Abstract

**Background/Objectives:** As for the consulting for the SMEs, of which the scale is not very big and the business is not that complicated, it is effective to base it on the business model and to suggest the measures to diagnose and solve the problems regarding the overall business cycle. **Methods/Statistical Analysis:** This study analyzes the documents on the business model and examines the possibility of a consulting tool by reconstituting them as well as examining technology commercialization from SME’s perspective. **Findings:** By analyzing the researches on the existing business models, this study clearly constitutes the relationships between strategies, dynamic capabilities, business models and business processing and suggests the consulting framework based on the business model. This study also suggests a consulting framework for ICT SMEs’ technology commercialization which applies the consulting framework based on business model to the technology commercialization. **Application/Improvements:** Although the suggested consulting framework could be applicable to ICT SMEs' technology commercialization, it is still at the conceptual level.

**Keywords:** Business Model, Consulting, Technology Commercialization

1. Introduction

The Information and Communication Technology (ICT) industry, which has grown explosively from the late 1990s to the middle 2000s, is developing in convergence with various industrial fields as well as making its own development. According¹, “As values are created through convergence of technology and there is a growing number of industries newly found, ITC industry is becoming a new growth engine for economic revitalization”. As an example of ICT convergences, Industry 4.0 in Germany and Smart Factory in Korea, which are drawing much attention lately, are conducting pilot projects along with the conceptual definition, actually aiming to create new values through convergence between the ICT and the existing manufacturing technology. To make ICT industry a new growth engine for the economic revitalization, related technologies and business should be expanded to SMEs². For doing this, the SMEs, which has weak foundations for internal competence, need consulting from outside³.

Unlike the existing approaches of business management consulting, the consulting for ICT SMEs needs to consider technology commercialization and inspect business model for creating new values. In this regard, this study analyzes the documents on the business model and examines the possibility of a consulting tool by reconstituting them as well as examining technology commercialization from SME’s perspective, which leads to suggesting the consulting framework based on business model for technology commercialization of ICT SMEs.

The composition of this thesis is as follows. Chapter 2 classifies the research trends on the business model up to date into three patterns, analyzes and reconstitutes the researches on the changes in business model and suggests the consulting framework based on the business model.
for SME consulting. Chapter 3 explains the concept of technology commercialization, the trend that technology commercialization is being focused on the market and consumers and the importance of the business model in the technology commercialization of ICT SMEs. Based on Chapters 2 and 3, Chapter 4 conceptually demonstrates the consulting framework for ICT technology commercialization based on the business model. Lastly, the conclusion and the meaning of this research are presented.

2. Consulting based on Business Model

2.1 Analysis of Business Model Researches

The concept of business model first appeared in 1957 and used a lot later with the advent of online business based on the Internet, which newly appeared in the late 1990s. It has received a lot of attention from the academic field as well as from industrial settings to the point where it was presented as special features two times in Long Range Planning in 1997. The research patterns about business models so far can be classified into three patterns, which are sometimes divided according to different research documents and sometimes integrated into one document.

The first is the research on the establishment of business model concept and business model designing, which makes up a great portion of the business model research. Each researcher draws key components of the business model from a business perspective, defines the business model after making the components into one set and describes the business model through examples of applying it to the new business. It summarizes the components and definitions of the business models that are claimed in many literatures. Many business model terms have been defined this kind of various researches, which often showed partial characteristics and showed central characteristics as well. Defines a business model as “a tool that includes the components and their relationships and something that can express the business logic of the company”. It describes a business model as nine components that are customer segments, value proposition, customer relationships, channels, revenue structures, key activities, key partnerships, key resources, cost structure. Eng KC (2014) defines the basic concept of business model as simply as consumer (the object of value creating), organization (method of organizing to create consumer value), profit formula (method of getting profit for what is worked). What this research pattern focuses on is not the business activities itself, but on mapping the components of the business model by segmenting the business logic and abstracting the business model by establishing the relationship between the components.

The second is the research on the establishment of relationship between the business model and the existing theory of business management (especially the strategy). According to Bernd W W (2016), there were a lot of criticisms while there were many uses of the business model term during the boom of the new economy and one of them was what Michael Porter said, “how optimistically we see it, the definition of business model is still obscure, as it defines how a company does business and makes profit too loosely, which can lead to wrong ideas of its own”. Based on this criticism, the definition of business model, in which the information technology, strategy and organization theory had been mixed so far, started to gradually establish its conceptual system. Shows the conceptual framework that distinguishes business model from strategy, arguing that business model is the reflection of the strategy that will be realized by the company. It also shows that in the simple competition, it is hard to distinguish the business model from strategy through one-on-one mapping but the two concepts are distinguishable when there is an emergency measure based on a well-designed strategy. Organized the existing research fields of business model in three different directions and expressed it in the picture, showing that the business model was leaning more toward the strategy between strategy (plan) and process (management). According to (2016), when establishing a company, it is necessary to consider the business model that creates, acquires and delivers values to the consumers. Also, in order to maintain the continuous growth in the competition even after the success of the business model, strategic choice is needed as its model can be copied by the competitors. That is to say, the business model is more comprehensive than the business strategy and to protect the competitive edge from the new business model designing, it is necessary to analyze the business model and strategy together. According to Carlos MD (2014), a strategy forms the development of competence to change the current business model in the future, establishing the dynamic capabilities to efficiently cope
with the unexpected happenings. It is classified into the long-term strategy, dynamic capabilities from a middle-term perspective and the short-term business model. As for the relationship between the model and the business processing (act), describes the innovation and changes in the business model, claiming that there needs to be innovation in the existing business processing, which is essential, repetitive and standard accumulated to conduct the existing business model. This means that the business model is a higher concept than the business processing. There are few researches on the theoretical foundation of the business model, but Carlos MD (2014) regards it as being related to the Resource Based View (RBV) in that the researches on the business model deal with the internal competitiveness for the company's competitive strengths and that they regard the company as the source and competence. And Carlos MD (2014) emphasizes the importance of the combination with the economic theory of transaction cost as the resource itself cannot give values to customers and the value occurs through transaction for the use of resources. In summary, the business model is distinguished from the strategy from a long-term perspective and as it is mainly defined as a concept which is abstracted from business logic, it is distinguished from the business processing. The changes and innovations of the business model require dynamic capabilities, which are selected by the strategy and make the business model change. That is to say, the strategy, dynamic capabilities, business model and business processing have conceptual strata.

The third is the research on the changes in the business model. Sergio C (2011) argues that the business model should have dynamics to allow changes as well as provide stability to develop the company's activities and it describes the changes in the business model in four different types. Raman CM (2010) claims that multiple business models can exist to prepare for the contingency and the tactics are what the company can choose in a more limited range through the choice of the business model. Also, a strategy is more than just about choosing the business model; it considers how the business model should be constituted in the case of contingency. In investigated 25 companies (in effect 9) to see how a company develops and changes its business model to create values continuously. This research pattern is the newest trend of the business model research, putting its basis on the claim that in order for a company to make continuous growth, the business model needs to change, innovate and evolve through adaptation to the internal and external environments. Further details related to this will be described in chapter 2.2.

2.2 The Business Model as a Consulting Tool

Mentions two uses of the business model term: One is a static approach and the other is a transformational approach. For the same concept, describes it as a static perspective of business model and a dynamic perspective of business model. First, the static perspective puts an emphasis on the "model" of the business model, showing the consistent relationships between the business logic and the components of the business model. In this approach, the business model is a blue print that shows how values are created, to which consumer segment they are delivered to and how and what the flow of the profit and cost is like according to it.

The dynamic perspective of the business model is a concept as a tool for explaining the changes and innovations of the organization or the business model itself. As mentioned earlier about the research analysis of the changes in the business model, for a company to continuously make a profit and grow, changes in the business model are necessary. The business model is a conceptualization of the essential, core, repetitive and standard process for a company to conduct business. That is, there are a good number of processes in a company and not all of these are related to the business model, but the essential, core, repetitive and standard process is linked to the business model of the company. Also, based on the claim that the business model is an abstract concept, it emphasizes the personal perception. Personal perception affects the personal interpretation of the results of the business events and the creation and development of the organized process. It also plays an important role in the business model dynamics, which is a dynamic perspective. In short, if a company performs a business model successfully, an essential and core process is formed. If the perception of individuals about the results of other business events lead to organized creation of processes and removal of them, it can be understood as part of the dynamic capabilities because new placement of the resources is needed, resulting in the changes in the business model as shown in Figure 1. In the end, the changes in the business model are for the evaluation and action of the changes in the organized process and it can be regarded as a systemic and analytic tool for innovative activities.
A Study on Business Model Consulting Framework for Technology Commercialization of ICT SMEs

Figure 1. Business model dynamics framework #1.

Sergio C (2011) is mainly about the researches on the 4 types of the business model changes, the characteristics of each type of change and the task of challenge, while Leona A (2013) focuses on the capabilities that change the business model. It investigated what kind of capability changes the business model through examples of the SMEs, which have grown for a long period of time. For theoretical grounds, it combined the strategy-as-practice with dynamic capabilities, which are the capabilities that other competitors cannot imitate, becoming a source for the company’s success. The critical capabilities, which were described as three types in Leona A (2013), are the ones that generate successful value. The strategy-as-practice is essentially about the activities and the micro-process and a great number of micro activities help the company to understand the strategic and organized actions for changes in the business model, that is, the strategizing actions. In short, what changes the business model to continuously create business values is the strategizing action, which is based on the dynamic capabilities. This can be shown like in Figure 2 in a simple way.

Figure 2. Business model dynamics framework #2.

2.3 The Consulting Framework based on the Business Model

There are not many researches on the consulting methods using the business model. In the previous research, argued that the business model is approaching the management practice of a company through “stage of concept definition”, “stage of the understanding of the mutual relationships of the components and concrete establishment”, “stage of suggesting the benchmarking examples that applied the business model concept” and “development of the simple establishment method of business model canvas and the rapid evolution to the lean start up using it”. In the prediction of the consulting types in the age of innovative creation, mentions “the business model creating consulting”, meaning the “business model consulting in the form of a paradigm shift that rocks the existing order of competition”. It also describes the “business model generation model, the 4 areas of models in the business model – methodology of finding business pulse”. Suggests “the methodology of business model consulting as a new methodology for the changes in the business model status and development of consulting business”, conducting a research on the components of the business model from “a problemsolving perspective, an innovation and competition perspective, a quantitative decision-making perspective and an expression method perspective”. If we examine this more closely, it developed the innovating technique of the convergence-type business model by suggesting CBI and MBI models, gave shape to the analysis method of the business model competition and finally suggested the consulting methodology that combined the business model innovation technique and competition technique.

Unlike the consulting methodologies mentioned earlier, this thesis suggests the consulting framework based on the dynamic perspective of the business model. In chapter 2.1 and 2.2, we examined the hierarchical concept (strategy-dynamic capabilities-business model-business processing), the business model dynamics which means the changing types of business model and the relationship between the dynamic capabilities and the strategizing actions that change the business model. If we integrate all these, we can constitute a framework as in Figure 3, which shows the strategy of the company, the business processing and dynamic capabilities of the business and
external environment focusing on the business model change, having the possibility of using it as a consulting framework based on business model.

![Figure 3. Business model based consulting framework.](image)

For the business that will be carried forward, the static perspective of the business model is applied to utilize it as a blueprint for promoting business and for the business that is currently being carried forward, the dynamic perspective of business is applied to predict the appropriate business model change. For the successful changes in the business model, we need to find the essential, repetitive and standard process and in case that a new business needs to be added or the existing process needs to be removed, innovation techniques can be introduced additionally. We can figure out the capabilities that are accumulate through business processing and confirm that a non-imitable environment is being made. Through analysis of the external environments, we can figure out the effects on the business model change and touch on the strategy for strategizing actions. Especially in case of SMEs, their business logics are simple, which makes the process of abstracting it to a business model simple and clearly shows the relationship between the business model components and the companies.

3. The Trend of the Business Model based Technology Commercialization

3.1 Concept of Technology Commercialization

The concept of technology commercialization is defined as “the activity of value creation through accomplishments of research development or application of technology” or as “a technology transfer in a narrow sense and as developing, manufacturing and selling products through technology in a general sense” claims that “the general concept of technology commercialization defines that it as a process and a variety of activities that create the added value through the transfer, transaction, spread and application of the developed technology”. In the end, from a perspective of a company, the main subject of the technology commercialization, technology commercialization is to create values by producing and selling the results of the research development acquired through the technology transfer and technology transaction or the results developed by the company itself. Also, it includes selling the technology through technology marketing according to the stages of the technological development. Figure 4 briefly shows the conceptualization of the technology commercialization.

![Figure 4. The concept of technology commercialization from the company's perspective.](image)

3.2 Market and Consumer-Centric Technology Commercialization Trend

To examine the consumer-centric technology commercialization trend, we need to investigate the current situation of the technology commercialization and technology transfer of the R&D results from the public research institutes. Point out that one of the main problems related to technology transfer is the asymmetry that happens between the supplier and the consumer and that the general method of technology transfer performed by public research institutes is a technology-push type that provides consumers with technology information owned by the research developer and in this process, the technology information that consumers want is not provided efficiently. Analyzed the success of the technology transfer targeting at three technology supply models - consumer company centered model, possessed technology centered model, consortium centered model -
and the result shows that the success rate of the technology transfer of the consumer company centered model was 80 percent, far higher than the rest two models.

Park W (2014) points out that ecosystem of technology commercialization is not still properly established due to the immature technology market, weak consumer foundation and market-separated R&D. It suggests business ecosystem model of the R&D commercialization, which is composed of four different domains such as R&D, market, information distribution and customer as a reference model for creating technology commercialization ecosystem. Also, it emphasizes the roles of public research institutes as a key stone to lead the technology commercialization ecosystem as following. First, they need to create new values of the technology commercialization ecosystem. For doing this, public research institutes need to figure out the demands of the customers and conduct consumer-oriented R&D to meet their needs. Second, the created value in the technology ecosystem needs to be shared with the members of the ecosystem. Third, the customer value needs to be expanded and a virtuous circle of the value flow. In short, to develop the technology commercialization ecosystem, public research institutes need to conduct research development that suits the demand of a company, which is practically the consumer and the customer in effect.

3.3 The Importance of the Business Model of ICT Technology Commercialization

Companies belong to the customer domain in the technology commercialization model, suggest the technology demand and do activities of providing goods and services and making a profit through technology transfer (or its own R&D) – securing technology resources – early commercialization process – business process as shown in Figure 4. As a failure factor of the technology commercialization, market failure and system failure are mentioned. Especially the market failure happens when the R&D investment into the application research by the public research institutes is too little due to the market danger inherent in the technology development and when the provision of technology finances toward companies is too little in the stage of early commercialization, which has more danger than value as shown in Figure 5.

![Figure 5. Market failure due to little investment by the technology finances](image)

The company is the consumer of the technology resources, which are the result of R&D, for public research institutes in technology commercialization and it is the supplier for the customers of the final goods and services. Companies as a medium that reflects the needs of the customer and market to R&D of public research institutes can materialize the needs of the customers and the market by utilizing the business model and can reflect the needs of the companies to public research institutes based on it. The market failure of technology commercialization results from the early underinvestment due to the danger and uncertainty inherent in the technology development and having commercialization vision through correct business model will be helpful in resolving the early underinvestment problem. And as mentioned in the introduction, ICT industry is a field where a new industry (business) can be created through combination. The types of combination are: 1. Combination of service and service, 2. Combination of service and goods and 3. Combination between industries. It is an already well-known fact that the new business combined with ICT has the biggest ripple effect when it is grown into the service platform business. The service platform business has the first stage of collecting a large scale of users with goods and services and making it into a platform and then develops into the second and third services targeting at the collected users. Therefore, to create values continuously, designing business model and changes in it are needed. This can be expressed as shown in Figure 6.
4. The ICT Technology Commercialization consulting Framework based on Business Model

Unlike large corporations, most of the SMEs do not have foundations for the business model regarding the existing business and started their business based on their own ideas and technologies. And for the successful business of SMEs, which do not have enough internal capabilities, consulting from outside is needed. The consulting for the SMEs, which do not have a large scale of organization and the business is not that complicated, it can be more effective to diagnose the problems of their whole business cycle based on the business model and suggest the measures to solve them instead of the comprehensive management consulting in the past. ICT SMEs, which have much room for technological development, can get technology transfer to secure the technology resources. Therefore, as the whole business cycle of ICT SMEs is similar to technology commercialization, the ICT SME consulting of technology commercialization can be proceeded as following using the business model based consulting framework of Figure 3. Here, the types of the business model change are “creation”, “extension”, “revision”, and “termination”, as cited in Sergio C (2011).

- The company creates a new business model to utilize the results from its own R&D or the technology transfer as technological resources, which are the foundations for the business. As the danger is higher than the value, creation of a sophisticated business model is needed to be receive technological finances. In case of having new technology transferred for the changes and innovations of the existing business model, the business model dynamics such as the business model extension and revision need to be considered.

- The company examines the validity of the created business model and considers the business model extension in the process of the early commercialization processing through technological resources. In this process, addition of the business items and composition of business portfolio can be carried out. The innovative business model with average technology has higher competitiveness than the average business model with new technology.

- In the business processing of the early commercialization process, the business model is performed and an essential, repetitive and standard process is established in the process that the business model becomes successful and the capabilities of the organization related to the business is improved. As shown in Figure 6, in the ICT field, the one-time success of the business model does not guarantee the continuous growth of the company. Therefore, dynamic capabilities and strategizing actions are drawn to revise the business model for the continuous growth of the company.

- After the business processing, the non-competitive business model gets terminated and the creation of new business model or the external technology to change the existing business model is explored.

The process above can be shown as in Figure 7.
5. Concluding Discussion

For the ICT industry, which creates a new value through convergence, to become the engine for growth, it needs to spread to SMEs and ICT SMEs need external consulting to build constant growth as they do not have enough capabilities inside the company. The consulting for the SMEs focuses more on the business itself as their organizations are not in a big scale and business is not so complicated. They need an effective consulting method that diagnoses the problems regarding the overall business cycle and suggests alternatives. To meet these needs, this study analyzed the documents about the business model researches, confirmed the possibility that the business model can be utilized as a tool for SME consulting and suggested the business model based consulting framework. The proposed framework is composed hierarchically: Strategy - business model - business processing. It is a structure in which dynamic capabilities and external environments connect the business processing and strategies cyclically and change the business model. Through this structure, we can figure out the flow of connection from the strategy to business processing in terms of the business process and the dynamic capabilities in terms of capabilities.

The process of technology commercialization of the ICT SMEs, which have much room for technology development, can be regarded the same as the overall cycle of the company’s business. For the consulting of the overall business cycle, this study suggested ICT technology commercialization consulting framework based on the business model, which applied the business model based framework to technology commercialization. The proposed framework is described focusing on the types of the business model change, which are needed for the 4 stages from technology transfer to business processing. Even though the proposed framework has the strength of being an effective consulting framework that focuses on the business itself of the ICT SMEs, it is yet far from actual application to the practical field as it is still at the conceptual stage. However, with a growing interest in the researches on the business model change, the proposed framework is expected to be more specified in the future.

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