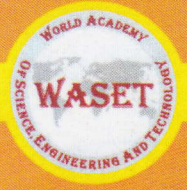
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A MODEL USING THE FLEXIBILITY OF INFORMATION SYSTEMS TO ENHANCE THE *ALIGNMENT OF INFORMATION SYSTEMS* AND THE ENVIRONMENT : IMPLICATIONS FOR INFORMATION SYSTEM SUCCESS

Wartika[1], Kridanto Surendro[2], Eddy Suryanto S.[3], Iping Supriana S.[4]

***Abstract*—** In this time, the changing of business environment is very fast and dynamic.Survival and growth of the organization in an increasingly complex and uncertain, impact on the need for information systems which can be adapted to respond the changes so that always keep in harmony with the environment. Alignment of information systems and the environment are important to maintain and enhance the success of information systems to give contribute in the achievement of corporate goals.

Information systems which are built without observe the possibilities that will be required user in the future, will result in a fundamental change in the information system built. Therefore, the strategy of flexibility is needed in anticipation of the changes. This paper proposes a model using the flexibility of the information system as an alternative solution to improve the alignment of information systems and the environment: implications for the success of information systems.

***Keywords*—**Information system alignment, environment, information system flexibility, information system success

I. INTRODUCTION

In this time, the changing of business environtment is very fast and dynamic. In order to meet the needs of users, won the competition in reaching consumers, provide the best service, and anticipate the environmental changes, companies are competing simultaneously to improve the performance of system information and make new innovations in the construction of information systems so that run successfully, and contribute greatly to the achievement of corporate goals.

One way can be done so that information systems which are built to achieve success is build the information systems that can easily adapt according to the changing business environment.

An increasing number of consumers, information technology changes so rapidly, the need for care facilities are more convenient, efficient and effective, network expansion markets, an increasing number of competitors, the innovations of the other form and new type of service, and so on are some examples of environmental changes that have anticipated.

Development of information systems that do not take into account the possibilities that will occur in the future, have an impact on information systems is not very long-lived because it requires a fundamental overhaul. For example, information systems can not meet the needs of the user again due to the addition of new functions, whereas in the old system facility to add new functionality not available or can not be integrated if available.

However, these features should not be included all because this relates to the capacity of processing and user interface. Another example is the development of service system which is web-based and mobile. Thus, the information system which is built must be flexible, easy to use and easy to change as needed, without having to make a huge change and fundamental.

To meet the needs of users who continuously change according to the changes in the business environment, the alignment of information systems and the environment are important. The alterations that originated, either in the internal or in the external environment of the business, create the need to exercise a flexible strategy

This paper proposes a model using the flexibility of information systems to enhance the alignment of information systems and the environment : implication for information system success.

II. ALIGNMENT OF INFORMATION SYSTEMS AND THE ENVIRONMENT

Alignment according to literally means an arrangement of groups or forces in relation to one another. environment has the most important role as the determinant of alignment.

Managing an organization is a delicate art of achieving alignment between its various internal and external components. Due to increasing of complexity, uncertainly,

and disruptive of environmental conditions , the alignment of information systems and environmental becomes important. Organizations basically scan their environment in order to understand the external forces of change that may affect their future position so that they can develop effective responses and strategies [6] .

Therefore it is necessary to develop a model that can facilitate the adaptation of information systems in order to stay in tune with the changing environment. In order to remain competitive and to survive, a company must be has a response to external forces of environment. This implies to consider the information system (IS) alignment [4]. Corresponding dynamic adaptations of the Information System are studied in the Information System alignment field [3].

Increasingly complex and uncertain environment drives the increase in IT capability, and the use of newer IT capabilities further increases the turbulence. Survival and growth of organizations in such a turbulent environment depends on how well information systems (IS) align the entire organization with environmental preferences [16] .

From a conceptual modelling or ontology point of view, " [6] suggest three main perspectives for modelling an information system dedicated to assessing such technology environments. The perspectives have been identified through a literature review of the major environment analysis approaches and correspond to the major properties of technology environments: the actors perspective deals with complexity; the issues perspective is concerned with uncertainty; the uses perspective copes with disruptiveness. In addition, these perspectives are linked by the concept of influence as illustrated in Figure 1"

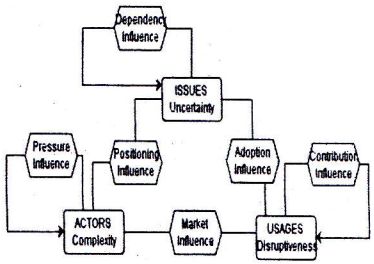


Fig. 1 : Environmental analysis framework [6]

The actors perspective represents the supply side of the environment. The relevant actors are those, which have the power to directly or indirectlyinfluence the organization's performance[7]

The use or usage perspective represents the demand side of the organization's environment. Assessing the uses and the market basically implies investigating the end user needs and how they are translated into demands (capacity and willingness to pay for these products). It is important to *understand how customers adopt and value the technologies* and the value propositions offered by the different actors.[7].

Issues can be defined as open and debatable questions, events or other forthcoming developments whose realization can significantly influence the future conditions of the environment and, consequently, the ability of the organization to achieve its objectives [2]

Complexity is mainly due to a large body of self-organized stakeholders. Uncertainty is due to unpredictable dynamic futures with many open issues. Disruptiveness means non-continuous development and use of technology, with inflection points (or substitute technology) [7]

III. INFORMATION SYSTEM FLEXIBILITY

Information System (IS) flexibility has been regarded as an important indicator of information technology success . Information systems must be flexible to satisfy user requirements, particularly in changing environments [12] , " [24] found users can never be satisfied in emergent organizations, because their needs are always changing ".

Using the flexibility of the information system has been widely used for various purposes, there are two types of Information system flexibility [11] :

A. Information system flexibility for use is the range of possibilities provided by an information system until a major change is required
B. Flexibility to change or the potential adaptability for further changes of a given information systems

Analogously, "[11] define *Information system flexibility-to-use* as the range of process requirements that is supported by the Information System without requiring a major change of the Information System".

" [11] Suggest to operationalize Information System flexibility-to-use with four factors :

A. System functionality refers to the different features a system provides to the user.
B. Scope of the underlying database refers, for example to the number of product categories that can be purchased through the catalog of an electronic procurement system, or the number of analyses and reports provided by a data warehouse application. In general, the larger the database, the more expensive and difficult it is to set up and maintain
C. User interface describes the different features and methods an Information system provides to a user to interact with the system, and includes the number and type of available access channels.
D. Processing capacity refers to the number of users an IS can accommodate oncurrently. It also refers to the number of transactions and user requests an information system can process without major performance losses, measured for example in response times"

Besides the level of information system flexibility-to-use with respect to functionality, data base, user interface, and processing capacity, information system managers face a second decision regarding an (additional) investment that will *allow the information system to be changed, upgraded, and* expanded after its initial implementation. Choices range from systems that cannot be changed in any way (off-the-shelf, turnkey systems) to arrangements that provide a large variety

of opportunities for change based for example on the modularization of system components[11]

Flexibility-to-change is conceptually related with *IT infrastructure*, defined as a general-purpose technological resource that is shared throughout the organization, that is of long-term use, and that provides a basis for more specific application [5].

"[10] Stated that IT infrastructure flexibility was defined in terms of three dimensions : connectivity, compatibility, and modularity". By" [9] connectivity and compatibility focus on sharing a common set of IT resources (hardware, software, and data) with internal and external users" . Other references define that connectivity as the ability of any technology component to attach to any of the other components inside and outside the organizational environment. Compatibility is the ability to share any type of information across any technology component. Finally modularity is defined as the ability to add, modify, and remove any software, hardware or data components of the infrastructure with ease and with no major overall effect [5].

To operationalize information system flexibility-to-change [12] build on the research results [1] of who carefully identified three factors as relevant to describe the flexibility of IT infrastructures:

A. The flexibility of the IT personnel, as the variety of skills and attitudes of the IT staff
B. The integration of data and functionality, as provided by an open network architecture, a multitude of interfaces with transparent access to platforms and applications and the compatibility of applications across platforms
C. Modularity, provided by reusable software modules, vendor-independent database connectivity, and objectoriented development tools.

For individual Information System applications, "[12] operationalize *flexibility-to-change* with the three categories of :

A. Personnel
B. Integration of data and functionality
C. Modularity of system components"

Each category impacts the ability of an organization to change the level of Information System flexibility-to-use manifested as the ability to provide new Information System functionalities, to recombine and reorganize access to various data sources, to allow for modifications of the user interface, and to change the available processing capacity. Hence, Information System flexibility to- change can be viewed as a real option, expressing an optional investment in addition to the investment into flexibility-to-use, that creates the possibility, but not the obligation of future changes of the Information System [1]

IV. INFORMATION SYSTEM SUCCESS

One of the most cited models for measuring information systems success is the DeLone and McLean Information Systems Success Model, from now on referred to as DMSM.

The DMSM has a basic model consisting of six categories of Information System success [19]:

A. System quality, the desirable characteristics of an information system. For example : ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times.
B. Information quality, the desirable characteristics of the system outputs. For example : relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability.
C. Service quality, the quality of the support that system users receive from information system department personnel. For example : responsiveness, accuracy, reliability, technical competence, and empathy of the personnel staff.
D. System use, the degree and manner in which staff and customers utilize the capabilities of an information system. For example amount of use, frequency of use, extent of use, and purpose of use.
E. User satisfaction, for example the most widely used multi attribute instrument for measuring information satisfaction
F. Net benefits, the extent to which information system are contributing to the succes of individuals, groups, organizations, industries, and nations. For example improved decision making, improved productivity, inceased sales, cost reduction, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development.

These categories of information system succes as illustrated in figure 2.

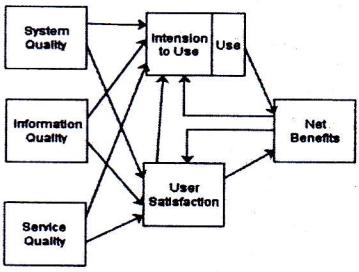


Fig. 2 Updated DeLone and McLean Information System Success Model [21]

Directional arrows indicate that system quality, information quality and service quality will affect the intension to use and user satisfaction. Then the net benefit obtained is influenced by the intension to use and user satisfaction.

In most cases it is not obvious how they will be measured in practice. To fulfill this, each criterion must in the end fulfill these qualities [9] :

A. Measurability , the purpose with all the above is to be able to measure and compare information systems. Thus the criteria themselves will need to be measurable. The mode of the measurement is another discussion, but in the end it must be possible to assign a value to a criterion.
B. Explicit definition, In order to do so, the criteria must be defined and broken down into points of observation, where it is stated clearly what entity or phenomenon the observation points actually concern.
C. Quantification, while not strictly necessary, it is my belief that it is a good design goal to formulate the measurements of the points of observation in a quantitative manner.
D. Possible to validate, With the above three points, it should also be possible to evaluate how well a specific contribute to the overall quality of an information system. Criteria which can be shown to have no impact should be removed.

V. DISCUSSION

With the appearance of demand variety, supply, product, labor, equipment, and others from the business environment, accordingly in this paper, the authors added the characteristics of the business environment beside complexity, uncertainty, and disruptiveness, as expressed by[6], there is also variability. Variability of the business environment will influence the success of information systems indicators.

For example, to simplify the transaction process, so that appears consumer demand for the various types of services in different transactions, on-lineservices via the internet will save time and cost. Then , growing the demand for services through the system which can do in mobile so that the transaction can be done anyw here. Both of them must be accommodated in a single system, because the type of services is used incertain cases as appropriate.

Another example is the different types of deals which are offered payment transactions by competitors. There are competitors that offer payments via internet banking system or offer a credit card payment system. Both of them should be accommodated in a single system, in order to serve various customers with different conditions.

If the information system which is built inflexible to provide additional functions that is required or offered by the environment with different variations, the impact is going to reduce the quality of service. While there-engineering of the whole system will take time and cost a bit.

Dashed arrows in Figure 3 shows that changes in environmental characteristics such as complexity, uncertainty, disruptiveness, and variability will affect the success of information systems indicators.

If there is decline in the value on the success of information systems indicators because the influence of environmental change, so that it is indicated a shift in the alignment between information systems and the environment. The existence of misalignment can lead to unfulfilled the needs of user as expected.

Therefore, to keep the alignment in this information systems and the environment is still stable despite there is effects of the changes in environment, it needs to build information systems that are flexible, adaptableas needed without having to make a significant and fundamentalchange. Proposed modelcan be seen infigure 3.

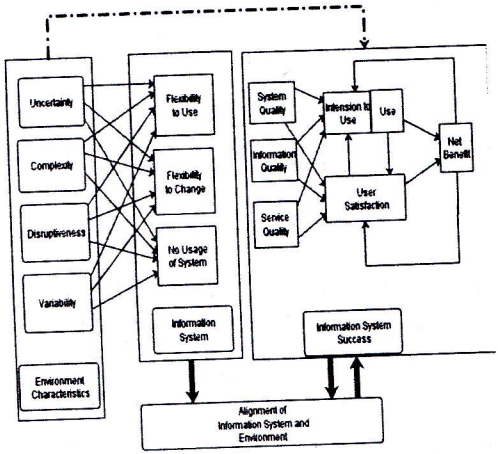


Fig. 3. A Model Using The Flexibility of Information Systems to Enhance The Alignment of Information Systems And The Environment : Implications for Information System Success

Based on the reference [7] and [12] can be described again as follows :

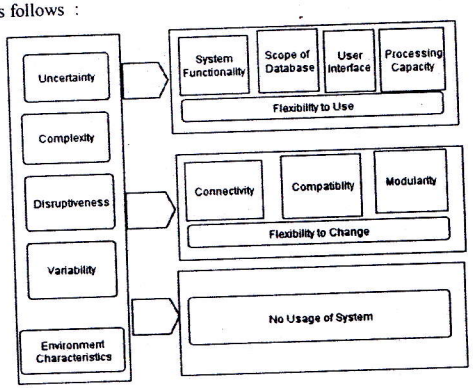


Fig 4. The relation between neighborhood characteristics with dimensions of information system flexibility

Figure 4 shows that in order to information systems flexibly in the changes of environment, so that at the time of information system which was built, it needs to be considered the

functionality of system, the scope of the database, user interface , processing capacity, connectivity, compatibility, and modularity.

VI. CONCLUSION

From the previous discussion, it can be concluded that the changes in the environment that cause a shift in the alignment between information systems and the environments which are characterized by impairment of the success indicators in information systems, allowing for anticipated with the construction of flexible information systems.

VII. FUTURE RESEARCH

From the model use information systems flexibility to enhance the alignment of information systems and the environment: implication for the success of information system proposed, it needs further research on analysis: the effect of the alignment of information system flexibility and environmental information systems, the success of environmental characteristics which is changes in information systems, the changes of characteristics is trough the alignment in shifting.

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