

# Systematic Review of the Builder Method and Product of the Information System Strategic Planning at Higher Education Institutions in Indonesia

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**Abstract**-Research on the utilization of Information System Strategic Planning (ISSP) in Higher Educations in Indonesia is still being conducted. ISSP provides an important role in the successful use of information systems in Higher Education in the form of the realization of benefits. Therefore ISSP needs to be built properly by utilizing the appropriate ISSP builder methods, to produce ISSP products that can provide benefits realization. Current ISSP building methodologies commonly used are frameworks such as Business Systems Planning (BSP), Ward and Peppard (W&P), Zachman Enterprise Architecture (EA), Enterprise Architecture Planning (EAP), EA TOGAF (The Open Group Architecture Framework), Tozer, PPDIOO (Prepare, Plan, Design, Implementation, Operate, Optimize) and EUP (Enterprise Unified Process). Commonly produced ISSP products are Blueprint(BLPT), Application Portfolio(APPF), EA Model(EAMD), Strategic Planning (STPN), Master Plan(MTPN), and Road Map (RDMP). The results of research that discuss building methodologies and ISSP products are currently being conducted at Higher Education in Indonesia, but there is still little research that discusses the exploration of the accumulated use of the ISSP method, ISSP products, and mapping of ISSP methodologies to ISSP products. This exploration effort is useful in obtaining reality and phenomena related to ISSP product development methodologies and their mapping. The research aims to explore the method of ISSP builders and products and their mapping at Higher Educations in Indonesia in the period 2009 to 2019 by utilizing the Systematic Literature Review (SLR) method. The results of this study provide synthesis and mapping related to the ISSP builder method and products in Indonesia.

**Keyword:** Information System Strategic Planning, ISSP Builder Method, ISSP Products

## Introduction

ISSP is part of the development of information systems that is a very important influence on the organization [1]. ISSP can be felt in terms of the realization of the benefits of the products it produces. Higher Education as an organization also utilizes the realization of ISSP benefits. The role of ISSP is very important for Higher Educations in Indonesia [2] because of the realization of perceived benefits. The realization of ISSP benefits is felt in terms of effectiveness, alignment, efficiency, capability, flexibility, competitive advantage, and performance improvement. ISSP needs to be built with a method that is in line with the Higher Education's business strategy to produce ISSP products that benefit realization. The method is in the form of stages of any activity [3] [4] and how it must be carried out by the enterprise, so that an information system or information technology can be developed as expected, for short, medium, and long term periods. The ISSP building method at Higher Educations in Indonesia varies and produces ISSP products that vary as well. Usually, the determination of the use of the builder's method and ISSP products is determined by the Higher Education based on its knowledge and best practices from other Higher Educations or vendors.

There are quite a lot of variations in the ISSP building method used at Higher Education in Indonesia including BSP, Ward and Peppard, EA Zachman, EAP, TOGAF EA, Tozer, PPDIOO and EUP. The BSP method[5] provides strategic planning capabilities with the stages of defining business processes, defining business data, and defining information architecture. The Ward and Peppard [6] method are capable of developing strategic planning with the inclusion of inputs and outputs in it. Inputs in this method are internal business environment analysis, external business environment analysis, internal IS / IT (Information System / Information Technology) environmental analysis and external IS / IT environmental analysis. The output of this method is the IS business strategy, IT strategy, and IS / IT management strategy. The Zachman EA method[7] provides enterprise architecture development capabilities with a framework consisting of 6 rows and 6 columns. The EAP method[8] provides the ability to build an enterprise architecture that takes precedence with identifying information needs and then utilizing technology by mapping in the form of data architecture, application architecture, and technology architecture. The TOGAF method [9] provides enterprise architecture development capabilities with 8 core phases in development and maintenance. The Tozer method provides the ability to prepare IS / IT strategic plans with the stages of analyzing the factors that affect company performance, formulating strategies, and implementing proposed projects to be carried out. PPDIOO method[10] provides strategic planning capabilities with the stages of Prepare, Plan, Design, Implement, Operate, and Optimize. The

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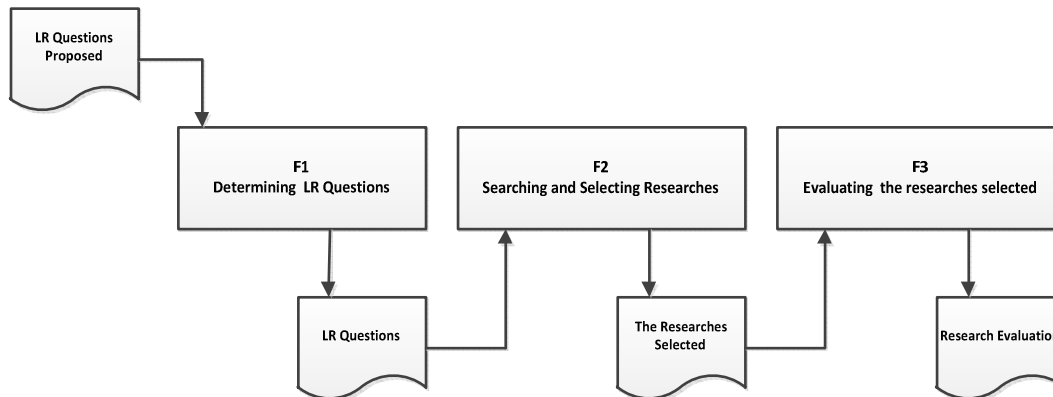
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EUP method [11] provides enterprise architecture development capabilities with a complete information technology system cycle with 7 disciplines of activities namely Enterprise Business Modeling, Portfolio Management, Enterprise Architecture, Strategic Reuse, People Management, Enterprise Administration, and Software Process Improvement. ISSP Higher Education in Indonesia utilizes the ISSP-building method to produce ISSP products in many names namely Blueprint, Application Portfolio, EA Model, Strategic Planning, Master Plan, and RoadMap. This paper will not discuss the conflicting definitions between ISSP products, it will only portray the naming of ISSP products available at Higher Educations in Indonesia.

The research method for building ISSPs and ISSP products has been extensively studied but there is still not much literature that explores the overall accumulated data in a certain period about this research. The accumulation of research data is useful in providing important information for tertiary institutions as best practices in determining the ISSP method and its products. The purpose of this study is to explore the ISSP method and ISSP products at Higher Educations in Indonesia during the period 2009 to 2019 by utilizing the SLR method.

## Research Method

In this study, the method used is the SLR method[12] which is a method that collects, filters literature related to the ISSP method and ISSP products at Higher Educations in Indonesia for evaluation. This SLR method can be seen in Figure 1 which shows about 3 important activity phases. The first phase (F1) is determining LR (Literature Review) Questions. The second phase (F2) is searching and selecting researches and the third phase (F3) is evaluating the research selected.



**Figure 1.** SLR Method

In this review study, the SLR method was utilized in reviewing relevant literature and relevant phenomena in discovering the ISSP method and ISSP products.

The activities in F1 are setting LR questions, carried out with a population approach, intervention, comparison, outcome, and context (PICOC). This PICOC approach is useful for establishing the criteria and scope of LR questions. This approach is shown in table 1. Based on table 1, LR questions can be determined namely RQ1: What is explored from the ISSP builder method and ISSP products at Higher Educations in Indonesia. RQ2: How to map the relationship between the ISSP builder method and ISSP products at Higher Educations in Indonesia.

**Table 1.** Criteria and scope of LR questions

No.	Criteria	Scope
1	Population	Many Higher Educations in Indonesia
2	Intervention	The builder methods of ISSP, ISSP Products
3	Comparison	ISSP builder methods and ISSP Products between Higher Educations
4	Outcome	Mapping the Builder Methods of ISSP ISSP Product Mapping Mapping the relationship between the ISSP Builder Methods and the ISSP Product
5	Context	Explore ISSP Builder Methods and ISSP Products Explore the relationship between ISSP Builder Methods and ISSP Products

Activities in F2, namely research search and selection are done by searching, finding, and getting journals and proceedings online on the publisher database through Google Scholar. The period of this activity starts from 2009 until 2019. The search used keywords that are "Planning information system strategies at Higher Educations in Indonesia". Search and selection in the initial stages have been obtained about 100 relevant

articles. In the F3 activity, the SLR method is evaluating 100 articles obtained in F2 activities and produced 53 articles which are determined as relevant articles with information related to ISSP at Higher Educations in Indonesia. The results of these F3 activities are grouped according to the criteria set up to produce synthesis from this study. The criteria determined in this F3 activity are the object of research based on the number of papers equal to the number of Universities in the identified provinces, ISSP method, ISSP products, and mapping of the relationship between the ISSP Builder Method and ISSP Products.

### Findings and Discussion

The Research Object specified in the F3 activity of the SLR method used, evidently in this evaluation activity found 53 Higher Education institutions spread across 16 Provinces in Indonesia. Table 2 shows each paper representing a Higher Education. Another fact that is seen in Table 2 is the number of Higher Education institutions in each province. The highest number of Higher Educations in a row is in the provinces of West Java, Jakarta, Central Java, and East Java. The highest number of Higher Educations is in Java. Higher Educations in Java but have few Higher Educations in the province of Banten. The rest of the Higher Educations are Higher Educations outside of Java, with a small number of Higher Educations, for example in the provinces of Bali, West Nusa Tenggara, North Maluku, West Kalimantan, Central Kalimantan, East Kalimantan, Riau, Bengkulu, South Sumatra, Lampung, and Jambi.

**Table 2.** Research Object of the ISSP Product and Builder Methods in Higher Education in Indonesia

No.	Province	Number of Higher Educations	Number of articles
1	Banten	2	2
2	Jakarta	8	8
3	West Java	9	9
4	Central Java	7	7
5	East Java	6	6
6	Bali	2	2
7	West Nusa Tenggara	2	2
8	North Maluku	1	1
9	West Kalimantan	1	1
10	Central Kalimantan	1	1
11	East Kalimantan	3	3
12	Riau	4	4
13	Bengkulu	1	1
14	South Sumatra	2	2
15	Lampung	3	3
16	Jambi	1	1
Total	16	53	53

The mapping in Table 3 is related to the ISSP builder method which has the highest percentage of usage in Higher Education in Indonesia starting from the highest percentage, namely W&P (39.6%), EA Togaf (26.4%), EAP (15.1%), EA Zachman (11.3%). The smallest percentage of use each amounting to 1.8% are BSP, Tozer, PPDIOO, and EUP. The distribution for the use of W&P which is the highest percentage in the use of the ISSP builder method in Indonesia, respectively starting from the largest are Jakarta (7.54%), Central Java (7.54%), West Java (5.66%), East Java (5.66%), Riau (5.66%), East Kalimantan (3.77%), Banten (1.8%) and Bali (1.8%). The largest distribution in a province using the ISSP development method besides W&P is EA Togaf in West Java (5.66%), EAP in West Java (5.66%), and EA Zachman in Jakarta (5.66%).

**Table 3.** Mapping the ISSP Builder Methods in Higher Education in Indonesia

No.	Province	ISSP Builder Method								Reference
		BSP	W&P	EA	EAP	EA TOGA	Tozer	PPDIO	EUP	

				Zachman		F		O		
1	Banten	-	1	-	1	-	-	-	-	[13] [14]
2	Jakarta	-	4	2	1	1	-	-	-	[15] [16] [17] [18] [19] [20] [21] [22]
3	West Java	-	3	-	2	3	-	-	1	[23] [24] [25] [26] [27] [28] [29] [30] [31]
4	Central Java	-	4	-	1	2	-	-	-	[32] [33] [34] [35] [36] [37] [38]
5	East Java	-	3	1	-	2	-	-	-	[39] [40] [41] [42] [43] [44]
6	Bali	-	1	-	-	1	-	-	-	[45] [46]
7	West Nusa Tenggara	-	-	-	-	1	-	1	-	[47] [48]
8	North Maluku	-	-	-	-	1	-	-	-	[49]
9	West Kalimantan	-	-	-	-	1	-	-	-	[50]
10	Central Kalimantan	-	-	-	-	1	-	-	-	[51]
11	East Kalimantan	-	2	-	1	-	-	-	-	[52] [53] [54]
12	Riau	-	3	1	-	-	-	-	-	[55] [56] [57] [58]
13	Bengkulu	-	-	-	1	-	-	-	-	[59]
14	South Sumatera	-	-	-	-	1	1	-	-	[60] [61]
15	Lampung	1	-	1	1	-	-	-	-	[62] [63] [64]
16	Jambi	-	-	1	-	-	-	-	-	[65]
Total		1	21	6	8	14	1	1	1	

The mapping in Table 4 related to ISSP products used at Higher Educations in Indonesia is as follows, starting from the highest to the smallest, namely EAMD (35.8%), BLPT (24.5%), STPN (20.75%), APPF (9.43%), RDMP (5.66%), and MTPN (3.77%).

**Table 4.** Mapping ISSP Products at Higher Educations in Indonesia

No.	Province	ISSP Product						Reference
		BLP T	APP F	EAM D	STP N	MTPN	RDM P	

1	Banten	1	-	1	-	-	-	[13] [14]
2	Jakarta	2	2	2	1	-	1	[15] [16] [17] [18] [19] [20] [21] [22]
3	West Java	5	-	2	1	-	1	[23] [24] [25] [26] [27] [28] [29] [30] [31]
4	Central Java	1	1	3	2	-	-	[32] [33] [34] [35] [36] [37] [38]
5	East Java	-	2	2	1	1	-	[39] [40] [41] [42] [43] [44]
6	Bali	-	-	1	-	1	-	[45] [46]
7	West Nusa Tenggara	1	-	1	-	-	-	[47] [48]
8	North Maluku	-	-	1	-	-	-	[49]
9	West Kalimantan	-	-	1	-	-	-	[50]
10	Central Kalimantan	-	-	1	-	-	-	[51]
11	East Kalimantan	-	-	1	2	-	-	[52] [53] [54]
12	Riau	1	-	-	2	-	1	[55] [56] [57] [58]
13	Bengkulu	1	-	-	-	-	-	[59]
14	South Sumatera	-	-	1	1	-	-	[60] [61]
15	Lampung	1	-	1	1	-	-	[62] [63] [64]
16	Jambi	-	-	1	-	-	-	[65]
Total		13	5	19	11	2	3	

The relationship of the ISSP builder method to ISSP products is shown in Table 5. This relationship indicates two things, namely mapping the distribution of specific ISSP builder methodologies that will produce specific ISSP products and the focus of the ISSP builder method to produce specific ISSP products. The relationship associated with mapping the distribution of ISSP builder methodologies to certain ISSP products shows that the WSP development method of WSP is the most widespread builder method and produces a variety of ISSP products with a percentage of 100%, meaning that all ISSP product variants are produced by the ISSP W&P builder method. Development Method of ISSP EA Zachman mapped the distribution of 4 varieties of ISSP products with a percentage of 66%. The ISSP EAP-building method maps the distribution of 3 different ISSP products with a percentage of 50%. Development Method of ISSP EA Togaf maps the distribution of 2 varieties of ISSP products with a percentage of 33%. Other ISSP builder methodologies such as BSP, Tozer, PPDIOO, and EUP each map only the distribution of 1 variety of ISSP products with a percentage of 16% each. Regarding the focus of the specific ISSP building method that produces the most or dominant ISSP products, it shows that the ISSP W&P building method is more focused on producing ISSP STPN products, EA Zachman is more focused on producing ISSP BLPT and EAMD products, EAP is more focused on producing ISSP BLPT products, EA Togaf is more focused on producing ISSP BLPT products. ISSP EAMD products, BSP is more focused on producing ISSP STPN products, Tozer is more focused on producing ISSP STPN products, PPDIOO is more focused on producing STPN products and EUP is more focused on producing ISSP BLPT products.

**Table 5.** Mapping the Relationship of the ISSP Builder Method to ISSP Products at Higher Educations in Indonesia

ISSP Builder Method	ISSP Product					
	BLPT	APPF	EAMD	STPN	MTPN	RDMP
BSP	-	-	-	1	-	-
W&P	3	5	2	9	1	1
EA Zachman	2	-	2	-	1	1
EAP	4	-	3	-	-	1
EA TOGAF	2	-	12	-	-	-
Tozer	-	-	-	1	-	-
PPDIOO	1	-	-	-	-	-
EUP	1	-	-	-	-	-

## Conclusion

The review activity of this research is an exploration effort to obtain and show the reality and phenomena of utilizing the ISSP builder method and the actual ISSP product at Higher Education in Indonesia. The SLR method is a research method used in this research, which is exploring relevant articles from 2009 to 2019. The results of the research are the synthesis of the use of the ISSP builder method and ISSP products and the mapping of the ISSP builder method to ISSP products. The results of this study are very important to provide the best practice for Higher Education, especially in Indonesia, in determining the use of the ISSP builder method and ISSP Products.

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