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# ANTECEDENTS INFLUENCING COMPETITIVENESS OF STAINLESS STEEL BUSINESS IN BANGKOK AND METROPOLITAN AREA

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**Abstract**

The competitiveness of business entrepreneurs is creation of benefits and growth in business operation. It enhances competitive advantage against competitors and is essential for business operation under tendency of intense and volatile competition that have constantly arisen. Consequently, stainless steel business needs to develop products and services to be qualified and to respond to consumers' needs for business competitive advantage. This research aims to 1) examine the level of antecedents; management innovation, administrative policy, spiritual leadership, organizational climate and competitiveness of stainless steel business in Bangkok and Metropolitan Area, 2) explore the antecedents' influence; management innovation, administrative policy, spiritual leadership and organizational climate towards the competitiveness of stainless steel business in Bangkok and Metropolitan Area, and 3) develop a competitiveness model of the stainless steel business in Bangkok and Metropolitan Area. The mixed research methodology was applied between the quantitative and qualitative ones. In view of the quantitative term, a sample group was 300 informants of the stainless steel manufacturers and distributors in Bangkok and Metropolitan Area and the sample group size was based on 20-time criteria of the observed variables through the stratified sampling. Data collection was undertaken through questionnaires and later analyzed by the structural equation modeling. For qualitative term, an in-depth interview was conducted with the targeted group of 20 management and expertise in stainless steel manufacturing and distribution. The findings revealed that 1) the antecedents' level of management innovation, administrative policy, spiritual leadership, organizational climate and competitiveness of stainless steel business in Bangkok and Metropolitan Area were all at high level, 2) the management innovation, administrative policy, spiritual leadership and organizational climate all influenced the competitiveness of stainless steel business in Bangkok and Metropolitan Area at statistical significance level of .05, and 3) the competitiveness model of the stainless steel business in Bangkok and Metropolitan Area as developed by the researcher was called "IPCL-COSS Model ((I = Innovation, P = Management Policy, C= Organization Climate, L = Spiritual Leadership, COSS = Competitiveness of Stainless Steel Business in Bangkok and Metropolitan Area). Additionally, the qualitative findings showed that in order to succeed in stainless steel business in Bangkok and Metropolitan Area, the entrepreneurs need to maintain their standardized product quality for competitiveness. Applying innovation and new technologies for manufacturing, working process and product & service development will also help enhance effective operating results in responding to consumers' needs in this digital age and this can be used as a guideline to define a strategy to promote stainless steel business to be more competitive at both national and international levels

## INTRODUCTION

The competitiveness of business entrepreneurs is of paramount importance in the situation of the world in the midst of many rapid and violent changes. The changes that have occurred are affecting both the way people live and do business. It may be caused by advances in technology, uncertainty of global and national economic conditions, political issues, epidemic disaster as well as energy and environmental issues. These factors quickly have both positive and negative

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impacts on entrepreneurs involved in the production of goods and services. Entrepreneurs therefore need to have the ability to adapt to be ready to accommodate changes and respond to all situations. These may be both risks and opportunities, including crises that may occur at any time of the business entrepreneurs. The competitiveness of entrepreneurs is a key factor in driving business operations that will result in business success or failure. This is because the entrepreneur is the one who plans the action, manages and develops to achieve the goals. Hence, the entrepreneurs need to have a spiritual leadership that will lead the organization to setting the vision, policies, strategies and creation of innovations to suit the environment (Kerdpitak et al., 2022). Creating a creative atmosphere in the organization as well as expertise in many operational skills can drive the operations of entrepreneurs in terms of planning procurement of resources for use in production, marketing, management as well as supervision so that business entrepreneurs can cope with the changing world trends promptly (Alzghoul et al., 2018).

The business of manufacturing and distributing stainless steel products, which are products related to the steel industry in the corrosion-resistant group, is facing changes. Entrepreneurs need to be able to compete due to changes in consumer behavior resulting from technological changes. Culture and society have an impact on marketing policies which make businesses more competitive. Consumers are demanding products that are more convenient to use, aesthetically pleasing, safer, more automated, small, light weighted, suitable for use and storage, or easy to move, etc. Nowadays, business competition is becoming fiercer. Organizations attempt to beat their competitors and increase any obstacles in new entering. Business innovation has become a key issue in the competitive environment regarding innovation. Organizations tend to spend their resources on research and development in pursuit of better technology and superior products. Organizations with more resources have an advantage, and organizations with similar resources and technology have a high level of product homogeneity. Therefore, enterprises should have creativity and innovation that are different from competitors because innovation often determines competitiveness. The company, thus, decided to allocate resources to this key success factor (Lee, & Chen, 2014).

As for the trend of the business of manufacturing and distributing stainless steel products, it is still a popular product with increasing demand in the market continuously. The stainless steel industry in Thailand has potential to grow. In addition, the average cold-rolled stainless steel consumption of the country's population is still low compared to developed countries in Asia such as Japan, South Korea and Taiwan, with an average consumption rate of more than 10 kilograms per person per year. The trend of the domestic stainless steel industry has an opportunity for future growth in which the demand for stainless steel is expected to increase due to the expansion of the country's main industries. Stainless Steel Consumption in Thailand has a relationship in the same direction as the growth of related industries such as the automotive industry, electrical appliance industry, construction industry, food industry, kitchenware and appliances industry in which each industry plays a part in driving the stainless steel industry in Thailand to grow continuously (Department of Industrial Promotion, 2018). Production development is considered an important part due to the development of technology used in the industrial sector. Stainless steel industry, hence, must develop an automatic system

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in manufacturing process so that the production is more efficient and reduces the occurrence of errors from human work as well as reduce production costs in the long run. In addition to industrial robots with high technology, automation for the manufacturing industry includes conveyor systems to help move workpieces, pneumatic system, automatic identification technology (Auto-ID) and RFID technology. These automations have been applied in many fields such as logistics, warehouse systems, and the production line in the factory, etc. to show the identity of the product and raw materials in the production process (Department of Industrial Promotion, 2018).

## LITERATURE REVIEW

### Innovation

Innovation is an important foundation for business competition. The more entrepreneurs can innovate, the more positive the competitiveness will be. It shows that innovation is a necessary factor for companies or organizations to increase competitiveness (Hendayana, Ahman, & Mulyadi, 2019). Companies that can properly innovate will be able to compete with other companies. Competitiveness is the ability of a company to compete with other companies and to produce goods and services to meet the test of international markets (Hendayana, Ahman, & Mulyadi, 2019). The competitiveness of a company is influenced by innovation. Innovation is very important because knowledge can be gained through innovation and can be integrated and adapted with the development of technology. Innovation is therefore considered an important tool of entrepreneurship in building competitive advantages and market opportunities, including contributing to business success. Entrepreneurship is related to innovation, especially in generating opportunities to create differentiation in business (Aujirapongpan et al., 2010).

Innovation ability has a positive influence on competitiveness. The innovation ability arises from the behavior of personnel within the coordination to drive innovation in products, processes that increase the organization's competitiveness. It includes cooperation with raw material suppliers by adding value and creating new processes (Kerdpitak et al., 2022a). The most important part of business operations is to create innovations in distribution channels and marketing using various strategies (Phongpaew and Phakasat, 2016). These are all important elements that lead to the creation of competitiveness. Innovation is an essential factor of economic development and it also determines competitiveness. The role of innovation has been driven by advances in technology that enable consumers to conveniently access diverse information. The consumers can compare and select products and services to meet their own needs as much as possible. This makes entrepreneurs seek innovative production and services with new technologies as well as new business models, such as Internet of Things (IoT) and Industrial Internet of Things (IIoT) technologies to create added value for manufacturers, especially in the field of monitoring the operation of the production process in real time, forecasting in maintenance, material handling, supply chain management, inventory and assembly (Kerdpitak et al., 2022a). The amount of data generated by IoT and IIoT systems is growing in size as the system adoption continues to grow and more sensors are embedded in the entire production chain for data analytics, which is the key to processing big data derived

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from real-time data monitoring, making decisions and improving production quality in real time. If entrepreneurs can use such systems in the development of the production system and products or services to get the competitive advantage gained from the innovative activities. Moreover, if they can maintain the advantage, it will affect continuous development and increase the ability to grow and sustainability of business operations. In today's competitive environment, innovation is not only necessary, but it is also an opportunity for organizations to succeed in the marketplace.

Innovation is something new that arises from creativity and can generate economic benefits. It is the development of new products or services, processes, structures or techniques to achieve the goals of an organization. In the last half century, academicians around the world have produced academic research and writing on innovation (Kretschmer, Miravete & Pernías, 2012). According to the theory of innovation in the economy in general, innovation is the economic impact of technological change due to the new combination of available productive forces in solving business problems (Schumpeter, 1982). Today, all economic processes are now closely related to new technologies and innovations. Scientific discoveries in project activities and the creation of new high-tech products, service and operations aims to understand what kind of innovation should be used in production (Timur, & Antanas, 2017; Kerdpitak, 2022). The importance of innovation to entrepreneurship is an innovation concept from the point of view of entrepreneurship. Entrepreneurs play an important role in the innovation development process, while innovation plays a role in making entrepreneurship successful. The entrepreneurs can create business competitiveness with innovation and reflect that innovation is important to entrepreneurship, such as Google that has succeeded in creating innovations in search information, Amazon that can dominate the book distribution market by developing innovative new distribution channels through the Internet system, Starbuck that has been successful in developing coffee drinking innovation that reflects the operating style of life and civilization, and Microsoft that controls the world market with continuous product innovation and process innovation that creates business alliances and influence over traditional product distribution channels, etc. (Aujirapongpan et al., 2010).

**Management Policy**

Management policy is formulated for entrepreneurs to conduct business in accordance with sustainable development guidelines to build trust among stakeholders through operational excellence and transparency with good service quality and maximum security for a sustainable future of society and the environment according to the management framework in the same direction, for example, international standards (Koontz & Weihrich, 1990). In addition, business operations are balanced in terms of economic, social and environmental aspects by good corporate governance, including taking into account all stakeholders in the operation to create sustainable business growth. Operations throughout the supply chain coupled with business growth pay attention to the dimensions of society, environment, quality, safety, and occupational health, including setting strategies for economic growth along with environmentally friendly business operations, promoting business innovation and social innovation to increase operational efficiency, and creating participation in the development of

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communities to be self-reliant in a sustainable manner (Kerdpitak, 2022). According to the report as stated by international standard framework for continuous improvement, the information on organization's suitable operations is fully transparently released to the public. Furthermore, policy formulation focuses on future challenges and the ability to gather quality non-financial data for criteria such as management quality, corporate governance structure, reputation, risk, human capital management, stakeholder engagement and social responsibility (Drucker, 1985).

**Organizational Environment**

Organizational environment plays an important role in corporate innovation. Innovation has become critical for organizations facing an increasingly complex and challenging world (Sethibe & Steyn, 2016). Entrepreneurs or companies strive to recruit and retain quality leaders who can create a positive organizational environment (Maamari, & Majdalani, 2017). The organizational environment is an important indicator necessary for observing an organization's ability to innovate (Sarros et al., 2008). It plays an important role in organizational innovation. A good environment is essential to the achievement of organizational goals. The organizational climate is often related to work performance, job satisfaction and employee morale. It is an important factor to be considered in the study and analysis of the organization because it has a profound influence on the image, well-being and the attitudes of all members of the organization and operations of employees. Improving organizational efficiency relies on the organizational environment, one important aspect which is the basis of improvement. The organizational environment is about the visual state of the individual who understands things within the existing organization. This is consistent with a study by Isaksen & Akkermans (2011), which found that the working environment within an organization had a significant influence on the level of innovative productivity, including that organizational leaders influenced innovation productivity as well as the environment for creativity and innovation. In today's dynamic work environment, creativity and innovation are valuable resources for gaining a competitive advantage (Alzghoul et al., 2018).

The most important challenge for industry and business organizations today is to develop innovative solutions that can motivate human behavior towards higher productivity and higher work efficiency. In current situation, the organizational climate is the most important factor in achieving goals in different types of organizations (Suguna, 2013). Each organization needs to continually improve its efficiency and effectiveness in order to survive in this era of globalization. One key element that is considered to be able to improve the efficiency and effectiveness of an organization is the employee's willingness to take on extra responsibilities beyond their functional roles to support the achievement of organizational goals. Employee commitment has a positive effect on employee attitude and behavior (Ngadiman & Ratmawati, 2013). A positive environment, accordingly, promotes employee productivity and reduces turnover rates. The impact of the organizational environment on efficiency due to motivated employees results in higher productivity and more dedication. This aligns with a study by Monika & Mehta (2013) which states that in today's highly competitive business environment, organizations are always looking for ways to gain an edge over their competitors. Successful

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organizations recognize the value of creating an organizational environment or pleasant working environment and motivate employees to be committed and efficient in order to gain a competitive advantage (Kerdpitak et al., 2022a). Numerous studies have found a positive relationship between a positive organizational environment and measures of organizational success, such as work efficiency, job satisfaction, work stress, employee retention, productivity, customer satisfaction and profitability.

**Spiritual Leadership**

Spiritual leadership plays an important role in the competitiveness of entrepreneurs. The expression of the leader in business must have the ability to persuade by creating a vision, credibility and faith, and emphasizing on performance by developing positive organizational potential to enable the group or organization to achieve the set goals. The production, production period, product form, services, communication, as well as innovation that affects competition in today's industrial business must be focused (Fry & Nisiewicz, 2013). The leaders are a participant in creating a vision with the ability to communicate clearly and follow the vision. They express the commitment to work, inspire work, and effectively face crises (Fry, 2003). Spiritual leaders play an important role in building trust using wisdom of cause and effect, good role model and honesty as well as creating good working relationships to people in the organization, such as factory managers working in production, design and production engineer and operators at all levels (Chen & Yang, 2012). To create production potential using automated production technology, Artificial Intelligence (AI), Internet of Things (IoT), or simulation technologies that can reduce production costs and solve the global skill shortage problem as well as manufacturing that aims to find new raw materials that are lightweight, economical, durable and environmentally friendly (Dubrin, 2004), as a result, the spiritual leaders need to adopt these technologies and enhance the level of production or conduct a new business. The highlight is the development of technology to communicate with machines and production system in nature of industrial automation. Modern technologies such as 3D Printing, Augmented Reality (AR), Big data and analytics, Autonomous Robots, Simulation, Horizontal and vertical system integration, Smart Factory, Cybersecurity, Cloud are applied in production in order to accommodate the changes in demand and supply of the world in the future. Spiritual leadership is the culmination of desirable personal qualities and should be developed in all professional practitioners, especially those with philosophy and ideology. Subsequently, leadership is very important in planning, making decisions, directing, supervising and controlling. Leaders must have judgment, caution, prudence, strength and courage to decide to change conditions that will make members concentrate and devote themselves to work (Edler & Fagerberg, 2017). If they lack leadership, such knowledge will not be used effusively because they cannot encourage or persuade others to comply and do tasks to accomplish goals (Chen & Yang, 2012).

**Competitiveness**

A company's competitiveness is influenced by innovation. Innovation is very important because knowledge can be derived from innovation and can be integrated and adapted to technological developments (Kerdpitak, 2022). Innovation is a factor that can increase

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competitiveness. According to Ambashi (2017), competition and innovation are caused by the driving force of the modern economy. Competitiveness is related to payback when innovation is accumulated. Technological competition tends to provide incentives for innovation. The payback conditions with proper distribution of profits can be the starting point for technological and innovative developments. According to Lam (2012), competitiveness has three-level different definitions: organization level, industry level and national level. The definition of competitiveness at the national level has been proposed as a macroeconomic variable by considering the exchange rate indicator of the country's exports per the participation in the world market, while the competitiveness of micro-economy refers to indicators of income and living standards (Le & Ikram, 2022). The competitiveness of business small and medium enterprises (SMES) in China found that indicators at the microeconomic level include reports of asset turnover rates, efficiency of production cost reduction and profitability, ratio of industrial growth per the number of employees, ratio of fixed assets per growth year over year, ratio of profitability per total assets, and sales growth ratio current year compared to last year. Key issues at the national level reflects the focus on entrepreneurial indicators derived from SME market share and industrial indicators arisen from the share of value added of the industry per total industries in the region, including the share of SME revenues per total regional revenues. Finally, the share of the increase in the total headcount of SMEs per the total headcount of the region is the interesting findings (Moguluwa et al., 2021).

## METHODOLOGY

The researchers used a mixed methods research methodology by conducting quantitative research and then qualitative research. The population was executives, managers or employees who were assigned to perform management duties in the establishment regarding the production and sale of stainless steel products in Bangkok, Samut Sakhon, Nakhon Pathom, Nonthaburi, Pathum Thani, Chachoengsao and Samut Prakan, amounting to 429 places, one person each, representing a total population of 429 people. The researchers classified the population into groups according to the area of the province. Then the sample was selected by simple random sampling according to the proportion of the population and the determination of the number of samples that the sample size must be at least 20 times greater than the numbers of observed variables (Jackson, 2003; Hair, Ringle & Sarstedt, 2011). In this research, there were 15 observed variables. The researchers, therefore, used 300 samples arisen from estimating values from 15 observed variables in a ratio of 1:20. Questionnaire was the quantitative research tool which consisted of measures of main variables according to the research conceptual framework. The measure was developed from research that has been reviewed in the literature. Then, the researcher used those measurements to develop and adjust them to fit with the context of prior factors influencing the competitiveness of stainless steel product entrepreneurs in Bangkok and metropolitan area by synthesizing data, defining terminology in research, determining indicators of variables according to the research concept. Afterwards, the questionnaire was constructed according to the 5-Point Likert Scale approach (Likert, 1932). After the Try Out, the question items were improved to fit the objectives of this research by testing both validity and reliability of the measurement before using it to collect

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data from the target population. The results were statistically analyzed using Structural Equation Modeling (SEM). For qualitative research, the researchers used in-depth interviews from executives and experts in the field of stainless steel products in Bangkok and metropolitan area. The qualitative data was compiled, analyzed, interpreted and linked to draw conclusions and explain the quantitative analysis results with depth, accuracy, and certainty in order to confirm and use in-depth analysis in this research.

## RESULTS

This study used the analysis of survey data to test the relationship between the variables by examining the distribution of 15 observed variables studied in the SEM using the chi-square test ($\chi^2$). The results of the statistically significance level of .05 indicated that the variables were not normally distributed, while the results of statistically insignificance (P-value > .50) revealed that the variables were normally distributed (Normal Distribution), as shown in Table 1.

**Table 1: Statistical test of empirical variables (n=440)**

| Variable | M | S.D. | %CV | Sk | Ku | $\chi^2$ | P-value |
|---|---|---|---|---|---|---|---|
| new | 3.97 | .84 | 21.31 | -1.877 | -1.956 | 7.350 | .025 |
| crea | 4.09 | .85 | 20.97 | -2.774 | -2.579 | 14.346 | .001 |
| econ | 4.04 | .87 | 21.62 | -2.556 | -3.002 | 15.549 | .000 |
| obje | 4.11 | .77 | 18.71 | -2.248 | -2.835 | 13.089 | .001 |
| stra | 4.15 | .73 | 17.64 | -2.123 | -2.239 | 9.522 | .009 |
| reso | 3.96 | .77 | 19.64 | -1.466 | -1.782 | 5.323 | .070 |
| inve | 4.13 | .73 | 17.74 | -2.128 | -.790 | 5.153 | .076 |
| part | 4.29 | .72 | 16.76 | -3.251 | -1.749 | 13.630 | .001 |
| rewa | 4.25 | .74 | 17.50 | -2.997 | -1.869 | 12.474 | .002 |
| visi | 4.25 | .73 | 17.19 | -2.985 | -2.223 | 13.850 | .001 |
| hope | 4.10 | .77 | 18.89 | -2.074 | -.810 | 4.957 | .084 |
| love | 4.24 | .69 | 16.33 | -2.449 | -1.462 | 8.134 | .017 |
| cost | 4.28 | .72 | 16.96 | -3.255 | -2.104 | 15.018 | .001 |
| time | 4.40 | .72 | 16.52 | -4.258 | -1.647 | 2.841 | .000 |
| quli | 4.29 | .77 | 18.16 | -3.581 | -1.767 | 15.946 | .000 |

Note: chi-square ($\chi^2$) with statistical significance (P-value <.05) indicates non-normal distribution.

The test results of the normal curve distribution (Normal Score) of the observed variables in the SEM using chi-square ($\chi^2$) found that resource (reso), invention (inve) and hope and faith (hope) were not statistically significant (p > .05), representing that such observed variables has a normal distribution. While, all other observed variables were statistically significant (p < .05), signifying that such variables has a non-normal distribution. Such results may cause the problem in model fit assessment using chi-square test ($\chi^2$), so the researchers solved the problem in assessing model fit by finding the ratio of chi-square ($\chi^2$) to degrees of freedom (df). If it was less than 2.00, it indicated that the model was empirically fit, although the chi-square test ($\chi^2$) of the model was statistically significant (p-value < .05) (Hair, et al., 2006).

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**Table 2: Factor Loadings (n = 300)**

| Variables | Factor Loading (λ) | Error (θ) | t | $R^2$ |
|---|---|---|---|---|
| **Innovation (INOVA)** | | | | |
| Newness (new) | .53 | .72 | 8.50 | .28 |
| Creativity (crea) | .91 | .17 | 13.09 | .83 |
| Economic Benefit (econ) | .66 | .57 | 10.22 | .43 |
| **$\rho_c$= .75 $\rho_v$ = .51** | | | | |
| **Management Policy (POCY)** | | | | |
| Objective (obje) | .83 | .31 | 13.00 | .69 |
| Strategy (stra) | .68 | .53 | 11.01 | .47 |
| Resource (reso) | .60 | .64 | 9.82 | .36 |
| **$\rho_c$= .75 $\rho_v$ = .51** | | | | |
| **Organizational Environment (ENVI)** | | | | |
| Invention (inve) | .61 | .23 | 9.53 | .77 |
| Participation (part) | .84 | .29 | 12.26 | .71 |
| Reward (rewa) | .61 | .63 | 9.56 | .37 |
| **$\rho_c$= .79 $\rho_v$ = .56** | | | | |
| **Spiritual Leadership (SPIR)** | | | | |
| Vision (visi) | .70 | .51 | 11.93 | .49 |
| Hope and Faith (hope) | .80 | .35 | 13.56 | .65 |
| Love (love) | .69 | .53 | 11.67 | .47 |
| **$\rho_c$= .78 $\rho_v$ = .54** | | | | |
| **Competitiveness (COMP)** | | | | |
| Cost (cost) | .77 | .30 | 9.93 | .70 |
| Response Time (time) | .63 | .40 | 8.77 | .60 |
| Quality (quli) | .50 | .45 | 7.50 | .55 |
| **$\rho_c$= .76 $\rho_v$ = .52** | | | | |
| **Chi-Square=0.00, df=0, P-value=1.00000, RMSEA=0.000** | | | | |

**Table 3: Measurement Model (n=300)**

| Dependent Variables | $R^2$ | Effects | Independent Variables | | | |
|---|---|---|---|---|---|---|
| | | | Innovation (INOVA) | Management Policy (POCY) | Organizational Environment (ENVI) | Spiritual Leadership (SPIR) |
| Innovation (INOVA) | .70 | DE | - | .53*(3.85) | .43*(4.10) | .39*(4.68) |
| | | IE | - | - | - | - |
| | | TE | - | .53*(3.85) | .43*(4.10) | .39*(4.68) |
| Competitiveness (COMP) | .93 | DE | .59*(4.53) | .55*(4.60) | .35*(4.16) | .79*(2.83) |
| | | IE | - | .31*(4.09) | .41*(4.10) | .15*(4.63) |
| | | TE | .59*(4.53) | .86*(4.36) | .76*(4.12) | .94*(3.33) |
| $\chi^2$= 133.21 df = 77 p-value = .00007, $\chi^2$ / df = 1.73, RMSEA = .049, RMR = .023, SRMR = .039, CFI = .99, GFI = .94, AGFI = .91, CN = 239.42 | | | | | | |

*statistically significant level of.05

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**Note:** In parentheses are the t-test values. The value not between -1.96 and 1.96 indicates statistically significant level of .05.

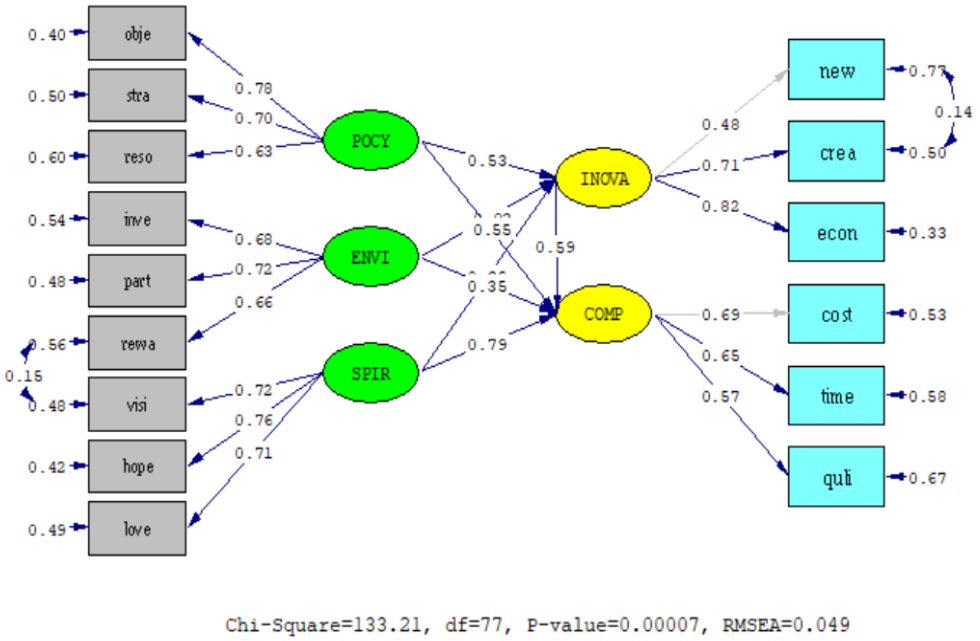


**Fig 1: Adjust model (n=300)**

The results of the model analysis revealed that the adjusted model was fit to the empirical data when considering the fit Indexes as follows: $\chi^2$= 133.21, df = 77, p-value = .00007, $\chi^2$ / df = 1.73, RMSEA = .049, RMR = .023, SRMR = .039, CFI = .99, GFI = .94, AGFI = .91, CN = 239.42.

The fit indexes of the adjust model, $\chi^2$= 133.21, df = 77, p-value = .00007, did not meet the criteria because it was still statistically significant (P-Value < .05) (Joreskog; & Sorbom, 1996). However, chi-square test ($\chi^2$) was sensitive to the sample size. The researchers therefore also considered ($\chi^2$) / df value = 1.73, which was considered to pass the criteria because it was less than 2.00 (Tabachnick & Fidell, 2007), RMSEA = .049, which was considered to pass the criteria because it was less than .05 (MacCallum et al, 1996), RMR = .023, SRMR = .039, which were considered to pass the criteria because it is less than .05 (Diamantopoulos & Siguaw, 2000), CFI = .99, GFI = .94, AGFI = . 91, which was considered to pass the criteria because it was greater than .90 (Tabachnick & Fidell, 2007), and CN = 239.42, which was considered to pass the criteria because it was greater than 200.00 (Joreskog; & Sorbom, 1996). So, it concluded that the adjust model was fit to the empirical data and the parameter estimation in such a model was acceptable.

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## CONCLUSION

The adjust structural equation model of antecedents influencing competitiveness of stainless steel business in Bangkok and metropolitan area was fit to the empirical data at an acceptable level, which was considered from the fit indexes as follows: $\chi^2$= 133.21, df = 77, p-value = .00007, $\chi^2$ / df = 1.73, RMSEA = .049, RMR = .023, SRMR = .039, CFI = .99, GFI = .94, AGFI = .91, CN = 239.42. The estimation in the structural equation model was found as follows:

1. Innovation (INOVA) has a direct effect on competitiveness (COMP) with the effect coefficient of .59 and a statistically significant level of .05, in line with the hypothesis 1: innovation has a direct positive influence on competitiveness.
2. Management policy (POCY) has a direct effect on innovation (INOVA) with the effect coefficient of .53 and a statistically significant level of .05, in line with the hypothesis 2: management policies have a positive direct influence on innovation.
3. Management policy (POCY) has a direct effect on competitiveness (COMP) with the effect coefficient of .55 and a statistically significant level of .05, in line with the hypothesis 3: management policies have a positive direct influence on sustainable competitiveness.
4. Organizational environment (ENVI) has a direct effect on innovation (INOVA) with the effect coefficient of .43 and a statistically significant level of .05, in line with the hypothesis 4: organizational environment has a positive direct influence on innovation.
5. Organizational environment (ENVI) has a direct effect on competitiveness (COMP) with the effect coefficient of .35 and a statistically significant level of .05, in line with the hypothesis 5: organizational environment has a positive direct influence on competitiveness.
6. Spiritual leadership (SPIR) has a direct effect on innovation (INOVA) with the effect coefficient of .39 and a statistically significant level of .05, in line with the hypothesis 6: Spiritual leadership has a direct positive influence on innovation.
7. Spiritual Leadership (SPIR) has a direct effect on competitiveness (COMP) with the effect coefficient of .39 and a statistically significant level of .05, in line with the hypothesis 7: spiritual leadership has a direct positive influence on competitiveness.
8. Innovation (INOVA), management policy (POCY), organizational environment (ENVI) and spiritual leadership (SPIR) can jointly predict competitiveness (COMP) by 93%.

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