Model Of Full Day School Financial Management Under Environmental Dynamics

Purwanto

Management Study Program, Trisna State College of Economics, Belitang, Indonesia
* Corresponding Author:
Email: purwantoup01@gmail.com

Abstract

This study examines the portrait of operational management, unit cost of service and its influence on full day school revenue amidst environmental dynamics. The study was conducted through a case study approach. The research data are in the form of financial reports and profiles of school institutions. The analysis was carried out in three stages. First, operational ratio analysis to determine the development of the performance of operating income and operating costs of the institution during the observation year (2005-2022). Second, regression analysis to describe the function of cost per unit of service against the institution's income. Third, simulation analysis aims to determine the extent to which a product or service can be easily reconfigured to respond to environmental changes. The simulation analysis is seen from the aspects of: changes in service scale, addition of new service units, elimination of service units and transfer of service units. This study found the following results. First, the highest institutional income comes from student fees (28%), followed by full-day meal consumption (17%) and government subsidies for operations (18%). The highest institutional expenditure comes from salaries (29%), followed by full-day meal consumption (17%) and government subsidies for operations (18%). Second, the full-day meal service unit has the greatest influence on full-day school revenue followed by the elementary school and kindergarten service units. Thirdly, the modular system has the potential for school financial management under environmental dynamics.

Keywords: *School Financial management; dynamic learning; unit cost analysis and modular-integrated.*

I. INTRODUCTION

School is a social organization for educational services. Schools as a public sector organization have different goals from companies that are purely profit-oriented. However, schools need to manage school finances [1], [2]. School financial management is not only for accountability, transparency, efficiency [3], [4] in managing funds but also opportunities for easy collaboration, learning resource management strategies and school independence [5], [6]. School independence is important especially for private schools. The concept of governance is different from management, because governance involves external parties as well as internal ones.Schools, like profit-oriented companies, are an integral part of the economic system that uses human, financial, and capital resources to achieve their respective goals [5]. School financial management is not only aimed at service, but also at maintaining the continuity or sustainability of services. Schools must be able to carry out effective and efficient management because human resources, finances, and capital are limited. Schools must be able to avoid bankruptcy or large debts so that the teaching and learning process can continue. In private schools, schools are built by the founder to meet service demands and students pay a fee according to the services provided [7]. Nowadays, the school environment is increasingly complex [8], dynamic [9] and uncertain [10]. The development of digital technology, the recent global pandemic, changes in government policies are increasingly dynamic and uncertain. Technological changes often change and even revolutionize the ways humans work, live and learn [11].

The recent pandemic has also affected the education sector. In the education sector, many classrooms are unemployed during online learning, replaced by investment in digital devices amid the pandemic. In full-day schools, student meal service units during full-day schools became idle during the pandemic. The era of digital disruption, pandemic, environmental changes encourage dynamic learning.Dynamic learning is not limited to classrooms [12], [13], at school. Learning anywhere anytime, in the fields, on farms, in factories, while on vacation, with family also has the potential to occur in the future (We et al., 2018). In addition to the flexibility of space, time, schools have the potential to collaborate with other fields such as: agriculture, tourism, health, green energy. information technology. Dynamic learning requires dynamic capacity [14] of

organizations or school institutions providing educational services. Dynamic capacity, namely business or social activities that are easily reconfigured to respond to environmental changes. Modular systems have the potential to support this dynamic capacity.The modular concept was initially developed in the field of industrial engineering for mass production, then developed in other fields such as strategic management [15]–[19].

Modular systems in organizations are reflected in hard components (products, processes, resources) and soft (financial information systems). Organizations providing service products require increasingly flexible, mobile, decentralized, modular, fast methods [20]. Reconfiguration refers to the redesign of certain elements or components of a system. Modular systems have the potential to support dynamic capacity and configure value [21]. The modular concept also has the potential to be developed by educational service units in schools. The modular concept standardizes resource elements including costs per component in a module, such as: the number of resources (proportion of teachers, students, facilities) needed to add 1 classroom, standard costs for laboratory procurement, standard costs for meal consumption services per student, standard costs for waste management, and other service units. The availability of these modules will make it easier to reconfigure, such as: adding, deleting, replacing old service units with new service units. Modularity is the ability of a system to be separated and recombined for the purpose of system flexibility [22]. Products, services, organizations or systems consist of several constituent elements. These constituent elements are codified, grouped, so that the product, organization or system is easy to reconfigure (add, reduce, replace, combine). These constituent elements consist of autonomous (self-contained) and interdependent modules. Elements or subsystems can stand alone (independent and self-contained) or be integrated into a larger system.

Modular organizations are characterized by decentralized decision-making and a flatter hierarchical structure. Each element is connected, interacts, or exchanges resources (such as: data and information, resources, or energy) in some way. These elements interact with each other to form old products, organizations or systems or form new configurations and can even be configured with other systems [23], [24]. Several standalone modules can act independently or together to provide new value. This is in accordance with the purpose of the business or service to provide value, capture value or create value [25]. Values can evolve along with changes in the environment.This study aims to explore the potential of a modular system in the financial management of full-day schools under environmental dynamics. The modular-integrated system is reviewed from the unit cost module per service unit in integrated schools, namely schools consisting of several integrated service units. Specifically, this study aims to: (1) analyze the portrait of the operational management of full-day school finances, (2) analyze the effect of costs per unit on the total income of the institution, (2) analyze the simulation of changes in service units to the total income of the institution.

II. METHODS

The research was conducted through a qualitative approach with case studies for conceptual development. A qualitative approach was used to explore the potential of modular systems in dynamic capacity development. Case study analysis seeks to examine contemporary phenomena in real-life contexts and is used to find answers to 'how' or 'why' questions and address real-life problems. Furthermore, case study designs allow for the investigation of complex relationships and provide a basis for theory development [26].Case samples were taken purposively on potential practice cases in the development of modular systems. Case samples were taken not to represent the population, but rather to explore the existence of relevant phenomena and potential practices. The object of the case study research is one of the full-day integrated schools in the context of dynamic learning. Modular financial governance to support such dynamic learning. One of the commonly used school financial analysis tools is the financial ratio.

Financial ratios are tools that can be used to help public sector organizations analyze their financial condition. However, financial ratios also have many limitations, so they need to be supported by qualitative analysis. Financial ratios can function as an "early warning system" by focusing on financial conditions that require further review.The research data consists of financial report data and institutional profiles during

2005-2021. Modular analysis starts from the analysis of revenue and operating cost development, the ratio of operating income to operating costs (BO/PO), infrastructure costs which are then break down into modular product or service units. Panel data regression analysis is used to estimate the effect of costs per service unit on the total income of the institution as follows.

$$Y = \beta_0 + \beta_1 U_1 + \beta_2 U_2 + \ldots\ldots + \beta_n U_n + \varepsilon \qquad (1)$$

Where : Y= Institutional Income, U_1 = 1st Service Unit, U_2= 2nd Service Unit, U_n = nth Service Unit, β= constant, regression coefficient, ε= error . Modular analysis aims to determine the extent to which a product or service is easily reconfigured to respond to environmental change opportunities. Simulation analysis is used to determine the effect of changes in service units on total revenue.

III. RESULTS AND DISCUSSION

Case Study Analysis

The case study was conducted at one of the integrated schools managed by a social foundation in Yogyakarta, Indonesia. The integrated school consists of various levels of education from early childhood education, kindergarten, elementary school, and junior high school (pioneer). The school also has several business units that are integrated with the school both to support the school's operational income, and are also useful for learning entrepreneurship and environmental love.

Viewed from a financial aspect, institutional expenditure generally consists of operational expenditure and development expenditure (Table 1). The largest institutional income is infrastructure development (69%). The largest operational income comes from tuition fees (28%) and meal consumption (25%). In addition to student fees, operational income comes from central government (Bosnas) and regional (Bosda) financial assistance of 18%. Business units contribute 1% of total operational income. The largest operational expenses are salaries (29%), followed by operations from national government subsidy (Bosnas) and local government subsidy (Bosda) (19%) and expenses for full-day meal consumption (17%). Operational expenses from Bosnas and Bosda funds are 14%. Head office costs consist of contributing 4% of total expenses.

Table 1. Illustration of Institutional Income and Expenditure in 2019

Income	**(x 1 million Rp)**	**weight**	**Expenditure**	**(x 1 million Rp)**	**weight**
Operating Income			**Operating costs**		
Student fees	757.52	0.28	Wages	785.77	0.29
Equipment charge	99.83	0.04	Equipment	80.53	0.03
IPP	25.29	0.01	IPP	22.80	0.01
Electricity charge	1.80	0.00	Electricity cost	12.10	0.00
Waste charge	3.92	0.00	Waste cost	5.16	0.00
Business Unit	31.81	0.01	Head office costs	139.29	0.05
School meal revenue	671.54	0.25	School meal expense	468.30	0.17
School uniform	97.89	0.04	School uniform	85.96	0.03
Student activities	74.12	0.03	Student activities	155.24	0.06
Administration	2.28	0.00	Administration	1.12	0.00
Health check up	14.13	0.01	Health check up cost	13.16	0.00
Government subsidy	494.16	0.18	Operational subsidy	516.03	0.19
Extracurricular	81.92	0.03	Extracurricular	87.03	0.03
Bank Profit Sharing	12.51	0.00	Bank Administration	2.28	0.00
Other Income	363.95	0.13	Other Expenses	308.45	0.11
Total	2732.67	1.00	Total	2683.22	1.00
Operating Income	**2732.67**	**0.31**	**Operating costs**	**2683.22**	**0.31**
Infrastructure fees	**5971.36**	**0.69**	**Infrastructure Cost**	**5843.22**	**0.69**
Total	**8704.03**	**1.00**	**Total**	**8526.44**	**1.00**

Source: Financial Report of the Institution

Since its establishment in 2005, service performance has always increased every year. The institution's income consisting of operational income and development funds has always increased every year. Based on Figure 1, since its establishment in 2005 the institution's income was only IDR 21.24 million. The institution's income increased to IDR 129.74 million in 2008, IDR 365 million in 2011, IDR 3.57 billion in 2017, IDR 8.719 billion in 2019. In terms of operating income, operating income also increases every year. Operating income was Rp. 113 in 2011 , Rp . 1,105.50 in 2017, Rp. 2,702.95 in 2019. Operational performance measured by the ratio of operating income to operating costs (PO/BO) always produced a positive ratio during 2011-2019, meaning that operating income was able to cover operating costs. The PO/BO ratio decreased in 2020 and 2021 due to the Covid-19 pandemic. The pandemic and online learning policies have forced students to study at home online. This affects full-day services, especially related to consumption costs which contribute 25% of the institution's income. The pandemic also affected the decline in the number of full-day school students from 498 students (in 2019) to 475 students (in 2020).

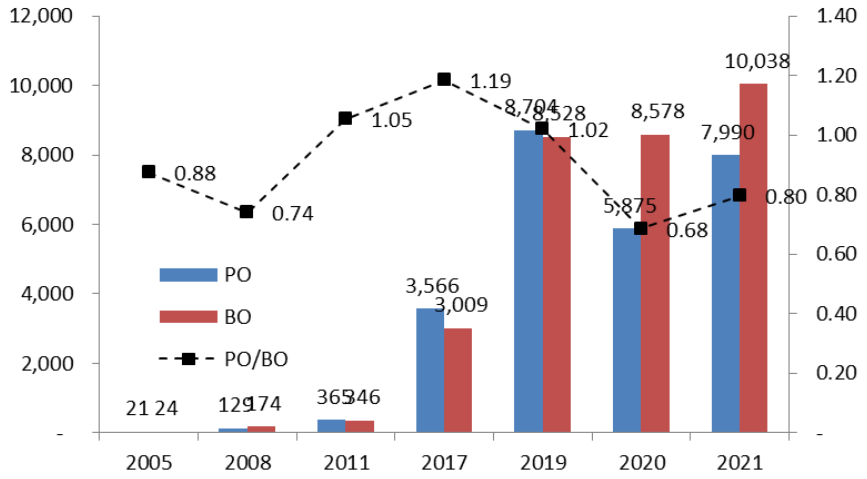

Fig 1. Development of the Institution's Operating Income and Operating Cost Performance

Source: processed from the Institution's Financial Report

Regression Analysis of Service Unit Revenue Function

The results of the correlation test (Table 2) of the research variables show that there is no high correlation (r <0.1) and significant (p>0.1) between the independent variables. High correlation was found between the independent variables U1, namely the cost of elementary school service units (r=0.805; p<0.05) and U4, namely the cost of consumption service units (r=0.479; p<0.05) with the dependent variable, namely institutional revenue. These results also indicate that there is no multicollinearity between the independent variables. The absence of multicollinearity between independent variables can also be seen from the Tolerance value < 1 and the *VIF value* < 10. (Table 3). The results of the Kolmogorov-Smirnov Z test (KZ-test) (Table 2) showed that all variables were normally distributed (p>0.1).The results of the model accuracy test (Table 3) , namely through the ANOVA test (*F-test*), obtained a significance value *(ρ)* < 0.01. This shows that the model fits the data. The regression model of the effect of expenditure on service unit costs on total revenue by entering data during 2005-2021 obtained the value of the adjusted R square *(R^2)* determination coefficient *of* 0.986 (98.6%) . This means that expenditure on service unit costs can predict revenue by 98.6% , the remaining 1.4% is influenced *by* other factors outside the variables studied.

Table 2 . Summary of Research Variable Correlation Test

		Y	U_1	U_2	U_3	U_4	U_5	U_6
Y	*r*	1						
	p							
U_1	*r*	.805**	1					
	p	0.00						
U_2	*r*	0.08	-.08	1				
	p	0.44	.45					
U_3	*r*	-0.122	-.07	-.07	1			
	p	0.22	.46	.46				
U_4	*r*	.479**	-.08	-.07	-.07	1		

	p	0.00	.45	.46	.46			
U_5	*r*	-0.06	-.07	-.07	-.07	-.07	1	
	p	0.54	.45	.46	.47	.46		
U_6	*r*	-0.041	-.08	-.08	-.08	-.08	-.08	1
	p	0.68	.42	.42	.43	.42	.43	
Kz-	*Z*	.64	.90	.54	.56	.56	.82	.69
test	*p*	.81	.39	.93	.91	.91	.50	.73

Description: U_1= Elementary school, U_2= Kindergarten, U_3= Pre-School, U_4=Meal, U_5=LPQ, U_6=Business Unit

**p < 0.001; *p < 0.05

Table 3. Summary of Regression Results

	Y			
	β	*p*	*Tolerance*	*VIF*
(Constant)	18,791	.241		
Elementary school	1,034	.000	.958	1,044
Kindergarten	1,014	.000	.959	1,043
Pre-School	.563	.257	.960	1,042
Meal Consumption	1,055	.000	.959	1,043
LPQ	.976	.000	.959	1,042
Business Unit	.696	.000	.955	1,048
Adjusted R Square	.986			
F test	1195.040			
p	.000			

Description: **p < 0.001; *p < 0.05

Source: Processed from data from the Institution's Financial Report 2005-2023

The results of this study found that Elementary school service units have a positive impact and significant to the total income of the institution ($\rho = 0.000 < 0.01$). The regression coefficient value *(β)* is 1.034. This means that a 1% change in the Elementary school service unit is accompanied by a 1.034% change in the institution's income, provided that other variables are constant. Kindergarten service units have a positive impact and significant to the total income of the institution ($\rho = 0.000 < 0.01$). The regression coefficient value *(β)* is 1.014. This means that a change in the Kindergarten service unit of 1% is accompanied by a change in the institution's income of 1.014%, provided that other variables are constant. Pre-School service units are not significant to the total income of the institution ($\rho = 0.257 > 0.10$). Nutrition service unit has a positive impact and significant to the total income of the institution ($\rho = 0.000 < 0.10$). The regression coefficient value (β) is 1.055. This means that a change in the Nutrition service unit of 1% is accompanied by a change in the institution's income of 1.055%, provided that other variables are constant.

LPQ service units have a positive influence and significant to the total income of the institution ($\rho = 0.000 < 0.01$). The regression coefficient value *(β)* is 0.976. This means that a 1% change in pre-school service units is accompanied by a change in the institution's income of 0.976%, provided that other variables are constant. Business Unit service units have a positive impact and significant to the total income of the institution ($\rho = 0.000 < 0.10$). The regression coefficient value *(β)* is 0.696. This means that a 1% change in the Business Unit service unit is accompanied by a 0.696% change in the institution's income, provided that other variables are constant.

Simulation Analysis

Based on table 3, the regression equation can be formulated as follows.

$$Y = 18.791 + 1.034U1 + 1.014U2 + 0.563U3 + 1.055U4 + 0.976U5 + 0.696U6 + \varepsilon \quad (2)$$

Once the regression equation is obtained, a prediction can be made of the behavior of costs per service unit against the total income of the institution. Further simulation analysis is carried out as follows.

1. Actual-Prediction Model: Simulation analysis of the actual model and the prediction model.
2. Scenario I: Simulation analysis of actual models and prediction models during the pandemic with no nutrition service units during the pandemic due to online schooling in the 2020 and 2021 periods.
3. Scenario II: Simulation analysis of the actual model and the predicted model with the largest service unit (Elementary school) acceptance of only 50%.

4. Scenario III: Simulation analysis of actual model and predicted model with increased acceptance of Business Unit 2(x).

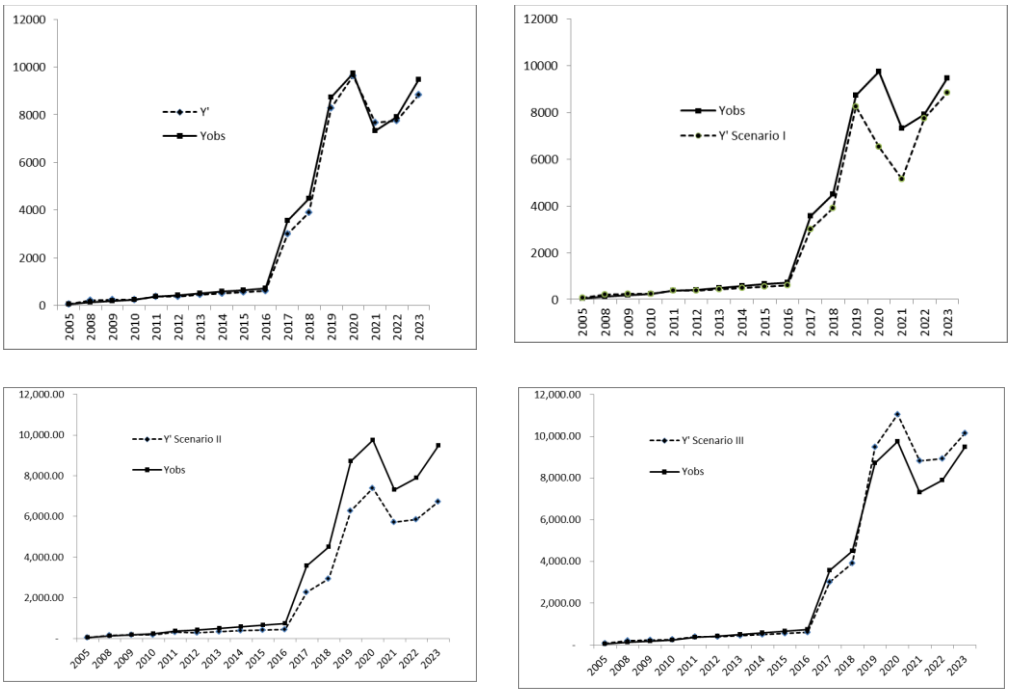

Fig 1. Simulation Analysis

Source: Processed from data from the Institution's Financial Report 2005-2023

School Environment Dynamics, Financial Modular and Dynamic Learning

Changes in the educational service environment often provide a natural experiment for an organization to reconfigure resources to capture new opportunities. Modularity can be used as a framework for understanding to explore issues of dynamics, evolution and transformation of service models. Schools have several financial modules, such as financial report modules in the form of income-expenditure reports, balance sheet reports, and school service planning modules . However, modularity at the module level (object) has not yet reached the stage of formalized modularity (attributes), modularity (patterns) and modularization (processes). Schools have actually unknowingly implemented financial modular, but have not been formalized. The configuration of the modular unit is reviewed from the aspects of: changes in service scale, addition of new service units, elimination of service units and transfer of service units. Changes in service scale are reviewed from the development of elementary school services from the beginning (1 class) to parallel classes (3 x 6 = 18) classes.

The addition of new service units consists of: service units: Pre-School, Playgroup and Kindergarten, and the addition of business units (cooperatives, catering, canteens, franchises).The elimination and transfer of service units occurred during the Covid-19 pandemic, namely the loss of *full-day services* and the unemployed building facilities and physical infrastructure for teaching and learning activities. At the beginning of its establishment in 2005, the school consisted of one elementary school class which developed into six classes. Currently (2021), the elementary school has parallel classes so that the total consists of 18 classes. Not only elementary school, the school also added kindergarten, pre-school and business unit units. In the context of a dynamic environment, decision makers need financial information such as related to operational costs per service unit, investment costs or rental of formalized infrastructure. This will facilitate reconfiguration or exchange of resources. Service costs per unit are done by classifying direct costs and indirect costs. Indirect costs are institutional costs consisting of: salaries of managers and head office staff , head office operational costs, bank administration costs and other costs, Indirect cost allocation based on activity, namely the number of employees on the roof of the service unit.

Table 4. Illustration of Institutional Expenditure in 2019

	Direct Costs (x 1 million Rp)	Indirect Costs *driver*	Indirect Costs (x 1 million Rp)	Total Operating Costs (x 1 million Rp)	Total Operating Costs Weight	Number of Units	Cost per Unit
Pre-School	7.21	0.02	12.36	19.57	0.01	1	19.57
Kindergarten	176.32	0.13	107.12	283.44	0.11	3	94.48
Elementary school	620.38	0.82	671.55	1,291.92	0.48	18	71.77
LPQ	87.03	0.02	16.48	103.51	0.04	18	5.75
Business Unit	147.31	0.01	10.99	158.29	0.06	1	158.29
Meal	820.99	0.01	5.49	826.48	0.31	1	826.48
Total cost	1,859.24	1.00	823.98	2,683.22	1.00	42	1,176.35

Source: Processed from data from the Institution's Financial Report 2005-2023

Infrastructure costs are separated from operational costs, because in the context of a dynamic environment, fixed assets are flexible. Infrastructure can be replaced, removed, easily transferred at any time. Investment in fixed assets with high depreciation value, in addition to increasing the initial investment cost will increase fixed operational costs especially during times of uncertainty.In terms of service units (Table 2), the largest income comes from the elementary school service unit (48%), followed by the nutrition service unit (31%) , and service unit B (11%). The elementary school service unit has the largest operational costs (48%) due to the number of study groups (18 classes) and the largest number of students compared to kindergarten and pre-school. The global pandemic that occurred in 2020 imposed social distancing restrictions on the teaching and learning process. The government provides online policies (online during the pandemic). This condition affects operational performance in schools, especially private schools with full days. Full-day private schools have changes in resource and service management. The performance of the nutrition unit, canteen, and cooperative for full-day services has decreased significantly. Resources in the nutrition unit, canteen, cooperative and classrooms are largely idle.

In a modular system, schools consist of core resources or service units that are difficult to change and resources or service units that are easy to reconfigure. The modular system provides opportunities for convenience through additions (plug-ins) such as: green schools consisting of: hydroponic units, fish ponds and farms for the development of dynamic learning and income units, Other cases such as pandemics that have the potential to occur in the future , schools can experience transformation in several modes of change. Under normal conditions (green zone), school activities are as usual (normal) while still implementing health protocols). In pandemic conditions (regional quarantine), learning spaces are no longer in the classroom, but are broken down in various life laboratories (homes, gardens, rice fields, farms). In red zone conditions or self-isolation, learning is done at home completely through online learning or boarding at school. Hybrid strategies can also be implemented between online learning, boarding at school, learning at school in limited numbers, especially for children with limited resources in online learning. In conditions of a prolonged and uncertain pandemic, more than two years or even ten years or more, the concept of classrooms and school buildings can potentially be changed into life laboratories (social laboratories, food and energy laboratories, arts and culture laboratories).

IV. CONCLUSION

The results of the study through case studies provide an illustration of the potential of modular in school financial management in a dynamic environment in the era of digital disruption. The results of this study provide a description of the potential to explain how elements of a service unit are configured or reconfigured with each other to achieve goals. In the era of digital disruption, school organizations or institutions need to have dynamic capacity through a modular system with the development of flexible assets compared to fixed assets. The results of this study have practical implications for the potential of a modular system in developing dynamic learning amidst the environmental uncertainty faced by full-day schools in the future . However , the research is limited to conceptual development.

This study has several limitations. First, the research was conducted through a case study for illustrative description, so it cannot be generalized to different cases. The research was conducted on educational social organizations, which have different characteristics to purely profit-oriented organizations. Further research is needed for different cases, different organizations especially profit-oriented organizations. Second, the research was conducted at the conceptual development stage. Further research such as through explanatory research and development research is needed for further modular development. Third, the research was conducted in the scope of financial management. Further research is needed, such as involving the fields of management, education and financial information systems engineering.

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