A Study on the Utilization of Convergence Business Item Development Model: A case study of the Interactive whiteboard

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Abstract—Convergence has become important in order to strengthen the competitiveness of recent enterprise. Especially in the case of small and medium-sized enterprises, there is a tendency that utilizes convergence as a tool with a new competitiveness in the market beyond the ability of the company is held. In this study, it was applied in the Convergence Business Item Development Model to target the interactive whiteboard manufacturer. Thus, this based on the convergence ability of the company it is being held in the existing in order to have a better competitive suggested a direction to proceed strategically from a technology and social point of view. Resulting from a technical point of view, focus on strengthening the environment-friendly factors and deleting unnecessary functions, also from a social point of view, the strengthening of price competitiveness has been identified that it is important.

Keywords—Industrial Convergence, Convergence Business Item Development Model, Interactive Whiteboard, SMEs Business Strategy

I. INTRODUCTION

RECENTLY, the convergence is used as the tool that enhances the competitiveness in many companies. Especially, in case of small and medium-sized enterprises, they are spending much effort to create new business opportunity through the convergence going beyond the single property that an individual company has. It is current status that the substantial tools that are capable of suggesting the strategic direction along the capability the individual company possesses are insufficient despite the application of convergence becomes essential to enhance the competence of the company like that. So, this thesis is willing to verify the utility by applying Convergence Business Item Development Model [1] suggested by Korean government to interactive whiteboard. And it is willing to suggest the strategy the company pursues through the convergence in technical and social respects based on the analysis process and results and make the foundation to apply Convergence Business Item Development Model to the product and other products furthermore.

II. CONVERGENCE BUSINESS ITEM DEVELOPMENT DIRECTION MODEL

Convergence Business Item Development Model is the tool that draws the direction of convergence development of the company along the level of technology development and social & cultural level finally through the analysis of relevant issue along technology, environmental and product properties based on the competence that the company possesses by themselves. It has the utility in respect that it is capable of suggesting the strategy that is suitable for the individual characteristics of the company by considering the internal and external environment analysis in short period especially.

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![Fig. 1 Convergence business item development model process](image-url)
Model analysis, 5 Forces analysis, PEST analysis and trend issue analysis) based on the previously-investigated issues in the step of relevant issue analysis.

Lastly, the level of technology development and social/cultural level that the product has shall be evaluated through the qualitative assessment based on previously-investigated contents in the step of developmental direction analysis.

So, the direction of developing convergence technology that the company pursues substantially can be suggested by developing R&D scenario based on the competence the company has, internal & external environmental factors and the issues about the product by this model.

III. ANALYSIS

In this study, Convergence Business Item Development Model was applied to the manufacturer of interactive whiteboard whose needs increase in educational sites, offices and hotels recently along the development of ICT technology.

A. Investigation of company status

The object company of analysis is the one whose technology is recognized in domestic and foreign markets through original technology of touch sensor and technology of developing tablet monitor without battery as the Korean manufacturer of interactive whiteboard.

Main products of the company are interactive whiteboard and electronic lecture desk and they develop and sell the products that education is linked with IT sensor in convergent way by using touch display.

Main customers of the company are the educational institution, military troops as the government organization and they sells the products to the institute, company and church in private section. They have the electromagnetic induction sensor (Touch Sensor), optical image sensor and Remote Monitoring System (RMS) as the core technology the company possesses and it was found out that they leads the technology in the field through the possession of various patents regarding touch sensor technology.

B. Analysis of technical/environmental trends

Interactive whiteboard is classified into type of integrated FDP (Flat Panel Display), front projection and rear production according to the position of light source. Among them, front projection is known as most-frequently distributed product worldwide as the one whose light source is positioned at front upper of whiteboard. In case of Korea, the technology related with integrated FPD products of large screen of 70 to 100 inches is evolved based on the education section whose demand for interactive whiteboard is high and the introduction of products with interactivity and multi-touch functions along the change of educational environment increases.

As the results of quantitative analysis of the patents related with interactive whiteboard in Korea, United States and Europe from 1978 to 2014 to analyze the technical trends of interactive whiteboard worldwide, it was investigated that the number of the related patents has increased since 2000 based on expression device, input device and transmission device.

Meanwhile, it is expected that the sales in the educational section would be increased gradually along the spread of digital textbook and educational informationization as the market prospect of interactive whiteboard and it is also expected that its demand increases gradually as the discussion tools of company and public organization. However, as it is influenced by the reduction of government budget caused by economic recession of education section, it appears that the entry to global market would acts as the important factor to overcome the uncertainty.

C. Analysis of relevant issues

Technology S-curve analysis was carried out to analyze the issue related with interactive whiteboard based on previously-analyzed technology, market trends and the patents related with interactive whiteboard (number of patents, impactor factor and family factor) since 1978.

As the results of analysis, it appeared that the number of patents that could grasp the development level of interactive whiteboard-related technology showed the rapid growth from the mid of 1990’s and the first peak point in 2000’s and it was investigated that it showed the growth again from 2010. It appeared that impactor factor that can grasp the level of patents showed the high value in the initial patents and showed the highest values especially in the end of 1980’s and 1990’s. It was investigated that family factor showed the highest value in the mid and end of 1990’s as the indirect index that is capable of judging the level of patent and profitability. So, as the results of diagramming it based on such analysis, it was judged that interactive whiteboard showed the position of mid and end out of technology evolution of S-Curve growth period.

Second, it made an inference about future system for 9-Windows analysis that is capable of grasping upcoming trends by defining beam projector as past system and current system as interactive whiteboard. As the results of analysis, future interactive whiteboard system can define high class of interactive whiteboard and it can be judged that maximization and link to various mobile devices are required along that. And it is considered that process development should be conducted to secure price competition.
Third, it used business canvas methodology that Osterwalder and Pigneur [2] suggested to investigate the series of process related with BM of interactive BM. As the results of analysis, differentiation point that is capable of conducting graphic and taking a note comparing to the existing blackboard regarding interactive whiteboard, value proposition area is needed to be considered with the first priority and it was judged that it is required to conduct business by taking the government as key partner because publicity of market is very clear such as school and hospital.

Fourth, 5 Force model that Porter [3] suggested was used to judge the degree of competition, profitability and structural attraction of the industry. As its results, it appeared that the power of interactive whiteboard supplier and consumers is stronger than the company and it was judged that market entry barrier is low in respect that market penetration is free by global conglomerates. Though the manufacturing companies of the products show the strength in the sales of public section using various technical power in Korea in respect of competitors, it appeared that it was difficult to judge that it is prior regarding the competition in case of foreign market.

In respect of substitute good, it was grasped that the competitiveness is insufficient due to its low price competitiveness comparing to beam projector.

Fifth, PEST analysis was carried out to grasp policy, economic, social and technical elements that influence on macro business and managerial environment [4]. As the results of analysis, it was grasped that interactive whiteboard satisfies with the education trends politically such as digital classroom and smart education, the demand of display increased economically along the spread of IoT and the distribution of culture that uses touch device can be the positive opportunity factor socially. Meanwhile, it was also grasped that tablet device for wide distribution was recognized as the substitute good of interactive whiteboard technologically in respect of smart education and there exists still the limit in technical respect to replace the existing printed matter and blackboard due to the continuous development of touch display technology in other fields.
Lastly, as the results of performing mega trend analysis in the social point of view, the plan of utilizing the interactive whiteboard along the development of information telecommunication technology and results of merging various devices together with the extension to the neglected class along the deepening of polarization.

D. Analysis of developmental direction

The evolution of technical system and socio-cultural evolution was analyzed through the evaluation of the experts in the field based on technical/environmental trends analysis and related issues. As the results of analysis, it appeared that the level of basic technology was high in respect of technology, but it was weak for high technology relatively, environment-friendly factors were insufficient and there existed unnecessary functions that were not used actually. And, in socio-cultural point of view, it coincided with the target of government policy such as distribution of interactive whiteboard and the feasibility was evaluated as high in the forthcoming fields but it was grasped that price competitiveness was low.

IV. RESULT

This study drew the development strategy of products that the company can take considering the previously-analyzed developmental direction and competence of the company. As its results, it suggested to consider applying remote control technology that is capable of one to multiple parties without restriction of time and space together with the development of premium UHD interactive whiteboard and PCAP type large screen display based on the advanced technical power that the company possesses currently. However, it was judged that time and cost can be consumed along the technology development and it could be overcome through the method such as technical benchmarking of TV market and technology transfer of core technology. And it appeared that process improvement should be conducted for cost-saving along the production of new product regarding price competition that was suggested importantly.

V. CONCLUSION

This thesis was willing to suggest the forthcoming strategy of interactive whiteboard manufacturer by using newly-developed Convergence Business Item Development Model. As the entry barrier was low and there existed the threat of substitute goods when analyzing technical and market environment, it was judged that it would be necessary to pursue cost-saving and sophistication strategy based on the technical power that the company possessed by themselves.

The effectiveness of Convergence Business Item Development Model could be verified through this study and it appeared that it could be applied to various manufacturing industries.

However, the research in the point of forthcoming service providers should be carried out to use this study widely as it only analyzed the technology such as patent targeting the manufacturer.

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