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## The Concept of the Relationship between Information System Maturity and Industry Performance in Indonesia

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# The Concept of the Relationship between Information System Maturity and Industry Performance in Indonesia

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**Abstract.** Industry in Indonesia continues to grow from year to year. Along with these developments, the use of information technology, which is the basis of information systems, should be considered as a handy tool to survive in the competition in the industry. Various previous studies have discussed much the use of information systems and their role at the strategic level. But more in-depth research is still needed to find out the extent to which the maturity of the use of information systems through its elements can affect the performance of companies in various sectors industries in Indonesia. It is hoped that this concept can be used as a subsequent research by distributing questionnaires based on the method of statements that have been defined by researchers. With this concepts, the next development will continue to measure the relationship information systems maturity in general with the organizations performance. The result of the concept proposed by the researcher is expected to be able to measure the maturity relationship of an information system with the connection with the consumer, demand/supply planning element, innovation, performance measurement, IT impact management and also internal process.

## 1. Introduction

Industry in Indonesia continues to grow from year to year. It does distinguish between the growth of the number of Industries. Based on the publication of the official website of Indonesian Central Statistics Agency [1]. Along with the development of this Industry, the use of information technology, which is the basis of information systems, should be considered as a very beneficial tool to survive in the competition in the industry. Information technology is changing rapidly or improving over time, so many Industries are investing substantial money to ensure that they have the latest technology [2]. The industry that can respond to innovations in IT applications efficiently and productively enabled to extend their business and have the power to outperform their competitors and keep the long-term progress [3].

**Table 1.** Production Index of Large and Medium Industry growth, 2010-2017 (BPS)

Year	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
2015	-0.70	2.16	0.83	2.41
2016	-1.29	3.02	0.70	4.01
2017	0.99	2.57		

As more companies use or plan to use applications to support business management, awareness of issues related to information will continue to grow, such as the paradox of information technology productivity, how IT delivers business value, and how IT can produce excellence Competitive [4]. IT becomes more a commodity, no company will gain a competitive advantage by utilizing IT [5]. But some experts do not think so. Business alignment with IT mediated by the flexibility of IT strategy has a positive impact on the company's competitive advantage [6]. The competitive influence as a result of this approach proved to have a positive impression of the performance of the organization [7]. Several other studies have also shown a positive relationship between information systems at strategic level and performance of the industries [8].



Various researches related to the use of information systems and their role at the strategic level have been widely implemented, but most of the previous research is more about retail and manufacturing companies and focus on the process of aligning business strategy with IS/IT. Similar research has not investigated more deeply related to the maturity level of information systems at a strategic level about organizational performance, particularly in the Indonesian industries. Therefore, to determine whether there is a significant positive relationship between the maturity of information systems and the performance of the industry in Indonesia, it is necessary to do this research.

## **2. Literature review**

The literature review will be based on the perspective of the expert and researcher on how to define the concept for further research, this review is very important to develop a method of the concept. The literature is divided into concept of the maturity model, information system and industries.

### *2.1 Maturity model*

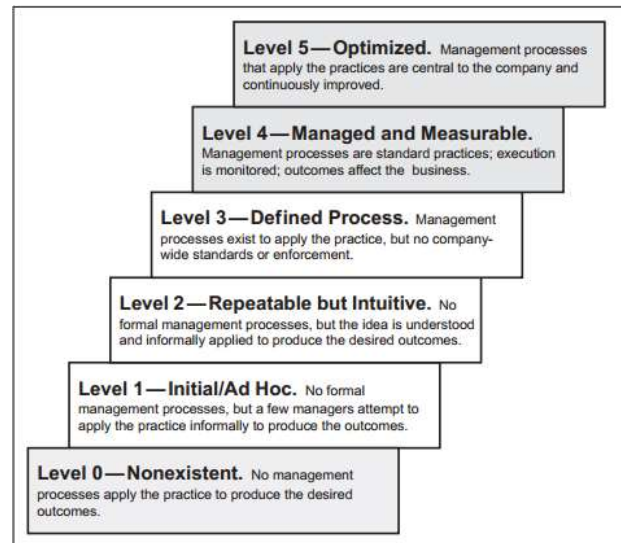
In general, maturity can be defined as a condition that is complete, perfect, or ready [9]. This affinity then causes an evolutionary development in which to demonstrate a particular ability or the achievement of the desired initial target or usually occurs in the final stages. The purpose of the maturity model is to guide the alteration of this process by incorporating formalities in increased activity [10]. The whole maturity model explains the general nature of the number of dimensions at some level of maturity, by describing the specific performance at varying levels [11]. The fundamental components of the maturity model are: (1) number of levels (usually three to six levels), (2) explanations for each level, (3) general description or summary of the characteristics of each level as a whole, (4) Such as the "process area" in the CMM, (5) the number of elements or activities in each dimension, and (6) a description of each component or action to be performed at each level of maturity.

### *2.2 Information system maturity model concept*

Maturity can signify recognized as a measure that allows an organization to evaluate capabilities related to a particular area problem. The concept can refer to different types of organizational resources. Distinguishes a maturity of objects or technology, and maturity of the ability of people [12]. The maturity model illustrates a particular pattern in resource development. Differences in level of maturity described as levels, where each level is superior to the previous. Maturity models provide ideas in the form of explanations or variables that characterize each stage, in which organizations must determine their stage of progress. Thus, the maturity model is the level of improvement that can provide benefits to the organization.

The importance of the relationship between IS/IT and business [13]. Comparing IS/IT with business strategy will encourage business units and leadership within the company to negotiate IS/IT investments with the goal of supporting business lines, products or regional businesses in the same way as they negotiate other budgets.

One way to know how the position of IS/IT to business is to conduct an assessment with a model called Business Value Maturity Model. One of the goals of using Business Value Maturity Model is to help organizations understand the gap between IS/IT contributions to organizational goals [14].



**Figure 1.** Business Value in Model Maturity Level

### 3. Concept proposed

This concept is based from the literature study and continue progressively to model for further research development, the concepts are divided into several parts such as:

#### 3.1 Industries performance measurement

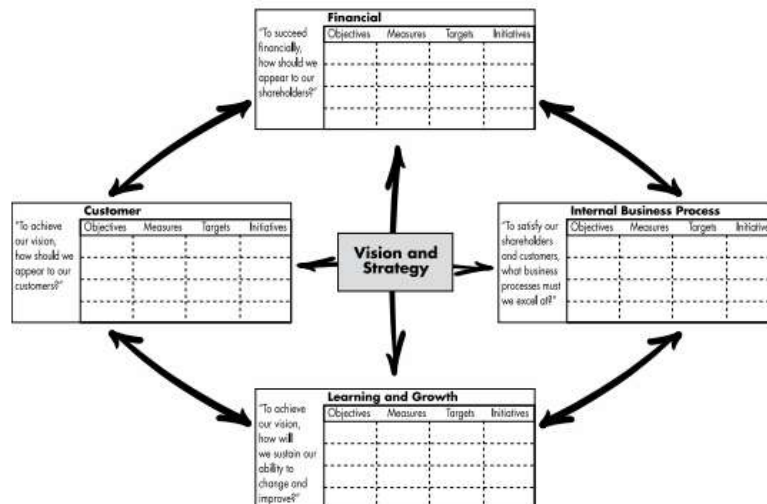
The definition of performance can be described in various ways. Performance is the work of an organization to realize its objectives. At first glance, performance can be interpreted as the work or work creation, and it is also can be defined as the success of the staff, team, or organizational unit in realizing the predetermined strategic objectives with the expected behavior. Understanding is a description of the level of achievement of the implementation of an organization's tasks to realize the goals, objectives, vision, and mission of the organization [16]. In other words, performance can be viewed from the perspective of results, processes or behaviors that lead to the achievement of goals. Thus it can be concluded that the performance of the company is the achievement of the implementation of an organization's duty or the level of achievement of the implementation of an organization's tasks to realize the Industries goals.

#### 3.2 Balance scorecard strategic approach

Since the beginning of its development, balanced scorecard has been successfully used as a strategic management tool in various domain areas [17]. Previously, BSC implementation was carried out in business units and divisions, recently the implementation of this model was seen at the corporate level and reflected all activities within the organization. Non-profit organizations have started to use them, including companies in the health sector [18] and the public sector [19] and government organizations around the world have adopted the concept.

Kaplan and Norton experiments to provide a monitoring system that can communicate financial and non-financial measures using a combination of lagging and leading indicators while addressing long-term and short-term goals [20]. Key elements mentioned by Kaplan and Norton are: targeting customers for profitable growth, value propositions that drive customers to do more business and at higher margins with companies, innovations in products, services, and processes, and investing in people and Systems to improve processes and provide different value propositions for development. In other words, organizational success can be achieved and measured well when viewed objectively from four perspectives: finance, customers, internal business processes, and innovation/learning [21]. A

typical scorecard includes four components. For each component, the manager must set goals and then translate those goals into specific measures. The Balanced Scorecard contains a financial measure that mentions the outcome of the action taken. It also complements financial measures with operational measures of customer satisfaction, internal processes, and organizational learning and growth. All these operational measures can be termed as a driver of future financial performance [17].



**Figure 2.** Balanced Scorecard: four perspectives

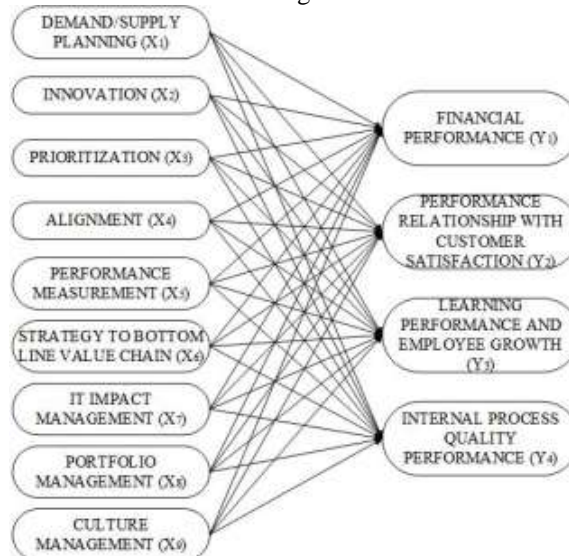
The results from a financial perspective can indicate whether the company's strategy has a role in increasing activity. Specific objectives that recognized in the balanced scorecard are profitability, development and shareholder value. BSC's role is to convert operational performance improvements into improved financial performance [17]. Measure the performance of a customer perspective from customer relationships with a website, i.e., by assessing website usability, website interactivity and assessing Web 2.0 functionality [22]. Social media to establish relationships with customers, the number of customers who survive, and the percentage of customer satisfaction [23].

Today, the company is in an environment marked by tremendous competition, which forces companies to make continuous improvements to their products and processes. Industries needed the innovation, learning, and growth that can help to win battles with competitors. Factors to be considered in this perspective are employee satisfaction, information systems capabilities, and motivation. Elements of employee satisfaction include the urge to do creativity and init if, access to information to continue to develop themselves, and involvement in decision-making. The information system's intended capability is that the information required by the employee is easy to obtain and has the right method/system facilitated or supported by management so that it is easy to use and manage. The employees who have abundant information will not contribute to the success of the business if they have no motivation to act in harmony with the company's goals [20].

The internal size for a balanced scorecard should aim at quality, employee competence, and productivity. The employee must be preoccupied with the identification of the company's core competencies. The Balanced Scorecard proves to be a powerful tool that can inform managers about what's working or not within the company, what to upgrade soon and what to prioritize, strategic management needs in managing internal business processes to drive innovation and learning [17]. BSC has evolved to fulfill two control roles within organizations at strategic and operational levels. At the strategic level, the focus is to determine what the organization is trying to achieve, while at the operational level, the focus is to discover the fundamental processes that have to be monitored [21].

Research begins with making research plans ranging from the preparation of research materials, research design, research procedures, how to test and retrieve data. From these materials, then the

hypothesis is formed from the results of other related studies and the reference theory and related textbook. Using the statistics examined the truth of each hypothesis. Based on the theoretical basis then developed the concept in the form of models made by researchers. The operational variables to be used in this study are adapted from the elements of maturity assessment of the information system in the business value maturity model TM that was introduced by Benson et.al [14] and performance appraisal from perspectives in Balanced Scorecard (BSC) by Kaplan and Norton [24], adapted for this study. The following operational variables are list on figure 3.



**Figure 3.** Relationship model between IS maturity and Industry performance

The explanation of the variable are

**3.2.1. Demand/supply planning.** Company strategy is defined in understandable terms, and both business managers and IT managers share the same commitment and understanding of the company's strategy. Thus, the planning of IT / IT and its implementation comes from the company's business strategy.

**3.2.2. Innovation.** Management oversees the performance of IS/IT and its contribution to the business success and understands its impact on business. In other words, business and IS/IT share the same view of how IS/IT can contribute to the business and then make it a new business opportunity.

**3.2.3. Prioritization.** The new IS/IT investment is described in business terms, especially regarding the impact that IT can make to business goals. Thus IS/IT can be assessed by business management in determining the order of investment priorities that need to be done.

**3.2.4. Alignment.** Business management is responsible for assessing the current service, quality and support levels for the strategic goals of current IT investments. This is done to ensure that resources to support existing investments have been allocated based on their contribution to strategic objectives.

**3.2.5. Performance measurement.** The value of existing IT activities can be assessed based on an IT impact evaluation of strategic objectives so that IT performance both in business and in industrial can be traced for later improvement.

**3.2.6. Strategy to bottom line value chain.** The management and functional business are responsible for every process within the company and understand the purpose of the relationship of each process.

3.2.7. *IT impact management.* Business and IT management implement processes that increase IT's contribution to business performance so that all IT spending can be effectively controlled and IT's contribution to the bottom line of a company can be improved.

3.2.8. *Portfolio management.* The planning and management process focuses on the overall IT investment and business management understand how to apply portfolio and portfolio information used in the decision-making process in management.

3.2.9. *Culture management.* Understand and shape the trust of management, values, and principles relating to the role and value of IT, including how IT can contribute to shareholder value.

3.2.10. *Financial performance*

- *Profitability*  
The use of information systems plays a role in increasing the company's net income.
- *Efficiency*  
The use of information systems reduces operational costs.
- *Profit Margin*  
The use of information systems plays a role in improving the company's profit margins.

3.2.11. *Performance relationship with customer satisfaction.* Websites, apps, information, social media

3.2.12. *Learning performance and employee growth*

- *Management Support*  
Information technology opens opportunities for the development of staff.
- *Accept Changes*  
Staff may allow a technological change (though there are, only a few rejections).
- *E-Learning Practice*  
The company online media center and is actively used by staff.

3.2.13. *Internal Process Quality Performance*

- *Sales and Marketing*  
The company has a website to introduce its services both products and services without the use of operators to update the data.
- *Procurement*  
Information needs of company logistics can be known more quickly so that can be done procurement process as quickly as possible.
- *Maintenance Process*  
Staff actively receive information about the company that employees need.
- *Support Process*  
Background processes (finance, accounting, etc.) are supported by web-based applications.

**Table 2.** Business Value Maturity Model Assessment Form

Practice Title	Practice Desc	Instruction circle the most	1-
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		closely describes the current state of affairs						9
		Lv	Lv	Lv	Lv	Lv	Lv	O
		0	1	2	3	4	5	p
Demand/Supply Planning	Explicitly connecting IT strategies and plans to business strategic intentions.	0	1	2	3	4	5	
	Establishing the business strategic demand for IT, and then IT's strategies and plans for the supply of the necessary IT capabilities							
innovation	Translating IT opportunities into new business strategic intentions and finding new ways for IT to support existing strategic intentions	0	1	2	3	4	5	
Prioritization	Assessing the business impact of new IT initiatives and prioritizing them according to strategic intentions.	0	1	2	3	4	5	
Alignment	Assessing the business impact and support of business strategic intentions of the existing IT infrastructure, applications, and services.	0	1	2	3	4	5	
	Assessing the quality and service levels for existing IT resources, as input to demand/supply planning							
Performance Measurement	Measuring IT performance in ways related to the business and its strategic intentions	0	1	2	3	4	5	
Strategy-to-Bottom-Line Value Chain	Connecting the processes doing planning, innovation, prioritization, alignment, and performance measurement with themselves and with the other appropriate company processes	0	1	2	3	4	5	
IT Impact Management	Establishing and achieving IT's business value proposition. Managing IT based on business value outcomes.	0	1	2	3	4	5	
Practice Title	Practice Description	0	1	2	3	4	5	
Portfolio Management	Establishing baseline, business value, and performance information for the entire IT investment.	0	1	2	3	4	5	
Culture Management	Establishing baseline, business value, and performance information for the entire IT investment	0	1	2	3	4	5	

**4. Conclusion**

This study was conducted to determine the relationship between the maturity of information systems with the performance of companies engaged in the field of Indonesian industries. Based on the results of literature review, the researcher obtained a model that needs to be proven empirically. Variables to be studied are the concept variables. Therefore, variables will be measured using the operational variables. Operational variables contain indicators that reflect the variables to be studied to be used to



measure the variables in question. To obtain valid, reliable, and objective data in quantitative research, it is necessary to test the validity and reliability of the research instrument to be used. A valid instrument means that the instrument can be used to measure what should be measured and a reliable instrument is an instrument that, when used multiple times to measure the same object, will produce the same data [25].

After the data is obtained, normality test will be conducted to determine whether the data is normally distributed or not. Normality test is required to perform other variable tests by assuming that the residual values follow the normal distribution. If this assumption is violated, then the statistical test becomes invalid, and the parametric statistics cannot be used [26]. Information systems still play a role in the strategic level to provide a competitive advantage for the company and a differentiator with other companies. Researchers will continue the further research so the indicators can be eliminated or added by the results of the research so that the result can be obtained for more comprehensive analysis. For the population, studied can be further enlarged so the results can be used to generalize the conditions in Indonesia, the research can also be perform in other sectors to test and analyze the factors that affect the industry performance.

### References

- [1] Badan Pusat Statistik 2017 available at: <https://www.bps.go.id/linkTabelStatistik/view/id/1062>
- [2] DiPietro R B and Wang Y R 2010 Key issues for ICT applications: impacts and implications for hospitality operations *Worldwide Hospitality and Tourism* **2** 1 49-67
- [3] Buhalis D and Law R 2008 Progress in Information Technology and Tourism Management: 20 years on and 10 years After the Internet *The state of e-tourism Research Tourism Management* **29** 4 609-623
- [4] Quan J, Hu Q and Wang X 2005 IT is not for everyone in China *Communications of the ACM* **48** 4 69-72
- [5] Carr N G 2003 *IT doesn't matter* Harvard Business Review **81** 5 41-49
- [6] Tian J, Wang K, Chen Y and Johansson B 2009 From IT Deployment Capabilities to Competitive Advantage : An Exploratory Study in China *Information System Frontiers* **12** 239-255
- [7] Majeed S 2011 Impact of Competitive Advantage on Organizational Performance *European Journal of Business and Management* **3** 4 191-197
- [8] Croteau A M and Bergeron F 2001 An Information Trilogy : Business Strategy, Technological Deployment, and Organizational Performance *Journal of Strategic Information System* **10** 77-99
- [9] Simpson J A, Weiner E S C 1989 *The Oxford English dictionary* (Oxford : Oxford University Press)
- [10] Tobias M 2009 A Design Science Research Perspective on Maturity Models in Information Systems *Management of Interconnected World* 333-340
- [11] Fraser P and Moultrie J and Gregory M 2002 The use of maturity models/grids as a tool in assessing product development capability *IEEE international engineering management conference* **1** 244-249
- [12] Tobias M 2011 Maturity Assessment Models: A Design Science Research Approach *International Journal of Society Systems Science* **3** 1-2 81-98
- [13] Lutchén M D 2004 *Managing IT as a Business : A Survival Guide for CEOs* (Hoboken : John Wiley & Sons)
- [14] Benson R J, Bugnitz T L and Walton W B 2004 *From Business Strategy to IT Action : Right Decisions For A Better Bottom Line* (New Jersey: John Wiley & Sons)
- [15] Dailly D 2010 *Balanced Scorecard Suatu Pendekatan dalam Implementasi MBS* (Bandung: Remaja Rosda Karya)
- [16] Bastian I 2001 *Akuntansi Sektor Publik di Indonesia* (Yogyakarta: BPFE)
- [17] Borza A and Boerdean A 2006 Performance Measuring of Tourism Small Medium-Sized Enterprises *Journal Management & Marketing* **1** 4

- [18] Chen X 2006 Using the Balanced Scorecard to Measure Chinese and Japanese Hospital Performance *International Journal of Health Care Quality Assurance* **19** 4 339-350
- [19] Chan Y C L 2004 Performance measurement and adoption of balanced scorecards: A survey of municipal governments in the USA and Canada *International Journal of Public Sector Management* **17** 3 204-221
- [20] Kaplan R S & Norton D P 2000 *Balanced Scorecard Menerapkan Strategi Menjadi Aksi* (Jakarta: Erlangga)
- [21] Philips P and Louvieris P 2005 Performance Measurement Systems in Tourism, Hospitality, and Leisure Small Medium-Sized Enterprises: A Balanced Scorecard Perspective *Journal of Travel Research* **44** 201
- [22] Pranicevic D G, Alfirevic N and Stemberger M I 2011 Information System Maturity and The Hospitality Enterprise Performance *Economic and Business Review* **13** 4 227-249
- [23] Qin S Y, Atkins A S and Yu H 2013 Balanced Scorecard Approach to Evaluate Business Performance Measurement Using Web Tools in E-Tourism *International Journal of Computing Science and Communication Technologies* **5** 2 822-828
- [24] Kaplan R S and Norton D P 1996 *Using the Balanced Scorecard as a strategic management system* Harvard Business Review **74** 1 75-85
- [25] Sugiyono 2012 *Metode Penelitian Kuantitatif Kualitatif dan R&D* (Bandung : Alfa Beta)
- [26] Ghozali I 2007 *Aplikasi Analisis Multivariate Dengan Program SPSS* (Semarang: BP Universitas Diponegoro)