Study on Factors Influencing the Intention of Organization to Acquire Service-Oriented Architecture: Focusing on Domestic Firms
Lee, Hyun Joo, Yonsei University,Korea, flgsuswn1@naver.com
Lee, Jung Hoon, Yonsei University, Korea, jhoonlee@yonsei.ac.kr
Jeon, Ho Jin, Yonsei University, Korea, jeonhojin@yonsei.ac.kr

Abstract
The SOA adoption is expected to bring a significant paradigm change in IT industry as the Client/Server architecture did from a terminal based architecture in the past. OSA is becoming a public attention because of its business agility and IT cost reduction benefit on today's business environment of growing diversity and convergence among various businesses. But since the SOA adoption level in Korea is still in early stage, many companies have difficulties both in setting a strategy and direction for adopting SOA and in achieving a goal of adoption SOA successfully.

So, this research investigates the factors which determine the decision of SOA adoption. The proposed model in this paper was developed on the basis of the innovation diffusion theory, fad theory, and rational efficiency theory.

For the study, six independent variables are selected: two organization variables - IS flexibility, Organizational innovational two environment variables - bandwagon pressure, market uncertainty two perceived characteristic variables - perceived benefit and risk of SOA. And one control variable is selected; strategic typology.

Chapter 1 Background and Purpose of Study
In today’s dynamic and steep business environment, influence of IT is expanding every [75]. Also, today’s companies are facing unprecedented, revolutionary change in business environment. Globalization, deregulation, emergence of new technology, increased flexibility of customers and more intense competition require fast change from companies. Because of interchange between different systems and fast development of diverse and new products that satisfy customers’ needs by increased change and cooperation in business environment, ability to change flexibly to domestic and foreign environmental change is becoming the key of business competitiveness. [43].

Therefore, business requirements and IT requirements not only make it possible to use the IT-based structure more effectively, but also it requires technology that can combine with practical solution and be equipped with adaptation and flexibility that can follow the continued change and development to business process and business model.

However, most of the solutions to synchronize technology and business work conditions so far have been skewed to technical side, and focusing on application programs, so they do not provide business flexibility. [7].

Most notable company IT architecture to respond to such business demand effectively is ‘Service-Oriented Architecture: SOA’. SOA is a paradigm that can seek IT efficiency and maximize business outcome by reusability and standardization as well as agility and flexibility by reconfiguring functions present in Silo system to Service structure in business and IT perspective, register into registry and make it possible for reuse in several clients. [7]

Recent IT product suppliers had reached standards consensus on SOA and main web service standards, and SOA is becoming reality thanks to emergence of new tools and base structure that enable SOA and service possible as reusable and interchangeable on all platform. [50]

Gartner said “transformation to SOA will bring change in the frame of thinking that can be comparable to that from terminal-based architecture to Client/Server architecture, and by 2008, 80% of the new development projects will be SOA” [12]. Also, Forrester Group analyzed that SOA had already become a critical part of IT [46], but Ovum’s dire prospect that says SOA-based projects would mostly fail in three years [28]. Also, extreme shrinking of IT investment following economic downturn is the most obstacle of SOA adoption. Likewise, domestic level is still in initial phase in the midst of hope and worries, and many companies have difficulty over forming strategy on SOA adoption, and since there are worries on SOA itself, such as process speed on outcome and security, there are suspicions on meeting the goal [28].

In order to alleviate suspicion on SOA, SOA must be settled as a means to combine business and IT, rather than a mere IT architecture. However, even though a company established a system based on SOA, industrial experts explain that there is few site that materializes the initial ideology of developing necessary service and recycling for the necessary service through sharing process.

This is the point to ask a question: “Disregarding the advantages that were emphasized when it appeared in market, is SOA in stalemate of failed?” Some say that, unlike SOA’s failure to satisfy the expectations, the industry sees potential for new development of SOA by unifying with some trends of the software market. An argument that emergence of new computing methods with service concept will open a new road for SOA is dominant. One IT expert says that “It is appearing that SOA is a key value to provide a service concept to the new popular software development and delivery methods like SaaS, cloud computing and BPM.” In other words, SaaS and cloud computing adopt service as software development and delivery method, so as these concepts stand out in the market, SOA’s utility will be increased. Particularly, SOA will be a useful concept to support reduction of cost, which
is a key value presented to customers by SaaS and cloud computing.

In order to introduce new information technology and strategy successfully for a company, planned and continual activities to lead change in members’ thinking and behavior and recognition of new technology as innovation must accompany, and it is studied that adoption of such innovation is influenced by environmental, organizational and adoption objects’ contexts. [18] To understand decision factors of the organization’s information technology acceptance, there needs much effort [65]. Recently, the subject of research is changing to the factors related to realization of IT in the organization. For example, there have been studies on what correlation exists between organizational variables and information technology to lead successful realization of IT [17, 45]. In this regard, it is focusing on recognizing SOA as a type of innovation, developing research model based on innovation model and realizing SOA adoption intention.

By taking a look at context of SOA, most influencing variables on SOA adoption are sought, intention of adoption depending on the company’s inside and outside context is studied, and the strategy to expand SOA is sought. Analyzing the variable influencing SOA adoption intention has huge meaning as it decides SOA’s development direction and business strategy. Also, the factors influencing domestic firms to introduce SOA are systematically analyzed, and through deduction of generalized adoption factors, a tactics to expand and settle SOA as company’s strategic competition tool will be presented. By checking influencing factors that need to be considered while introducing SAO, and by studying the chance and necessity of SOA by companies that plan to introduce SOA and SOA vendors, adoption strategy specific to each company’s environment will be devised and factors that do not play positive function will be realized or removed, to contribute to transforming to positive function.

Today’s information technology has critical influence on business success. Therefore, organizations use such information technology to increase effectiveness of organization. Thus, study on adopting and expanding technology-based innovation is necessary [26]. Empirical study with theoretical and statistical verification and based on innovation research’s outcome on existing IT and information system, fundamental reason to introduce SOA is sought from IT innovation perspective, and factors that have positive or negative impact on SOA adoption are to be recognized. In order to meet the goal, research model on SOA adoption intention is developed, and main factors that influence companies to introduce SOA are presented.

In this research, along with theoretical study on SOA, through study on existing research over the factors influencing selection of innovation-perspective information system based on theories related to information system and new technology selection, theoretical basis will be gained for building structural model. The study is consisted of the following five chapters.

In chapter 1 ‘Adoption’, study’s background, purpose, method and structure are sought, and in chapter 2 ‘Theoretical Background of Study’, SOA concept and previous studies on technology adoption are covered. In chapter 3 ‘Study Model and Hypothesis’, empirical study model is presented, and hypothesis for empirical analysis through operational definition of factors and factor analysis to set measurement model is presented. In chapter 4 ‘Empirical Analysis and Verification of Hypothesis’, data collection and sample selection process for verification of the set hypothesis are shown, and hypothesis is verified. In the last chapter 5, ‘Conclusion’, limit and implication of study is presented, as well as the summary.

Chapter 2 Theoretical Background of Study

Clause 1 SOA (Service-Oriented Architecture)
Companies have so far been responsible for huge cost of integration and system maintenance due to expansion of different-model solution. Also, they have had difficulty upgrading the disparately separated system when necessary. In order to grow in the changing business environment, it is necessary to transform to RTE with ‘on time perception’ and ‘quick response’ as key. Also, with emergence of such concept, a necessity of integrated environment in which application and data are quickly accessible is growing. So, companies have gained business requirements to achieve agility and cost effectiveness [76].

Also, as a wall among previously invested applications (ERP, CRM, SCM, etc.) is made, lack of compatibility appeared. This is not a merely technical issue, but for business execution and interaction with other business, a wall is made on the method companies use for IT [6]. The IT subjects for companies to satisfy the business model necessity is as follows [7].

- Maintenance of consistence IT architecture that adapt to changing environment
- Making clear and easy application development environment
- System that is easy for support, expansion and restoration
- Development of recyclable program
- Immediate finding of reason and solution when problem emerges
- Setting business logic’s architecture
- IT structure that supports change and minimizes shock

Such IT requirements not only make IT-based structure efficient, but also it requires technology that can successfully integrate with flexible, adaptive and practical solution to follow the continued change and development of business process and model. However, most applications to synchronize technology and business condition are skewed to technology and focused on application program.

Therefore, it is necessary to find company approach to allow business leaders and IT at mid-point. In order to secure business and architecture framework that can connect the issues of business, rather than method to overcome technical incompatibility, necessity of SOA is emerging [6].
The term SOA is first used by Prof Alexander Pasik in 1994 to explain the difference of Client/Server model in dispersion environment and the traditional model [40], and SOA, an acronym of Service Oriented Architecture, has no standardized definition yet, but there are technical and business point definitions exist [6].

In Gartner, it is defined that “SOA is a concept of standard interface, and software architecture that establishes total application” [57, 67], and OASIS defines that “SOA organizes business logic dispersed in different domains, and by using it, new service is created and SOA is a paradigm to create a new service from those services.” [48]

In Web Service Architecture Working Group of W3C, He defined SOA as “Service Oriented Architecture is an architectural style whose goal is to achieve loose coupling among interaction software agent” [34]. In this, Loose Coupling means that it is not necessary to know the application’s technical specifics in order for an application to talk to other conversation. This includes that platform must be independent, and neutral to programming language. Furthermore, it includes that it must follow the mature standard. Even if it has complete platform, language and independent interface, in order to achieve loose connection in real meaning, an authoritative rule that everyone acknowledges is necessary.

In SOA, service means a unit of service provided to customers, as business task that can be repeatedly used. SOA must exist autonomously while each unit of logic is not isolated and interacted. Therefore, logic unit must comply with principles, but evolve independently while maintaining community and standard [23].

Bieberstein et al. suggests advantage of SOA adoption as recycling of component, and SOA's flexibility as reduction of cost, time and effort, solution of IT problems by flexible solution and reduction of realization time, and differentiation of business competitiveness and justification of IT investment through close connection of IT and business service [6].

In the research by Yoon and Carter, advantage of SOA adoption is classified as improved business agility and lowered costs. Improved business agility includes quick response of IT to business environment, change of market or customer demand, easy system integration, stronger connection of IT and business, improvement of data flow and improvement of customer service. Lowered costs include reduction of application development cost and time, reusing existing functions, reduction of installation cost and management cost [76].

IBM proves through IBM SOA method that advantage of SOA adoption is increase in agility, quick response to change, reduction of cost, improvement of effectiveness, business management and application of new technology [38].

Gartner anticipates “Change to SOA will bring change in frame of thinking comparable to that from terminal based architecture to Client/Server architecture, and 80% of the new development project by 2008 will be SOA [12]”. Also, Forrester Group analyzes that SOA has already become an inseparable part of IT. [46].

Domestic adoption of SOA is slower than other advanced countries. On this, the situation of domestic market in which systematic and active approach is less sufficient than American and European states where many success stories and detailed achievements are found. In 2007, SOA gained most attractions in every IT area like system management, ERP and BPM, in domestic IT industry. Especially, like in overseas cases, in domestic cases too, all communication companies adopted SOA to conduct projects, and in financial, public, manufacture and service sectors, adoption is being considered. In case of communication industry, not only in management, sales and fee charge, but also in SDP (Service Delivery Platform), which provides new product service by interacting with IP network and previous network like Internet phone and IPTV based on IP, SOA is expected to be introduced [27].

Clause 2 Concept of Innovation

Damanpour defined that innovation is development of tool, system, policy, program, process or product inherently in organization or adoption of them from outside [18]. Amabile defined that, by attempting connection of individual creativity and organizational innovativeness, organizational innovation is successful execution of unique idea in organization [4]. Also, Rogers defines that innovation is idea, practices or objectives newly recognized by individual or other selection unit. Therefore, response to innovation could be perceived differently by individual objectives. [65]

Innovation can be classified into three types. First, it is technology innovation, which means creation of innovation where no product or service exists before. Secondly, it is a process innovation, calling improvement of existing product or service and making it with new method. Lastly, it is administrative innovation, which is an innovation that makes and emphasizes new organizational design. New organization will support new product and service effectively. Management innovation includes information management system. [35].

Also, innovation’s types can be classified into the following three. First, incremental innovation means improving function or adding it to the existing product or procedure; secondly, synthetic innovation means integrating existing idea or technology to make new product or service. Lastly, Discontinuous innovation is making new product or service not existing before [30].

Clause 3 Spread of Innovation

3.1 Rational-Efficiency Theories

So far, the effective perspective, which has been mainstream in study on spread of innovation, has set decision making of each company in economic environment, in which declining outcome creates pressure of organizational change and search, as rational self decision. However, effective perspective can explain only part of spread of innovation for the following reason. First,
the premise of introducing management innovation methods following the Pro-innovation biases can explain accelerated spread only partially, and it cannot explain the reasons of not accepting effective innovation in the organization and spreading non-effective innovation methods, well[1].

Secondly, the complete-information assumption which says that spread of innovative method causes the introducer recognizes the technical achievement following adoption of innovation is unrealistic in phenomenon, while theoretically making sense.

Thirdly, the perspective of benefit and cost of assuming incomplete information perception is based on an assumption that as there are more entities introducing the method, the cost will be decreased and achievement improved, so more firms will introduce. In other words, decision makers calculate the outcome of introducing innovation correctly, so the information on efficient innovation must be delivered from early adopter to late adopter via some channel. [13] However, in order to verify the efficiency, it takes some time, so late adopter cannot wait for the outcome, and not only it can prove the presence of specific channel where the information exchange taking place, but also early adopter has no reason to spread the information of innovation in competitive nature. [2]

According to Rational-Efficiency Theories, innovation is a main source of profit or economic benefit, and the important purpose of innovation is to get economic profit like maximize profit, promote market share and secure competitive superiority [1].

3.2 Fad Theory

An organization copies other organization when the reason or method of the problem to be solved is uncertain or understanding of technology is vague [20], and it is an argument that it works as a strong myth as spread to many organizations. Increase in organizations which adopt the innovation influences the organizations which have not taken innovation yet, but soon to do so [49]. Innovation is selected and spread not because of its effectiveness, but it becomes natural to adopt it due to social norm, so organizations cannot help but bandwagon. Through this process, spread pressure is created. As the number of adopters increase, the pressure increases, and the increased pressure in turn increase the number of adopters. [52]

Rumelt analyzed the argument that organizations suggested by Chandler adopt multiple business organizational structure in order to solve management issue of diversification strategy, and he found that it has correlation from 1940s to 1960s, but the reason is not related to efficiency [66]. The result implies that in initial phase of innovation spread, organizations select innovation to solve the facing problem, but in later phases, there could be other reasons [2]. Organization theorists tried to find the reason from Bandwagon pressure. Bandwagon pressure means that in later innovate phase, the organizations which want to adopt innovation continue innovation while not having recent information its efficiency or profitability, and this asserts pressure to adopt innovation to other organizations as more organizations adopt it in initial phase [2]. In other words, bandwagon means a process of spread of innovation due to pressure of bandwagon by many organizations which adopted innovation, rather than to gain efficiency or profit. [2, 73]

3.3. Innovation Diffusion Theory

Innovation diffusion theory gives useful view to explain the phenomenon in which new information technology is accepted and used, so it is used as a standard theory of many empirical researches on selection and spread of information technology by individual or organizations.

Diffusion theory is closely related to technical innovation, most used by not only anthropology, sociology, education, marketing and also by technical innovation. Spread of innovation can be defined as increase of adopters of an innovation through communication after time, by social system like individual group or other units. [65]

Rogers says that levels of adoption of innovative goods is innovators, early adopters, early majority, late majority and laggard. Innovation diffusion theory emphasizes the importance of the group which buys new product early. In other words, the purchase behavior of innovators who buy new products early influences early adopters' behavior, and early majority copies early adopters' reaction after observing it. Therefore, the early adopter group, which plays a role of opinion leader, plays big role of spread of new products by leading potential adopters' imitation [9].

Rogers argues that there are the following factors of innovation diffusion's contexts.

- Relative advantage: Degree of perceiving innovation is better than the existing one
- Compatibility: Degree of perception of compatibility of innovation with existing one in value, necessity and previous experience
- Complexity: degree of difficulty to use the innovation by user
- Triability: degree of attempt and test before accepting innovation by user
- Observability: degree of observing innovation from others

Especially the perceived usefulness and easiness used by TAM (technology acceptance model) are same as relative advantage and complexity, and Davis (1989) adopted these from diffusion theory [3, 56, 59, 71].

Tornatzky and Fleische suggests theoretical TOE framework used for research of adoption of technical innovation [74]. Through this, the factors influencing the innovation adoption process are suggested as External Environmental Context, Organizational Context, and Technological Context. External Environmental Context has relevant industry, competitor, regulation and relation with government as main variables. Such variables are factors existing outside of the company that provides limits and opportunities to technical innovation. Organizational Context means the context of general company like size of company, degree of centralization, standardization, complexity of management structure, quality of personnel,
and size of resources to use from inside of company. The factors are company’s structure and process that limit or promote adoption and execution of innovation. Technological Context is how technological contexts influence the adoption process.

Thong and Yap developed integrated model on information system adoption by small-sized firms, based on technological innovation literature [72]. The model sets CEO context as innovation on information selection, and organizational context as company size, competitiveness and information strength.

Premkumar and Roberts conducted research on usage of various communication technology and the factors influencing selection of the technology by rural companies. They divided innovation, organization and environmental contexts, and included total of 10 variables [63]. After empirical analysis on 78 companies in the U.S., comparative advantage, support from CEO, organization size, competition pressure and outside support are found to be important variables.

Grover researched how uncertainty of environment and ripeness of inner information system, the organization’s structural factor and factor to outside environment, influence innovation technology adoption. The uncertainty factor found that innovation technology is accepted due to outside pressure, and the organization is influenced by dynamics of outside environment, degree of competition environment and difference of environment to accept innovation [26].

Iacovou et al. conducted research by dividing the factors influencing EDI adoption among small-sized firms with three criteria [37]. It points ‘outside pressure on adoption’ by low status of small sized firms, organizational preparedness on technology and resources, and ‘perceived benefit’ limitedly perceived by small sized firms due to lack of usage and integration, are important factors.

Burgelman et al. defines company’s innovation capacity as ‘combination of organizational context that can promote and support innovative strategy’, and suggests a model to evaluate innovation capacity [10]. There are two categories: injection factors necessary to devise innovation strategy and structural and cultural factors that can influence execution of the devised innovation strategy, and detailed variables on each are suggested. For detailed variables, as injection factors, degree of securing resources, capacity to understand competitor’s innovation strategy, and capacity to understand technological environmental change, and as organizational factor that influences strategy execution, organizational cultural factor and management’s innovation acceptance capability are pointed.

Kimberly and Evanisko classified the variables influencing technology innovation acceptance, rather than management innovation, as individual, organization and environmental variables. The variable used as decision making factor of adoption is leader’s context (experience, academic history), organizational context (centralization of decision making, possession of expert personnel, size of organization, diversification of functions) and environmental factor (competition). After empirical research on hospitals, organizational factor is found to have more impact on degree of innovation than individual and environmental factors [44].

Chapter 3 Research Model and Hypothesis

Clause 1 To Set Research Model and Hypothesis

1.1 Research Model

According to the definition of innovation, defined by many researchers in previous researches, the SOA to be discussed in this study can be regarded as innovation. Since it is creation of new service, it can be Technology Innovation, and since it improves the existing information system’s function, it can be seen as Incremental Innovation.

Adoption of information system can be classified into individual level adoption and that of organizational level, and this study focuses on organizational level adoption, regarding SOA adoption as a company’s decision.

Combining the previous studies, it is found that the factors influencing technology adoption in organization commonly consider Organization Context, Environment Context and Technology Context, presented by Tornatzky and Fleische’s TOE framework.

Unlike individual level adoption of innovation, that of companies must accompany many changes in basis and process of the company, in addition to huge amount of investment, so it uses organizational context, environmental situation and innovation context as basis of decision for general decision making. Also, perceived context of the technology subject to innovation is included as variable. Therefore, this study also adopts organizational, environmental and technology contexts, proved of their importance by previous studies, as dimensions.

At the same time, based on rational efficiency theory, as variables of organizational context, flexibility of information system and innovation of IT organization are included. Given that SOA adoption’s advantage is flexibility, the fundamental purpose of introducing SOA could be flexibility. Therefore, it is deemed that when flexibility of information system is harmed, intention to introduce SOA is created, and this is added.

Among outside company contexts, based on trend theory, bandwagon pressure and uncertainty of management environment variables are included. Bandwagon pressure is a pressure of adoption from the company which introduced SOA. Company adopted SOA vary by industries like communication and financial sector. With this in mind, it is judged that bandwagon pressure inside the industry is judged to have influence on SOA adoption intention. Also, as management environment becomes uncertain, more accurate information is needed and reliance on information system increases. So uncertainty of management environment is prospected to have influence on SOA adoption intention.

Among the perceived contexts of SOA, based on the majority of theses that say perceptions have decisive importance on organization’s decision making, SOA’s perceived advantages and risk variables are selected. For
adjustment variables, information system building strategy types are selected, to check adjustment effect between independent and dependent variables.

In this study, based on the previous study on technology adoption intention decision, research model to verify the relationship among factors influencing SOA adoption intention in the organization is presented like

![Research Model](image)

**1.2 To Set Research Hypothesis and Operational Definition of Variable**

**1.2.1 Flexibility of Information System**

IS flexibility can be defined as system capacity to adapt effectively to the changed in and outside conditions [9]. Satisfaction on flexibility and expansion of existing system is important factor in motivation of change. If satisfaction on current system is low, a new method to increase outcome is devised [14]. In Chau and Tam’s study, it is studied that current system’s high satisfaction has negative influence on open system adoption intention [14].

The most advantage that organization can acquire through SOA adoption is flexibility [6]. If the organization’s information system has high flexibility, it will feel less necessity of SOA, but if the flexibility is low, it is expected to actively seek adoption of SOA. Thus, the following hypothesis is presented.

**Hypothesis 1: High IS flexibility of organization has negative impact on SOA adoption intention**

**1.2.2 IT Organization’s Innovativeness**

There are many studies on spread of innovation, and the unit of choosing innovation is not individual but group. Therefore, a certain tendency to innovation in organization, or innovativeness must be measured or compared, and it reached an agreement that such innovativeness must be treated as analysis unit. Through initial studies on organization’s innovativeness, the characteristics of organizations with strong innovativeness are found to have same level of innovativeness with individuals. [65]

Innovativeness of IT organizations is self-oriented motive to introduce new technology, and according to Kim, and Prabhakar [42] and Gefen [24]’s studies, innovative users prefer new technology or new business or trust them. This argument is supported by Lewise et al. [47]’s study.

In Donthu and Garcia’s research, online customers tend to be innovative without considering risk factors existing the new transaction way, and pursue new and diverse experiences. Based on this, organizations with innovative tendency prefer new information technology, so it is inferred that they will risk, trust and accept new technology [21].

IT innovativeness means fast decision making process and intention to introduce new technology, and willingness and support from management part means conferring decision making authority or directly participating in adoption or application of new technology.

It calls the degree of accepting new products in advance to other members by individual or unit. So, innovative adopter is a type which takes risk in initial phase of innovation spread, while adopter with low innovativeness avoids risk and reduces expected loss. Therefore, as innovativeness is higher, it will adopt innovation faster and more actively.

**Hypothesis 2: IT Organization's innovativeness has positive impact on SOA adoption intention**

**1.2.3 Bandwagon pressure**

In the research of Abrahamson and Rosenkopf, it is explained that adoption of innovation is done continuously, fearing loss of competitive advantage. Such reason forces pressure to adopt the innovation by other groups as more organizations adopt it in initial phase. This is called bandwagon pressure. Bandwagon means a process of adopting innovation by bandwagon pressure from many organizations, rather than to do so in order to gain effectiveness or profit [2, 73].

Bandwagon pressure can be divided into institutional bandwagon pressures and competitive bandwagon pressure. Institution bandwagon pressure is a pressure from fear of not getting legitimacy or support from the community the organization belongs or interested parties if not adopting innovation. Competitive bandwagon pressure is a pressure from fear of possible degradation of organization’s outcome below than average if not adopting innovation, while groups of the same industry have adopted the innovation. Also, many researchers of information system argue that it is likely to adopt new information technology introduced in the industry, if the technology is regarded as threat to competitors [41, 62].

If SOA’s domestic adoption status is taken a look at, large companies of financial and communication sectors lead the adoption. From this, a hypothesis of presence of bandwagon effect in the industry can be set.

**Hypothesis 3: As bandwagon pressure is higher, it will have positive influence on SOA adoption.**

**1.2.4 Uncertainty of management environment**

The uncertainty of the environment, related with the level of market change and the impossibility of expectation, means the causal relationship between environmental elements is uncertain because the important information about company or products and some activities are not correctly known [36]. As the result, the company has much difficulty in expecting and controlling the flow of
Hypothesis 1: The uncertainty of management environment will have a positive effect on the introduction of SOA.

1.2.5 Perceived advantage of SOA

In deciding human behavior, the emphasis on the decisive importance of perceptions and the study started from Chicago School of society. Thomas and Znaniecki(1927) stressed the importance of the perception saying “If people perceive situation as reality, that exist in their ends”. Not attributes classified by experts or change workers, the perception about the innovation attribution of consumers themselves affect the rate of acceptance.

The perceived interest means the potential interest caused by building and using new information system of company, and in many previous studies, the interest perceived classified in many perspectives of perceived interest is explained to affect positively the introduction of information system.

Pfeffer and Leblebicis classified the perceived interest largely into direct interest and indirect interest, and the direct interest includes the reduction of transaction cost, the increase of cash flow, the reduction of stock level, the improvement of information level, the increase of operational efficiency and the increase of decision-making efficiency, etc., and the indirect interest includes the differentiation of product and service, the improvement of customer service, the relationship improvement between transaction parties, the increase of competitiveness, the increase of market share and the enhancement of image etc., [61].

Chau and Tam used perceived benefits in the part of characteristics of technology innovation of open system studying the factors affecting the introduction of open system [14]. They proposed benefits that the open system does not need specific license system, can select hardware and software more freely, can use well the resources of information technology and can access transparent data.

Based on the above mentioned previous studies, we develop the following hypothesis.  

- Hypothesis 5: If the perception level of perceived benefits is higher, it will have a positive effect on the introduction of SOA.

1.2.6 Perceived risk of SOA

The perceived risk is subjective uncertainty of adopter about the result of adopting activity. That is, to set as function relationships of importance of uncertainty and adoption results, the perceived risk discussed here means the risk adopters subjectively perceive even though risk exists practically and objectively. Thus how the adopter perceives the innovation during the decision-making process of innovation introduction affects decisively in forming the attitude of preference or non-preference and leads to whether to introduce the innovation or not [39].

The adopter of innovation perceives the innovation attributes but the risk together, so it affects as much as the advantages of innovation on the adoption process of
innovation, and it can explain more clearly about what decision-making the adopter takes to decide the introduction of innovation. If the introduction of innovation occurred in spite of high perceived risk, this introduction of innovation can be presumed not to be an adoption by rational decision.

Generally if the perceived risk about new innovation is high, the possibility of adoption is reduced, so the perceived risk and introduction activity can be considered to have a negative effect on the intention of introduction [64].

Chau and Tam used the perceived barrier in the feature item of technology innovation of open system in studying the factors for the introduction of open system. They said, using the fact that open system has many options as an example, barriers of selection lurk as many [14].

SOA should perform additional tasks such as communication network in case of method call, XML document generator and package of protocol XML document due to web service usage. Such additional tasks have a negative effect on the capability of entire IT infrastructure [70]. Furthermore setting the level necessary for security also can be quite difficult task [16].

One major problem SOA has independently can be that the processing speed can slow above all. Because of this, banks or other institutions regarding processing speed important are unwilling to introduce SOA. The issue on security is also a big obstacle. Since in SOA environment many services are connected, it is possible to generate risk factors on security. The customers which unconditionally order SOA project when business requirements are not analyzed clearly are being pointed out as a problem.

As projects are performed when SOA is not understood exactly, there are some cases which has little effect and only growing management burden. In addition, as IT organizations lead most SOA projects, there are other cases that they cannot derive support of work-site during analysis decision process [28].

Beimborn and Joachim divide the risks of SOA into technological uncertainty, capability and security [5]. When realizing SOA generally web service standards such as SOAP and WSDL are used[60, 77], this is used universally but W3C still classifies it as immature stage [8]. Based on the above mentioned previous studies we develop the following hypothesis.

Hypothesis 6: If the level of perceived risk is higher, it will have a negative effect on the introduction of SOA.

1.2.7 IS strategy types

The company strategy can be defined as the whole course of exploring, confirming and redefining the communication method with management interaction [53]. This is the definite plan for accomplishing the goal of company and the plan for the company to adapt to changes inside and outside environment and it includes the plan for innovation of management structure to adapt as the whole company to the change of business environment and the plan for coping with the diversification of market.

A representative research about the type of organization strategy was performed by Miles and Snow [54]. Miles and Snow assumed that one can simplify the complexity of strategic process by classifying the action type of organization and classified the strategy types of company from a strategic viewpoint for effective harmony between organization and environment maintaining the interdependence within the organization. Theses are divided into ‘Defender’ stressing the cost effectiveness, ‘Prospector’ stressing the innovation, ‘Analyzer’ giving priority to quality, and ‘Reactor’ reacting to market situation without special strategy. This classification is not only the most influential, the most refined and the most widely used, but also the organization classification verified experimentally [19, 31-33] [51] [58] [68, 69]. The types of organization strategy of Miles and Snow has a strength to clearly explain the form counteracting the management environment as relationship of strategy, structure and process [25]. The characteristics of each type are as follows:

First, Defender is a strategy focusing on searching for the stability of organization and is a favorite for companies belonging to mature industry. It searches for methods to defend the position in market by effective production, strong control mechanism continuity and reliability etc. The companies adopting this do their best in stable environment, are cost-initiated, specialize them on specific areas and maintain the low cost structure using existing standardized technology process. In addition, as the environment change where these set in is slow, the defensive strategy can rely on long-term plan.

Second, Prospector is a strategy that companies searching for method to look forward to new opportunity, new product, service and market adopt. It copes with the environmental change elastically, develops new products and actively pioneers new market. The core technology is at marketing and research and development, and it wants to have wide range of technology and product form. It gives priority to the development of new product and service and the innovation, meets the ever-changing customer needs and generates fresh demand.

Third, Analyzer is a strategy that companies evading excessive risk and focusing on new product and service choose. It concentrates on limited range of products and technology and searches for method to hold a dominant position in competition with other companies based on quality enforcement. The analyzer type maintains the effectiveness of existing products and service at any cost and maintains the flexibility to pursue new business action. Searching for technological effectiveness to maintain low cost structure and emphasizing the development of new product and service at the same time, it maintains the competitiveness in case of market change [53, 54].

This study adopts the strategy types of Miles and Snow as control variables, and develops the following hypotheses:

Hypothesis 1-1: The effect that the flexibility of information system has on the introduction of SOA will be different by business strategy types.
Hypothesis 2-1: The effect that the innovation of IT organization has on the introduction of SOA will be different by business strategy types.

Hypothesis 3-1: The effect that the jump pressure has on the introduction of SOA will be different by business strategy types.

Hypothesis 4-1: The effect that the uncertainty of management environment has on the introduction of SOA will be different by business strategy types.

Hypothesis 5-1: The effect that the perceived benefits have on the introduction of SOA will be different by business strategy types.

Hypothesis 6-1: The effect that the perceived risk has on the introduction of SOA will be different by business strategy types.

Chapter 4 Conclusion
To verify the hypothesis, the effect that the innovation of IT organization, the flexibility of information system, the jump pressure, the uncertainty of management environment, the perceived benefits of SOA and the perceived risk have on the variable of adoption intention of SOA will be confirmed by multiple regression analysis.
<table>
<thead>
<tr>
<th>Dependent variable (Likert5-point rating scale)</th>
<th>Independent variable (Likert5-point rating scale)</th>
<th>Variable</th>
<th>Operation Definition</th>
<th>Items</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility of IS</td>
<td>Flexibility of IS</td>
<td>System capability to meet changed internal/external requirements and to adapt quickly and effectively</td>
<td>Integration possibility of information system Other task feasibility of information system Connectivity with information system inside/outside company Rapid change of information system Easy change of information system</td>
<td>Chung (1996)</td>
<td></td>
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<tr>
<td>IT organization innovation</td>
<td>IT organization innovation</td>
<td>Spontaneous motivation to introduce new technology</td>
<td>New technology preference tendency Curiosity about new technology and service Effort not to be behind the times</td>
<td>Agarwal &amp; Prasad (1998), Agarwal &amp; Karahanna (2000)</td>
<td></td>
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<tr>
<td>Jump pressure</td>
<td>Jump pressure</td>
<td>In case some organization does not adopt innovation when many organizations in same industry adopt innovation, degree of pressure by fear that the organization outcome may fall below average due to that</td>
<td>Degree of competitive jump by introduction to rivals Degree of sensitive reaction to rivals’ change</td>
<td>Reich &amp; Benbasat (1990), Abrahamson (1991)</td>
<td></td>
</tr>
<tr>
<td>Perceived benefit of SOA</td>
<td>Perceived benefit of SOA</td>
<td>Degree of awareness about benefits by companies building and using SOA</td>
<td>Degree of flexibility enforcement of business process Degree of linkage enforcement of IT and business Degree of time/cost reduction for application development/maintenance\ Degree of rapid response to change Degree of system integration support Degree of feature recycling</td>
<td>Yoon &amp; Carter (2007), Beimborn &amp; Joachim (2009), Kawamoto &amp; Lobach (2007), Beimborn et al. (2008), Schulte et al. (2007), Bieberstein et al. (2006),</td>
<td></td>
</tr>
<tr>
<td>Perceived risk of SOA</td>
<td>Perceived risk of SOA</td>
<td>Degree of perception about danger caused by companies building and using SOA</td>
<td>Degree of security issue occurrence Degree of processing speed reduction Degree of technological reliability Degree of additional cost spending Degree of additional labor input</td>
<td>Beimborn &amp; Joachim (2009)</td>
<td></td>
</tr>
<tr>
<td>Control variable (Nominal Scale)</td>
<td>Information system building type</td>
<td>Future direction of companies for surviving competition and maintaining dominant position and decision-making or process related to effective distribution of limited resources</td>
<td>Defender Analyzer Prospector</td>
<td>Miles &amp; Snow, et al. (1978), Sabherwal &amp; Chan (2001).</td>
<td></td>
</tr>
</tbody>
</table>


