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LOCAL PRODUCT DEVELOPMENT FOR BAMBOO PLYWOOD OF KANCHANABURI THAILAND

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ABSTRACT

Bamboo plywood is a non-timber forest product which is growing rapidly in the market and become the intention of practitioners as well as academicians. However, the local product development in Bamboo plywood is lacking which require significant strategies to promote. Therefore, the current study is an attempt to examine product development in Bamboo plywood. To achieve the current objective, the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development was examined. Data were collected through questionnaires from Kanchanaburi Thailand and analyzed by using statistical software. Results of the study shows that employee capability can increase the ideas generation process which further lead to the product development. Idea implementation also has major role in product development. Additionally, idea marketing and idea evaluation has the ability to foster product development.

INTRODUCTION

Bamboo plywood is a non-timber forest product which is growing in the market and capturing the intention of people. Bamboo plywood can be used in place of regular plywood (ZHOU, CHEN, ZHAO, & YANG, 2018). It can be manufactured to follow horizontal as well as vertical grain making for an attractive plywood interior. Furthermore, it is one of the important products which can also be used for interior walls, countertops, cabinetry, or furniture. This is the important product of furniture market and has significant importance. It is used in houses, shops and markets to increase the beauty. It is one of the important forest product which is its own importance (Qi, Xie, Huang, Yu, & Chen, 2014; Zhao, Yang, & Zhou, 2019). Among all other forest products, Bamboo plywood is one of the significant products which has influence on the market. The beauty of the walls can be increased by using the Bamboo plywood and now a days, it is commonly used product which has vital importance for the beauty of buildings (Nguyen, Vo, & Hung, 2020). Literature on Bamboo plywood mentioned that these products have major importance for the market and contributing significantly through different ways.

Bamboo plywood also has important role in Thailand. This market in Thailand has major importance to the furniture market. Bamboo plywood has significant share of the market which is also increasing and increasing the market share. Furniture market has major importance worldwide (Imran & Khaliq, 2019) in which Bamboo plywood is also playing important role has major contribution to the furniture market. Now the Bamboo plywood market is producing significant revenue which has vital importance for the economic development. Thailand is a country in which furniture market is growing rapidly (Hareebin, Aujirapongpan, & Siengthai, 2018) as it has several business opportunities. Along with the growth of furniture market, the Bamboo plywood market is also playing significant role. Bamboo plywood designing market is contributing to the revenue which has role in economic development of Thailand and it also has major role in the welfare of society because it provides various business opportunities. Kanchanaburi is one of the areas of Thailand which is growing in respect to the Bamboo plywood market. The performance of Bamboo plywood designing market can be increased by promoting product development activities.

Product development can be promoted with the help of employee capabilities. As the capable employees bring new ideas to increase the accuracy in products. Innovative ideas generally come from the employees having capabilities which has positive influence on product performance. After the development of new idea, the implementation of idea is also another important task contributed to the product development. Various strategies to enhance the innovative idea and idea implementation has the ability to enhance product development. In addition to this, idea marketing and idea evaluation also has positive role in product development. Therefore, the performance of business can be promoted by using the product development strategies (Kwak, Kim, & Kim, 2018; Pearson et al., 2020).

Various studies are carried out in the field of Bamboo plywood designing (Li et al., 2009; Qi et al., 2014; ZHOU et al., 2018), furthermore, various studies are also carried out for product development (Liu, Chen, & Tsai, 2005), however, these studies have not examined the relationship between product development and Bamboo plywood. Hence, the current study is an attempt to examine product development in Bamboo plywood. In this direction, the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development is examined.

LITERATURE REVIEW

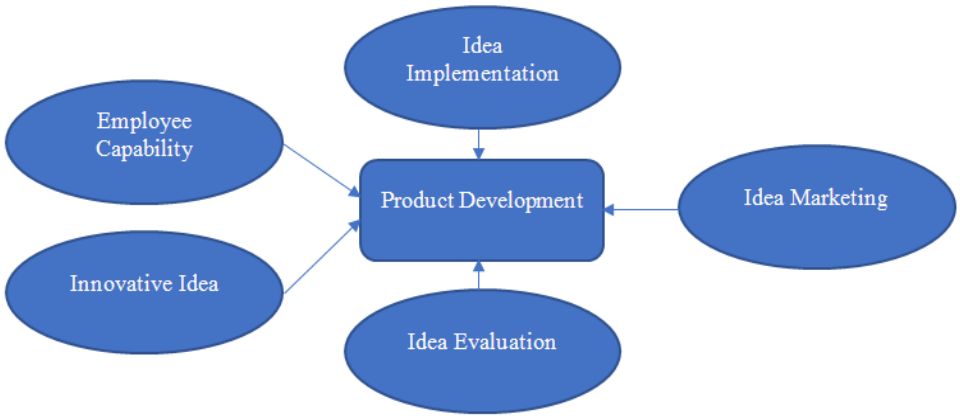
Product development is an important element of business which has major influence on the business activities (Ibieta, Tapia, Venegas, Hausdorf, & Takle, 2011; Souder & Song, 1997). Currently, companies are majorly focusing on the development of products

because proper development of product lead to the better business results. In any business organization, the development of product has major role to enhance the business success. As the product is the key area of organization on which the whole business depends. To achieve the higher business growth in the market, the success of product is most important, and success of product is dependent on the accuracy in product development (Kureski, Moreira, Veiga, Rodrigues, & Aquino, 2015). The new product must be innovative and have unique features as compared to the other products of the competitors, similar product with low features cannot attract the customer and could not achieve the higher growth in the market. Therefore, the development of innovative as well as unique product with quality features is most important in the Bamboo plywood in Thailand. In Thailand, Bamboo plywood is increasing in the market, however, the product development for Bamboo plywood is most important. To sustain the growth in the market, the product development is most important. The market is full of various products, therefore, to compete in the market, Bamboo plywood require important product development. It is needed for the Bamboo plywood to adopt a good strategy to promote product development to enhance the business performance in highly competitive market.

Several studies are showing different ways of literature. Furthermore, companies adopting different ways to develop a product. Definitely it requires planning and stepwise process to develop a product because it consists of various important points to consider such as market condition, competition and need of product. It is important to examine the market conditions because market has variations in terms of competition and in terms of competitors. In a market where several competitors are working, companies require high quality product to make the difference. In this market, companies require different products from the other companies and must have different features. With other products in the market, the new product must highlight innovation to attract the customer and to capture the market share. The unique features have the ability to enhance the product success which has major influence to enhance the overall company business. In the market, where many substitutes are available, the Bamboo plywood require differentiation strategy to highlight the product and capture the attention of the customers, otherwise, the customer will not purchase the product and it will automatically lead to the failure of the product which has negative effect on the business success. As given in previous studies that innovation in product development is most important to introduce for the companies (Chen, Chang, Lin, Lai, & Wang, 2016; Dadfar, Dahlgaard, Brege, & Alamirhoor, 2013).

According to the current study, Bamboo plywood designing require employees' capabilities. Employees capabilities are required for Bamboo plywood designing. As the employee's capabilities always require (Lopez-Cabrales, Valle, & Herrero, 2006)for designing which are unique in nature. Better employee's capability has major influence on innovation and new product development activities. To introduce new features among the business activities or new products, employees must be sufficient capable which has vital role to influence on business success. Therefore, employee's capability leads to the innovative idea generation. New idea generation lead to the idea implementation and implemented of idea could be promoted by using the marketing activities which has the ability to promote idea among the customers. Finally, after the implementation and the evaluation is the most important step in product development (Der Foo, Wong, & Ong, 2005). Therefore, the successful implementation of all those products lead to the product development. The relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development is highlighted in Figure 1. The relationship between employee's capability, innovative idea, idea implementation, marketing of idea and idea evaluation lead to the product development having major importance in Bamboo plywood designing.

Figure 1: Framework of the study showing the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development.



The first major element required for the companies to promote product development is employees' capabilities. As to develop new product, companies always require unique capabilities of the employees to bring something new in developing product. Capability denotes to an employee's skill to achieve the work expected of them to the essential standards. This may be evaluated by reference to an employee's skill, ability, health or any other physical as well as mental quality in relation to the job that they are employed to do. To do any business activity, it is always required a significant skill. Each business activity requires a special skill which is mandatory to promote accuracy and effectiveness. In a business organization, each employee has the skills towards a specific business area which are unique in nature, however, an employee cannot be expert in all business areas. Therefore, product development also requires significant business skills to enhance the accuracy and uniqueness in the product (Nezam, Ataffar, Isfahani, & Shahin, 2016; Sopa et al., 2020). Hence, companies working for Bamboo plywood designing require special skills for product development. It is also highlighted in several previous studies that product development has important relationship with capabilities. As all the products are unique in nature which require proper business skills having the major importance to development something new in the product and offer to the customers as compared to the competitors.

Employees capabilities lead to the introduction of new innovation while product development. To bring innovation in product development, the employee's capabilities are most important which has possible effect on the success. Innovation is the process to introduce something new in the product, process or services which has low cost and higher benefits. In the current study, innovation is related to the product development by introducing new idea. Therefore, idea is the major part of product development as all the products developed and start with the new ideas which are also based on the employee capabilities. Innovative ideas has unique importance among companies as highlighted in the literature (Carnevale, Huang, Crede, Harms, & Uhl-Bien, 2017; Kaphengst, Ma, & Schlegel, 2009). Generally, innovative ideas have positive role in product development. Innovative ideas have direct and positive effect on product development. To ensure the high-quality products as well as services, a unique ideas development is most important. Therefore, in Bamboo plywood designing companies of Thailand, the effect of innovative ideas has key importance for the product success which is key to the business **success** (Najafi-Tavani, Najafi-Tavani, Naudé, Oghazi, & Zeynaloo, 2018).

Once the company have recognized a creative idea or a solution to a problem, the next phase is to convert the idea from concept to practical work in business activities by implementing it. The implementation of idea generally provides the clear picture of

idea success as well as performance in the market. After the introduction of idea will the help of employees capabilities, the next process is to examine the role if idea implementation in product development of Bamboo plywood in Thailand. According to the literature, the implementation of idea is most important because in various companies, the management develop new ideas and innovative methods, however, companies cannot get benefit from these ideas due to not having low practical implications, therefore, idea implementation in for Bamboo plywood in Thailand is increasing, the role of idea implementation is most important. Therefore, to get proper benefits and to develop a unique product, idea implementation must be on priority for the companies. In the same direction, literature also shows that idea implementation is vital for various business practice (He et al., 2019; Lu, Bartol, Venkataramani, Zheng, & Liu, 2019; Watts, Steele, Medeiros, & Mumford, 2019). Therefore, the idea implementation has positive effect on product development.

Furthermore, area marketing is also another significant part of product development which influence on the product success. It has important contribution to enhance the success of new product. Most of the companies use various strategies to promote the new product. Generally, new product in the market remain new for the customer, until unless, companies do not advertise the product and its unique features to the customer in the concerned market. Business organizations always requite to introduce the new product in the market. To introduce the ideas, companies use various marketing strategies to enhance the awareness among the people. To increase the sale of any product, companies always require awareness among the people in relation to the product features which has major influence on the popularity of the product. Therefore, marketing activities in product development has major importance (Arromba et al., 2020; Leung, Tse, & Yim, 2020; Prior et al., 2018). Therefore, it is provided from the previous studies that marketing activities has central role in product development. Idea marketing has positive effect on product development. Hence, the product development in Bamboo plywood in Thailand can be promoted with the help of marketing activities. Another most important element in product development is evaluation of the product. Evaluation means the performance evaluation of the product. Generally, Product evaluation is the procedure of measuring a manufactured product's suitability as well as safety for use by consumers. Product evaluation is shown for two main reasons: 1) to confirm product follows relevant standards, and 2) to classify and remove manufacturing or design defects. Therefore, product development can be further promoted with the help of product evaluation as product evaluation detect any shortcoming of the product which can be removed and increased the product quality. In this evaluation process, market gives the feedback of the product in which the customer has major importance. The users of the product provide the feedback which is important to enhance the quality of the product. Product evaluation is also central role in business along with the other activities which is also given in previous studies (Mardani et al., 2020; Nazeer et al., 2020). Hence, product evaluation has positive effect on product development. Thus, from the above discussion, it is clear that employees' capabilities have important role in product development. Employee capabilities also has positive role in innovative idea generation which lead to the product development. Furthermore, idea implementation has similar role to promote new products. Furthermore, after the implementation of idea, the marketing of idea increases the awareness among the people and finally, evaluation of idea lead to the product promotion. Therefore, from this discussion, following hypotheses are proposed;

Hypothesis 1: Employee capabilities has positive effect on product development.
Hypothesis 2: Innovative idea has positive effect on product development.
Hypothesis 3: Idea implementation has positive effect on product development.
Hypothesis 4: Idea marketing has positive effect on product development.
Hypothesis 5: Idea evaluation has positive effect on product development.

RESEARCH METHODOLOGY

Five hypotheses were developed with the help of literature review. To test the hypotheses, this study examined the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development. This relationship was examined through survey questionnaire. Therefore, a survey questionnaire was prepared to measure the relationship between variables and to test the hypotheses. Therefore, the current study utilized quantitative research approach by using a cross-sectional research design. Finally, after development of questionnaire, data were collected from the employees working for Bamboo plywood designing in Kanchanaburi Thailand. The employees working in various companies were selected as the respondents. 200 questionnaires were used in this study for data collection by using the cluster sampling technique. Finally, 140 questionnaires were received and used for data analysis.

DATA ANALYSIS AND FINDINGS

Data analysis of the study started with the data screening as given in Table 1. This Table 1 shows that data has no error. Data is free from errors such as missing value and outlier. After data screening, Partial Least Square (PLS) is employed for data analysis which is most suitable in the current study. PLS was used to apply Structure Equation Modeling (SEM) which is most appropriate for primary data analysis (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014; J. F. Hair, 2010; J. F. Hair, Ringle, & Sarstedt, 2013; J. F. Hair, Sarstedt, Pieper, & Ringle, 2012; Henseler et al., 2014).

Table 1: Data Statistics**.**

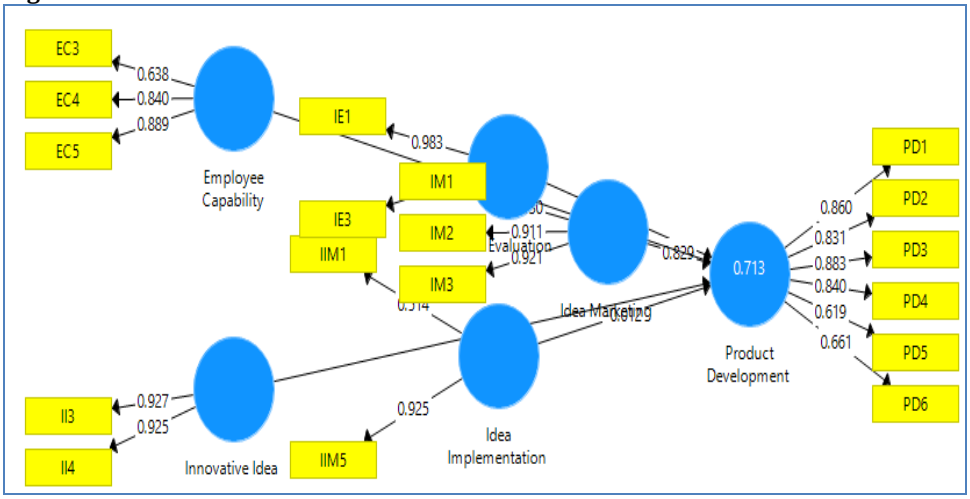
	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
EC1	1	0	2.918	3	1	5	1.1	-0.909	1.026
EC2	2	0	2.896	2	1	5	1.08	-1.208	0.374
EC3	3	0	3.234	4	1	5	1.135	-0.586	-0.649
EC4	4	0	3.528	4	1	5	1.092	-0.663	-0.424
EC5	5	0	3.45	4	1	5	1.254	-1.237	-1.344
II1	6	0	3.234	4	1	5	1.064	-1.102	-0.283
II2	7	0	3.234	4	1	5	1.154	-1.078	-0.263
II3	8	0	3.095	3	1	5	0.98	-0.778	-0.387
II4	9	0	3.238	3	1	5	0.998	-0.142	-1.151
IIM1	10	0	3	3	1	5	1.309	-1.251	-0.07
IIM2	11	0	2.983	3	1	5	1.173	-1.258	0.05
IIM3	12	0	2.952	3	1	5	1.137	-1.176	0.379
IIM4	13	0	3.316	4	1	5	1.195	-0.672	-0.539
IIM5	14	0	3.602	4	1	5	1.119	-0.685	-0.471
IE1	15	0	3.489	4	1	5	1.255	-1.191	-0.379
IE2	16	0	3.303	3	2	5	0.839	-0.547	0.174
IE3	17	0	3.303	3	2	5	0.839	-0.547	0.174
IM1	18	0	3.385	4	1	5	1.102	-0.407	-0.614
IM2	19	0	3.398	4	1	5	1.344	-0.957	-0.444
IM3	20	0	3.398	4	1	5	1.254	-0.871	-0.417
PD1	21	0	3.29	3	1	5	1.289	-0.929	-0.323
PD2	22	0	3.381	4	1	5	1.34	-1.026	-0.418
PD3	23	0	3.394	4	1	5	1.341	-1.137	-0.314
PD4	24	0	3.325	4	1	5	1.365	-1.138	-0.388
PD5	25	0	3.407	4	1	5	1.255	-0.898	-0.409
PD6	26	0	3.455	4	1	5	1.338	-0.997	-0.459

Note: EC = Employee's Capability, II = Innovative Idea, IIM = Idea Implementation, IM = Idea Marketing, IE = Idea Evaluation, PD = Product Development

The first step of PLS is given in Figure 2 which shows the factor loading. Employee's capability is measured by using three items, innovative idea is measured by using two

items, idea implementation is measured by using two scale items, marketing of idea is measured by using three scale items, idea evaluation is measured by using two scale items and finally, product development is measured by six scale items. It is given in Table 2 that; employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development have factor loading above 0.5.

Figure 2: Measurement Model



Note: EC = Employee's Capability, II = Innovative Idea, IIM = Idea Implementation, IM = Idea Marketing, IE = Idea Evaluation, PD = Product Development.

Table 2: Factor Loadings.

	Employee Capability	Idea Evaluation	Idea Implementation	Idea Marketing	Innovative Idea	Product Development
EC3	0.638					
EC4	0.84					
EC5	0.889					
IE1		0.983				
IE3		0.594				
II3			0.927			
II4			0.925			
IIM1				0.514		
IIM5				0.925		
IM1					0.513	
IM2					0.911	
IM3					0.921	
PD1						0.86
PD2						0.831
PD3						0.883
PD4						0.84
PD5						0.619
PD6						0.661

Note: EC = Employee's Capability, II = Innovative Idea, IIM = Idea Implementation, IM = Idea Marketing, IE = Idea Evaluation, PD = Product Development

Furthermore, it is found that all the variables; employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development have composite reliability (CR) is above 0.5. Along with this, average variance extracted (AVE) is also above 0.5 for employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development which is recommended by J. Hair, Hollingsworth, Randolph, and Chong (2017). Furthermore, this study examined discriminant validity (Albassami, Hameed, Naveed, & Moshfegyan, 2019; Henseler, Ringle, & Sarstedt, 2015). It is examined by using cross-loadings as shown in Table 4.

Table 3: Reliability and Convergent Validity.

	Cronbach's Alpha	rho_A	CR	(AVE)
Employee Capability	0.701	0.738	0.836	0.634
Idea Evaluation	0.362	1.073	0.684	0.561
Idea Implementation	0.262	0.367	0.702	0.56
Idea Marketing	0.522	0.81	0.747	0.565
Innovative Idea	0.835	0.835	0.924	0.858
Product Development	0.878	0.906	0.907	0.623

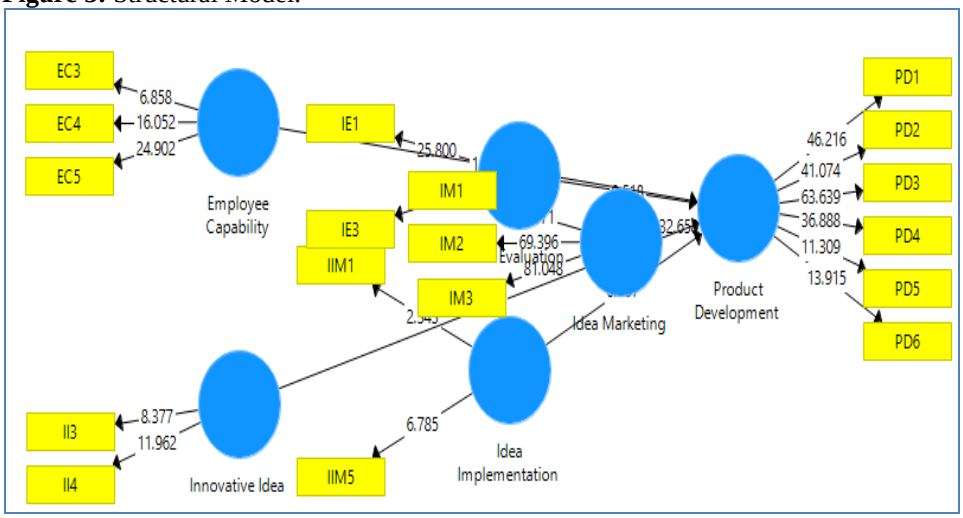
Table 4: Cross-Loadings.

	Employee Capability	Idea Evaluation	Idea Implementation	Idea Marketing	Innovative Idea	Product Development
EC3	0.638	0.364	0.405	0.186	0.391	0.202
EC4	0.894	0.648	0.877	0.208	0.237	0.212
EC5	0.889	0.75	0.668	0.298	0.27	0.281
IE1	0.855	0.983	0.64	0.308	0.272	0.291
IE3	0.283	0.794	0.329	0.063	0.539	0.057
II3	0.337	0.331	0.413	0.207	0.327	0.164
II4	0.346	0.329	0.427	0.148	0.325	0.161
IIM1	0.331	0.356	0.514	0.71	0.621	0.1
IIM5	0.797	0.608	0.925	0.829	0.248	0.226
IM1	0.29	0.224	0.262	0.13	0.486	0.099
IM2	0.254	0.27	0.203	0.411	0.852	0.744
IM3	0.259	0.259	0.201	0.521	0.865	0.8
PD1	0.262	0.258	0.225	0.777	0.188	0.86
PD2	0.269	0.243	0.181	0.683	0.13	0.831
PD3	0.265	0.247	0.226	0.802	0.23	0.883
PD4	0.266	0.3	0.234	0.725	0.144	0.84
PD5	0.131	0.098	0.104	0.442	0.002	0.619
PD6	0.164	0.14	0.084	0.442	0.051	0.661

Note: EC = Employee's Capability, II = Innovative Idea, IIM = Idea Implementation, IM = Idea Marketing, IE = Idea Evaluation, PD = Product Development

Furthermore, structural model was applied to test the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development. Structural model is second step of PLS-SEM (Hameed, Nisar, & Wu; Henseler et al., 2014). In this process, the direct effect of employee's capabilities was examined on product development. The direct effect of innovative idea was examined on product development. Idea implementation effect was examined on product development. The direct effect of idea marketing and idea evaluation was also examined on product development. Figure 3 shows the PLS-SEM and results are given in Table 5. The direct effect of employee's capabilities on product development found positive and significant. The direct effect of innovative idea on product development also found positive and significant. Idea implementation effect was examined on product development which is positive. Finally, the direct effect of idea marketing and idea evaluation was also examined on product development which is also positive and significant. Finally, it is found that all the variables; employee's capability, innovative idea, idea implementation, marketing of idea and idea evaluation are expected to bring 71.3% variance in product development.

Figure 3: Structural Model.



Note: EC = Employee's Capability, II = Innovative Idea, IIM = Idea Implementation, IM = Idea Marketing, IE = Idea Evaluation, PD = Product Development

Table 5: Direct Effect Results.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Employee Capability -> Product Development	0.087	0.066	0.03	2.899	0.003
Idea Evaluation -> Product Development	0.033	0.02	0.016	2.032	0.045
Idea Implementation -> Product Development	0.012	0.001	0.006	1.999	0.047
Idea Marketing -> Product Development	0.829	0.83	0.025	32.658	0
Innovative Idea -> Product Development	0.002	0.002	0.001	1.999	0.047

CONCLUSION

Results of the study shows that employee capability can increase the idea generation process which further lead to the product development. Increase in employee capabilities increase the product development by generating new ideas. Therefore, companies in relationship to the Bamboo plywood designing should promote employee's capability. Furthermore, Idea implementation also has major role in product development. Better idea implementation has the potential to increase product development. Moreover, idea marketing and idea evaluation has the ability to foster product development. It is found that marketing of idea also helps to promote product development. Finally, the evaluation of idea is required to remove the errors and provide perfect product. The current study is one of the unique studies which examined the relationship between employee's capability, innovative idea, idea implementation, marketing of idea, idea evaluation and product development, and this relationship is not examined in the previous studies. Thus, this study has significant importance for the management of companies dealing with Bamboo plywood designing.

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