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Maturity Level Assessment for ERP Systems Investment Using Val IT Framework

Renny Sari Dewi*

Department of Information Systems, Universitas Internasional Semen Indonesia, Jalan Veteran, Gresik 61122, Indonesia

Abstract

The Enterprise Resource Planning (ERP) system in the last few years has become an important thing for companies to manage business easily and integrated. Likewise, PT Semen Indonesia Distributor, one of the subsidiaries of Semen Indonesia Group, which has implemented an ERP system namely Waru Abadi Information System (SIWA) since 2017. After 2 years running, they took the initiative to measure the ERP system investment performance that they have issued using the Val IT framework 2.0. As we have known, Val IT framework has 3 domains, namely Value Governance, Portfolio Management, and Investment Management. There are 3 stages carried out by researchers, including data collection by means of in-depth analysis of 5 influential people in IT investment decision making, data validation, and maturity level justification. The results of this study are the maturity level of the ERP system implementation at PT Semen Indonesia Distributor reaches 3.79 (scale 5) based on the Val IT framework 2.0.

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1. Introduction

Information technology (IT) has been successfully infused in all aspects of life, starting from the service businesses, manufactures, educations, social and economics, politics, even cultural and creative fields. The dependence on IT

* Corresponding author. Tel.: +62-31-398-5482.

E-mail address: renny.dewi@uisi.ac.id

certainly has an effect to the diverse of supply and demand in business. Demand on IT needs will also increase along with the improvement of competencies possessed by human resources in IT field.

In business, IT has become the spearhead of a company in imposing transparency and accountability to its stakeholders. IT has also big role in the service and manufacturing business which expressed in the issue of industrial revolution 4.0, thus changing the pattern and business strategy. Therefore, by considering the condition and mindset of the community, companies in the service sector are required to be extra-creative in penetrating the market.

The Investment Coordinating Board (BKPM) of Republic Indonesia predicts that by 2020 investment in the IT sector will increase to US \$ 130 Billion [1]. From the nominal above, companies are competing to upgrade its IT infrastructure in order to catch up with the development trend of the industrial revolution 4.0.

The Business' objectives and strategies in a company also determine the value of IT investments. High IT investment should be followed by the productivity of the company in which companies are very selective in investing IT. Based on data released by Project Management Institute [2], as many as 32% of IT project investments fail and inflict in a financial loss.

From the explanation above, this study contributes to evaluate whether IT investments made by PT Semen Indonesia Distributor (Semen Indonesia Group) in the form of Enterprise Resource Planning (ERP) system is in line with the company's strategy. The developed-ERP systems by PT Semen Indonesia Distributor, namely Waru Abadi Information System (SIWA) which implemented in 2017 is a key application in running their core business. Therefore, this research was able to answer the challenges of PT Semen Indonesia Distributor's Board of Directors whether or not the ERP systems were continued.

In general, there are 2 familiar frameworks used in measuring IT performance, namely Control Objectives for Information and Related Technology (COBIT) and Val IT [3]. Both were launched by the international organisation Information Technology Governance Institute (ITGI) through ISACA. But along with its popularity, some researchers have considerations for using Val IT framework as a best practice in measuring the value of IT investments for company's productivity [4][5][6]. The latest Val IT is version 2.0 which consists of 3 domains, namely value governance (VG), portfolio management (PM), and investment management (IM). The COBIT and Val IT frameworks have been used to test several IT investments carried out by profit-based and non-profit based institutions, some of which are:

- Evaluation of IT investments in organizational governance using COBIT 4.1[7] [8]
- Val IT for measuring IT investment in the scope of universities [9] [10]
- Measuring the performance of IT investments in both services and manufacturing company [11] [12]

Determination of measurement techniques whether COBIT or Val IT depends on the availability of the data studied. The measurement result of IT investment in the previous researches are quite diverse. This is due to, among other things, the factors that influence the IT investment climate in addition to the Val IT's indicators.

2. Related research

2.1. Literature review

Based on review of previous researches, the summary can be seen in Table 1. Val IT framework has 3 domains namely Value Governance (VG), Portfolio Management (PM), and Investment Management (IM) with a total of 22 processes used in analysing investment performance IT in services and manufacturing companies.

Table 1. Previous Research.

Author, Year	Research summary	Relationship with this research	Gap analysis
Dhaniawaty et al, 2017 [9]	Evaluation of IT investments in universities and companies using Val IT but only in the Value Governance (VG) domain.	Val IT framework, especially in the VG domain, can be used in non-profit based organisations.	This study only observes the performance of IT investments in the VG domain, ignoring the domain of Portfolio Management (PM) and

Author, Year	Research summary	Relationship with this research	Gap analysis
			Investment Management (IM) which is an important part of IT investment.
Nourizadeh et al, 2011 [7]	Val IT strongly effects the organisation to achieve their objectives and to help enterprises optimise the realisation of value delivery from IT investment with implementing IT governance in Isfahan municipality.	Val IT framework is used in measuring IT investment in a city, and researchers believe that Val IT is right in evaluating city-level IT investments in Isfahan.	This research is used at the city level which is basically not profit oriented, unlike the company's business objectives and strategies that tend to prioritise profit in investing IT.
Suzangar et al, 2011 [11]	This research collaborates 4 best practices, namely Val IT, Risk IT, ITIL, and COBIT comprehensively to implement IT investment management in the company by considering risk, governance, and financial aspects.	Val IT framework is feasible to use to evaluate a company's IT investment.	Comprehensive testing is not yet needed as the case studies in the research didn't have optimal supporting data.
Kozina and Popovic, 2010 [5]	Val IT framework is mapped with RACI chart hence this research produces a new theory that IT investments are influenced by key roles and areas with Val IT activities, goals, and metrics.	Deeper understanding of the details of the process in each domain when the author interviews company leaders related to IT investments.	Val IT framework that is mapped and detailed contains only one example process, namely PM2. In this study, the entire process, both VG, PM, and IM, was evaluated and assessed.
Grembergen and De Haes, 2009 [6]	integrates theoretical advances and empirical data with practical application, including in-depth discussion of such frameworks as COBIT and Val IT, which are used to measure and audit the value of IT investments and ensuring regulatory compliance.	Val IT can be used to measure and audit IT investments at the company.	Many cases are explained, but this book does not provide examples of case studies of service companies that do IT investment.

2.2. Val IT framework and maturity level assessment

Val IT framework is one of the best practices that are familiarly used in evaluating corporate governance for IT investment. According to ITGI, Val IT framework's last version 2.0 was launched in 2008. In general, Val IT framework consists of 3 domains namely Value Governance (VG), Portfolio Management (PM), and Investment Management (IM), see Fig. 1.

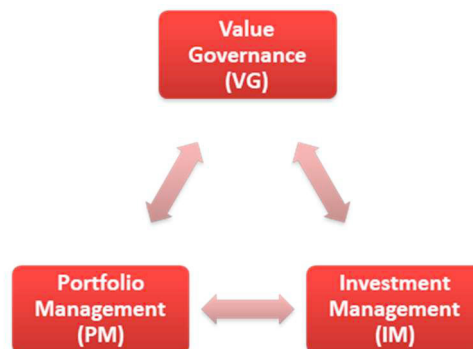


Fig. 1. Val IT Diagram.

For Value Governance (VG) domain, the purpose of measuring IT investments is to ensure that the value of money invested which can produce added value for the company, as shown in Table 2. Therefore, 6 processes that support the VG domain whose contents are dominated by alignment between the enterprise's goals and the value to be invested are accompanied by the company's financial strength.

Table 2. Val IT Framework: Value Governance Domain (Source: ITGI, 2018).

Val IT Domain	Objective	Process
Value Governance (VG)	To ensure that the value management practices in the company are already embedded or not, and to secure the optimum value of IT investments made, it can produce added value for the company.	VG1 : Establish informed and committed leadership VG2 : Define and implement processes VG3 : Define portfolio characteristics VG4 : Align and integrate value management with enterprise financial planning VG5 : Establish effective governance monitoring VG6 : Continuously improve value management practices

At the Portfolio Management (PM) domain, IT investment measurement is focused on acquiring optimal value and increasing value added for the company (see Table 3). There are 6 processes that compose the PM domain, these domains could produce a business portfolio which can increase the value for the company.

Table 3. Val IT Framework: Portfolio Management Domain (Source: ITGI, 2018).

Val IT Domain	Objective	Process
Portfolio Management (PM)	To ensure that companies with invested IT portfolios are able to obtain optimal value and increase added value for the company.	PM1 : Establish strategic direction and target investment mix PM2 : Determine the availability and sources of funds PM3 : Manage the availability of human resources PM4 : Evaluate and select programmes to found PM5 : Monitor and report on investment portfolio performance PM6 : Optimise investment portfolio performance VG1 : Establish informed and committed leadership

In the domain of Investment Management (IM), IT investments are measured by business objectives, namely, to ensure that companies can contribute with optimal value. IM domain consists of 10 processes as shown in Table 4.

Table 4. Val IT Framework: Investment Management Domain (Source: ITGI, 2018).

Val IT Domain	Objective	Process
Investment Management (IM)	To ensure that company IT investments can contribute with optimal value.	IM1 : Develop and evaluate the initial programme concept business case IM2 : Understand the candidate programme and implementation options IM3 : Develop the programme plan IM4 : Develop a full life-cycle costs and benefits IM5 : Develop the detailed candidate programme business case IM6 : Launch and manage the programme IM7 : Update operational IT portfolios IM8 : Update the business case IM9 : Monitor and report on the programme IM10 : Retire the program

The three domains described above (see Table 2, 3, and 4) are detailed explanations of the Val IT framework. IT investment performance according to Val IT framework is influenced by these 22 processes, but it does not rule out the possibility that the company's productivity is also influenced by other interrelated factors.

3. Research methods

This study uses a qualitative approach. Stages carried out include collecting data and information, data validation, and maturity level justification. Explanation of each stage is as follows:

3.1. Collecting data and information

Data and information collection is carried out by conducting in-depth interviews with stakeholders directly or indirectly who involved in planning, managing, and monitoring the implementation of an Enterprise Resource Planning (ERP) system at PT Semen Indonesia Distributor. In addition to the primary data, authors also used secondary data in the form of reports on the use of SIWA as material for reviewing evaluations of core-systems in the company.

3.2. Data validation

Data related to SIWA investment that were successfully obtained from stakeholder statements, are processed and analysed then carried out to multilevel validation. The first validation is from the operational level, then tactical, and after that strategical. Statements deemed valid are those which approved by the three level of positions above at the PT Semen Indonesia Distributor.

3.3. Maturity level justification

Data that has been successfully validated then justified on the maturity level interval. Table 5 shows an explanation of each maturity level in the Val IT framework. Author using this level to adjust the scale in each item-reviewed is appropriate.

Table 5. Data Collection (Source: ITGI, 2018).

Maturity Level	Apply when
0 (Non-existent)	The enterprise sees the IT function as a supplier and a cost to be minimised. There is limited communication between the business and the IT function
1 (Initial)	Business cases are defined on a project-by-project basis and often are incomplete. Reporting is budget- and cost-driven.
2 (Repeatable)	There is no formal commitment from the business owner. Process occurs repeatedly without reporting and in-depth evaluation.
3 (Defined)	The business and IT functions understand the governance requirements to select and execute new investments, deliver the resulting IT services efficiently, and ensure optimal allocation of IT resources. Formal training plans and business process based on business case exist but are not consistently.
4 (Managed)	There is a shared commitment between the business and the IT function to optimise the contribution of individual IT investments and services to business value. Processes and skills exist to support investment decision making and value management, and to ensure that resource allocation is consistent with the priorities.
5 (Optimised)	The business and IT functions work in partnership to continually optimise and report on the portfolios of IT investments, and resulting services, assets, and other resources. Processes are continuously improved.

4. Result

4.1. Data collection

The data and information obtained are the result of interviews from stakeholders related to SIWA investment in PT Semen Indonesia Distributor. There are 5 stakeholders involved in investing in the SIWA at PT Semen Indonesia Distributor, the details of which can be seen in Table 6.

Table 6. Data Collection.

Respondent	Role	Number of Respondent
IT Supervisor	Responsible for maintaining IT infrastructure and human resources involved in utilising IT that the company has invested	2
IT Manager	Responsible for planning, managing and evaluating spending on all IT needs in the company	1
Board of Director	Consist of President Director and Vice President Director in Financial to make decision based on need priorities	2

4.2. Value Governance (VG) domain

Maturity level justification for VG domain which consists of 6 processes can be seen in Table 7.

Table 7. Maturity Level Assessment for VG Domain.

Process	Average Score
VG1 : Establish informed and committed leadership	3.20
VG2 : Define and implement processes	3.33
VG3 : Define portfolio characteristics	2.60
VG4 : Align and integrate value management with enterprise financial planning	2.25
VG5 : Establish effective governance monitoring	4.50
VG6 : Continuously improve value management practices	4.00

Based on Table 7, VG3 and VG4 processes have a bit value because the SIWA portfolio is not based on the enterprise long-term strategy plan. The importance of harmony between business goals and IT goals has not been accommodated in the enterprise financial planning. So, average maturity level for VG domain is 3.31 (Defined), which means that SIWA investment in PT Semen Indonesia Distributor is in good condition.

4.3. Portfolio Management (PM) domain

For the PM domain, a detailed calculation of the maturity level based on Val IT framework 2.0 consisting of 6 processes is presented in Table 8.

Table 8. Maturity Level Assessment for PM Domain.

Process	Average Score
PM1 : Establish strategic direction and target investment mix	5.00
PM2 : Determine the availability and sources of funds	5.00
PM3 : Manage the availability of human resources	4.10
PM4 : Evaluate and select programmes to found	4.80
PM5 : Monitor and report on investment portfolio performance	5.00
PM6 : Optimise investment portfolio performance	4.00

SIWA is a fabulous decision to invest in this enterprise. The portfolio management (PM) domain that assessed has huge score dominantly (see PM 1, PM2, PM5 in Table 8). The results of data validation for the maturity level justification in PM domains are 4.65 (Manage-Optimised), which means that SIWA investment in PT Semen Indonesia Distributors including business and IT functions has synergised in creating a company's portfolio. This results in business processes are continuously improved.

4.4. Investment Management (IM) domain

Maturity level for IM domain in Val IT framework 2.0 which consists of 10 processes can be seen in Table 9.

Table 9. Maturity Level Assessment for IM Domain.

Process	Average Score
IM1 : Develop and evaluate the initial programme concept business case	2.60
IM2 : Understand the candidate programme and implementation options	3.00
IM3 : Develop the programme plan	3.00
IM4 : Develop a full life-cycle costs and benefits	3.67
IM5 : Develop the detailed candidate programme business case	3.00
IM6 : Launch and manage the programme	4.33
IM7 : Update operational IT portfolios.	4.00
IM8 : Update the business case	5.00
IM9 : Monitor and report on the programme	4.00
IM10 : Retire the program	2.00

The IM10 process identify has a lowest value because of the retire program is never stated. SIWA, for now still relevant with the business process and still maintain to accommodate if the regulation was changed. But the top-level management in PT Semen Indonesia Distributor must estimate when the SIWA may retire or be changed by another powerful ERP system. Reviewing the calculation in Table 9, the average maturity level for IM domain is 3.40 (Defined), which means that SIWA investment in PT Semen Indonesia Distributor including business functions and IT are understanding each other's needs and can align with IT resources.

4.5. Maturity level interpretation

From the calculation of Table 7, 8, and 9, an interpretation of the overall maturity level is obtained which includes the domains of VG, PM, and IM result in average-final values (see Table 10). This value is at the Define-Managed level, which means that the process and needs of the SIWA at PT Semen Indonesia Distributor have been supported by decision making based on priorities and alignment of business functions with IT.

Table 10. Maturity Level Interpretation.

Value Governance (VG)	Portfolio Management (PM)	Investment Management (IM)	Maturity Level
3.31 (Defined)	4.65 (Managed-Optimised)	3.40 (Defined)	3.79 (Define-Managed)

With a value of 3.79 as shown in Table 10, PT Semen Indonesia Distributor should also pay attention to the shortcomings that make SIWA investment not perfect. If referring to the previous table, then from the three Val IT domains, this company needs to improve and refine several processes including VG3, VG4, PM1, PM2, PM5, IM1, and IM10 which have values below 3.00.

5. Conclusion

The conclusions obtained from this study include:

- A case study of IT maturity level assessment conducted on the measurement of SIWA investment (ERP systems who developed by PT Semen Indonesia Distributor) using Val IT framework 2.0. There are 3 domains, namely Value Governance, Portfolio Management, and Investment Management. The entire process found in the 3 domains are 22 processes.
- The maturity level of the SIWA is 3.79, which means it is in the *Defined-Managed* level. This score states that ERP system investment makes the process and needs of the ERP system at PT Semen Indonesia Distributor supported by priority-based decision making.

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References

- [1] CNN Indonesia. (2019) “Global Weakening, BKPM Focus Attracts Digital Economic Investment.” Available FROM: <https://www.cnnindonesia.com/ekonomi/20190311135434-532-376189/pelemahan-global-bkpm-fokus-gaet-investasi-ekonomi-digital>. [Accessed: 20-Mar-2019].
- [2] PMI. (2018) “Success in Disruptive Times”.
- [3] Afsali, P., E. Azmayandeh, R. Nassiri, and G. L. Shabgahi. (2010) “Effective Governance Through Simultaneous Use of COBIT and val IT”, in *ICEMT 2010 - 2010 International Conference on Education and Management Technology, Proceedings*.
- [4] I. T. G. Institute. (2008) “Enterprise Value: Governance of IT Investments, the Val IT Framework, Version 2. 0. ISACA.
- [5] Kozina, M., and D. Popović. (2010) “VAL IT Framework and ICT Benefits,” *Eur. Conf. Inf. Intell. Syst.*, pp. 221–227.
- [6] Van Grembergen, W., and S. De Haes. (2009) “Val IT as a Framework for Enterprise Governance of IT”, in *Enterprise Governance of Information Technology*.
- [7] Nourizadeh, Z., A. Nourizadeh, and M. Mahdavi. (2011) “Implementing Information Technology Governance Using Val IT; Case Study: Isfahan Municipality”, in *2011 2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC)*. pp. 4644–4647.
- [8] Witanti, W., and Falahah. (2007) “VAL IT: IT Investment Framework”, in *Seminar Nasional Aplikasi Teknologi Informasi*.
- [9] Dhaniawaty, R. P., I. Pangaribuan, and R. Sidik. (2017) “The Information Technology Investment Measurement of Value Governance (VG) Domain Using VAL IT Framework at XYZ University.”
- [10] Kuswanto, R. B. H., E. Utami, and A. Amborowati. (2013) “Val IT Framework 2.0 : Assessing IT Investment at ‘MMTC’ School Yogyakarta.” *J. Teknol. Inf. Respati* 7 (1): 41–60.
- [11] Suzangar, A., M. Kalantarian, S. Nasher, M. Kajbaf, and N. Madani. (2011) “Optimizing Information Technology Value Governance Framework Based on Val IT”, in *ICIME 2011-Proceedings of the 2nd International Conference on Information Management and Evaluation: ICIME 2011 Ryerson University, Toronto, Canada, 27-28 April 2011*. p. 412.
- [12] Dhaniawaty, R. P., and E. Susilawati. (2018) “The Evaluation of Information Technology Investment Management using the Domain of Portfolio Management (PM) Val IT Framework 2.0 in PT. XYZ”, in *IOP Conference Series: Materials Science and Engineering* 407 (1): 12129.