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E-Commerce Service Design Readiness using ITIL framework with IT Balanced Scorecard Objective (Case Study: University E-Commerce)

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Abstract

E-commerce has a big impact on economic growth. E-commerce provides equal opportunities for everyone to start a busin without an obstacle. University X builds e-commerce namely Unimart with the ITIL framework. This research measures the readiness and success of implementing Service Design at Unimart using IT Balanced Scorecard (ITBSC). Scientific contributions in this study provide recommendations about the objectivity of each ITBSC perspective for e-commerce universities. Further research needs to be done on how the suitability of objective measurement from every ITBSC perspective for e-commerce universities. The results of Unimart readiness measurements based on ITIL v.3 service design assessment have an average value of 2.69. Maturity levels based on the assessment index in repeatable level. Measurements on ITBSC for each service design domain produce an average score of 2.93. The processes in the service design domain measured include; service management with an average of 2.64, service design principles with an average of 2.65, a service design process with an average of 2.75, service design technology with an average of 2.85, organizing service design with an average of 2.82, design service considerations with average of 2.49, and service design implementation with an average of 2.66. Requirements in each process must be fulfilled to achieve the expected level of maturity. The score is at an adequate level of effectiveness. Thus, the level of effectiveness of e-commerce universities at the University of X is at an adequate level.

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1. Introduction

E-comerce has changed the way people shop. E-commerce has a big impact on economic growth [1]. The Indonesian government's program at the 2019 Kemenristek Dikti universities to create a digital market called Unimart. This research was held at one of the private universities in Indonesia. ITIL is one general framework that describes the practices in managing services or ITSM [2]. Unimart was built using ITIL v3 framework. This research measures the readiness and success of implementing Service Design at Unimart. ITIL provides an alternative measurement of the success of service design using the Balanced Scorecard [2]. IT Balanced Scorecard is a Balanced Scorecard on the Engineering side [3, 4]. In this study there are the following questions, how ready is the design of ITIL services at Unimart? What are the recommendations for Unimart service design domain to achieve the expected level of maturity? How to present objectivity for each ITBSC perspective that is suitable for measuring the success of service design at Unimart? The purpose of this paper is to present information about Service Design readiness at Unimart : provide recommendations to achieve the expected level of service design maturity on Unimart; presents the objectivity perspective of ITBSC as needed by Unimart. The objectivity of the ITBSC perspective is generally presented in this study. Further research is needed to provide objective recommendations and measurements for the ITBSC perspective at e-commerce universities.

2. Literature review

2.1. ITIL model

Organizations adopt the best industry practices to improve the quality of service organization. ITIL is one of the best frameworks recognized in ITSM [5]. This framework can be implemented in large and medium scale organizations [6]. ITIL has five interconnected cycles namely service strategy, service design, service transitions, service operations, and continuous improvement [7]. This paper discusses the implementation of service design at university e-commerce (Unimart). There are eight processes in service design [8] including: Service Catalog Management, Service Level Management, Capacity Management, Supplier Management, Availability Management, Information Security Management, Continuity Management of IT Services.

2.2. Maturity model

Maturity Model is a model to help evaluate the maturity level of each service management process in general. The comparison models for measuring the maturity of ITSM [9] can be shown in Table 1.

Table 1. Comparison of Maturity Models.

Criteria	CMM	PMF	Bootstrap	ITS CMM	CMMI-SCV
Success	Extremely High	Very Low	Medium	Medium	High
Staged Model (SM)/ Continuous Model (CM)	Staged Model	Both.	Continuous Model	Staged Model	Both.
Number of Maturity Level	1-5	1-5	0-5	1-5	SM: 1-5 CM: 0-5
Scope	Software	Services	Software	Services	Services
Details	High	Low	Medium	Extremely high	High
Base for	Many models	Any model	Any model	CMMI-SVC	-------

The Maturity Model in this study uses CMMI-SCV. Levels of maturity in IT management include non-existent for Level 0, initial for Level 1, repeatable for Level 2, defined for Level 3, managed for Level 4, and optimized for Level 5. Higher level of maturity in information technology management means more can be relied upon in achieving organizational goals [10].

2.3. Balanced scorecard

Balance Scorecard (BSC) is a performance measurement used to measure performance management or strategic management systems from a company's vision and strategy, which translates into important business aspects [11]. IT Balanced Scorecard (ITBSC) is a Balanced Scorecard from the IT side. Grembergen explains that ITBSC consists of 4 perspectives [12]; Customer orientation, Company Contributions, Operational advantages, and Future orientation. The IT BSC is more appropriate to be implemented in measuring IT success in an organization.

2.4. Conceptual model

The conceptual model is a visual construct that gives a logical picture of the problem based on theoretical concepts. The logical relationship between variables related to the scope of the study is presented through the conceptual model [13, 14].

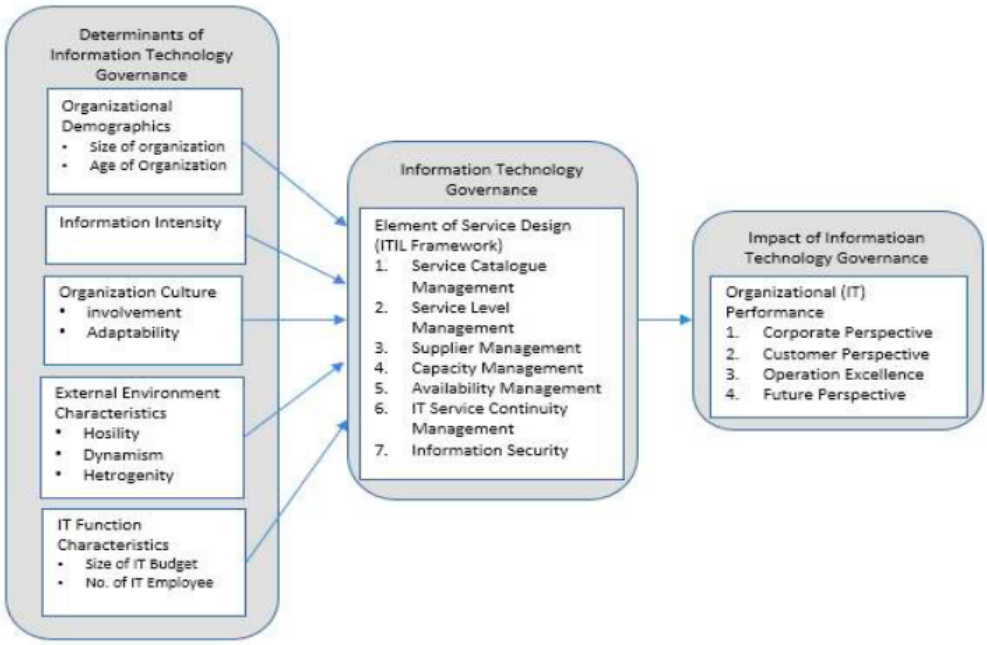

Fig. 1. Conceptual Model.

Mapping the conceptual model in this study adopts a conceptual model for IT effectiveness [15]. The conceptual model of the Unimart service on ITBSC is presented in Fig. 1. Conceptual Model.

3. Methodology

This research uses quantitative methodology with structural modeling using Structural Equation Modeling (SEM). The results of the study were processed by questionnaires and Likert scale. Calculations are carried out to measure the success of the implementation of Unimart service design based on the effectiveness of each ITBSC perspective.

Presents the objectivity perspective of ITBSC as needed by Unimart. The objectivity of the ITBSC perspective is generally presented in this study. Further research is needed to provide objective recommendations and measurements for the ITBSC perspective at e-commerce universities. The measurement results provide answers to how the level of service design readiness at Unimart; the recommendation to achieve the expected maturity of the Unimart Service Design according to the ITIL framework; present the objectivity of ITBSC perspective in accordance with the Unimart to measure the success of service design. Unimart system users have been interviewed to help evaluate Service Design readiness as defined through the Service Design Readiness Assessment of preparedness templates published by UCISA [16, 17].

3.1. Survey sample

The selection of respondents was based on job descriptions and their involvement in the ITIL Unimart Service Design. Respondent involved consist of seven people that already agreed to participate in the evaluation of Service Design readiness and success measurement using ITBSC. The questionnaires sent to respondents are given in limited survey time sessions with the respondent's name made anonymous to help accommodate the privacy of the participants.

3.2. Analysis

Analysis of Service Design readiness at Unimart is in accordance with ITIL 3 standardization to help assess the level of readiness in Service Design. The results of the analysis will be compared with the expected level of maturity in the organization to help find gaps through Gap Analysis. From the analysis, improvement recommendations can be given for each process in Service Design. The measurement of success for Service Design is done by determining the Critical Success Factor (CSF) that will be processed further using ITBSC. The results of the analysis are used to evaluate the success of Service Design at Unimart using ITBSC. The expected scientific contribution is to present the objectivity of each ITBSC perspective for measuring success at the e-commerce University.

4. Result and analysis

4.1. Readiness Level Measurement

Readiness Level Assessment on the Unimart Service Design uses Service Design Readiness Assessment Questionnaire by USICA [17]. The questionnaire result of Unimart Service Design readiness is presented on Table 2.

Table 2. Service Design Readiness Assessment.

Service Design responses all participants	Initial – undefined processes	Repeatable - a level of discipline and adherence	Defined - process defined, documented, standardized and integrated together	Managed – Quality and appropriately improves process	Optimizing – activity mature	Number of Responses
Service Management (SM) a Practice	9	30	38	13	1	91
Service Design (SD) Principles	10	44	61	18	0	133
SD Processes	12	160	320	46	1	539
SD Technology Related Activities	4	81	188	42	0	315
Organizing for Service Design	4	29	54	18	0	105
SD Technology Considerations	9	47	59	4	0	119
SD Process Implementation Considerations	1	30	40	6	0	77

4.2. Gap analysis

Gap analysis is conducted by comparing the level of readiness in Service Design used with the expected level of maturity. Super-priority Improvement status when Expected Maturity Level – Current Maturity level >= 0,5.

Table 3. Service Design Unimart maturity level calculation result.

No	Service Design Area	Current Maturity	Expected Maturity	Gap	Improvement Status	
1	SM as a Practice	2,64	3,00	0,36	Priority	Improved
2	SD Principles	2,65	3,00	0,35	Priority	Improved
3	SD Processes	Service Catalogue Management	2,73	3,00	0,27	Priority	Improved
4		Capacity Management	2,72	3,00	0,28	Priority	Improved
5		Availability Management	2,78	3,00	0,22	Priority	Improved
6		Service Continuity Management	2,76	3,00	0,24	Priority	Improved
7		Information Security Management	2,73	3,00	0,27	Priority	Improved
8		Supplier Management	2,77	3,00	0,23	Priority	Improved
9	SD Technology Related Activities		2,85	3,00	0,15	Priority	Improved
10	Organising for Service Design		2,82	3,00	0,18	Priority	Improved
11	SD Technology Considerations		2,49	3,00	0,51	Super Priority	Improved
12	SD Process Implementation Considerations		2,66	3,00	0,34	Priority	Improved

Based on the gap analysis in each Service Design field, there is a gap between the expected maturity level and service design readiness. The gap between the expected maturity level and the current conditions is presented in Table 3 provides recommendations for process improvement to achieve the expected level of maturity. The average service design readiness score in the Service Design area can be shown in Fig. 2.

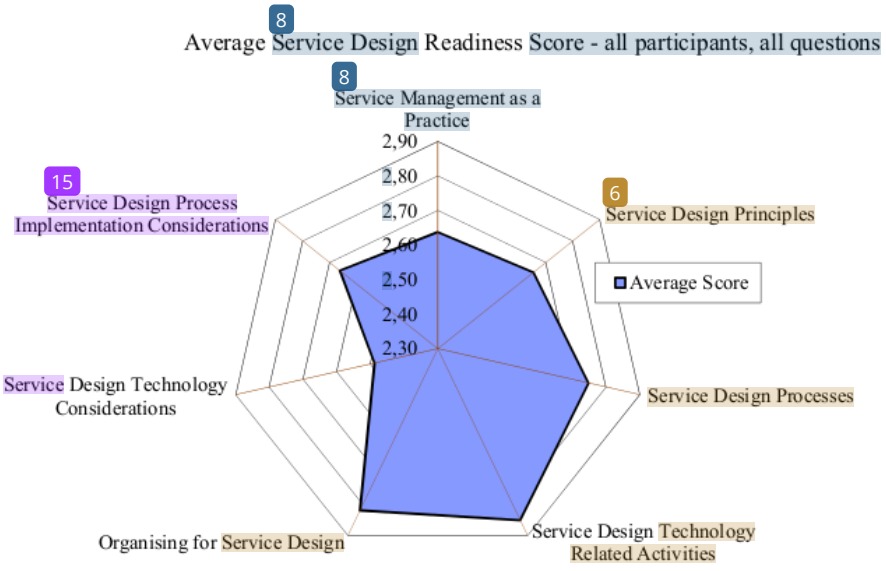

Fig. 2. Average Scores of Service Design Readiness.

4.3. Measurement of service design using ITBSC

Measurement of the success of the Unimart design service using ITBSC. In general, ITBSC is not equipped with objectivity in every perspective. Organizations must adapt their own use of objectivity to each perspective without any objective guidance. In the end, the use of objectivity for each perspective of ITBSC is subjective and may not be used in other similar organizations. In general, the objectivity of each ITBSC perspective is presented in Table 4

Table 4. ITBSC Objectives & Measurement.

CORPORATE PERSPECTIVE	CUSTOMER PERSPECTIVE
Objective	Objective
Business/ IT alignment [18, 19, 20, 21, 22, 23, 24]	Customer Satisfaction [18, 19, 20, 22, 25]
Value Delivery [18, 19, 20, 21, 22, 23, 24, 25]	Competitive Costs [18, 20, 21, 23]
Cost Management [18, 19, 20, 22, 23, 26, 27]	Development Services performance [18, 19, 20, 23]
Risk Management [18, 20, 21, 22, 23, 24]	IT/ business partnership [19, 27]
Inter-company synergy achievement [18, 19, 20]	Service level performance [19]
Provision of new business capabilities [19, 25, 26]	Application delivery performance [19, 23, 25, 27]
Management of IT investments [19, 25]	Operational Services Performance [18, 20, 21, 22, 26,27]
Strategic contribution[19]	User Satisfaction [19, 20, 21, 23, 24, 26, 27]
	Management of Stakeholder Need [20, 24]
	Legal and Ethical Compliance [20, 24]
OPERATIONAL EXCELLENCE	FUTURE PERSPECTIVE
Objective	Objective
Development process performance [18, 19, 23, 24]	Human Resources Management [18, 19, 20, 22, 23, 24, 25, 26, 27]
Operational process performance [18, 19, 21, 23, 25]	Employee Satisfaction [18, 20, 23, 25]
Process Maturity [18, 19, 20, 21, 23, 24]	Knowledge management [18, 20, 23]
Enterprise architecture management [18, 23]	Research into emerging technology [27]
Efficient and effective developments efforts [18, 26, 27]	Age of application portfolio [19, 21, 26, 27]
Efficient and effective operations [19, 26, 27]	Service capability improvement [19, 21, 22, 23]
Responsiveness [23, 24]	Enterprise architecture evolution [19]
Backlog Management and Aging [19]	IT/ Business Partnership [24]
Security and Safety [19, 22, 26]	
Structures [20, 23, 24]	

Examples of the ITBSC objectives in Table 4 are presented from references in previous research studies. The scientific contribution of this study is a general recommendation of objectivity in ITBSC perspective. Further research is needed to produce objectivity and measurement for each perspective of the ITBSC of e-commerce cases at the University. The objectivity of each ITBSC perspective that has been adjusted to Unimart's needs is presented in Table 5.

Table 5. Unimart IT Balance Scorecard Objective Perspectives and measurement.

Perspective	**Objective**	**Target**	**Realization**	**Score**	**Weight**	**Total Score**
Corporate	Business/ IT alignment [18, 19, 20, 21, 22, 23, 24]	90%	85%	3	0,064	0,19

Perspective	Objective	Target	Realization	Score	Weight	Total Score
	Value Delivery [18, 19, 20, 21, 22, 23, 24, 25]	95%	88%	3	0,063	0,19
	Cost Management [18, 19, 20, 22, 23, 26, 27]	35%	31%	4	0,060	0,24
	Risk Management [18, 20, 21, 23, 24]	20%	18%	2	0,061	0,12
Customer	User satisfaction [19, 20, 21, 23, 24, 26, 27]	3,5	3	3	0,058	0,17
	Development Services performance [18, 19, 20, 23]	95%	88%	3	0,063	0,19
	Application delivery performance [19, 23, 25, 27]	90%	88%	3	0,066	0,20
	Operational Services Performance [18, 20, 21, 22, 26, 27]	90%	82%	3	0,062	0,18
Operational	Development process performance [18, 19, 23, 24]	90%	85%	3	0,064	0,19
	Operational process performance [18,19, 21, 23,25]	90%	83%	3	0,062	0,19
	Process Maturity [18, 19, 20, 21, 23, 24]	3	2,7	3	0,061	0,18
	Security and Safety [19, 22, 26]	98%	90%	4	0,062	0,25
Future	Human Resources management [18, 19, 20, 22, 23, 24, 25, 26, 27]	52%	51%	2	0,066	0,13
	Employee Satisfaction [18, 20, 23, 25]	3,5	3,1	4	0,060	0,24
	Knowledge management [18, 20, 23]	90%	88%	3	0,066	0,20
	Service capability improvement [19, 21, 22, 23]	25%	23%	1	0,062	0,06
					1,000	2,93

Table 5 shows the Unimart score based on ITBSC is 2.93. The score is at an adequate level of effectiveness. This implies that the IT effectiveness of Unimart is at an adequate level.

5. Conclusion and implication

The conclusions from the research on ecommerce design service readiness using the ITIL framework with the IT Balanced Score Card objectivity are as follows:

1. The level of readiness of the ITIL V3 Service Design Framework on Unimart produced an average score of 2.69. The average readiness of each process in the service design as follows, service management as a practice with an average of 2.64; service design principles with an average of 2.65; service design process with an average of 2.75, service design technology with an average of 2.85, organizing service design with an average of 2.82, service design considerations with an average of 2.49, and service design implementation with an average of 2.66. Provide recommendations for process improvement to achieve the expected level of maturity. Knowing the Unimart Service design readiness and knowing the parts of the service design process that need to be improved.
2. The measurement of the success of Unimart's service design with ITBSC produces an average of 2.93. The successful implementation of service design is quite effective based on the level of effectiveness score means that the effectiveness of Unimart IT is at an adequate level.
3. The scientific contribution of this research is to present objectivity in the perspective of ITBSC for e-commerce University. Basically, ITBSC is not equipped with its objectivity. objectivity standards for each ITBSC perspective at e-commerce universities are needed.
4. Further research is needed to present the measurement of each objective in measurement using ITBSC in the case of e-commerce universities.

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