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# STRUCTURAL EQUATION MODELING IN BUSINESS PERFORMANCE THROUGH COMPETITIVE ADVANTAGE WITH INFORMATION TECHNOLOGY AS MODERATING

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## ABSTRACT

*This study aims to assess the effect of entrepreneurial orientation, information technology, strategic planning in delivering business performance and competitive advantage of micro and small food-processing industry. The results Showed that the models of competitive advantage with information technology as moderating on SMEs in Batam with the approach of Structural Equation Modeling (SEM) is a models that fit based on the criteria of Goodness of Fit (GoF). Business performance with operational indicators influenced by entrepreneurial orientation and strategic planning, and further affect the competitive advantage. Information Technology with moderate utilization rate indicator of business performance with operational performance indicators that are strengthening influence on competitive advantage on the indicators of the uniqueness of the product, not easily imitated and competitive price.*

**Keywords:** Information Technology, Performance, Competitive Advantage, intervening, Moderating, SEM, SMEs.

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## 1. INTRODUCTION

Micro, small and medium enterprises (SMEs) or Micro, Small and Medium-sized Enterprises (MSMEs) has Become one of the machines are effective in developing the pattern of economic market in almost all countries and regions. Data from the Ministry of Cooperatives and SMEs, in 2013 SMEs are Able to donate 5,440 trillion (at current prices) to Gross Domestic Product (GDP) roomates absorb labor National 114.14 million people, and Attract investment to 1655.2 trillion total effort as much as 57.8 million units (Sari et al., 2015). The contribution of SMEs to the national GDP in the year 2013 were 57.6 per cent (at constant prices), which came from micro 30.3 percent, 12.8 percent of small businesses, and 14.5 percent Came from medium-sized businesses.

Data Contributions SMEs to the national economy of 2014 as in get that volume figures for Micro Provides 98.74 percent of the number of business units, amounting to 1:15 percent of Small, Medium Enterprises and Large Enterprises by 12:10 by 0:01 percent figure. Contributions Highest number of SMEs in 2013 was 55 586 million micro-businesses with businesses, followed by 629 000 small businesses, 49,000 medium and large business operators 5000 issued by the Ministry of Cooperatives and Small and Medium Enterprises as the SOE Creative Home Handbook 2016. Meanwhile, various internal and external factors also influence and support the competitiveness of SMEs. These factors are supporting the competitiveness of the company or the SMEs Themselves. The level of innovation is still low in Indonesia increase of the severity of competition to the open market. Added by Sari et al. (2015) in the working paper Bank Indonesia that factors inhibiting the lack of innovation and SMEs to come forward. The problems that exist in the food processing industry in Batam till now that is not the Indication of readiness both professional processing, quality and market standards-compliant. Entrepreneurial orientation and planning strategies of SMEs and the Government has not established maximum synergy.

According Asmarani (2006), the turmoil facing the business world today is not just occurred because of changes in the external environment, but also the consequences of development and the internal changes of the respective companies. The number of SMEs or SME businesses are Likely to Decrease performance and impact the weakening of competitive advantage even lead to bankruptcy is a classic weakness in entrepreneurial-entrepreneurial. The rapid development of information technology today is not only related to the current era of the advent of computers and devices to support all business activities. Information technology is changing while the other inventors create the application, which is very useful for the overall corporate world and is used by entrepreneurs all over the world. For the inventors, self-created applications were initially thought to benefit from their patents and to support future business potential. With the mutual economical, the owners of the information technology world such as Microsoft, Facebook, Google for example see applications is an advantage that Regardless of the value they have to buy in order to maintain performance and excellence in global competition in information technology markets. The owners of the technology world with information technology application investors Realize that the price of applications is very similar to the existence of information technology at their disposal. It creates super-value purchases with price Because Reviews their awareness to not lag behind the competitors who are ready to seize the market through the application of technology that is growing rapidly at the moment.

The research conducted by Murni (2014) in his research explained that there was no significant negative relationship between entrepreneurial orientation towards the performance of *batik* SMEs. By Krauss et al. (2005) a study of small entrepreneurs in South Africa emphasizes that entrepreneurial orientation has a positive and significant influence on business growth, the number of workers and external evaluation of success the which is a measure of

company performance. Research by Li et al. (2006) produced an entrepreneurial orientation that has a positive effect on company performance. Significantly positive relationship between entrepreneurial orientation towards organizational performance was Also Obtained through Covin and Slevin (1991) and Zahra and Covin (1995). Nevertheless, Auger et al. (2003) contradictively get results that entrepreneurial orientation has no effect on performance. Likewise, significant negative results were conveyed by Rachmadi (2004) who stated that there was no significant influence of entrepreneurial orientation on performance in the context of franchise outlets. Mahmood and Hanafi (2013) in their research resulted in a significant influence between entrepreneurial orientation and competitive advantage. Matsumo et al. (2002) and Sadler-Smit et al. (2003) stated the results of research that entrepreneurial orientation is not related to performance. Some constructs of entrepreneurial orientation such as innovativeness, proactiveness and risk-taking have no relationship with performance such as the research of Nugroho and Setiawan (2015). According to Wibisono et.al., (2018), motivation as a moderating variable emotional intelligence dominant influence on the performance of lecturers. Emotional intelligence is influenced by the Organizational Citizenship Behavior, and further affect the workload and performance of lecturers. Nugroho and Setiawan (2015), found no significant relationship between entrepreneurial orientation and organizational performance. Rauch et al. (2004) found some indications that size moderates the relationship of Entrepreneurship Orientation and Performance, where the relationship is stronger in microenterprises than small businesses. Through the research of Suseno (2010) suggests that the results of reviews their research that is entrepreneurial orientation does not have a positive and significant effect on competitive advantage. The difference in results of research encourages Researchers to study the effects of entrepreneurial orientation on performance.

Methods related to latent variables namely Confirmatory Factor Analysis (CFA) or measurement model (Brown, 2006 N. Rusdi et. al., 2014)) and Structural Equation Modeling (SEM) (Mulaik 2009; Raykov & Marcoulides, 2006; Hair et. al., 2006; Bollen, 1989). Research related to SEM, among others: N. Rusdi et.al., (2018), Purchase decision with the indicator easy channel selection and purchase the brand from the election offers accommodation and lodging influence on the level of customer satisfaction and the level of satisfaction with the service indicator and the location that offered a significant effect on customer loyalty, namely convey positive service providers. While Relating to SEM moderating, among others: Wibisono et.al., (2018), Management information system as a moderating variable total quality management provides a strengthening effect on performance. Dominant influence culture of total quality management organization and subsequently affect study program performance.

This study aims to examine the effect of the use of entrepreneurial orientation, information technology, strategic planning in presenting business performance and competitive advantage of micro and small entrepreneurs in the food processing industry or also commonly referred to as food processing industries in the city of Batam roomates have progressed quite rapidly during reviews their existence.

This study aims to provide an explanation of the influence of entrepreneurial orientation, strategic planning on competitive advantage through business performance with information technology as moderating on micro and small entrepreneurs in the food processing industry in Batam City.

## 2. METHODOLOGY

The Data used in this study is primary the data from the results of a survey of micro and small entrepreneurs in the food processing industry in Batam City. Sampling was obtained from the Slovin formula with a simple random sampling technique (Sekaran, 2011; Razif et al., 2006; Samudro and Mangkoedihardjo, 2012). The study involved 5 latent variables with 14 indicators. Entrepreneurship Orientation latent exogenous variables (X1) with proactive indicators (X1.1) innovation (X1.2) and freedom (X1.3) (Li et al., 2006). Strategic planning latent exogenous variables (X2) with indicators of formality of strategic planning (X2.1), sources of information (X2.2), and evaluation and control (X2.3) (Sandada, 2012). Moderate information technology latent variable (Z) with indicators of diversity of use (Z1.1) and utilization rate (Z1.2) (Gusrita, 2010). The latent variable is intervening business performance (Y1) with financial performance indicators (Y1.1) and operational performance (Y1.2) (Jahanshahi et al., 2012). Competitive advantages of endogenous latent variables (Y2) with indicators of product uniqueness (Y2.1), competitive prices (Y2.2), rarely found (Y2.3) and not Easily replicated (Y2.4) (Asmarani 2006). Conceptual research is presented as follows.

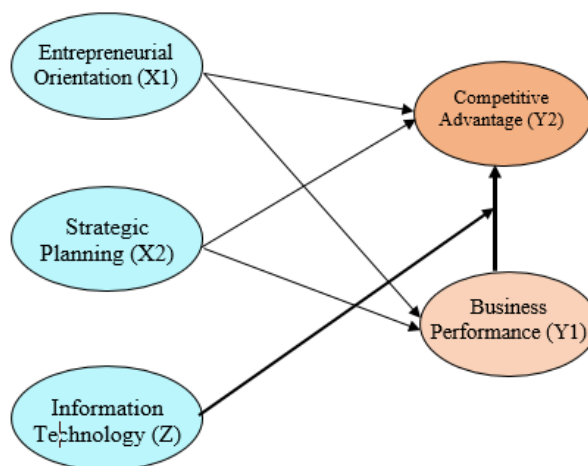


Figure 1

Conceptual Framework for Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance with Information Technology as a Moderating Variable

Evaluation of the measurement model, namely convergent validity and reliability of composite. Convergent validity is used to determine the correlation between each indicator with latent variables. Convergent validity can be seen from the value standardize loading factor ( $\lambda$ ). Value standardize loading factor above 0.5 is acceptable, while values below 0.5 standardize loading factor can be removed from the model. Composite reliability a block indicator that measures a construct and can be evaluated by the size of the internal consistency. Composite reliability can be calculated with the following formula:

$$C - R = \frac{\left( \sum_{k=1}^{K_j} \lambda_{jk} \right)^2}{\left( \sum_{k=1}^{K_j} \lambda_{jk} \right)^2 + \sum_{k=1}^{K_j} (1 - \lambda_{jk})^2} \quad (1)$$

These sizes are acceptable levels of reliability when the latent variable coefficients greater than 0.7.

Structural Equation Modeling have a direct or indirect relationship and allow the relationship between a latent variable exogenous to endogenous latent variables that influenced other latent variables (moderating). The method can be used to assess the effect of moderating one is the Ping method. The first stage: estimate without entering the variable interactions that we only estimate the model with two exogenous variables  $\xi_1$  and  $\xi_2$  are used to predict the endogenous variables  $\eta_1$ ; the output of this model is used to calculate the value of the interaction latent variable loading factor ( $\lambda$  interaction) and error variance values of the latent variable indicator interaction. Stage two: after a  $\lambda$  value of interaction and  $\theta_q$  value obtained from the first stage, then these values are incorporated into the model with latent variable interaction; the results of the manual calculation of the loading factor of interaction is used to set the value of the interaction parameter loading value, while the result of the calculation error variance manual interaction variables used to define an error variance interaction variables (Ping, 1995).

### 3. RESULTS AND DISCUSSION

Measurement models consist of validity and reliability test. In detail, the validity and reliability in each of the latent variables are presented in the following table:

Table 1.  
Value and Reliability Validity Indicator Latent Variables

Latent variables	Indicators	p variance error	Loading ( $\lambda$ )	$\lambda^2$	$1 - \lambda^2$	C-R
Entrepreneurial orientation (X1)	Proactive (X1.1)	0.000	0.840	0.706	0.294	0.844
	Innovation (X1.2)	0.000	0.834	0.696	0.304	
	Freedom (X1.3)	0.000	0.730	0.533	0.467	
Strategic Planning (X2)	Formality of strategic planning (X2.1)	0.000	0.721	0.520	0.480	0.798
	Sources of information (X2.2)	0.000	0.838	0.702	0.298	
	evaluation and control (X2.3)	0.000	0.699	0.489	0.511	
Information technology (Z)	Biodiversity Utilization (Z1.1)	0.000	0.694	0.482	0.518	0.716
	Utilization level (Z1.2)	0.000	0.798	0.637	0.363	
Business Performance (Y1)	Financial Performance (Y1.1)	0.000	0.689	0.475	0.525	0.731

	Operational Performance (Y1.2)	0.000	0.826	0.682	0.318	
Competitive Advantage (Y2)	Product uniqueness (Y2.1)	0.000	0.781	0.610	0.390	0.828
	Competitive price (Y2.2)	0.000	0.733	0.537	0.463	
	Rarely Found (Y2.3)	0.000	0.668	0.446	0.554	
	Not easily imitated (Y2.4)	0.000	0.772	0.596	0.404	

Table 1 shows that the latent variable orientation of entrepreneurship (X1), Strategic Planning (X2), the Information Technology (Z), performance (Y1) and competitive advantage (Y2) gives the loading factor and Composite reliability (C-R) at equation (1) values above the cut-off so as to is said to be valid and reliable. Similarly, in each indicator all error variance p value less than 0.05 then virtually all reliable indicators. Entrepreneurial orientation (X1) is formed indicator by proactive (X1.1) (0.840), innovation (X1.2) (0.834), and freedom (X1.3) (0.730). Strategic planning established by the formality indicator of strategic planning (X2.1) (0.721), sources of information (X2.2) (0.838), and the evaluation and control (X2.3) (0.699). Information technology (Z) is formed by the indicator biodiversity utilization (Z1.1) (0.694), and utilization rate (Z1.2) (0.798). Performance (Y1) is formed by indicator financial performance (Y1.1) (0.689), and operational performance (Y1.2) (0.826). Competitive advantage (Y2) formed by the uniqueness indicator products (Y2.1) (0.781), competitive prices (Y2.2) (0.733), rarely encountered (Y2.3) (0.668), and not easily imitated (Y2.4) (0.772).

Testing assumptions on structural modeling is a normal multivariate assumption, assuming the absence of multicollinearity or singularity and outliers. Results of testing the normality of the data on all study variables give multivariate Critical Ratio of 2.197 and is located outside the -2.58 value up to 2.58, so that it can be said that the data normal multivariate distribution. The singularity can be seen through the determinant of the covariance matrix. The results of the research value of the sample covariance matrix determinant of 0.001, so that it can be said that there is a singularity problem. Multicollinearity can be seen through the correlation between exogenous latent variables. The value of the correlation between entrepreneurial orientation latent variables (X1) with Strategic Planning (X2) of 0.339 with  $p = 0.191$  is greater than the significance level  $\alpha = 0.05$ , it can be said does not happen multicollinearity. The test results are presented on the Mahalanobis distance outlier greater than Chi-square table or value  $p1 < 0.001$  there is one data, it can be said does not happen outlier. Further analysis of the shape of the path diagram is presented as follows:



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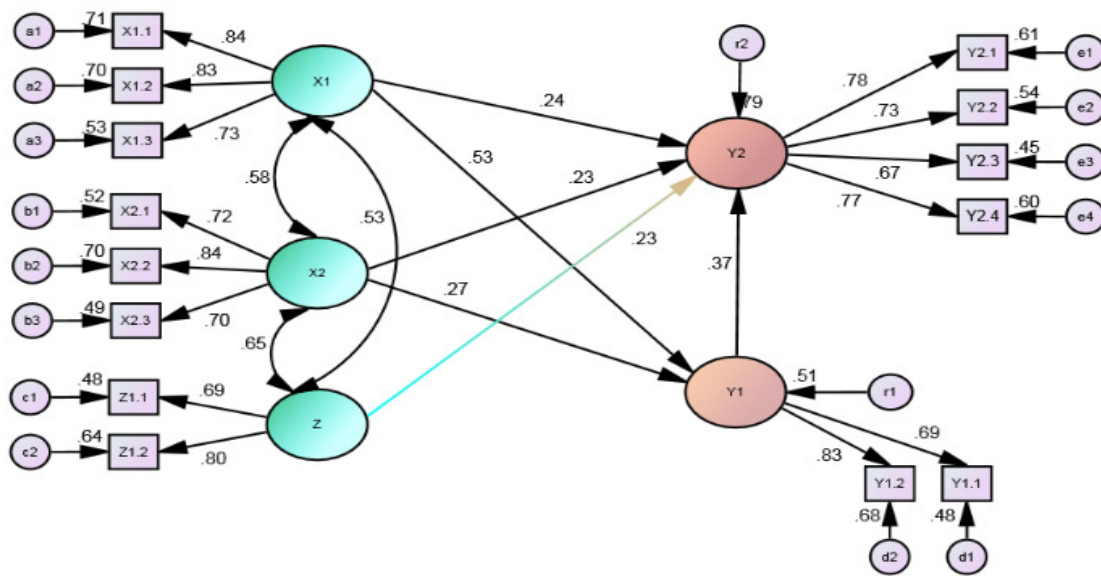


Figure 2

Model Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance with Information Technology As a Moderating Variable (Step - 1)

The path coefficient test in Figure 2 is presented in the following Table 2.

Table 2

Test Results Path Coefficient of Model Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance with Information Technology as a Moderating Variable (Step - 1)

Variables	Coefficient	Critical Ratio (CR)	Probability (p-value)	information
Entrepreneurial orientation (X1)→Business performance (Y1)	0.526	3.923	0.000	significant
Strategic planning (X2)→Business performance (Y1)	0.266	2.168	0.030	significant
Entrepreneurial orientation (X1)→Competitive advantage (Y2)	0.245	2.086	0.037	significant
Strategic planning (X2)→ Competitive advantage (Y2)	0.233	1.966	0.049	significant
Information technology (Z)→ Competitive advantage (Y2)	0.225	1.983	0.047	significant
Business performance (Y1)→Competitive advantage (Y2)	0.371	2.922	0.003	significant

Based on Table 2, moderating variables (Information Technology (Z)) have a positive and significant effect on competitive advantage (Y2). This can be seen from the path coefficient that is positive at 0.225 with a T-Statistic value of 1.983 which is greater than t-table = 1.96. Thus Information technology (Z) has a direct effect on the competitive advantage (Y2) of 0.225, which means that whenever there is an increase in Information Technology (Z) it will increase

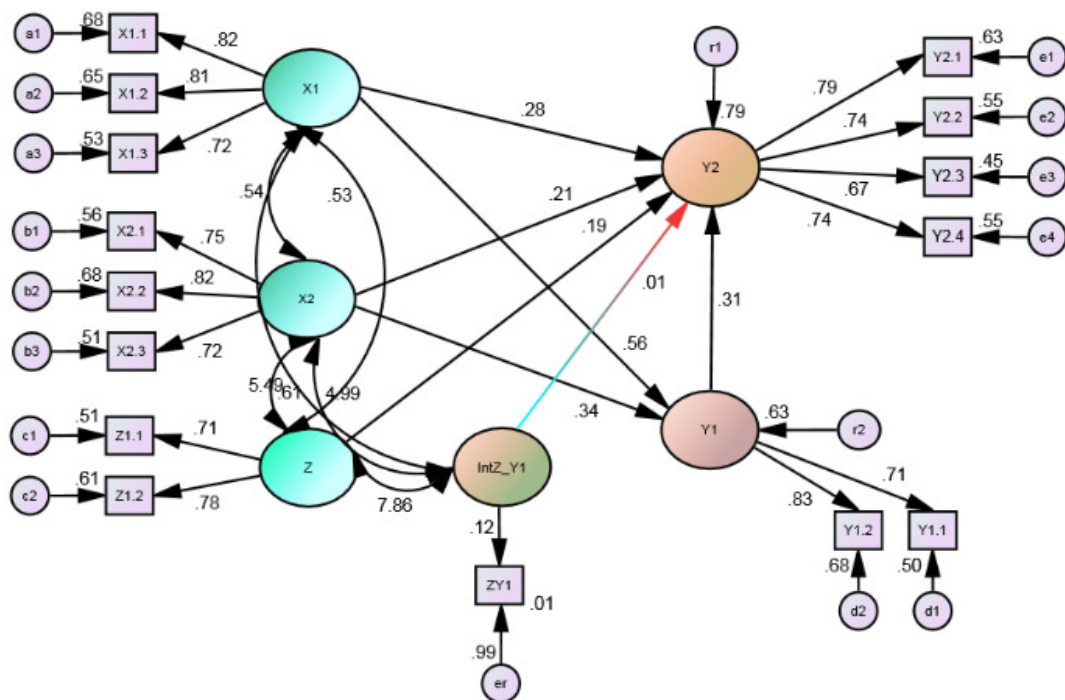
the competitive advantage (Y2) by 0.225. This shows that Information Technology (Z) is thought to be a moderating variable that strengthens the effect of performance on competitive advantage (Y2). The Moderating Structural Equation Modeling (MSEM) model in Step - 1 is used to get the lamda Interaction and Variance Error presented as follows.

**Tabel 3**

The Calculation Lamda Interaction and Error Variance

Z Moderation Y1 to Y2	Z		Y1	
	Loading	variance	Loading	variance
Indicator	0.694	0.510	0.689	0.554
	0.798	0.401	0.826	0.327
variance	0.473		0.246	
Lamda Interaction (Int_Z_Y1)	2.26038			
Error Variance (Z_Y1)	2.24459			

Table 3, the moderator latent variables can be continued in the form of path analysis diagram is presented as follows:



**Figure 3**

Moderation Effects Information Technology at Model Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance (Step - 2)

Results of testing the measurement models with AMOS complete program can be seen in the following table.



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**Table 4**

Goodness of Fit Moderation Effects Information Technology at Model Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance (Step - 2)

Goodness of Fit (GoF)	Value Cut - Off	The calculation results	information
Chi - Square	expected to be small	167.805	$\chi^2$ with df = 165 is 195.973 Good
significance probability	$\geq 0:05$	0.425	Good
RMSEA	$\leq 0:08$	0.073	Good
GFI	$\geq 0.90$	0.904	Good
AGFI	$\geq 0.90$	0.828	Good
CMIN / DF	$\leq 2:00$	1.017	Good
TLI	$\geq 0.90$	0.913	Good
CFI	$\geq 0.90$	0.927	Good

Of a suitable models, it can be interpreted in each structural path coefficients through the following equation:

$$Y1 = 0.555 X1 + 0.340 X2$$

$$Y2 = 0.277 X1 + 0.209 X2 + 0.193 Z + 0.309 Y1 + 0.009 \text{IntZ\_Y1}$$

with:

X1 : Orientation entrepreneurship

X2 : Strategic planning

Y1 : Performance

Y2 : Competitive advantage

Z : Information Technology

Testing the path coefficients in Figure 3 and the above equation in detail presented in the following Table 5.

**Table 5**

Test Results Path Coefficient of Model Entrepreneurial Orientation, Strategic Planning Against Competitive Advantage Through Business Performance with Information Technology as a Moderating Variable (Step - 2)

Variables	Coefficient	Critical Ratio (CR)	Probability (p-value)	information

Entrepreneurial orientation (X1)→Business performance (Y1)	0.555	4.458	0.000	significant
Strategic planning (X2)→Business performance (Y1)	0.340	2.982	0.003	significant
Entrepreneurial orientation (X1)→Competitive advantage (Y2)	0.277	2.113	0.035	significant
Strategic planning (X2)→Competitive advantage (Y2)	0.209	2.785	0.004	significant
Information technology (Z)→Competitive advantage (Y2)	0.193	2.032	0.042	significant
Performance * Information technology (IntZ_Y1)→ Competitive advantage (Y2)	0.009	2.054	0.040	significant
Business performance (Y1)→Competitive advantage (Y2)	0.309	2.759	0.006	significant

Table 5, the interpretation of each path coefficients are as follows:

- Entrepreneurial orientation (X1) is positive and significant impact on the performance (Y1). It is seen from the path marked positive coefficient of 0.555 with CR values of 4.458 and gained significance probability (p-value) of 0.000 the which is smaller than the significance level ( $\alpha=0.05$ ). Thus entrepreneurial orientation (X1) directly affects performance (Y1) of 0.555, which means that whenever there is an increase in entrepreneurial orientation (X1) it will increase performance (Y1) by 0.555.
- Strategic planning (X2) positive and significant impact on the performance (Y1). It is seen from the path marked positive coefficient of 0.340 with CR values of 2.982 and gained significance probability (p) of 0.003 the which is smaller than the significance level ( $\alpha=0.05$ ). Thus spake strategic planning (X2) direct effect on performance (Y1) of 0.340, the which means that every increase is in strategic planning (X2) will increase of the performance (Y1) of 0.340.
- Entrepreneurial orientation (X1) is positive and significant impact on the competitive advantage (Y2). It is seen from the path marked positive coefficient of 0.277 with a value of CR for 2.113 and gained significance probability (p) of 0.035 the which is smaller than the significance level ( $\alpha$ ) which is set at 0.05. Thus entrepreneurial orientation (X1) direct impact on competitive advantage (Y2) of 0.277, the which means that every increase is in entrepreneurial orientation (X1) will increase of the competitive advantage (Y2) of 0.277.
- Strategic planning (X2) positive and significant impact on the competitive advantage (Y2). It is seen from the path marked positive coefficient of 0.209 with a value of CR for 2.785 and gained significance probability (p) of 0.004 which is smaller than the significance level ( $\alpha=0.05$ ). Thus strategic planning (X2) directly

affect the competitive advantage (Y2) of 0.209, which means that every increase in strategic planning (X2) will increase the competitive advantage (Y2) of 0.209.

- Information technology (Z) is significant in influencing the competitive advantage (Y2). It is seen from the path coefficient is negative for 0.193 with a value of CR for 2.032 and gained significance probability (p) of 0.042 which is greater than the significance level ( $\alpha$ ) which is set at 0.05. Thus spake the information technology (Z) directly affect the competitive advantage (Y2), the which means that every increase is in information technology (Z) will raise the competitive advantage (Y2) of 0.193.
- Information technology\*performance (IntZ\_Y1) positive and significant impact on the competitive advantage (Y2). It is seen from the path marked positive coefficient of 0.009 with CR values of 2.054 and gained significance probability (p) of 0.040 the which is smaller than the significance level ( $\alpha=0.05$ ). Thus spake the information technology (Z) moderate the performance (Y1) to the competitive advantage (Y2) that is strengthen by 0.009, the which means that every increase is in information technology (Z) followed performance (Y1) will strengthen the influence of competitive advantage (Y2) of 0.009.
- Performance (Y1) positive and significant impact on the competitive advantage (Y2). It is seen from the path marked positive coefficient of 0.309 with a value of CR for 2.759 and gained significance probability (p) of 0.006 the which is smaller than the significance level ( $\alpha$ ) which is set at 0.05. Thus performance (Y1) directly affect the competitive advantage (Y2) of 0.309, the which means that every Increase in performance (Y1) will raise the competitive advantage (Y2) of 0.309.

### 3. CONCLUSION

Modeling results showed that indicators of entrepreneurial orientation, strategic planning, information technology, performance and competitive advantage is valid and reliable. Indicators of entrepreneurial orientation is dominant in a pro active and innovation indicators. Strategic planning is formed by the dominant indicators are sources of information and formality of strategic planning. Utilization rates are a dominant indicator on information technology. Performance indicators established by the dominant namely operational performance, while the competitive advantage that is the uniqueness of the product, not easily imitated and competitive price. Model competitive advantage with information technology as moderating on SMEs in Batam with SEM approach is a model of that fit based on the criteria of Goodness of Fit (GoF). Business performance is influenced entrepreneurial orientation and strategic planning, and subsequently affects the competitive advantage. Information technology utilization rate moderating indicator of business performance with operational performance indicators that are strengthening the influence of the competitive advantage.

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