

SUCCESS FACTORS THAT AFFECT THE EFFICIENCY OF STEEL INDUSTRY ORGANIZATIONS IN THAILAND

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ABSTRACT

This study aims to 1) develop and test structural equation model of success factors that affect the efficiency of the steel industry organizations in Thailand and 2) study the factors that have both direct and indirect effects on the efficiency of the steel industry organizations in Thailand. The research was a quantitative study. The sample was 365 executives and employees in 115 companies that were the members of the steel industry group in Thailand, as selected by purposive sampling. Data were collected using questionnaires and analyzed by structural equation model. The findings depicted that the success factors affecting the organizational efficiency (OrgEff) consisted of organizational learning culture (OrgLear), organizational function collaboration (OrgCol), organizational absorption ability (OrgAbs), and organizational innovation creation (OrgInno). In addition, OrgInno directly affected OrgEff and OrgLear as well as OrgAbs indirectly affected OrgEff. The results, besides, portrayed that in operating the steel industry business effectively, the public and private sectors should cooperate with relevant organizations in all sectors to formulate policies and support the development of an information system that linked in a complete production system so that businesses attain the ability to increase their competitiveness, the opportunity to access more funding sources, and the expansion in both domestic and foreign markets.

Keywords:

Success Factor, Organizational Efficiency, Steel Industry

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Introduction

The 21st century is a world of rapid change (Drucker, 1999). As a result, Organizations that once had a competitive advantage without adaptation will lose their advantage in a short period of time (D'Aveni, 1994), just as innovation and knowledgeable employees, as a basis for creating a competitive advantage, play an important role in knowledge era today (Drucker, 1993). The changes have a huge effect on the organization as the quote "Not the strongest or smartest species can survive, but the species most responsive to change are the ones that survive" (Audretsch, 1995). Organizational leaders need to closely monitor changes and movements in the various environments and develop their organization into a dynamic organization so that the organization gets an opportunity. Organizations need to change for their survival and they need to learn how they should act to have the least damage to the organization or the lowest cost of transformation (Senge, 1990).

In the past, most studies emphasized innovation management in organizational level, which explains how Organizational Innovation Creation (OrgInno) management can be achieved through an overview of the organization from leaders to operators (Krause, 2004), however, the factors that affect success are not solely on the overall policy and strategy of the organization (Smith, 2002). In addition, a small number of studies have been done on innovation management in the dimensions of the integration of administrative and operational levels, for example, the study of Innovative Work Behavior (IWB) (De Jong and Den Hartog, 2010). Besides, the literature review proposes the study on factors affecting operational innovation management, such as organizational culture, as suggested by Nanda and Singh (2009), but the study on the relationship between organizational capabilities, the ability to perform operations using a combination of available resources (Grant, 1991), or organizational ability

to develop business innovation (Nielsen et al., 2009), and OrgInno has not been found.

In addition, the study on the application of organizational management theory to promote and support employees so as to create innovative products to generate competitive advantage has not been found, as described by Lopes and Dodinho (2008) that internal factors influence organizational differentiation in terms of innovation development. Additionally, most of the previous studies focus on employee innovation behaviors in developed countries such as the United States, England or Japan (Nanda and Singh, 2009). These issues cause the citation question applicable to people in other regions since such results are the innovative development behaviors of the organizations resulting from the studies of samples in developed countries, which differs in many aspects with Thailand. Consequently, the results of such studies cannot be used to summarize the research results effectively and truly. For this reason, this is a further confirmation of the concept of organizational innovation development behavior in the context of Thailand's environmental factors. From previous literature reviews, it was found that business management scholars have studied the concept of innovation management extensively as it can apply to a wide range of government and business organizations, enabling the organization to develop new innovations continuously and sustainably (Drucker, 1985). Although recent innovation management studies have shown that innovation theory explains that innovation management can take place in every aspect of an organization, including management, staff, workforce, and corporate overview, but most studies only highlight organizational innovation management, such as resource-based innovation management that influences marketing (Day and Wensley, 1988). The concept of resource-based innovation management is able to explain the factors creating an organizational competitive advantage, as studied by Hansen and Wernerfelt (1989), Powell (1996), Roquebert et al. (1996),

and Rumelt (1991). Furthermore, the past studies on innovation relate to various industries, such as food industry agricultural industry (Wilk and Fensterseifer, 2003), and sports industry (Smart and Wolfe, 2000). Likewise, Richard et al. (2008) found that innovation management in the UK of 12 industries was the study of organizational innovation management, Kuczmarski (2000) studied how corporate innovation management affects growth rates, as well as Lopes and Dodinho (2008) examined how innovation management affects the operations of commercial organizations. However, disappeared factors that need to be studied in order to confirm these academic results are policy, strategy, work environment, personal factors of executives and employees (Smith, 2002). From the research gaps mentioned, thus the study aims to 1) develop and test structural equation model: success factors that affect the efficiency of the steel industry organizations in Thailand and 2) study the factors that have both direct and indirect effects on the efficiency of the steel industry organizations in Thailand.

Literature Review

1.1 Organizational Learning Culture

Organizational learning refers to the process by which the organization receives and develops knowledge. This learning process consists of four basic components: obtaining knowledge, data distribution, data interpretation, and organizational memory (Garvin, 1993). Organizational Learning Culture (OrgLear) signifies the culture that organizational members represent the creation of learning. However, the organization must still be able to learn activities by creating favorable conditions. Organizations that intend to remove learning barriers expand the capacity of learning, and fostering continuous improvement and internal change to shape the future of the organization are considered a learning organization (Anderson and Krathwohl, 2001; Senge, 1990).

The organizations, that commit to a learning culture about trends in relation to the external

environment (Marsick and Watkins, 2003) and new technologies (Calantone et al., 2002), stimulus new ideas. Moreover, Aiken and Hage (1971) portrays that a communication mechanism that encouraged the transfer of information is the great importance for enterprise innovation. Thus, it is hypothesized that:

H1: OrgLear has a positive effect on OrgInno.

The better formerly learned organization is likely to learn more skills. These learning skills promote the ability of organizations to encompass the connections and synergies between old knowledge and information that may not have been previously considered (Cohen and Levinthal, 1990). Thus, it is hypothesized that:

H2: OrgLear has a positive effect on OrgAbs.

2.2 Organizational Absorption Ability

The Organizational Absorption Ability (OrgAbs) has become a new and popular way to describe the connection between corporate learning and innovation (Cohen and Levinthal, 1990). Absorbency refers to the ability of businesses to recognize the value of new external information for commercial ends. Zahra et al. (2006) further consider OrgAbs a dynamic ability embedded in organizational processes. OrgAbs influences an organization's ability to generate and utilize knowledge. Two components for OrgAbs include (a) the company's exposure that is consistent with external sources of knowledge and (b) experience. As suggested above OrgLear has an impact on OrgInno by enhancing the organization's ability to absorb which is the key to improve the research and development (R&D) functions in the organizations, as revealed by Cohen and Levinthal, (1990). Thus, it is hypothesized that:

H3: OrgAbs has a positive effect on OrgInno.

2.3 Organic Organizational Structure

The organizational structure refers to the relationship in authority, division of labor, preparation of work procedures, and internal communication. Several important dimensions comprise formalization, expertise, standardization, centralization, class in authority, professionalization, and complexity. These mark

the organizational structure (Martin and Scott, 2000). Two types of organizational structures include mechanistic and organic structures. First, mechanistic organizational structure is characterized by inflexibility, rigorous hierarchy, centralized control, and limitation on the interactions and communication between people. Second, organic organizational structure (OrgStru) explains more of an organization's adaptability and model of resilience. Organizations with organic structure management system have a less hierarchical system based on authority and control (Nohria, (1992).

It is argued that the hierarchical structure is based on actual productivity, representing innovation and creativity of the organization (Thompson, 1965), while bureaucratic and mechanical organization reduces the ability of organizations to innovate because it is embedded in the monarchy concept, which lacks mechanisms for dealing with conflict (Zaltman et al., 1973). Whereas centralized power and formal model have a negative influence on the innovative ability of an organization (Rogers, 1983). In addition, the organization's willingness to embrace new ideas is the most important driver for creating innovation (Hult et al., 2004; Zaltman et al., 1973). Thus, it is hypothesized that:

H4: OrgStru has a positive effect on OrgInno.

2.4 Organizational Function Collaboration

In the 21st century, there was a sudden change in creating collaboration in contemporary organization style, as first emphasized by Jacobs (1965), who gives the important to the development of employee organizational function collaboration (OrgCol) to build trustworthiness of the group. After that, Nahapiet and Ghoshal (1998) identifies that the collaboration is significant in building resources and resource distribution to other partners of the social cost network. OrgCol is based on four criteria: social relationship, organizational fields, employee performance, and commitments. In addition, resource allocation and knowledge sharing are carried out through the employee collaboration.

Besides, Spraggon and Bodolica (2008) analyzes that social costs, as related to OrgCol, consist of structural dimension, relation dimension, and cognitive dimension. First, the structural dimension refers to the patterns of collaborative member relationships. Second, relational dimension refer to the relationship characteristics of the employee. Finally, cognitive dimension refers to the resources that help collaborative members to attain working knowledge.

Collectivism (Hofstede, 1984) and communication are based on an attitude of respect for the opinions of others (Kim, et al. 1994; Triandis, 1994) and they are critical to innovation. Since organizational innovation is phenomenal, convergence and requires input from all members of the organization. The group values considered in this regard may actually promote enterprise innovation capability. Thus, it is hypothesized that:

H5: OrgCol has a positive effect on OrgInno.

2.5 Organizational Efficiency

Organizational efficiency (OrgEff) is generally a measure of how well an organization performs compared to established criteria (Griffith et al., 2006). OrgEff can be measured by profitability, growth in sales, market share, employee satisfaction, recognition, turnover, productivity, flexibility, and adaptability (Albert and Nora 2003). Other criteria include the survival of the company, more control over the environment, optimal balance of differentiation and integration, and resource supply. OrgEff has become very important in recent years since global competition has become more intense. Moreover, it can be divided into 3 dimensions: value, structure, and results (Guan and Ma, 2003).

2.6 Organizational Innovation Creation

The concept of innovation is used to describe individual consumer attitudes and acceptance of

new products in published research articles (Rogers, 1995). OrgInno is dissimilar when used in different environments. It is considered as part of the corporate culture competition. OrgInno demonstrates organizational competence in a warm atmosphere of willingness and openness to new ideas (Abernathy and Utterback, 1978). OrgInno are defined as the organization's overall innovation ability to bring new products to market or open new markets through the gathering of strategic behavioral planning and innovative processes (Wang and Ahmed, 2004). Innovating becomes the organization-wide awareness of its members in terms of organizational openness and support on innovative ideas, experiments, and creative processes (Dess et al., 2007).

Hult et al. (2004) states that enhancing corporate innovation with a focus on marketing, learning, and entrepreneurship, helps organizations achieve better results and their business efficiency. Other researchers have also shown similar results, showing a positive correlation between corporate innovation and efficiency (Calantone et al., 2002; Hyvonen et al., 2004), however, collaboration and assimilation increases complexity and rapid change in the current environment so that it makes the organization's ability to support efficiency insufficient and it cannot ensure the company's future success (McCann, 2004). Thus, it is hypothesized that:

H6: OrgInno has a positive effect on OrgEff.

H7: OrgAbs has a positive effect on OrgEff.

As shown in Figure 1, three variables, comprising OrgLear, OrgStru, and OrgCol, affected to OrgInno. Besides, all three variables, OrgAbs, and OrgInno directly affected OrgEff. The model, furthermore, depicted the links among three dimensions: OrgLear, OrgStru, and OrgCol.

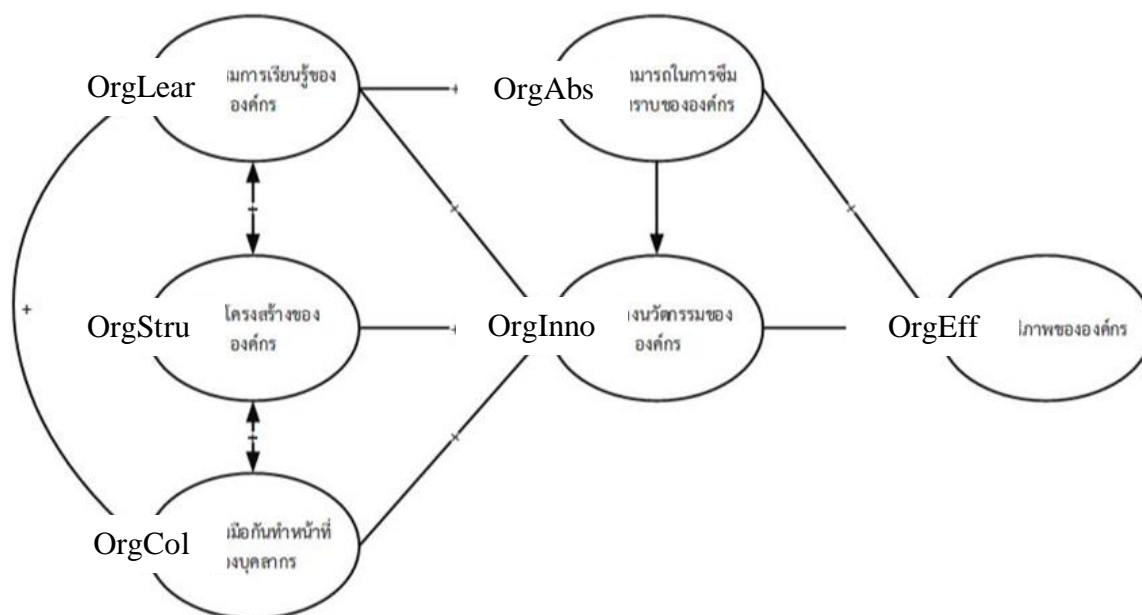


Figure 1: *Conceptual Framework*

Methodology

The research was quantitative research. Therefore, the researchers determined executives and employees in 115 organizations that are members of the Thai steel industry as the population. The sample consisted of 345 executives and employees of the organizations that are members of the Thai steel industry group. The sample size was based on the minimum of 300 samples in the case of less than 7 latent variables in the model, as suggested by Hair et al. (2010). As shown in Table 1, it was found that most of the sample

comprised 153 managers in different departments, representing 41.92%, holding the post for more than 9 years, accounting for 104 persons or 28.49%. The highest level of education was master's degree, representing 235 persons or 64.38%, in the range of age 41-50 years, accounting for 144 persons or 39.45%. For types of business, commercial enterprise represented mostly 157 businesses or 43.01% with 223 more-than-200-employee organizations, accounting for 61.10%. Business experience was mostly more than 15 years or 75.07%.

Table 1: *Sample Demographics Summary*

General information	Number (persons)	Percentage
Position		
Chief executive officer, Managing Director	106	29.04
Assistant Managing Director	106	29.04
Manager	153	41.92
Period of holding the post		
1-3 years	89	24.38
4-6 years	97	26.58
7-9 years	75	20.55
More 9 years	104	28.49
Educational Level		
Bachelor Degree	111	30.41
Master Degree	235	64.38

Doctoral Degree	19	5.21
Age		
31 – 40 years	61	16.71
41 – 50 years	144	39.45
51 – 60 years	98	26.85
More than 61 years	62	16.99
Types of Business		
Manufacturing	116	31.78
Management	88	24.11
Commerce	157	43.01
Others	4	1.10
Number of Employees		
Less than 50 persons	21	5.75
50-200 persons	121	33.15
More than 200 persons	223	61.10
Business Experience		
1-5 years	6	1.64
6-10 years	29	7.95
11-15 years	56	15.34
More than 15 years	274	75.07
Total	365	100

The research instrument used in this research was a questionnaire divided into 3 parts: Part 1 - a personal information questions such as position, period of holding the post, educational level, age, types of business, number of employees, and business experience, Part 2 – the 5-level rating scale questions about latent variables comprising OrgLear, OrgInno, OrgAbs, OrgStru, OrgCol, and OrgEff, and part 3 - open-ended feedback question. The data were on the specified date and time in which the samples were asked for the cooperation in answering the questionnaire to achieve the research results and objectives. Data

gathered were analyzed using percentage, mean, standard deviation (S.D.), Skewness, Kurtosis, Bartlett's Test of Sphericity, Kaiser-Meyer-Olkin (KMO), coloration, and structural equation modeling.

Data Analyses

1.2 Construct Reliability and Validity

First, preliminary analysis was done, as shown in Table 2, to interpret means and consider S.D., Skewness, and Kurtosis of all variables. It was found that all values passed the criteria, as recommended by Vanichbuncha, (2003).

Table 2: Preliminary Analysis

Variables	\bar{x}	S.D.	Interpretation	Skewness	Kurtosis	Remaks
OrgInno						
Lead	4.18	.63	High	-.536	-.393	Acceptable
Cult	4.11	.77	High	-.954	.233	Acceptable
NewId	3.93	.67	High	-.331	-.428	Acceptable
Perfo	3.95	.64	High	-.598	-.342	Acceptable
OrgAbs						

Know	3.72	.65	High	-.188	-.554	Acceptable
Abso	3.70	.68	High	.059	-.474	Acceptable
Comm	3.73	.63	High	-.383	-.522	Acceptable
Expl	3.75	.63	High	-.049	-.033	Acceptable
OrgLear						
OutLea	3.60	.86	High	-.613	-.331	Acceptable
CulLea	3.79	.66	High	-.229	-.736	Acceptable
ProLea	3.91	.77	High	-.978	1.195	Acceptable
OrgCol						
OrgCol4	3.96	.81	High	-.394	-.393	Acceptable
OrgCol6	3.65	.97	High	-.087	-.994	Acceptable
OrgCol7	3.74	.81	High	-.069	-.610	Acceptable
OrgCol8	3.36	.72	Moderate	-.626	1.416	Acceptable
OrgEff						
OrgEff1	3.28	.67	Moderate	.030	.090	Acceptable
OrgEff2	3.35	.56	Moderate	-.108	-.755	Acceptable
OrgEff4	3.87	.78	High	-.673	.409	Acceptable
OrgEff5	3.06	.77	Moderate	.256	-.466	Acceptable
OrgStru						
OrgStru1	2.96	.89	Moderate	-.503	-.544	Acceptable
OrgStru2	3.19	.91	Moderate	-.416	-.241	Acceptable
OrgStru4	3.45	.67	Moderate	-.815	-.462	Acceptable
OrgStru5	3.21	.80	Moderate	-.041	-.820	Acceptable
OrgStru7	3.46	.82	Moderate	-.699	.680	Acceptable

After that, construct validity of the measurement model was verified using confirmatory factor analysis. Measurement model results, as shown in Table 3, of all variables represented acceptable

values since t-value was more than 1.96, as suggested by Vanichbuncha (2003), and statistical significance at the level of .001.

Table 3: Measurement Model Results

Variables	β	SE	t-value	R ²
Organizational Innovation Creation (OrgInno)				
Lead	0.837	0.032	26.464***	0.701
Cult	0.804	0.050	20.057***	0.646
NewId	0.893	0.029	32.807***	0.797
Perfo	0.968	<- ->	<- ->	0.937
Organizational Absorption(OrgAbs)				
Know	0.861	0.029	33.508***	0.741
Abso	0.863	<- ->	<- ->	0.745
Comm	0.935	0.037	27.463***	0.873
Expl	0.869	0.041	23.120***	0.755
Organizational Learning (OrgLear)				
OutLea	0.875	<- ->	<- ->	0.766

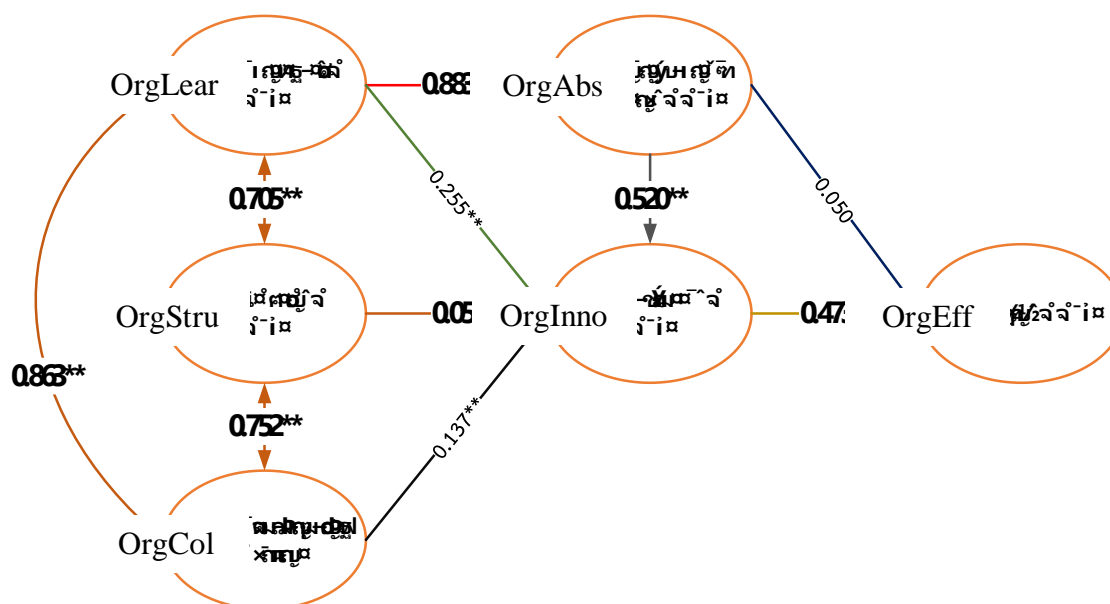
CultiLea	0.878	0.031	24.698***	0.772
ProLea	0.901	0.035	26.390***	0.813
Organizational Collaboration (OrgCol)				
OrgCol4	0.819	0.040	19.933***	0.670
OrgCol6	0.855	<- ->	<- ->	0.731
OrgCol7	0.819	0.040	20.174***	0.671
OrgCol8	0.646	0.038	15.044***	0.418
Organizational Efficiency (OrgEff)				
OrgEff1	0.356	0.065	8.022***	0.127
OrgEff2	0.296	0.047	7.649***	0.087
OrgEff4	0.593	<- ->	<- ->	0.352
OrgEff5	0.442	0.083	8.831***	0.196
Organic Organizational Structure (OrgStru)				
OrgStru1	0.660	0.090	13.471***	0.436
OrgStru2	0.545	<- ->	<- ->	0.297
OrgStru4	0.673	0.081	11.221***	0.453
OrgStru5	0.344	0.057	10.146***	0.119
OrgStru7	0.396	0.071	9.384***	0.156

Note : β = standardized factor loading, R^2 = R-Square, <- -> = Constrained Parameter S.E.= standard error, ***= $p < 0.001$

4.2 Hypotheses Testing

Adjusted SEM portrayed the following fit indices: $\chi^2/df = 105.960/87$, p -value = 0.082, $\chi^2/df = 1.218$, RMSEA = 0.024, RMR = 0.032, GFI = 0.976, AGFI = 0.919, CFI = 0.998. The model depicted that first, OrgLear had a direct effect on OrgAbs (effect size of .883), with a statistically significant at the 0.05 level and had a direct effect on OrgInno (effect size of .255), with a statistically significant at the 0.05 level. Second, OrgStru had a direct effect on OrgInno (effect size of .050), with no statistically significant at the 0.05 level.

Third, OrgCol had a direct effect on OrgInno (effect size of .137), with a statistically significant at the 0.05 level. Forth, OrgAbs had a direct effect on OrgInno (effect size of .520), with a statistically significant at the 0.05 level, and had a direct effect on OrgEff (effect size of .050), with no statistically significant at the 0.05 level. Fifth, OrgInno had a direct effect on OrgEff (effect size of .473), with a statistically significant at the level 0.05. Sixth, OrgLear, OrgCol, OrgAbs, and OrgInno could jointly predict OrgEff by 82 percent, as shown in Figure 2 and Table 4.



Note: ** $p < .05$, Chi – Square = 105.960, $df = 87$, $p\text{-value} = 0.082$, $\chi^2/df = 1.218$ RMSEA = 0.024, RMR = 0.032, GFI = 0.976, AGFI = 0.919, CFI = 0.998

Figure 2: Structural Equation Modeling

Table 4: Path Analysis

Independent Variables	R ²	Effect	Dependent Variables		
			(OrgAbs)		
OrgLear		DE	.883**	.255**	-
		IE	-	.460**	.382**
		TE	.883**	.715**	.382**
OrgStru		DE	-	.050	-
		IE	-	-	.023
		TE	-	.050	.023
OrgCol		DE	-	.137**	-
		IE	-	-	.065
		TE	-	.137**	.065
OrgAbs	0.780	DE	-	.520**	.050
		IE	-	-	.246**
		TE	-	.520**	.296**
OrgInno	0.820	DE	-	-	.473**
		IE	-	-	-
		TE	-	-	.473**

Chi – Square = 105.960, $df = 87$, $p\text{-value} = 0.082$, $\chi^2/df = 1.218$ RMSEA = 0.024, RMR = 0.032, GFI = 0.976, AGFI = 0.919, CFI = 0.998

Note: ** $p < .05$, DE = Direct effect, IE = Indirect effect, TE = Total effect

Discussions and Conclusion

The results of the development and testing the structural equation model in the study were found

that all the fit indices were acceptable as recommended by (Tabachnick and Fidell, 1983; Petchnoi Singchangchai, 2006) the good quality of research instruments was examined as suggested by Araya Ong Iam and Pongthara Wichitchitpaisarn (2018). The model depicts the factors that directly and indirectly affect the efficiency of steel industry organizations in Thailand as follows.

First, organizational learning has a direct effect on organizational absorption as in line with Zahra and George (2002). Besides, the organizational learning has a direct effect on Organizational Innovation Creation as in agreement with Marsick and Watkins (2003). The findings above are sustained by Gurteen (1998) which concludes that knowledgeable entrepreneurs will support for new and innovative ideas, including participation in experiments and creative processes (Hurley and Hult, 1998). In addition, the organizational learning indirectly affects organizational efficiency through the Organizational Innovation Creation (Lumpkin and Dess, 1996). Second, organic organizational structure has a direct effect on the Organizational Innovation Creation, as in keeping with Thompson (1965) and Rogers (1983). Besides, Aiken and Hage (1971) explain that the organizations with organic structure tend to be more innovative organizations. Third, organizational collaboration has a direct effect on Organizational Innovation Creation, as revealed by Wagner (1995), because creating Organizational Innovation Creation is a converging phenomenon and requires input from members of the organization. All the cooperation in the organization, thus, helps to promote innovative abilities of the organization truly. Forth, organizational absorption has a direct effect on Organizational Innovation Creation since it increase ability to convert countless information used to identify external environments and internal departments of the organization, as portrayed by Cohen and Levinthal (1990). Fifth, Organizational Innovation Creation has a direct effect on organizational efficiency, especially

innovations on marketing, learning, and entrepreneurship, as suggested by With Hult et al. (2004), including the efficiencies on profitability, sales growth, and market share, as recommended by Calantone et al. (2002) and Hyvonen et al. (2004). Sixth, organizational learning, organizational collaboration, organizational absorption, and organizational innovation creation can jointly predict organizational efficiency since these factors will allow members to adhere to the goals of the organization, create incentives for members (Deal and Kennedy, 1982; Phrapratanporn et al., 2019), improve the quality of management decisions, and help the organization to respond to needs of the environment (Sukhothai Thammathirat Open University, 2009).

The results conclude that first, organizational learning culture had a direct effect on organizational absorption ability and organizational innovation creation. Second, organic organizational structure had no direct effect on organizational innovation creation. Third, organizational function collaboration had a direct effect on organizational innovation creation. Forth, organizational absorption ability had a direct effect on organizational innovation creation, and however it had no direct effect on organizational efficiency. Fifth, organizational Innovation creation had a direct effect on organizational efficiency. Finally, organizational learning culture, organizational function collaboration, organizational absorption ability, and organizational innovation creation could mutually forecast organizational efficiency. Therefore, Thai government should accelerate the creation of knowledge and understanding of Thailand Steel Producers regarding steel product standards and develop an information system that can fully linked in the production system to increase entrepreneurial competitiveness and accessibility of funding sources.

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