industry from our target population.

4.2.2 Sampling and Sample Frame:
Sampling is "a procedure using a small number of units of a given population as a basis for drawing conclusions about the whole population" (Zikmund 1999). The sampling design process includes five steps, which are shown sequentially in the figure 4.1:

The target population of this study comprises the logistics and supply chain function related managers from Thai automotive Industries. The Sampling frame in this study is based on the list of around 400 – 450 local direct auto parts suppliers from Thailand Automotive Institute (TAI), Thai Auto-Parts Manufacturers Association (TAPMA) and Thai Automotive Industry Association (TAIA) is considered.
After identifying the target population and the sampling frame, the sampling method is determined.

Define the Target Population

Determine the Sampling Frame

Select Sampling Method(s)

Determine the Sample Size

Execute the Sampling Process


Figure 4.1: The Sampling Design Process

Questionnaires was distributed to the Supply Chain / Logistics Managers or equivalent managers of each company, including a self introduction letter and instructions on how to complete the questionnaire. There were two language versions of the questionnaire: Thai and English.

4.2.3 Sampling Method:
A probabilistic sampling method was used in this study due to the preference for probabilistic sampling over the non-probabilistic sampling in scientific study (Sekaran, 1992). A simple random sampling technique was be employed to gather the data in this study. Based on the available sampling respondents by Thai Automotive Industry Association (TAIA) a total number of 120 samples was randomly selected by the researcher.
4.2.4 Sample Size:
The sample size used in structural equation modeling is perhaps the most influential single element under the control of the researcher in designing the analysis. The effects of sample size are seen most directly in the statistical power of the significance testing and the generalizability of the result. The size of the sample has a direct impact on the appropriateness and the statistical power of the Structural Equations (Hair, Anderson, Tatham, and Black, 1998).

The population of this study comes from Auto Parts manufacturers and Auto makers in Thailand. A sample size was determined according to the recommendation of Hair, Anderson, Tatham, and Black (1998). Factor analysis should have a minimum of five subjects per variable and Structural Equation Modeling requires at least five respondents for each estimated parameter. As the data violates the assumption of multivariate normality, the ratio of respondents to parameters needs to increase with a generally accepted ratio of fifteen respondents for each parameter (Wang, Fan, and Wilson, 1996). The researcher used around 20 respondents per parameter. Based on the TAPMA and TAIA manufacturers directory samples was selected for the current study. Sample size for the study is as follows:

**Sample Size:** 6 parameters x 20 samples per parameter = 120 samples.

4.2.5 Research Instrument:
The researcher used a questionnaire as the research instrument. The researcher developed scales based on several other empirical studies to make an initial list of items. Then the researcher eliminated several redundant items after being advised by the advisor, and will test the first draft of the questionnaire as pilot tests. Construct analysis of the results guided revisions. The researcher used five point scales anchored by “Strongly Disagree” and “Strongly Agree” for some of the predictors and also “Extremely High” and “Extremely Low” were also used and for firm’s operational performance “Very Low Performance” and “Very High Performance” were used. Measures are reported in the following section of this chapter.
4.3 Measurement Items

The proposed full model of Supply Management Performance is composed of 4 constructs. They are: Supply Management Performance, Supplier Integration, Strategic Supply Management Skills, and Supply Management Perceived Status. The measurement of each of these constructs is explained as follows:

4.3.1 Supply Management Performance

The performance measures address the benefits that accrue to the firm through effective management of supply, is conceptualized as a first order factor consisting of three first order factors: Market Indicators, Productivity Indicators, and Non-Productivity Indicators. Each of these factors focuses on capturing an aspect of a firm's supply chain management and its impact on overall performance and especially on operational performance. All of these measures were adopted from previous studies (Frolich and Westbrook, 2001). All the factors in the firm operational performance model are measured as: Please indicate, "What is Your Firm’s Operational Performance relative to your immediate Competitor in the following areas?". The Performance items were measured on a 5 point scale ranging from: 1 = Very Low Performance, 2 = Low Performance, 3 = Medium, 4 = High Performance and 5 = Very High Performance, relative to the firm’s immediate competitor. Table 4.1 below summarizes these measures.

Table 4.1

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measurement Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10. Inventory Turnover (Sales/Inventory)</td>
<td>Frolich &amp; Westbrook (2001)</td>
</tr>
</tbody>
</table>
### 4.3.2 Supplier Integration

The Supplier Integration measures address the benefits that accrue to the firm through effective management of Supplier Integration attributes, and is conceptualized as a Second order factor. All of the measures were adopted from previous research (Stank, Keller, and Closs; 2001). The factors in the Supplier Integration model are measured as: "Please indicate the intensity of the following components of Supplier Integration with your most important supplier." on a five point scale ranging from: 1 = Strongly Disagree, 2 = Disagree, 3 = Average, 4 = Agree, 5 = Strongly Agree. Table 4.2 below summarizes these measures:

<table>
<thead>
<tr>
<th>Measurement Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. My firm shares technical resources with key suppliers to facilitate operations.</td>
<td>Stank, Keller, and Closs (2001)</td>
</tr>
<tr>
<td>4. My firm is committed to sharing responsibility with suppliers in new product development &amp; commercialization.</td>
<td>Stank, Keller, and Closs (2001)</td>
</tr>
</tbody>
</table>

### 4.3.3 Strategic Supply Management Skills

The Strategic Supply Management Skills measures address the process of planning, evaluating, implementing, and controlling highly important and routine sourcing decisions (Carr and Smeltzer 1997; Carr and Pearson 2002), and is conceptualized as a Third order factor. It enables directing all activities of the supply management function toward opportunities consistent with the firm's capabilities in order to achieve its long-term goal. All of the measures were adapted from previous research of Giunipero and Pearcy.
and Anderson and Katz (1998) and by Monczka et.al (2002). The factor in strategic supply management skills model are measured as: “Please rate the importance of the skills you require of your supply management personnel.” on a five point scale ranging from: 1 = Not Important, 2 = Important, 3 = Average, 4 = Very Important, 5 = Most Important. Table 4.3 below summarizes these measures:

**Table 4.3**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measurement Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimension</td>
<td>2. Understanding general business conditions</td>
<td>Anderson &amp; Katz (1998) and Monczka et.al. (2002)</td>
</tr>
<tr>
<td></td>
<td>7. Structuring supplier relationships</td>
<td>Giunipero and Pearcy (2000)</td>
</tr>
</tbody>
</table>

**4.3.4 Supply Management Function Perceived Status**

The Supply Management Function Perceived Status measures are known from other literature under various names, e.g. status and recognition of purchasing, purchasing status, and purchasing foresight (Bowen, Cousins, Lamming, and Faruk 2001; Carr and Smeltzer 2000; Cavinator 1987b; Pearson, Ellram, and Carter 1996), and is conceptualized as a Fourth order factor. It refers to whether the individuals employed in that function perceive themselves to be making a strategic, value-adding contribution to the firm (Goebel et al, 2003). This measurement lacks structure since it is gathered from difference self-report items. However, Eltantawy (2005) has adapted and suggested a new scale to assess “supply management perceived status”, because an established one does not currently exist. The goal was to assess the way in which supply management is perceived by the top management team and the extent to which firm supported the supply management function. From Eltantawy’s (2005) research, the following indicators from various sources are used to assess supply management
function perceived status. The factors in the Supply Management Function Perceived Status model are measured on a five point scale ranging from: 1 = Least Likely, 2 = Less Likely, 3 = Average, 4 = More Likely, 5 = Most Likely. Table 4.4 below summarizes these measures:

Table 4.4
Measurement Items for Supply Management Function Perceived Status Attributes

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measurement Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. How top management views purchasing training</td>
<td>Giunipero and Flint (2001)</td>
</tr>
<tr>
<td></td>
<td>3. Supply management is considered a training ground for upper management</td>
<td>Giunipero and Flint (2001)</td>
</tr>
<tr>
<td></td>
<td>4. The extent to which supply management's training budget is stable following periods of devolution</td>
<td>Cunningham and Hyman (1999)</td>
</tr>
</tbody>
</table>

4.4 Data Collection Method
The study uses multiple techniques of data collection to ensure that the response in terms of usable questionnaires should reach the sample size of 120. Techniques used in this study are calling up the respondents for data collection and interview. Respondents are executive managers (Logistics/Supply Chain Management, President, General Managers, Owners of the firms or equivalent), who are knowledgeable regarding the logistics and supply chain activities of the firm.

4.5 Data Analysis Process
4.5.1 Data Coding and Cleaning
Data coding and cleaning was done through SPSS version 14.0

4.5.2 Assessment of Internal Consistency
Assessing internal consistency of the measures involves examining two independent but related concepts: Unidimensionality and Reliability.
4.5.2.1 **Unidimensionality**

It exists when all items belonging to an underlying trait can be shown to group together using a technique such as factor analysis.

4.5.2.2 **Reliability Assessment**

It is assessed after unidimensionality has been established, and measures the amount of error present (or absent) in the item grouping. Cronbach's (1951) $\alpha$ (alpha) and Fornell and Larcker's (1981) measure of internal consistency was calculated to determine reliability.

**Cronbach’s $\alpha$ Measure for Reliability Assessment**

Establishing construct reliability shows that each of the multiple indicators of a construct appropriately covary. The traditional measure of reliability is Cronbach’s $\alpha$ (Nunnally and Bernstein 1994) which assumes that the indicators are measured without error. Values for Cronbach’s $\alpha$ range from 0 to 1, with $\alpha$ – values greater than 0.70 considered acceptable (Nunnally and Bernstein 1994). Cronbach’s $\alpha$ was calculated for each of the constructs in the model. If $\alpha$ is less than 0.70, items that caused a significant drop in $\alpha$ were deleted. The value for $\alpha$ was recalculated until an acceptable level could be obtained.

4.5 **Data Analysis Strategy**

One of the primary objectives of multivariate techniques is to expand the researcher’s explanatory ability and statistical efficiency. Multiple regression, Factor Analysis, Multivariate Analysis of Variance, Discriminant Analysis, and the other techniques, all provide the researcher with powerful tools for addressing a wide range of managerial and theoretical questions. But they all share one common limitation: each technique can examine only a single relationship at a time. Even the techniques allowing for multiple dependent variables, such as multivariate analysis of variance and canonical analysis, still represent only a single relationship between the dependent and independent variables. For this reason the researcher examined the technique of Structural Equation Modeling (SEM), which is an extension of several multivariate techniques, most notably multiple regression and factor analysis (Hair, Anderson, Tatham, and Black, 1998).
4.6.2 Confirmatory Factor Analysis (CFA)

It seeks to determine if the number of factors, and the loadings of measured (indicator) variables on them, conform to what is expected on the basis of pre-established theory. A minimum requirement of confirmatory factor analysis is the at one hypotheses beforehand the number of factors in the model, but usually also the researcher will posit expectations about which variables will load on to which factors (Kim and Mueller 1978b: 55). The researcher sought to determine, for instance, if the measures created to represent a latent variable really belong together.

Confirmatory factor analysis can also mean the analysis of alternative measurement (factor) models using a structural equation modeling package such as AMOS or LISREL. While SEM is typically used to model causal relationships among latent variable (factors), it is equally possible to use SEM to explore CFA measurement models.

4.6.2 The Structural Equation Model (SEM)

Structural Equation Modeling (SEM) is a confirmatory approach to data analysis requiring the a priori assignment of inter-variable relationships. It tests a hypothesized model statistically to determine the extent a proposed model is consistent with the sample data. SEM incorporates observed (indicator) and Unobserved (Latent) variables, which are separated into measurement models and structural equation models. Observed variables are those that can be measured, while unobserved variables cannot be measured and must be inferred or hypothesized from the observed variables. The measurement models specify how the latent variables are measured in terms of the indicator variables as well as addressing the reliability and validity of the indicator variables in measuring the latent variables or hypothesized constructs. The Structural Equation Model provides an assessment of predictive validity, specifies the direct and indirect relations among the latent variables, and describes the amount of explained and unexplained variance in the model (Byrne n1998; Schumacker and Lomax 1996). SEM encourages confirmatory rather than exploratory modeling; thus, it is suited to theory testing rather than theory development. It usually starts with a hypothesis, represents it as a model, operationalises the constructs of interest with a measurement instrument, and tests the model. The causal assumptions embedded in the model often have falsifiable implications which can be tested against the data. With an accepted theory or otherwise confirmed model, SEM can also be used inductively by specifying the model
and using data to estimate the values of free parameters. Often the initial hypothesis requires adjustment in light of model evidence, but SEM is rarely used purely for exploration.

In SEM there is no single test of significance that can absolutely identify a correct model given the sample data (Schumacker and Lomax 1996). Many goodness-of-fit criteria have been established to assess an acceptable model fit. Consequently, several authors recommend presenting a number of indices to support model fit (Bentler 1992; Garver and Mentzer 1999).

Structural Equation Modeling (SEM) encompasses an entire family of models known by many names, among them Covariance structure analysis, Latent variable analysis, Confirmatory Factor Analysis, and often simple LISREL analysis or AMOS 6.0 (the name of the more popular software packages). Resulting from an evolution of multi-equation modeling developed principally in econometrics and merged with the principles of measurement from psychology and sociology, SEM has emerged as an integral tool in both managerial and academic research. SEM can also be used as a means of estimating other multivariate models, including regression, principle components, canonical correlation, and even MANOVA (Hair, Anderson, Tatham, and Black, 1998).

4.7 Method of Analysis

Structural Equation Analysis Model (SEM) is the primary statistical technique used to analyze the survey data in this study due to the advantages it has over traditional regression methods. Recently, the use of SEM has become increasingly common in psychology and social sciences (Anderson and Gerbing, 1988; West, Finch, and Curran, 1995). One reason for this is that SEM takes a confirmatory, rather than exploratory approach to the data analysis (Anderson and Gerbing, 1988; Byrne, 1998; Hair, Anderson, Tatham, and Black, 1998). It provides the researcher with a comprehensive means for assessing and modifying theoretical models (Anderson and Gerbing, 1988). Whereas other multivariate techniques are incapable of accounting for measurement error, SEM can provide explicit estimates of these parameters (Anderson and Gerbing, 1988).
SEM is also a comprehensive statistical technique used to examine the relationship among observed and latent (unobserved) variables (Hoyle, 1995). SEM is particularly useful when one dependent variable becomes an independent variable in a subsequent dependence relationship. The hypothesized model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data (Byrne, 1998; Hair et al., 1998). Thus, SEM will be used in this study because of the provisions of the ability to accommodate multiple interrelated dependent relationships in a single model and the ability to represent unobserved concepts in the relationships and account for measurement error in the estimation process. This concludes the research design of this dissertation.

4.8 The Concept of the AMOS Model
AMOS has gained increased popularity in recent years due to its simple interface for the user, and it has been compared recently to LISREL and EQS. Amos provides powerful and easy-to-use structural equation modeling (SEM) software. It can be used to create more realistic models than the ones used in standard multivariate statistics or multiple regression models alone. With Amos, it is possible to quickly specify, build, and view the model using simple drawing tools, then assess the model's fit, make any modifications, and print a publication-quality copy of the final model. Amos provides the ability to confirm the validity of claims such as “value drives loyalty” in minutes, not hours.

Amos creates structural equation models by extending standard multivariate analysis methods, including multiple regression models, with observed and latent variables. User-friendly features, such as drawing tools, configurable toolbars, and drag-and-drop capabilities, help build structural equation models with more accuracy than standard multivariate statistics models. After fitting the model, the Amos path diagram uses causal models to show the strength of the relationship between variables.

Amos builds models that more realistically reflect complex relationships because it can use observed variables (such as survey data) or latent variables (such as “satisfaction” or “loyalty”) to predict any other numeric variable. Structural equation modeling, sometimes called path analysis, can helps gain additional insight into causal models and the strength of variable relationships.
4.8.1 AMOS 6.0: Modeling Capabilities

According to Hox, 1995; and Jöreskog and Sörbom, 1996, the following modeling capabilities of AMOS 6.0 can be achieved.

1) Structural Equation Models can be created (including such special cases as path analysis and longitudinal data models) with observed and latent variables.
2) Candidate models can be specified using one of the two methods:
   - Each individual candidate model can be specified as a set of equality constraints on model parameters.
   - SEM can be used in an exploratory way. AMOS tries out many models and suggestions promising ones, while using Akaike Information Criterion (AIC) and Bayes Information Criterion (BIC) statistics to compare models.
3) Confirmatory factor Analysis (CFA) such as Variance Components, errors in variables, Measurement models and Latent variables can be performed.
4) Mean Structures and multiple group datasets can be analyzed and multi-group data can be quickly specified and tested through automated specification.
5) Data from several population can be analyzed at once.
6) Time can be saved by combining factor and regression models into a single model, and then can be fitted simultaneously.
7) Multiple models can be analyzed simultaneously; AMOS determines which models are nested and automatically calculates test statistics.

4.8.2 AMOS 6.0: Analytical Capabilities and Statistical Functions

According to Hox, 1995; and Jöreskog and Sörbom, 1996 the following analytical capabilities and statistical functions of AMOS 6.0 can be achieved.

1) Full Information Maximum Likelihood Estimation in missing data situations can be used for more efficient and less biased estimates.
2) Parameter values can be entered to observe the effect on implied moments and on the value of discrepancy function using the modeling laboratory.
3) Approximate distribution of any model parameter estimate can be found under any empirical distribution, including standardized coefficients, using fast bootstrap simulation
   - Model fit can be assessed with Bollen and Stine's bootstrap approach.
- Percentile internals can be calculated and bias-corrected percentile intervals.

4) Randomized permutation tests can be performed to show whether equivalent or better fitting models can be found.

5) Equality Constraints in the path diagram can be specified by using the same level for two or more parameters, including means, intercepts, regression weights and/or Covariances, in the same group or across different groups.

6) Means for Exogenous variables can be estimated.

7) Intercepts in Regression Equations can be estimated.

8) Degrees of freedom can be recalculated after adding new elements or changing model constraints.

9) Parametric Bootstraps can be performed to find the approximate distribution of any model parameter estimate under normal distribution theory, including standardized coefficients with Monte Carlo simulation.

10) A variety of estimation methods can be used including maximum likelihood, outweighed least squares, generalized least squares, Browne's asymptotically distribution free criterion and scale-free least squares.

11) Models can be evaluated using more than two dozen fit statistics, including Chi-square; AIC; Bayes and Bozdogan information criterion; Browne-Cudeck (BCC); ECVI, RMSEA and PCLOSE criterion; root mean square residual; Hoelter's criterion; Bentler-Bonett and Tucker-Lewis indices.

12) Bias and standard error estimates can be obtained for any parameter and derived statistics easily with bootstrapping or Monte Carlo options.

4.9 Conclusion
The objectives of this chapter were twofold. The Primary objective was to explain the research design: sampling design, instrument design, and analysis design. The Secondary objective was to operationally define the variables in the two proposed models: Measurement models and the full model of Firm Operational Performance. The criteria in selecting and adjusting the fitted model are explained.
Chapter 5
DATA ANALYSIS

This chapter will reveal the result data which had been gathered from the respondents who are working in the Automobile industry in Thailand. This section includes the survey response rate, respondent demographics, reliability assessment, confirmatory factor analysis, and structural equation model analysis and hypothesis testing.

5.1 Survey Response Rate
The targeted key respondent included the level of supervisors to managers, who are typically the decision maker of the firms on supply chain functions, including sales, marketing, logistics, supply chain, and procurement. A total of 120 companies were listed for questionnaire interview, only 70 completed surveys were completed. The overall response rate was 18.1%.

5.2 Respondent Demographics
General demographic information of the respondent firms is presented in Table 5.1. Over 90%, the firms classified themselves as an Automobile parts supplier. A large percentage of the respondents (approximately 56%), has been operating the business in Thailand for 16-35 years. Regarding the minimum education requirement for the position, almost 65% required a bachelor degree and none had a master degree requirement, while nearly 93% of the respondents posses a bachelor degree. The respondents’ years of service with a company, with an average range of 4-6 years, represented approximately 41%, while the current years of service in the position were also nearly 43%. However, most of the respondents had an experience in the logistics field ranging from 1-3 years (almost 80%). Over 33% were working for pure Thai businesses. Overall, all respondents have been involved in supply management in the automobile industry.
Table 5.1: General Demographics

<table>
<thead>
<tr>
<th>Demographic Profile</th>
<th>Number of respondents</th>
<th>Percentage contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>45.7%</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>54.3%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>65</td>
<td>92.9%</td>
</tr>
<tr>
<td>Master Degree</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Minimum Education Required for professionals to be hired in your function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>24</td>
<td>34.3%</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>46</td>
<td>65.7%</td>
</tr>
<tr>
<td>Master Degree</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Years end service with company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 Years</td>
<td>17</td>
<td>24.3%</td>
</tr>
<tr>
<td>4-6 Years</td>
<td>29</td>
<td>41.4%</td>
</tr>
<tr>
<td>7-15 Years</td>
<td>19</td>
<td>27.1%</td>
</tr>
<tr>
<td>16-25 Years</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>Over 25 Years</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Years end service with current position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 Years</td>
<td>19</td>
<td>27.1%</td>
</tr>
<tr>
<td>4-6 Years</td>
<td>30</td>
<td>42.9%</td>
</tr>
<tr>
<td>7-15 Years</td>
<td>18</td>
<td>25.7%</td>
</tr>
<tr>
<td>16-25 Years</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>Over 25 Years</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Experience in logistics field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 Years</td>
<td>56</td>
<td>80.0%</td>
</tr>
<tr>
<td>4-6 Years</td>
<td>12</td>
<td>17.1%</td>
</tr>
<tr>
<td>7-15 Years</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>16-25 Years</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Over 25 Years</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Belonging Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing</td>
<td>28</td>
<td>40.0%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>Logistics</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Engineering</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Marketing</td>
<td>6</td>
<td>8.6%</td>
</tr>
<tr>
<td>Others</td>
<td>31</td>
<td>44.3%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Master of Science in Supply Chain Management -- 75
<table>
<thead>
<tr>
<th>Company primary business</th>
<th>Automobile Manufacturer</th>
<th>7</th>
<th>10.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automobile Parts Suppliers</td>
<td>63</td>
<td>90.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Company Sizes</td>
<td>Less than 2,000 employee</td>
<td>15</td>
<td>21.4%</td>
</tr>
<tr>
<td></td>
<td>201-500 Employee</td>
<td>26</td>
<td>37.1%</td>
</tr>
<tr>
<td></td>
<td>501-2,500 Employee</td>
<td>26</td>
<td>37.1%</td>
</tr>
<tr>
<td></td>
<td>2,500-10,000 Employee</td>
<td>3</td>
<td>4.3%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Age of Business</td>
<td>Less than 5 Years</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td></td>
<td>5-15 Years</td>
<td>25</td>
<td>35.7%</td>
</tr>
<tr>
<td></td>
<td>16-35 Years</td>
<td>39</td>
<td>55.7%</td>
</tr>
<tr>
<td></td>
<td>36-70 Years</td>
<td>5</td>
<td>7.1%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>70</td>
<td>100.0%</td>
</tr>
<tr>
<td>Type of Business ownership</td>
<td>Pure Thais'</td>
<td>23</td>
<td>32.9%</td>
</tr>
<tr>
<td></td>
<td>Joint Venture - Thai majority</td>
<td>16</td>
<td>22.9%</td>
</tr>
<tr>
<td></td>
<td>Joint Venture - Foreigner majority</td>
<td>19</td>
<td>27.1%</td>
</tr>
<tr>
<td></td>
<td>Pure Foreigner</td>
<td>12</td>
<td>17.1%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>70</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

5.3 Reliability Assessment

The questionnaire format of this research was designed to use scaled responses, thus, it was necessary to test for reliability. KMO and Barlett’s Test of Sphericity Chi-Square were applied to test factor analysis. Also, Cronbach Alpha tests were performed. Based on the coefficient values, the items tested were deemed reliable for this type of research under the theory which indicated that the values for Cronbach’s α range from 0 to 1 with α-value greater than 0.70 are considered acceptable (Nunnally and Bernstein 1994).

Table 5.2: Summary of Reliability Analysis

<table>
<thead>
<tr>
<th>RESEARCH CONSTRUCTS</th>
<th>No. of Question</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK - Strategic Supply Management Skills</td>
<td>7</td>
<td>4.03</td>
<td>0.44</td>
</tr>
<tr>
<td>SS - Supply Management Function Perceived Status</td>
<td>5</td>
<td>3.82</td>
<td>0.55</td>
</tr>
<tr>
<td>SI - Supplier Integration</td>
<td>4</td>
<td>3.41</td>
<td>0.70</td>
</tr>
<tr>
<td>SM - Supply Management Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM1 - Marketing Indicators</td>
<td>3</td>
<td>3.89</td>
<td>0.68</td>
</tr>
<tr>
<td>SM2 - Productivity Indicators</td>
<td>8</td>
<td>3.65</td>
<td>0.43</td>
</tr>
<tr>
<td>SM3 - Others</td>
<td>5</td>
<td>4.08</td>
<td>0.44</td>
</tr>
</tbody>
</table>
The research applied KMO and Bartlett's Test of Sphericity to analyze a fitness of the model, as shown in Table 5.3.

**Table 5.3: Kaiser-Meyer-Olkin Factor Analysis Result**

<table>
<thead>
<tr>
<th>KMO</th>
<th>0.742</th>
<th>0.584</th>
<th>0.699</th>
<th>0.692</th>
<th>0.735</th>
<th>0.632</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett's Test of Sphericity Chi-Square</td>
<td>75.955</td>
<td>82.538</td>
<td>56.32</td>
<td>96.896</td>
<td>158.315</td>
<td>62.687</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td>21</td>
<td>10</td>
<td>6</td>
<td>3</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>Significant</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

As shown in table 5.3, the KMO index was higher than 0.50 and close to 1, suggesting the model is fit for further analysis by Factor Analysis.

All constructs and model were analyzed using factor loadings to screen irrelevant data from the factor analysis. The data is shown in table 5.4.
## Table 5.4:

### Summary of Reliability Analysis

<table>
<thead>
<tr>
<th>Code</th>
<th>Construct/item</th>
<th>Mean</th>
<th>SD</th>
<th>Factor Loading</th>
<th>Selected Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SK</strong></td>
<td><strong>Strategic Supply Management Skills (Reliability = 0.7190)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SK1</td>
<td>Analytical</td>
<td>4.23</td>
<td>0.78</td>
<td>0.713</td>
<td></td>
</tr>
<tr>
<td>SK2</td>
<td>Understanding general business conditions</td>
<td>4.10</td>
<td>0.68</td>
<td>0.708</td>
<td></td>
</tr>
<tr>
<td>SK3</td>
<td>Planning</td>
<td>4.16</td>
<td>0.75</td>
<td>0.635</td>
<td></td>
</tr>
<tr>
<td>SK4</td>
<td>Strategic thinking</td>
<td>3.96</td>
<td>0.84</td>
<td>0.612</td>
<td></td>
</tr>
<tr>
<td>SK5</td>
<td>Structuring supplier relationships</td>
<td>4.11</td>
<td>0.75</td>
<td>0.558</td>
<td></td>
</tr>
<tr>
<td>SK6</td>
<td>Managing the supply base</td>
<td>3.86</td>
<td>0.60</td>
<td>0.533</td>
<td></td>
</tr>
<tr>
<td>SK7</td>
<td>Project Management</td>
<td>3.79</td>
<td>0.70</td>
<td>0.521</td>
<td></td>
</tr>
<tr>
<td><strong>SS</strong></td>
<td><strong>Supply Management Function Perceived Status (Reliability = 0.7082)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS1</td>
<td>What is the perceived status of the supply management function in your organization?</td>
<td>4.17</td>
<td>0.76</td>
<td>0.824</td>
<td></td>
</tr>
<tr>
<td>SS2</td>
<td>How does your executive management team view supply management training?</td>
<td>3.96</td>
<td>0.82</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>SS3</td>
<td>When your business volume/profits decline impacts the decrease/increase in supply management training budget?</td>
<td>3.36</td>
<td>0.90</td>
<td>0.643</td>
<td></td>
</tr>
<tr>
<td>SS4</td>
<td>In your corporation, supply management is considered a career track.</td>
<td>3.81</td>
<td>0.75</td>
<td>0.635</td>
<td></td>
</tr>
<tr>
<td>SS5</td>
<td>In your corporation, supply management is considered a training ground for upper management.</td>
<td>3.80</td>
<td>0.79</td>
<td>0.564</td>
<td></td>
</tr>
<tr>
<td><strong>SI</strong></td>
<td><strong>Supplier Integration (Reliability = 0.7580)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI1</td>
<td>My firm experiences improved performance by integrating operations with supply chain partners</td>
<td>4.04</td>
<td>0.71</td>
<td>0.831</td>
<td></td>
</tr>
<tr>
<td>SI2</td>
<td>My firm places employees at a business facility of suppliers to facilitate coordination.</td>
<td>2.69</td>
<td>1.02</td>
<td>0.803</td>
<td></td>
</tr>
<tr>
<td>SI3</td>
<td>My firm shares technical resources with key suppliers to facilitate operations</td>
<td>3.33</td>
<td>1.05</td>
<td>0.741</td>
<td></td>
</tr>
<tr>
<td>SI4</td>
<td>My firm is committed to sharing responsibility with suppliers in new product development &amp; commercialization.</td>
<td>3.59</td>
<td>1.04</td>
<td>0.525</td>
<td></td>
</tr>
<tr>
<td><strong>SM</strong></td>
<td><strong>Supply Management Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM4.1</td>
<td>Market Share</td>
<td>3.89</td>
<td>0.83</td>
<td>0.912</td>
<td></td>
</tr>
<tr>
<td>SM4.2</td>
<td>Profitability</td>
<td>3.93</td>
<td>0.80</td>
<td>0.903</td>
<td></td>
</tr>
<tr>
<td>SM4.3</td>
<td>Return on Investment</td>
<td>3.84</td>
<td>0.69</td>
<td>0.813</td>
<td></td>
</tr>
<tr>
<td><strong>SM2</strong></td>
<td><strong>Productivity Indicators (Reliability =0.7678)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM4.4</td>
<td>Average Unit manufacturing cost</td>
<td>3.57</td>
<td>0.58</td>
<td>0.759</td>
<td></td>
</tr>
<tr>
<td>SM4.5</td>
<td>Material &amp; overhead total cost</td>
<td>3.44</td>
<td>0.61</td>
<td>0.732</td>
<td></td>
</tr>
<tr>
<td>SM4.6</td>
<td>Manufacturing lead time</td>
<td>3.67</td>
<td>0.72</td>
<td>0.720</td>
<td></td>
</tr>
<tr>
<td>SM4.7</td>
<td>Equipment changeover time</td>
<td>3.57</td>
<td>0.75</td>
<td>0.710</td>
<td></td>
</tr>
<tr>
<td>SM4.8</td>
<td>Procurement lead time</td>
<td>3.73</td>
<td>0.66</td>
<td>0.700</td>
<td></td>
</tr>
<tr>
<td>SM4.9</td>
<td>Delivery lead time</td>
<td>3.90</td>
<td>0.85</td>
<td>0.624</td>
<td></td>
</tr>
<tr>
<td>SM4.10</td>
<td>Inventory turnover</td>
<td>3.57</td>
<td>0.79</td>
<td>0.532</td>
<td></td>
</tr>
<tr>
<td>SM4.11</td>
<td>Worker/Direct labor productivity</td>
<td>3.71</td>
<td>0.68</td>
<td>0.516</td>
<td></td>
</tr>
</tbody>
</table>
Summary of Reliability Analysis (CONT)

<table>
<thead>
<tr>
<th>Code</th>
<th>Construct/item</th>
<th>Mean</th>
<th>SD</th>
<th>Factor Loading</th>
<th>Selected Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM3</td>
<td>Non-Productivity Indicators (Reliability = 0.7009)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM4.12</td>
<td>Conformance quality</td>
<td>4.20</td>
<td>0.60</td>
<td>0.774</td>
<td>✓</td>
</tr>
<tr>
<td>SM4.13</td>
<td>Speed of product development</td>
<td>3.97</td>
<td>0.64</td>
<td>0.764</td>
<td>✓</td>
</tr>
<tr>
<td>SM4.14</td>
<td>Number of new products developed</td>
<td>3.59</td>
<td>0.88</td>
<td>0.655</td>
<td>✓</td>
</tr>
<tr>
<td>SM4.15</td>
<td>On-time delivery</td>
<td>4.51</td>
<td>0.65</td>
<td>0.591</td>
<td>✓</td>
</tr>
<tr>
<td>SM4.16</td>
<td>Supplier quality</td>
<td>4.16</td>
<td>0.58</td>
<td>0.523</td>
<td>✓</td>
</tr>
</tbody>
</table>

If a factor loading index was less than 0.5, that question should be excluded from factor analysis to secure reliability (Kulya Wanichbancha, 2546; 1-19).

From table 5.4, factor loadings of all construct were above 0.50, thus none of them were deleted to secure the scale of reliability. Also, when the researcher calculated Cronbach Alpha tests for reliability, as shown in table 5.5, all indices revealed that the model was fit for all alpha above 0.70.

\[
\text{Cronbach, 1990: 204) }
\]

Consequently, we can conclude that all final results of all constructs and models were deemed reliability.

Table 5.5: CRONBACH ALPHA TEST

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK - Strategic Supply Management Skills</td>
<td>0.7190</td>
</tr>
<tr>
<td>SS - Supply Management Function Perceived Status</td>
<td>0.7082</td>
</tr>
<tr>
<td>SI - Supplier Integration</td>
<td>0.7580</td>
</tr>
<tr>
<td>SM - Supply Management Performance</td>
<td></td>
</tr>
<tr>
<td>SM1 - Marketing Indicators</td>
<td>0.8439</td>
</tr>
<tr>
<td>SM2 - Productivity Indicators</td>
<td>0.7678</td>
</tr>
<tr>
<td>SM3 - Others</td>
<td>0.7009</td>
</tr>
</tbody>
</table>
5.4 Analysis of Measurement model (Confirmatory Factor Analysis—CFA)

**Figure 5.1: CFA Model**

**Table 5.6: Summary of Factor Analysis**

<table>
<thead>
<tr>
<th>Index</th>
<th>Standard Criteria</th>
<th>Statistical Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>p-value &gt; 0.05</td>
<td>0.120</td>
</tr>
<tr>
<td>GFI</td>
<td>≥ 0.90</td>
<td>0.961</td>
</tr>
<tr>
<td>AGFI</td>
<td>≥ 0.90</td>
<td>0.914</td>
</tr>
<tr>
<td>NFI</td>
<td>≥ 0.90</td>
<td>0.921</td>
</tr>
<tr>
<td>IFI</td>
<td>≥ 0.90</td>
<td>0.943</td>
</tr>
<tr>
<td>CFI</td>
<td>≥ 0.90</td>
<td>0.936</td>
</tr>
<tr>
<td>CMIN/DF</td>
<td>Close to 1</td>
<td>1.648</td>
</tr>
<tr>
<td>RMR</td>
<td>≤ 0.05</td>
<td>0.037</td>
</tr>
<tr>
<td>RMSEA</td>
<td>≤ 0.05</td>
<td>0.046</td>
</tr>
</tbody>
</table>
From reviewing the model fit indices in table 5.6, a good fit is apparent regarding all indices; Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normal Fit Index (NFI), Incremental Fit Index (IFI) and Comparative Fit Index (CFI) were all above the standard criteria of greater than 0.90 (Arbuckle, 1995, p.529), and Chi-Square was less than 0.05 (Bollen, 1989, p.263). Root Man Square Residual (RMR) and Root Man Square of Error Approximation (RMSEA) were all less than 0.05 (Brown & Cudeek, 1993, p.141-162), suggesting excellent model fit. The Chi-Square statistic comparing the tested model and the independent model with the saturated model (CMIN/DF) for the overall model was close to 1, suggesting the model fit the sample data as well.

Consequently, to ensure the fitness of model, the research further conducted the analysis SEM to identify and ensure a good result.

5.4 Analysis of Structural Equation Model and Hypotheses

The structural equation model was analyzed based on the research constructs in table 5.3; Maximum Likelihood Estimation (MLE) was used to fit the structural model presented in Figure 5.2:

![Figure 5.2: A MODEL OF SKILLS-PERCEIVED STATUS-INTEGRATION-PERFORMANCE](image-url)
The estimations were computed using AMOS 6.0. The structural proposed model of strategic supply management skills, supply management function perceived status, supplier integration and performance is presented in Figure 5.3 along with the parameters estimates and fit statistics.

![Diagram of the structural model](image)

Chi-square = 3.296, df=2, p-value = 0.120, CMIN/DF = 1.648, GFI = 0.961, RMSEA = 0.046

**Figure 5.3: A MODEL OF SKILLS-PERCEIVED STATUS-INTEGRATION-PERFORMANCE RATIO AND PROBABILITY**

**Table 5.7:**
Summary of Regression Weights, T-Statistic, Standardized Regression Weights and Squared Multiple Correlations (R²)

**Regression Weights: (Group number 1 - Default model)**

<table>
<thead>
<tr>
<th>Label</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5 &lt;--- sk1.7</td>
<td>.683</td>
<td>.126</td>
<td>5.411</td>
<td>***</td>
</tr>
<tr>
<td>si1.4 &lt;--- sk1.7</td>
<td>.588</td>
<td>.213</td>
<td>2.762</td>
<td>.006</td>
</tr>
<tr>
<td>si1.4 &lt;--- ss1.5</td>
<td>-.005</td>
<td>.170</td>
<td>.027</td>
<td>.979</td>
</tr>
<tr>
<td>sm1.16 &lt;--- sk1.7</td>
<td>.171</td>
<td>.117</td>
<td>2.469</td>
<td>.042</td>
</tr>
<tr>
<td>sm1.16 &lt;--- ss1.5</td>
<td>.077</td>
<td>.089</td>
<td>.873</td>
<td>.383</td>
</tr>
<tr>
<td>sm1.16 &lt;--- si1.4</td>
<td>.173</td>
<td>.063</td>
<td>2.765</td>
<td>.006</td>
</tr>
</tbody>
</table>
Standardized Regression Weights: (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5 &lt;-- sk1.7</td>
<td>.546</td>
</tr>
<tr>
<td>si1.4 &lt;-- sk1.7</td>
<td>.369</td>
</tr>
<tr>
<td>si1.4 &lt;-- ss1.5</td>
<td>-.004</td>
</tr>
<tr>
<td>sm1.16 &lt;-- sk1.7</td>
<td>.195</td>
</tr>
<tr>
<td>sm1.16 &lt;-- ss1.5</td>
<td>.110</td>
</tr>
<tr>
<td>sm1.16 &lt;-- si1.4</td>
<td>.314</td>
</tr>
</tbody>
</table>

Squared Multiple Correlations: (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5</td>
<td>.298</td>
</tr>
<tr>
<td>si1.4</td>
<td>.135</td>
</tr>
<tr>
<td>sm1.16</td>
<td>.231</td>
</tr>
</tbody>
</table>

Note: C.R (T-Statistic) > 1.96 is considered significant

The test of the structural model included estimating the path coefficient, which interpreted as standardized beta weights in a regression analysis, and $R^2$, which is used to assess the proportion of variance in the endogenous constructs that can be accounted for by the exogenous constructs.

Table 5.8:
Summary of Standardized Direct Effects, Indirect Effects and Total Effects Estimation

Standardized Total Effects (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>sk1.7</th>
<th>ss1.5</th>
<th>si1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5</td>
<td>.546</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>si1.4</td>
<td>.367</td>
<td>-.004</td>
<td>.000</td>
</tr>
<tr>
<td>sm1.16</td>
<td>.370</td>
<td>.109</td>
<td>.314</td>
</tr>
</tbody>
</table>
Standardized Direct Effects (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>sk1.7</th>
<th>ss1.5</th>
<th>si1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5</td>
<td>.546</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>si1.4</td>
<td>.369</td>
<td>-.004</td>
<td>.000</td>
</tr>
<tr>
<td>sm1.16</td>
<td>.195</td>
<td>.110</td>
<td>.314</td>
</tr>
</tbody>
</table>

Standardized Indirect Effects (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>sk1.7</th>
<th>ss1.5</th>
<th>si1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss1.5</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>si1.4</td>
<td>-.002</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>sm1.16</td>
<td>.175</td>
<td>-.001</td>
<td>.000</td>
</tr>
</tbody>
</table>

From table 5.8 we conclude a standardized direct effect of Supply Management Performance in a Structural Equation Model as shown:

SS1.5 = 0.546 SK1.7 ; R² = 0.298 (29.8%)
SI1.4 = 0.369 SK1.7 -0.004 SS1.5 ; R² = 0.135 (13.5%)
SM1.6 = 0.195 SK1.7 + 0.110 SS1.5 +0.314 SI1.4 ; R² = 0.231 (23.1%)

Meanwhile, the equation summarized above indicated the path analysis relationship among Strategic Supply Management Skills, Supply Management Function Perceived Status, and Supplier Integration effect on Supply Management Performance. Table 5.8 summarizes the details of the path analysis of the structural model. For every path, a beta coefficient is calculated. This coefficient’s sign indicates the direction of the relationship (positive or negative) and its magnitude represents the strength of the interrelationship between the variables. The path coefficients identify direct and indirect effects of each variable on the respective dependent variables. The total effect is simply the sum of the direct effect and all the indirect effects that occur through intervening variables. The path coefficient of an exogenous construct represents the direct effect of that variable on the endogenous variable. An indirect effect represents the effect of a particular variable on the second variable through its effects on a third mediating variable. It is the product of the path coefficients along an indirect route from cause to effect via tracing arrows in the headed direction only. When more than one indirect path
exists, the total indirect effect is their sum. The sum of direct and indirect effects reflects the total effects of the variable on the endogenous variable (Alwin and Hauser, 1975; Ross 1975; Igbaria et al., 1997).

All of the estimated direct effects were statistically significant, except the direct effect of supply management perceived status to supplier integration, and all were of practical importance (i.e., all were larger than 0.1). Beginning with supply management performance, the outcome of ultimate interest, the determinant with the largest total causal effect (0.370) was strategic supply management skills, with most of the total effect due to both the indirect effect (0.175), and direct effect (0.195) between strategic supply management skills and supply management performance. What this points to; is that strategic supply management skills have both a strong total causal effect and direct effect on supply management performance. This is an interesting finding and calls for additional research. The next most important determinant of supply management performance was the total effect of supplier integration (0.314) that was entirely a direct effect, followed by supply management function perceived status with a total effect of (0.109), which was also entirely from direct effect. These determinants accounted for approximately 23.1% of the variance of supply management performance.

The only determinant of supplier integration is strategic supply management skills with a total effect of (0.367) comprised primarily of the direct effect (0.369). These determinants accounted for approximately 13.5% of the variance of supplier integration.

Finally, the determinant of supply management perceived status was strategic supply management skills with a total effect of (0.546), which was entirely a direct effect. These determinants accounted for approximately 29.8% of the variance of supply management perceived status.

5.5 Hypothesis Testing
To test the hypothesized relationship between supply chain strategic supply management skills, supply management perceived status, supplier integration and performance; the researcher used the estimates of the path coefficients, i.e. C.R and P value that showed in Figure 5.6.
H1. Higher levels of strategic supply management skills have a significant positive impact on the supply management performance.
The structural model expressed the relationship between strategic supply management skills (SK) and performance (SM); (P < 0.05) that the value of Critical Ratio (C.R) was at 0.195. It implies that if Strategic Management Skills is high, Supply Management Performance is also consistently high, suggesting acceptance of this hypothesis as true.

H2: Higher levels of supplier integration have a significant positive impact on supply management performance.
The structural model expressed the relationship between supplier integration (SI) and performance (SM); (P < 0.05) that the value of Critical Ratio (C.R) was at 0.314. It implies that if Supplier Integration is high, Supply Management Performance is also consistently high; suggesting acceptance of this hypothesis as true.

H3: Higher levels of strategic supply management skills have a significant positive impact on supplier integration.
The structural model expressed the relationship between strategic supply management skills (SK) and Supplier Integration (SI); (P < 0.05) that the value of Critical Ratio (C.R) was at 0.369. It implies that if Strategic Management Skills is high, Supplier Integration is also consistently high, suggesting accepted this hypothesis was true.

H4. Supply management perceived status has a significant positive impact on supplier integration.
The structural model expressed the relationship between supply management perceived status (SS) and supplier integration (SI); (P > 0.05) that the value of Critical Ratio (C.R) was at - 0.004. It implies that if Supply Management Perceived Status changed, there would be no impact to Supplier Integration, suggesting a rejection of this hypothesis.

H5. Higher levels of strategic supply management skills have a significant positive impact on perceived supply management perceived status
The structural model expressed the relationship between strategic supply management skills (SK) and supply management perceived status (SS); (P < 0.05) that the value of Critical Ratio (C.R) was at 0.546. It implies that if a strategic management skill is high,
supply management perceived status is also consistently high; suggesting acceptance of this hypothesis as true.

H6. Higher levels of Supply management perceived status have a significant positive impact on supply management performance

The structural model expressed the relationship between supply management perceived status (SS) and performance (SM); (P ≥ 0.05) that the value of Critical Ratio (C.R) was at 0.110. It implies that if supply management perceived status changed, there would be no impact to performance, suggesting rejection of this hypothesis.
Chapter 6
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

The researcher concludes the results from the data analysis in the previous chapter. Support was found for the relationship between supplier integration and supply management performance; strategic supply management skills and supplier integration; supply management function perceived status and supplier integration; and strategic supply management skills having a significant indirect effect on supply management performance. In this chapter, the significance of these results for the summary of findings, managerial implication and research limitations will be discussed. A direction for future research will also presented.

6.1 Summary of Findings
The research provides useful implications for both academics and practitioners. The aim of the research is to provide analysis and empirical support for the Thai context on supply management performance antecedents such as strategic supply management skills, supplier integration, and the supply management function's perceived status. The study serves to fill a gap in the supply management literature with respect to supply management performance antecedents such as strategic supply management skills, levels of supplier integration, and the supply management function's perceived status. In addition, the research is design to explore of key antecedents of supply management performance and its relative should lead to elevate the bottom line performance of the firm.

Previous research examined the role of strategic sourcing and its contribution to the firm’s value growth (e.g., Anderson and Katz 1998; Guinipero and Pearcy 2002). Findings indicate that strategic sourcing could be taken to new levels and be applied to business to sharps corporate revenue realization as well as competitive cost position. This research extended a scope of research studies for the skills required for achieving success in supply management to cover the consideration regarding contributions of each skill set category to supply management performance. This study extends previous work and provides a linkage between specific skills (strategic supply management skills) and supply management performance through a qualitative analysis aiming at developing a model of supply management performance.
The findings of this study are consistent with previous literature. In summary, the study has found the results of the relationship among strategic supply management skills, supply management functions perceived status, supplier integration and supply management performance are shown in table 6.1.

Table 6.1
Summary of Hypotheses result

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1. Higher levels of strategic supply management skills have a significant positive impact on the supply management performance.</td>
<td>✓</td>
</tr>
<tr>
<td>H2: Higher levels of supplier integration have a significant positive impact on supply management performance.</td>
<td>✓</td>
</tr>
<tr>
<td>H3: Higher levels of strategic supply management skills have a significant positive impact on supplier integration.</td>
<td>✓</td>
</tr>
<tr>
<td>H4. Supply management perceived status has a significant positive impact on supplier integration.</td>
<td>✓</td>
</tr>
<tr>
<td>H5. Higher levels of strategic supply management skills have a significant positive impact on supply management perceived status,</td>
<td>✓</td>
</tr>
<tr>
<td>H6. Higher levels of Supply management perceived status have a significant positive impact on supply management performance</td>
<td>✓</td>
</tr>
</tbody>
</table>
(1) Strategic supply management skills have a significant positive effect on the supply management performance measures. Also, this effect is achieved indirectly through supply management function perceived status and supplier integration. The results revealed that strategic supply management skills' impact is positive overall (i.e., positive total effect). However, only strategic supply management skills had an indirect effect on supply management performance, and had not so if it was through a mediated path such as supplier integration and supply management functions perceived status (i.e., negative indirect effect). These results can be interpreted by arguing that a supply management staff with the necessary strategic skill set does necessarily translate to a better performance result both directly and indirectly.

(2) Strategic supply management skills had a significant positive impact on supply management functions perceived status. This finding supports the notion that a strategic supply management function, in contrast to a non-strategic supply management function, is viewed by top management as an important resource of the firm. When the supply management function is viewed by top management to possess strategic skills, it gets treated as an equal to other major functions in the firm and, in turn, its perceived status is more likely to be elevated. It should be noted here that other antecedents could influence supply management perceived status as well, such as managerial philosophy and top management support to functional strategies.

(3) According to Table 5.7, 'strategic supply management skills' has the highest total positive effect on supply management performance (Total effect = 0.370), when compared to the total effect of supply management perceived status (Total effect = 0.109) and the total effect of supplier integration (Total effect = 0.314) on supply management performance, as well as, strategic supply management skills having a positive indirect effect to supply management performance (Indirect effect = 0.175). This result indicates that hiring the supply management staff with the necessary strategic skill sets is the most influential antecedent in this study's theoretical model on supply management performance. In rationalizing their budgets, top management teams should assign greater priorities to staffing the supply management function. Hence, the human assets
proved in this model to be the most valuable resource in the supply management function. In conclusion, hiring the staff with strategic supply management skills can be more critical in its impact on supply performance than assigning that staff greater status and budgets.

(4) Table 6.2 summarizes the findings of this study with regards to the variables used to measure strategic supply management skills. On average, when the respondent were asked to rate the importance of the skills they require of the supply management personnel in their function, they rated analytical, planning, structuring supplier relationships, and understanding general business conditions as most important. Analytical skills are required in order for supply management staff to be able to interpret and analyze supplier markets and supplier proposals.

Table 6.2: STRATEGIC SUPPLY MANAGEMENT SKILLS ITEM AVERAGE

<table>
<thead>
<tr>
<th>SK - Strategic Supply Management Skills (Reliability = 0.7190)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK1 Analytical</td>
<td>4.23</td>
<td>0.78</td>
</tr>
<tr>
<td>SK2 Understanding general business conditions</td>
<td>4.10</td>
<td>0.68</td>
</tr>
<tr>
<td>SK3 Planning</td>
<td>4.16</td>
<td>0.75</td>
</tr>
<tr>
<td>SK4 Strategic thinking</td>
<td>3.96</td>
<td>0.84</td>
</tr>
<tr>
<td>SK5 Structuring supplier relationships</td>
<td>4.11</td>
<td>0.75</td>
</tr>
<tr>
<td>SK6 Managing the supply base</td>
<td>3.86</td>
<td>0.60</td>
</tr>
<tr>
<td>SK7 Project Management</td>
<td>3.79</td>
<td>0.70</td>
</tr>
</tbody>
</table>

(5) Table 6.3 summarizes the findings with regard to the various aspects of supplier integration. In this research, those firm experiencing improved performance by integrating operations with supply chain partners had the highest average means when the respondents were asked to rate the supplier integration activities. These findings are consistent with previous literature and reflect that today companies are seeking for supply chain partners to improve supply chain performance through well integrated decisions and operations with the firms' suppliers.
Table 6.3: SUPPLIER INTEGRATION ITEM AVERAGE

Scale: "1" = Strongly disagree; "3" = Neutral; "5" = Strongly agree

<table>
<thead>
<tr>
<th>SI - Supplier Integration (Reliability = 0.7580)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI1 My firm experiences improved performance by integrating operations with supply chain partners</td>
<td>4.04</td>
<td>0.71</td>
</tr>
<tr>
<td>SI2 My firm places employees at a business facility of suppliers to facilitate coordination.</td>
<td>2.69</td>
<td>1.02</td>
</tr>
<tr>
<td>SI3 My firm shares technical resources with key suppliers to facilitate operations</td>
<td>3.33</td>
<td>1.05</td>
</tr>
<tr>
<td>SI4 My firm is committed to sharing responsibility with suppliers in new product development &amp; commercialization.</td>
<td>3.59</td>
<td>1.04</td>
</tr>
</tbody>
</table>

6.2 Managerial Implications

The findings of this research will have several implications and meanings for managers in the global market, especially regarding human assets management. This study elaborates on the effects of the relationship between strategic supply management skills and perceived status, with supplier integration as a mediator of supply management performance. Practitioners, especially in the Thai Automobile Industry, may utilize this knowledge as a guide to designing necessary strategic supply management skills training to supply management staff, and enhancing supplier integration among strategic supply chain partner for the best influence on the firm’s performance. Further, it also provides some justification for assisting supply management professionals in the Automotive Industry to rationalize their investments in various inter-and intra-departmental decisions such as developing the appropriate types of supplier relationships and recruiting, assessing, and selecting the right skills in the supply management function, as well as being a guide for managers to determine how much to invest in developing the supply knowledge bases to further enhance performance especially relating to training budget for analytical, planning, understanding general business condition and structuring suppliers relationship skills. Also, supplier integration is important and directly relates to supply management performance, as well as supply management staff possessing strategic skills in coordinating and integrating supply management with suppliers in order to have greater effect on the level of the firm’s supply management performance.

6.3 Limitations and Directions for Future Research

The research described in this manuscript is an attempt at developing the current theory in a specific industry and context. The limitations encountered during the conducting of this research were limited time constraints as well as limited availability of data sources,
and thus the sample population drawn for this research cannot cover all firms in the automobile industry. Besides, generalizability may be restricted, in that other industries have different environment contexts, as the sample for this study was drawn from only one industry. Most theories of supply management skills, function perceived status, integration, resource-based theory, and performance in the research context were collected from the previous study in Europe and North America. Consequently, variations might exist in the way of practice in the Thai context. As related supply management research in Thailand is limited, this may have led to a lack of understanding and cooperation in data collection.

It is essential for future research to address the meaning of "strategic supply management" as it goes beyond calling an order and negotiating on price. Additional measures of strategic management skills, supply management performance, supplier integration, and supply management perceived status should be developed, which would lead to better explanations of supply management performance. Also, scales for the constructs used in this study exist but they generally are not used in conjunction with one another. The present study has pursued these constructs simultaneously, but there is room for further development in that direction and beyond.
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http://research.kgi.com
http://www.fortune.com/fortune/alllists
Appendix
Appendix A: Survey Instrument


Date:

Dear Supply Chain Manager,

This questionnaire is a part of a research study currently being carried out by a Masters of Science in Supply Chain Management candidate in the faculty of Risk Management from the Graduate School of Business at Assumption Business Administration College (ABAC). This research attempts to understand the relationship between strategic supply management, supply management perceived status through supplier integration in pursue of improvement in supply management performance.

You are one of a number of supply chain members (Customer, Manufacturer, or Supplier) firms that have been selected to participate. Your participation will provide valuable information concerning: (1) General information about your firm, (2) The factors that are related to your supply chain specific factors and firm's operational performance. The survey is anonymous, so nothing you answer in the course of the survey could reveal anything about your company specifically. The questionnaire takes approximately 15-20 minutes to complete, and a prepaid, preaddressed envelop has been enclosed for your convenience. Please be assured that all the responses are anonymous and will remain strictly confidential.

Your participation and valuable contribution to this research is greatly appreciated. Please answer all the questions fully and sent it back. If you are the owner or the chief executive officer, please answer the questionnaire yourself, if not, please give it to the owner or chief executive to complete it.

Thank you for your valuable contribution to this research.

Sincerely,

Asst. Professor Dr. Mohammad Asif Salam
Program Director, SCM
School of Management, AU

Sincerely,

Pornnapa Makapunyo
MSc. SCM Candidate
School of Management, AU

Mobile Phone (089)033-2407, E-mail:pm7725@yahoo.com
Part I

General Instructions:

This survey is intended to capture the characteristics of a number of common supply chain measures. You will be asked to evaluate each measure for its usefulness in providing certain types of information. When answering these questions please consider the measure’s ability to provide the listed type of information.

The way a measure is presently being used in the supply chain operation of your company should have no bearing on how the measures could perform. We are interested in the measure’s inherent usefulness, not its current success within your company. Please base your responses on your overall familiarity with the measure itself, not the current success or failure of the measure to perform within your current company. We are trying to understand how the measure should be used, rather than how you might be presently using them. The next section describes the Ten criteria you will be asked to rate for each measure.

Definition of Terms:

The definitions of the terms that will be used in this questionnaire are summarized below for your guidance and usefulness.

**Strategic Supply Management Skills**: Strategic Supply Management Skills is defined as the process of planning, evaluating, implementing, and controlling highly important and routine sourcing decisions.

**Supply Management Function Perceived Status**: Supply management function perceived status refers to the esteem in which the department is held by other.

**Supplier Integration**: The capability of the firm that deploys shared operational activities with its main supplier(s).

**Supply Management Performance**: Operational performance is the accrued benefits to the firm that reflect operational tangible and intangible costs resulted from firm’s operations decisions. Operational performance can be measured as market indicators, productivity indicators and non-productivity indicators.

Please evaluate each measure along the four (4) different criteria.

Thank you very much for your participation.
Part II

QUESTIONNAIRE

1) Strategic Supply Management Skills (SK1-7): Please rate the importance of the skills you require of your supply management personnel.

<table>
<thead>
<tr>
<th>Not Important</th>
<th>Important</th>
<th>Average</th>
<th>Very Important</th>
<th>Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. Analytical 1 2 3 4 5
2. Understanding general business conditions 1 2 3 4 5
3. Planning 1 2 3 4 5
4. Strategic thinking 1 2 3 4 5
5. Structuring supplier relationships 1 2 3 4 5
6. Managing the supply base 1 2 3 4 5
7. Project Management 1 2 3 4 5

2) Supply Management Function Perceived Status (SS1-5): Within your company

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Slightly Disagree</th>
<th>Average</th>
<th>Slightly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Supply Management Function Perceived Status:
Please indicate the extensity of how Supply Management Function or relating section importance status to an overall organization.

1. What is the perceived status of the supply management function in your organization? 1 2 3 4 5
2. How does your executive management team view supply management training? 1 2 3 4 5
3. When your business volume/profits decline impacts the decrease/increase in supply management training budget? 1 2 3 4 5
4. In your corporation supply management is considered a career track: 1 2 3 4 5
5. In your corporation supply management is considered a training ground for upper management: 1 2 3 4 5
3) **Supplier Integration (SI 1 – 4):** For your Firm’s Primary Supplier please indicate and respond your level of agreement with each of the following Statements.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Slightly Disagree</th>
<th>Average</th>
<th>Slightly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Supplier Integration:**
Please indicate the extensity of the following components of Supplier Integration with your most important supplier.

1. My Firm Experiences Improved Performance By Integrating Operations with Supply Chain Partners.  
   | 1 | 2 | 3 | 4 | 5 |

2. My Firm places employees at a business facility of suppliers to facilitate coordination.  
   | 1 | 2 | 3 | 4 | 5 |

3. My firm shares technical resources with key suppliers to facilitate operations.  
   | 1 | 2 | 3 | 4 | 5 |

4. My firm is committed to sharing responsibility with suppliers in new product development & commercialization.  
   | 1 | 2 | 3 | 4 | 5 |

4) **Supply Management (SM1-19):** For the primary Product (s) or Product Line (s) you have chosen, please indicate:

What is Your Firm’s Supply Management Performance relative to your immediate Competitor in the following areas?

<table>
<thead>
<tr>
<th>Very Low Performance</th>
<th>Low Performance</th>
<th>Average</th>
<th>High Performance</th>
<th>Very High Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Market Indicators:**

1. Market Share.  
   | 1 | 2 | 3 | 4 | 5 |

2. Profitability.  
   | 1 | 2 | 3 | 4 | 5 |

3. Return on Investment.  
   | 1 | 2 | 3 | 4 | 5 |

**Productivity Indicators:**

   | 1 | 2 | 3 | 4 | 5 |

5. Materials & Overhead Total Cost.  
   | 1 | 2 | 3 | 4 | 5 |

   | 1 | 2 | 3 | 4 | 5 |

   | 1 | 2 | 3 | 4 | 5 |

8. Procurement Lead Time  
<p>| 1 | 2 | 3 | 4 | 5 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Delivery Lead Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Inventory Turnover (Sales/Inventory)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Worker / Direct Labor Productivity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Non-Productivity Indicators:**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Conformance Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Speed of Product Development</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>Number of new products developed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>On-Time Delivery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>Supplier Quality</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Part III

Demographic Information:

1) What is Your Company’s Primary Function?

☐ Auto Manufacturer  ☐ Auto Parts Supplier  ☐ Assembler

2) What is Your Company Size (Employees)?

☐ 200 or less Employees  ☐ 201 – 500 Employees
☐ 501 – 2,500 Employees  ☐ 2,500 – 10,000 Employees

3) Age of Business?

☐ Less than 5 Years  ☐ 5 – 15 Years
☐ 16 – 35 Years  ☐ 36 – 70 Years
☐ Over 70 Years

4) What Type of Ownership does Your Company have?

☐ Pure Thai  ☐ Thai Majority Joint Venture
☐ Foreign Majority joint venture  ☐ Pure Foreigner

Personal Information:

5) Gender  :

☐ Male  ☑ Female

6) Level of Education:

☐ High School  ☐ Master Degree
☐ Bachelor Degree  ☐ Doctoral Degree

7) Minimum education level required for professionals to be hired in your function.

☐ High School  ☐ Master Degree
☐ Bachelor Degree  ☐ Doctoral Degree
8) How many years have you worked for this company?

☐ 1 – 3 Years  ☐ 4 – 6 Years  ☐ 7 – 15 Years
☐ 16 – 25 Years ☐ Over 25 years

9) Kindly State Your Current Department in the Company.

☐ Purchasing  ☐ Manufacturing  ☐ Logistics
☐ Engineering  ☐ Marketing  ☐ IT

10) How many years have you worked in the present position?

☐ 1 – 3 Years  ☐ 4 – 6 Years  ☐ 7 – 15 Years
☐ 16 – 25 Years ☐ Over 25 years

11) Please state the duration of your logistical experience.

☐ 1 – 3 Years  ☐ 4 – 6 Years  ☐ 7 – 15 Years
☐ 16 – 25 Years ☐ Over 25 years ☐ No Experience

==================================================================

**Thank you for your participation**
APPENDIX B: SURVEY INSTRUMENT (THAI)

การวิเคราะห์ความสัมพันธ์ระหว่าง ทักษะการบริหารจัดการอุปทาน สถานภาพของแผนการบริหารจัดการอุปทาน และประสิทธิภาพของการบริหารจัดการอุปทาน
กรณีศึกษา: อุตสาหกรรมรถยนต์ในประเทศไทย

วันที่
เรียน ผู้จัดการบริษัทฯ

แบบสอบถามนี้ เป็นส่วนหนึ่งของงานวิจัยของนักศึกษาปริญญาโท แผนการบริหารจัดการห่วงโซ่อุปทาน มหาวิทยาลัยอัสสัมชัญ (ABAC) โดยงานวิจัยนี้ได้นำเกี่ยวกับการดำเนินงาน และปัจจัยที่มีผลกระทบต่อการดำเนินงานของบริษัทรถยนต์

คุณเป็นบริษัทหนึ่งที่ได้รับเลือกให้มีส่วนร่วมต่องานวิจัยนี้ ในฐานะของ (ลูกค้า, ผู้ผลิต, ผู้จัดหา) จึงใคร่ขอความร่วมมือในการตอบแบบสอบถามนี้ เกี่ยวกับ

1. ข้อมูลทั่วไปของบริษัทร้อยต์
2. ปัจจัยที่ส่งผลกระทบต่อการดำเนินงานของบริษัท

คำตอบของคุณจะไม่แสดงชื่อผู้ตอบและจะถูกกักกันเป็นความลับเฉพาะ แบบสอบถามนี้จะใช้เวลาประมาณ 15 - 20 นาที และกรุณาล็อกกลับค้น ตามที่อยู่ที่จ้างหน้าของไว้ ซึ่งได้ช่วยระดับการแผลมีเรียบร้อยแล้ว เพื่อความสะดวกของคุณ โปรดทางใจว่า คำตอบทั้งหมดจะถูกเก็บรักษาเป็นความลับอย่างเข้มงวด

ความร่วมมือของคุณในการตอบแบบสอบถาม ในการวิจัยนี้ จะเป็นทรัพยากรอย่างยิ่ง โปรดตอบคำถามทั้งหมด และส่งกลับเร็ว

- ถ้าคุณเป็นเจ้าของกิจการ หรือ ผู้จัดการงาน โปรดตอบแบบสอบถามด้วยตนเอง
- ถ้าไม่ใช่เจ้าของกิจการ โปรดสอบถามให้เจ้าของกิจการหรือผู้จัดการงานเป็นผู้ตอบแบบสอบถาม

ผลที่ได้รับจากงานวิจัย จะเป็นประโยชน์อย่างยิ่งต่อการศึกษาวิชาการบริหารจัดการห่วงโซ่อุปทานของคุณสำหรับการมีส่วนร่วมที่มีค่าต่องานวิจัยนี้

ตัวความนับถือ

นางสาวพรภรณ์ เมทะปุญญา
นักศึกษาปริญญาโท

โทรศัพท์: (089)033-2407, E-mail: pm7725@yahoo.com
บทที่ 1

แบบสำรวจนี้เน้นถึงการเข้าใจคุณสมบัติของผู้รับสารในการบริหารจัดการอุปทาน (Supply Management) โดยทั้งๆ ไป ที่จะทำาและต่ำ∨รวมในต่อมาจะวัดเพื่อจัดการเป็นประโยชน์ได้จากข้อมูลในแต่ละวันที่ได้เตรียมไว้ให้ ขณะตอบคำถามนี้โปรดพิจารณาข้อบทบาทของผู้รับสารในแต่ละประเภทที่ได้จัดเตรียมไว้ให้

มีการที่ได้เบ่งให้ในบริบทของทานนี้ มีได้มีไว้เพื่อบำรุงรักษาและผู้มีผู้บังคับ เรากูเรื่องสนิธัตโจที่ประโยชน์จากผู้รับสารใดนี้เลย ไปแล้วเพื่อความสุขใจของผู้ในบริบทของ โปรดทำาแบบสำรวจนี้บันทึกผล ของความเข้าใจในแบบทดสอบต่าง ๆ รายชื่อ ไม่ให้เพื่อความสุจริตหรือผลประโยชน์ที่มีผลต่ออิทธิพลของทานเอง เรา กำไรที่จะตอบให้เองการนำเศรษฐกิจเหล่ามันใช้เป็นข้อมูลที่เป็นประโยชน์มากกว่าที่จะนำมาใช้ในตอนนี้ ในหมาย ต่อไปจะถือเป็นธุรกิจ บรรทัดฐานที่ 4 อย่างที่ทานจะได้รับการแสดงให้เป็นประโยชน์ในแต่ละประเภทของผู้รับสาร

คำนิยาม

ทักษะการบริหารจัดการอุปทาน (Strategic Supply Management Skills): ทักษะการบริหารจัดการอุปทาน อธิบายถึงผลการปฏิบัติงานและความสามารถของพนักงาน ที่มีส่วนเกี่ยวข้องกับการบริหารจัดการอุปทาน ที่นำไปสู่ การเพิ่มประสิทธิภาพและลดความสูญเสียให้กับองค์กรในระยะยาว อาทิ การรักษาสภาพแวดล้อมที่ดีหรือ ทรัพยากร การจัดการสินค้าคงคลัง และการบริหารจัดการอุปทาน

สถานภาพของแผนการบริหารจัดการอุปทาน (Supply Management Function Perceived Status): สภาพ สถานภาพแผนการบริหารจัดการอุปทาน กล่าวถึง สถานภาพหรือระดับความสัมพันธ์ของแผนการบริหารจัดการ อุปทาน หรือแผนที่มีส่วนเกี่ยวข้อง ต่อองค์กร

ความสามารถในการประสานงานระหว่างองค์กร (Supplier Integration): ความสามารถในการประสานงานได้ นำมาใช้ให้เข้าใจถึงหลักความคิดกล่าวว่าเป็นต่อชะลูมบริบทอิทธิพลหลาย อาทิ กลุ่มผู้ผลิตวัสดุติด้วย กลุ่ม ผู้ผลิต กลุ่มผู้กระทำสินค้า ผู้ให้บริการและวัสดุติด้วยและกลุ่มผู้บริโภค เพื่อที่จะปรับปรุงความเป็นไปของแผนงานด้านโลจิ สติกส์ เพื่อที่จะทำาผู้ตัดการออกแบบเปลี่ยนแปลงในบริบททางการตลาด

ผลการดำเนินงานส่วนการบริหารจัดการอุปทาน (Supply Management Performance): ผลการดำเนินงาน ส่วนการบริหารจัดการอุปทาน กล่าวถึง ผลการปฏิบัติงาน หรือผลการดำเนินงาน หรือประสิทธิผลของการบริหาร จัดการ อุปทาน ขององค์กร

โปรดประเมินในแต่ละสวนของบรรทัดฐานที่ 4 อย่างนี้โดยละเอียด

ขอบข่ายปัจจัยส่วนภูมิศาสตร์ของทานมาก ณ โอกาสนี้
ส่วนที่ 2: แบบสอบถาม

1) ทักษะการบริหารจัดการลูกบาท (SK1-7)
หากพิจารณาภายในองค์กรของท่าน สำหรับพนักงานในแผนกการบริหารจัดการลูกบาท (Supply Management Function) ทุกระดับความสัมพันธ์ของทักษะ ในหัวข้อต่อไปนี้

<table>
<thead>
<tr>
<th>ลำดับ</th>
<th>ทักษะ</th>
<th>ค่าสัมประสิทธิ์</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ทักษะเชิงวิเคราะห์</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2</td>
<td>ความเข้าใจเกี่ยวกับสภาพของธุรกิจโดยทั่วไป</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3</td>
<td>ทักษะการวางแผนพิจารณาจัดการ</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4</td>
<td>ทักษะการคิดเชิงสรุปและวางแผนกลยุทธ์</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5</td>
<td>โครงสร้างความสัมพันธ์ระหว่างผู้ค้า</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6</td>
<td>การบริหารจัดการด้านการจัดหารพื้นฐาน</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7</td>
<td>ทักษะการบริหารจัดการโครงการ</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

2) สถานภาพของแผนกการบริหารจัดการลูกบาท (SS1-5):
หากพิจารณาในองค์กรของท่าน ท่านมีความคิดเห็นอย่างไรต่อคำนำดังต่อไปนี้

<table>
<thead>
<tr>
<th>ลำดับ</th>
<th>ไม่เห็นด้วย</th>
<th>ให้เห็นด้วย</th>
<th>ปานกลาง</th>
<th>เห็นด้วย</th>
<th>เห็นด้วยอย่างยิ่ง</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

สถานภาพของแผนกการบริหารจัดการลูกบาท
กรุณาระบุระดับความสัมพันธ์ เกี่ยวกับสถานภาพของแผนกการบริหารจัดการลูกบาท ภายในองค์กรของท่าน

<table>
<thead>
<tr>
<th>ลำดับ</th>
<th>แนวโน้มประเทศ</th>
<th>แนวโน้มการการมีความรู้เกี่ยวกับการบริหารจัดการลูกบาท (Supply Management) ขับเคลื่อนไป/ขาดทุนหรือการขึ้น/ลง ของธุรกิจ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 2 3 4 5</td>
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</table>

<table>
<thead>
<tr>
<th>ลำดับ</th>
<th>แนวโน้มประเทศ</th>
<th>แนวโน้มการการมีความรู้เกี่ยวกับการบริหารจัดการลูกบาท (Supply Management) ขับเคลื่อนไป/ขาดทุนหรือการขึ้น/ลง ของธุรกิจ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
3) ความสามารถในการประสานงานระหว่างองค์กร (SI1-4): หากพิจารณาบริษัทคู่ค้า หรือหุ้นส่วนใช้สู่ผ่าน ของผ่าน ท่านมีความคิดเห็นอย่างไรต่อคำถามดังต่อไปนี้。

### ความสามารถในการประสานงานระหว่างองค์กร

<table>
<thead>
<tr>
<th>ไม่เห็นด้วย</th>
<th>ไม่เห็นด้วย</th>
<th>บางกล自贸区</th>
<th>เห็นด้วย</th>
<th>เห็นด้วยอย่างยิ่ง</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. บริษัทของคุณ ประสบความสำเร็จในการเพิ่มประสิทธิภาพองค์กรโดยการร่วมกับท่านกับบริษัทคู่ค้า
2. บริษัทของคุณมีการจัดให้มีพนักงานอยู่ประจำ ณ สำนักงานของบริษัทคู่ค้า
3. บริษัทของคุณมีการแบ่งปัน หรือร่วมใช้ทรัพยากรร่วมกับหุ้นส่วนใช้สู่ผ่าน หรือบริษัทคู่ค้า ที่สำคัญ เพื่อประสิทธิภาพในการดำเนินงาน
4. บริษัทของคุณ ร่วมคิดค้นและรับผิดชอบในการคิดค้นพัฒนาผลิตภัณฑ์และวางแผนการตลาดร่วมกับหุ้นส่วน หรือบริษัทคู่ค้า

4). ตัวชี้วัดผลการบริหารจัดการอุปทาน (SM1-18)

หากพิจารณาในองค์ประกอบข้อที่ ท่านมีความคิดเห็นอย่างไรต่อคำถามดังต่อไปนี้

### ปฏิบัติงานใต้ดามาท

<table>
<thead>
<tr>
<th>ปฏิบัติงานใต้ดามาท</th>
<th>ปฏิบัติงานใต้ดามาท</th>
<th>ปฏิบัติงานใต้ดามาท</th>
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<th>ปฏิบัติงานใต้ดามาท</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

#### ตัวชี้วัดสภาพทางการตลาด:

<table>
<thead>
<tr>
<th>ตัวชี้วัดการตลาด</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ส่วนแบ่งการตลาด</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ผลกำไร</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ผลตอบแทนจากการลงทุน</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

#### ตัวชี้วัดความสามารถในการผลิต:

<table>
<thead>
<tr>
<th>ตัวชี้วัดความสามารถในการผลิต</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. ค่าใช้จ่ายในการผลิตต่อสิ้นเดือนโดยประมาณ</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. วัสดุที่เหลือและค่าใช้จ่ายทั่วไป</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. เวลาในการผลิต (Manufacturing Lead Time)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. อุปกรณ์หน่วยเวลาน (Equipment Changeover Time)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. เวลาในการทำงาน</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. เวลาในการจัดส่ง</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. ค่าด้านหน่วยเวลาน</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. ค่าค่าใช้จ่ายของกับสถานที่ผลิตโดยตรง</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

#### ตัวชี้วัดความสามารถทางด้านอื่นๆ:

<table>
<thead>
<tr>
<th>ตัวชี้วัดความสามารถทางด้านอื่นๆ</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. คุณภาพของระบบงานโดยรวม</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. ความรวดเร็วในการพัฒนาสินค้า</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. ค่าใช้จ่ายของสินค้าหน่วยที่พัฒนา</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. การจัดส่งที่ทันตามกำหนดเวลา</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. คุณภาพของส่วนการผลิต</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
ส่วนที่ 3

ข้อมูลทั่วไปของบริษัท:

1) ลักษณะธุรกิจของบริษัทคุณคืออะไร?
   - บริษัทประกอบรถยนต์
   - บริษัทจัดส่งส่วนประกอบรถยนต์

2) ขนาดของบริษัท (จำนวนพนักงาน)?
   - 200 คนหรือน้อยกว่า
   - 201 - 500 คน
   - 501 - 2,500 คน
   - 2,500 - 10,000 คน

3) อายุของบริษัท
   - น้อยกว่า 5 ปี
   - 5 - 15 ปี
   - 16 - 35 ปี
   - 36 - 70 ปี
   - มากกว่า 70 ปี

4) ลักษณะของผู้ถือหุ้น
   - ไทย
   - ต่างชาติ
   - ไทยถือหุ้นมากกว่าต่างชาติ
   - ต่างชาติถือหุ้นมากกว่าไทย

ข้อมูลหน่วยแบบสอบถาม:

5) เพศ:
   - ชาย
   - หญิง

6) ระดับการศึกษา
   - มัธยมปลาย
   - ปริญญาตรี
   - ปริญญาโท
   - ปริญญาเอก

7) ระดับการศึกษาขั้นพื้นฐาน ที่บริษัทของท่านต้องการ সাফার্বত্রায়ন নগ্নন ধাঢ ঢাঢ  নমতাক
   - มัธยมปลาย
   - ปริญญาตรี
   - ปริญญาโท
   - ปริญญาเอก

8) ระยะเวลาที่ท่านร่วมงานกับบริษัทปัจจุบัน
   - 1 - 3 ปี
   - 4 - 6 ปี
   - 7 - 15 ปี
   - 16 - 25 ปี
   - มากกว่า 25 ปี

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9) ระยะเวลาที่ทำการงานในตำแหน่งปัจจุบัน?

☐ 1 - 3 ปี    ☐ 4 - 6 ปี    ☐ 7 - 15 ปี
☐ 16 - 25 ปี  ☐ มากกว่า 25 ปี

10) ประสบการณ์เกี่ยวกับโลจิสติกส์

☐ 1 - 3 ปี    ☐ 4 - 6 ปี    ☐ 7 - 15 ปี
☐ 16 - 25 ปี  ☐ มากกว่า 25 ปี

11) แผนกของท่านในบริษัท

☐ จัดซื้อ    ☐ ฝ่ายผลิต    ☐ โลจิสติกส์
☐ วิศวกร  ☐ การตลาด    ☐ อื่นๆ (โปรดระบุ)

ข้อตอบประสงค์ในความร่วมมือ ณ โอกาสนี้