The Effect of Environmental Factor on Organizational Performance through Disruptive Innovation Management in the Electronic Industry

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Abstract **- Thailand's electronics industry is influenced by the strong competitive environment especially, on information technology and innovation. This research aimed: 1) to study the business competitive environment influence on organizational performance; 2) to investigate the influence of disruptive innovation management over organizational performance; and 3) to study the impacts of environmental factors on organizational performance through disruptive innovation management. This research involved 255 managers for in the information technology companies in Thailand. The questionnaire respondents were directly involved in IT management for the samples electronics industry. The descriptive statistical analysis and the structural equation model: SEM was adapted to seek for the relationship between variable and hypothesis testing. The study results showed that the four elements in competitive environment were competitive pressure, government regulation, industry characteristics and technology. This indicates that for the success of Thailand's electronics industry, companies must pay attention on cross functional integration which helps to analyze and manufacture products and services to meet consumers' requirement.**

Keywords **- Environmental Factor, Disruptive Innovation Management, Organizational Performance**

I. INTRODUCTION

Change in technology is so challenging for business competition in the 21st century with the violent forms of business competition and gone quickly with information technology and communication evolution. The ability in innovation and technology then being the crucial factor to add more potential in organization competition. Technology has increased its main role to be able to form innovation which is to form up new things to be the idea to lead the organization toward success and forming the competitive advantage. Besides, innovation is the idea being accepted as part of strategic management [1]. Organization with innovation and ability to invent or create new things usually are the successful organization in business operation [2].

The electronics industry in Thailand is being influenced by the violence business competitive environment plus, the influences from economics, politic, society and technological aspects especially, the influence of modern technological changes on the internet, Digital Economy era. With reference to the information from the group of electric

and electronics in Thailand, the export value of production from years 2012-2016 declined. For household appliances industry and computer parts production industry this was due to the high cost of production and the impact from innovation or technology. This made many firms adjust their strategic plans by moving the production base to the neighbor countries with the policy to stimulate economics and better political security. This is to support the expansion of businesses to compete in ASEAN or the global venue in the future.

The main problems with the current electric and electronic industry can be concluded as follows:

- Most of productions are the middle and end stream production.
- The Thai electronics exporting is still gathering around the computer materials and parts.
- Changes in consumption behavior in the Internet of Things era.
- Lack of highly skilled labor in the development.

In order to overcome the problems, the Thai Electric Manufacturing Industry (TEMI) need to take lead in business competition, the organization must learn to adjust with the changes in environment and develop the organization potential in sustainable competition [3].

Thus, the organization management must pay attention to the innovative development for the products or services quality development with high efficiency. Moreover, to form the organization personnel with the ability to create innovation with efficiency and effectively operational performance in which will result toward the business sustainability onward.

II. LITERATURE REVIEWS AND HYPOTHESES DEVELOPMENT

A. Environment Factor (ENF)

Competitive environment consists of work or industrial environment. The ability to generate profits by the business and competitive characteristics in the industry has direct direction toward competitive environment development. Competitive environment refers to the crucial factor toward the business strategy such as competitors, customers, and sellers of production factors in which lead to the opportunities and threats in organization performance [4]. The analysis of competitive environment is the main tool for the organization to plan and establish the policy and prevent risk [5-6]. PEST Analysis is a basic tool for the analysis and to understand the big picture of external factor that would influence the organization [7]. The analysis of competitive environment that influences toward organizational operation consists of four elements from the external environment which are political, economic, social, and technology [8].

B. Disruptive Innovation Management (DIM)

To establish the goal and stimulate each part for work commitment as well as to create innovation to be the tool to form business competitive advantage and step toward the market leader with the same goal [9]. Innovation is the concept, procedure, and approach accepted as the new things in the organization [10]. It has significant benefits for the organization and a concept that results from new creation with the influences on the organizational operation [11]. Technology is the key element that would bring discovery and new presentation in the market [12]. The ability of innovation reflects the ability of the business to form and use new idea to develop products and service and work process that affect the organization operation [13].

C. Organizational Performance (ORP)

Organization performance is the operation level that an organization expects and plans to achieve goals [14]. Organization performance is the ability that make organizations reach to

their goals from worth used of resources for the potential in business competition and create customers satisfaction [15] .

Therefore, the analysis of competitive environment is the basic tool for the management and it is necessary for the administration, strategic planning, organization policy, planning for the business opportunity and preventing the obstacles that affect on the organizational operation.

The importance of innovation capabilities and disruptive innovation management, its potential mediating role on organizational performance have been emphasized per the aforementioned. Therefore, the following hypotheses are put forth to establish the model relationship.

H_1: Environmental factor (ENF) has positive effect on disruptive innovation management (DIM).

H_2: Disruptive innovation management (DIM) has positive effect on organizational performance (ORP).

H_3: Environmental factor (ENF) has positive effect on organizational performance (ORP) through disruptive innovation management (DIM).

III. RESEARCH METHODOLOGY

A. Population and Sampling

The study is aimed at examining the effect of environmental factor (ENF) on organizational performance (ORP) through disruptive innovation management (DIM) of the electronic manufacturing industry in Thailand. The target respondents were IT managers. These respondents were considered having adequate knowledge about the company's environmental competitive, innovation capabilities and performance. The study was conducted with one selected industry to enable the more control of extraneous variables [16]. The sample size was calculated according to Bentler and Chou [17] which offered a simplified guideline for trustworthiness of parameter estimates which suggested the ratio for sample size to number of free parameters at 5:1 ratio, the calculated sample size for this study was 204 from the electronic manufacturing industry in Thailand.

B. Data Collection

This study adapted the key informant survey research methodology for data collection, the key informant survey research strategy suggests that the key informants must be knowledgeable on issues being studied willing and able to communicate this information [18]. The mail survey methodology was used to collect data. The data was collected through combination approaches where the respondents were provided with options to complete and return the questionnaires: through a postage-paid, addressed return envelope; by fax or through web-based questionnaire.

C. Measurement

The latent variables for this study are based on literature review of the relevant research works which comprises of: environmental factor (ENF) measured by competitive pressure, government regulation, industry characteristics and technology support; disruptive innovation management (DIM) measured by new-market disruptive and low-end disruptive, organizational performance (ORP) measured by organizational productivity, organizational effectiveness, market share and customer satisfaction as observed variables.

D. Reliability and Validity

The questionnaire was reviewed and assessed, using Index of Item-Objective Congruence (IOC) method by six subject-matter experts. The test of reliability of the variables used in the model was done Cronbach's alpha as means to measure internal consistency with the alpha value not less than .8. Data within normal distribution with the Kurtosis value between -2 to +2. The testing of Multi-collinearity was by Variance Instruction Factor (VIF); it was lower than 10 which reflects no multi-collinearity among all variables.

TABLE I
VARIABLES DIMENSIONS

Variable Label	Descriptions	Mean	Std. Deviation	Cronbach's Alpha
COPAv	Competitive Pressure	4.98	1.23	0.913
GORAv	Government Regulation	4.48	1.26	0.917
TESAv	Technology Support	4.48	1.23	0.915
INCAv	Industry Characteristic	4.40	1.10	0.912
NEDAv	New-Market Disruptive	4.94	1.05	0.903
LODAv	Low-end Disruptive	5.08	1.02	0.905
ORPAv	Productivity	5.20	1.09	0.905
OREAv	Effectiveness	5.17	1.06	0.905
MKSAv	Market Share	4.59	1.03	0.908
CUSAv	Customer Satisfaction	5.05	1.05	0.908

E. Convergent Validity and Discriminant Validity

The convergent validity was tested prior to the evaluation with SEM [19]. It the factor loading values are greater than .6 and the AVE are higher than .5, the model can be considered converged. The loading factors ranged from .65 to .89 while the squared correlation values from the study ranged from .57 to .77.

The assessment of discriminant validity is evaluated by comparing the Average Variance Extracted (AVE) value with squared correlation between variables. Fornell [20] suggested that the values of squared root AVE should be higher than squared correlation values as to be valid. The result shown on table II and III indicates that the all the values mentioned support the discriminant validity. The AVE values from each latent variable were greater than the level of correlation involved.

TABLE II
FACTOR LOADING OF THE LATENT VARIABLES

Latent Variables	Observed Variables	Factor Loading	Composite Reliability	AVE
ENF			0.840	0.568
	COPAv	0.78		
	GORAv	0.74		
	TESAv	0.80		
	INCAv	0.69		
DIM			0.867	0.766
	NEDAv	0.89		
	LODAv	0.86		
ORP			0.881	0.653
	Productivity	0.88		
	Effectiveness	0.89		
	Market Share	0.65		
	Customer Satisfaction	0.79		

TABLE III
THE SQUARED CORRELATION BETWEEN VARIABLES

	ENF	DIM	ORP
ENF	**0.916**		
DIM	0.35	**0.875**	
OPR	0.28	0.80	**0.808**

The Squared root AVE in diagonal

F. Measurement of Model Fit

The results of the measurement model indicated that the Normed Chi-Squared fit index derived from Chi-Square/degrees of freedom (χ^2/df) is 1.907, indicating a good model fit between the data and the hypothetical model. The Goodness of Fit (GFI) value is .957 and the Adjusted Goodness of Fit (AGFI) value is .922. The Value of Root Means Square Error of Approximation (RMSEA) value is .060. The Normed Fit Index (NFI) and Comparative Fit Index (CFI) value are .961, and .981 respectively. All of the data mentioned above demonstrate an acceptable model for this study.

TABLE IV
STANDARDIZED DIRECT, INDIRECT, AND TOTAL EFFECTS

	Standardized Direct Effect			Standardized Indirect Effect			Standardized Total Effect		
	ENF	DIM	ORP	ENF	DIM	ORP	ENF	DIM	ORP
ENF	-	-	-	-	-	-	-	-	-
DIM	.347	-	-	-	-	-	.347	-	-
ORP	-.037	.845	-	.293	-	-	.259	.845	-

TABLE V
ASSESSMENT OF THE MODEL FIT INDICATORS

Chi-square / Degree of freedom (CMIN/df)	1.907
Goodness of Fit Index (GFI)	0.957
Adjusted Goodness of Fit Index (AGFI)	0.922
The Root Means Square Error of Approximation (RMSEA)	0.060
Normed Fit Index (NFI)	0.961
Comparative Fit Index (CFI)	0.981

IV. DATA ANALYSIS OF STRUCTURAL EQUATION MODEL

Structural Equation Model (SEM) was constructed for the test of the proposed hypotheses. To determine the relationship between latent variables, the hypotheses was developed that the H_1: ENF would affect DIM,

H_2: DIM would affect ORP, H_3: ENF would affect ORP.

The standardized direct effect coefficients associated with the SEM as shown below.

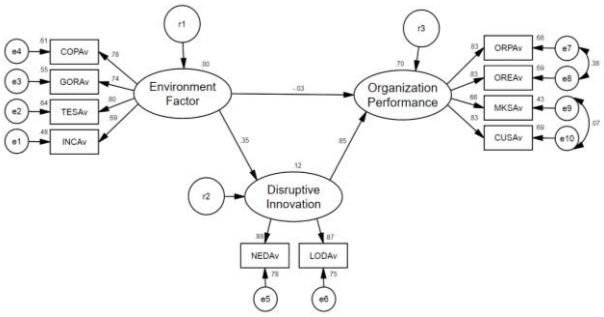

Fig. 1 Measuurement Model

In considering the presence of the standardized indirect effect of the IT investment on organizational performance through innovation capabilities, the result indicated that there is an indirect effect at .293.

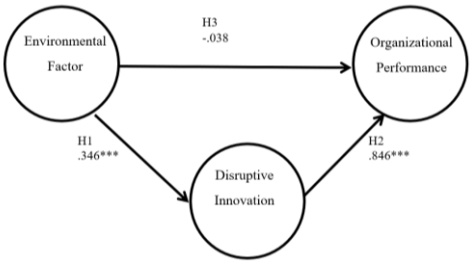

Fig. 2 Research Model Results

The result indicates that ENF has affects on DIM at .347 ($p<0.001$), DIM has affects on ORP at .845 ($p<0.001$) and ENF has no affects on ORP at .036 but ITI has indirect effect on ORP through INC. The relationships hypothesized for latent variables on this empirical study were supported. The regression weights between latent variables in the model is shown in table VI.

TABLE VI
REGRESSION WEIGHTS BETWEEN LATENT VARIABLES IN THE MODEL

Latent Variables	Regression Weights
ENF ---> DIM	.347***
DIM ---> ORP	.845***
ENF ---> ORP	.034

V. DISCUSSION AND CONCLUSION

This research was conducted by collecting data through questionnaire from 255 companies in the electronics manufacturing industry in Thailand. The conclusion from this study is that firms pay attention on environmental factor (ENF) which comprises of competitive pressure, government regulation, technology support and industry characteristics and the most effect which firms focused on was technology support. This conformed with the research by [21] who studied the external environment impacts related to the industry. The most influential environment toward organization is technology. It requires the management to understand and to use technology to form the competitive advantages and intervene into all competitive dimensions. The hypotheses set forth for this study showed that:

H_1: environmental factor (ENF) has positively effect on disruptive innovation management (DIM) (β=.347, $p<0.001$).

H_2: disruptive innovation management (DIM) has positive effect on organizational performance (ORP) (β=.845, $p<0.001$), which indicates that environmental factor (ENF) has positive relationship on disruptive innovation management (DIM) and disruptive innovation management (DIM) has positive relationship on organizational performance (ORP).

H_3: environmental factor (ENF) has no positive direct effect on organizational performance (ORP) but rather has indirect effect on organizational performance (ORP) through disruptive innovation management (DIM).

The study of Carneiro [22] stated that business organization shall pay attention to the competitive environment analysis either internal or external. It is to form the opportunities and prevent risks from the environment. Therefore, external environment can have effects on organizational performance thus, paying attention to the external environment in regard of opportunity and threat could allow

the organization to seek for the benefits from the external environmental status to establish and run the strategy toward the highest profits. If the organization can correctly and exactly analyze the factor, they could be successful [2]. Besides, the industry environment refers to the factors with organization influenced and result on the internal industry competition. The industry environment was influenced by general environment and affected the organizations that were competing in that industry [23].

VI. IMPLICATOIN AND FUTURE RESEARCH

This research has explored the opinion of the electronic industry in Thailand by using the tool for external organization environmental analysis that affects the electronic industry or PEST Analysis. The effects can be divided into 4 aspects; competitive pressure, government regulation, technology support and industry characteristics. The analysis result can be summarized as follows. The most influential factor on the electronic industry is technology support. It indicates that technology has the highest impact on business operation and this conforms to researches in the past.

Thus, electronic industry in Thailand shall pay attention on technology development both in the part of technology in support to operation, organization and knowledge on information technology. Especially, on new technology support such as internet of think, cloud technology, mobile internet, advanced materials etc., since these technologies are the key instrument to facilitate and form work efficiency, forming differences in product and service, efficient manufacturing process and to help in efficient data analysis to response to consumers' demand.

Business competition nowadays is quite violence and with quick change thus, the management shall understand and acknowledge how to adjust themselves with the competitive environment. They shall stress on creative innovative to adjust technology according the new forms of world technology as well as to integrate any science of strategic management and innovation technology to form the competitive advantage and continue to have business sustainability. Therefore, management from all levels shall understand and pay attention to innovation development or technology together with the analysis of competitive environment impacts. Technology and innovation will help facilitating the dominate competitive potential for the organization and partly help push the organization to be manageable, to create the better products and service and with better performance than rivals. According to innovation integration is multidimensional, the further research might examine other dimension of innovation integration and their influence on organizational performance.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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