"A dynamic model of budget competition allocation on craft industry: evidence from Indonesia"

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A DYNAMIC MODEL OF BUDGET COMPETITION ALLOCATION ON CRAFT INDUSTRY: EVIDENCE FROM INDONESIA

Abstract

This research aims to create a sustainable dynamic model concept towards the craft industry, which competes with each other in order to get the government budget allocation. The object of this research is superior industry (IU) from regional work unit. The regional work unit allocates its fund's proportion of wood craft industry (IKA) by 51 percent and leather craft industry (IKU) by 49 percent. With almost equal portion, it turns out that the development result of IU has unequal proportion, which is 34 percent for IKA and 66 percent for IKU. This inequality indicates that there is a budgeting allocation, which is not based on performance. System dynamic simulation approach (SD) is conducted to predict the development of performance of both observation objects. In the phase of SD model development, Balanced Scoreboard (BSC) framework is used as a frame of development. The approach of ARCH-type model Success to Successful (StoS) is used as a concept of problem-solving. Several scenarios are formed in this research and needed as symbiosis redesign policy towards IKA product to increase the absorption of IKU product. Practical implications on sustainability of IKA and IKU are discussed in this research. The problem-solving can be applicable and replicable in Indonesia's craft industry.

Keywords	craft industry, budget allocation, system dynamic, policy redesign
JEL Classification	E30, E32, E37

INTRODUCTION

Indonesia is a developing country, which has a large area of coverage. With total population of over 250 million, many government activities are continuously performed. Therefore, it is necessary to have careful planning and selection in order to actualize the program. In industrial sector, the reference of strengthening of industrial structure has been made. In the point of concept *Bangun Industri Nasional* (Build National Industry) 2025, there are two implementations of industrial structure strengthening approach that are (1) top down approach and (2) bottom up approach. The bottom up approach is intended as a tool of strengthening the small and medium enterprises (SMEs). The symbiosis connection is present in the IU, which are wood craft industry (IKA) and leather craft industry (IKU).

As for the possibility of symbiosis connection of IU, the researchers argue that the total performance of both is more feasible to be improved by applying the innovation in the form of budget allocation policy. This budget allocation policy will bring benefit to SME IU as follows: (1) to be a solution in the existing budget constraints, to obtain budget allocations, which have an impact on performance growth and (2) increasing the opportunities for SMEs to obtain fiscal and non-fiscal incentives as priority industry based on KIID/IU about capital invest-

ment (Government of Indonesia, 2007). To determine which IU should be allocated with a larger budget in previous and how to determine the reallocation, the prediction model of potential performance growth on dynamic simulation is required.

This paper aims to build a dynamic simulation model of budget allocation competition between IKA and IKU and to test its application in StoS archetype mechanism. The simulation model begins by constructing a dynamical hypothesis based on reference modes, which are found in the SMEs business system of IKA and IKU groups. The improvement model in the form of policy innovation for the proportion of government budget allocation will be applied in the form of scenarios to obtain the correct combination of budget proportion in increasing the total performance of IKA and IKU. This budget allocation policy will represent the innovation of the cross-sectoral alignment model among the regional work unit towards the national government in supporting the performance of SMEs business systems subjects of IKA and IKU, which are craft industries. The present study could be a prototype design of the budget allocation in the government institution and the business institution. This present study also considers several business variables, such as demand, price, and carrying capacity (CC) to the budget allocation. The implications of this simulation are to understand several conditions that business institution and government institution should face in several scenarios. The result of the allocation proportion scenario indicates that marketing could be considered as the most important and prioritized relocation of budget for improvement program. The model tested also showing that this simulation model could be representing the actual condition and feasible to use as the prediction method for IKA and IKU growth for the following 16 years.

1. LITERATURE REVIEW

1.1. Prediction model of business growth

Business growth prediction models have been developed for so many times, starting from analytical models to simulations. In the analytical model, Dimotikalis (2009) developed the first business growth prediction model based on the Lotka-Volterra differential equation (LV) for multi entities. Dimoticalis' Model is a growth prediction model that shows the intercompetition among products, which is the real competition between products, and not the diffusion competition as defined in the basic model. Sterman (2008) subsequently developed a further Bass diffusion competence model in the framework of dynamic simulation method. Sterman's model was later developed by Thun, Größler and Milling (2000). Inside the competition in branding concept is a competition between the early products and the new ones as defined by Khemani and Shapiro (1993), which are analogous with intracompetition. The weakness of conventional methods is the such regression is a performance over the next period and is considered linear over time, despite the policy changes and management systems (Srijariya, Riewpaiboon, & Chaikledkaew, 2008).

1.2. Framework model

The framework for constructing SD models in this study uses a BSC performance measurement model framework, which is called by the researcher as BSC-like framework. Analogous to the generic BSC model (Kaplan & Norton, 1992), BSC-like framework will consist of four levels of perspective: objective, business, technical, and program alignment. Another model development is to minimize the weaknesses of static BSC such as from the inadequate relationship between strategy and operation (Hudson, Smart, & Bourne, 2001). The BSC-like framework, which is developed by the researcher, is not a combination of SD and BSC methods (Haroon & Wahba, 2002; Young, Tu, & Li, 2004; Cruz, 2010); Bianchi, 2012), but it is a concept that uses BSC's performance management mindset in constructing a dynamic hypothesis model.

At the BSC-like framework of the existing phase, in principle, the model will be created by minimizing the weaknesses and improving the performance of the existing business functions in the SMEs business system of IKA/IKU groups starting from marketing, research and development, production management, and human resources through government programs and budgets from

the technical department. There are three perspectives that will be developed in the existing model: objective, business, and technical regional work unit.

BSC-like framework will implement the alignment, either horizontally or vertically. Horizontal alignment is implemented to build a dynamic model of the IKA/IKU group SMEs business system that reflects the empirical relationships between business functionalities, while vertical alignment is implemented to align the model between programs, which are capable of improving the performance of SMEs business system of IKA group.

2. METHODOLOGY

2.1. Problem of articulation

The research question of this research is mentioned as: "How to develop IKA and IKU performance growth prediction model in the future by using the alternative method such as SD that able is to accommodate the characteristics of craft industry, and also able to show the influence prediction of growth improvement of performance on total export turnover of IKA and IKU, which compete for government budget allocation."

2.1.1. Key variables

There are three criteria used by IU in determining the superior product/commodity:

1. labor absorption of more than 70%;

2. domestic raw material usage of more than 70%;

3. marketing ability, represented with export turnover with the indicator:

- export market of more than 90%;
- domestic market of less than 10%;
- export value greater than USD 1 million;
- destination of export country of more than 3 countries; and
- export growth of more than 5% for four years (Cooperative Trading Industry & MSME Agency, 2011).

Statistically there is a positive correlation between the increase of local worker absorption on IKA and IKU to export's turnover, with the correlation value above 0.5 and p-value, which is smaller than the significance level of 10% (IKA correlation value = 0.539, p-value = 0.07; IKU = 0.9744, p-value < 0.001). Positive correlations were also shown between the use of local raw materials and the export turnover of IKA = 0.9959, p-value < 0.001 and IKU = 0.9987, p-value < 0.001.

2.1.2. Key variables on revenue sub-model

The key variables of the revenue sub-model will relate to the empirical mechanisms of the IKA and IKU industry-level business systems. This total turnover of exports is at the level of industrial systems IKA/IKU industry will be achieved through

Table 1. Proportion of labor absorption and IKA raw material

IKA	City	KLBI	Production value (IDR.000)			Labor (people)			BB/BP (IDR.000)		
			2011	2012	2013	2011	2012	2013	2011	2012	2013
Wood Meuble	Sleman	36.101	15.713.286	15.959.280	15.959.928	2.055	2.061	2.061	1.908.268	2.004.038	2.004.038
	Bantul	36.101	135.617.313	135.768.562	144.325.600	14.949	15.048	15.248	74.334.333	74.396.043	73.450.750
Wood Craft	Sleman	20.299	16.982	N/A	18.256	301	N/A	301	1.715	N/A	2.156
	Bantul	20.293	15.729.268	15.747.194	15.847.195	2.610	2.623	2.623	4.799.501	4.780.128	4.780.128

Table 2. Proportion of labor absorption and IKU raw material

IKU	CIty	KLBI	Production value (IDR.000)			Labor (people)			BB/BP (IDR.000)		
			2011	2012	2013	2011	2012	2013	2011	2012	2013
STK Wood	Sleman	19.121	117.603.616	117.970.275	118.990.289	2.433	2.447	2.463	73.611.544	73.800.486	74.800.486
	DIY	19.121	N/A	4.210.300	4.248.300	N/A	325	350	N/A	2.522.493	2.522.493
	Bantul	20.293	11.679.965	11.696.381	11.696.381	845	873	873	3.221.582	3.239.750	3.239.750

sales increase, which can be achieved through increased market share and increased production capacity to minimize the backlog. Therefore, key variables that form the revenue sub-model in this research are sales, market share, backlog, production rate, and production capacity.

Key variable sub-model of fund allocation will be related to the budget allocation, which is responsible for improving the performance of SMEs IKA and IKU. The budget allocation for improvement of non-technical service in supporting IU is:

1) for IKA is forestry department in the form of development of SVLK program and wood supply sustainability;

2) for IKU is department of agriculture in the form of development of supply stabilization program for leather raw materials and COM for SME.

A four-year horizon choice is to consider:

1) the longest delay in the context of aligning the IKA and IKU, which is in the minimal timber planting pattern estimated at four years, so that the two-year period is considered by researchers as a minimal progress that can be used to predict the success or failure of the cropping program;

2) fiscal and non-fiscal incentives for priority industries based on KIID/IU as referred to in articles 18 and 21 of Law No. 25/2007 on investment will be reviewed at most every two years (Government of Indonesia, 2007), so that the selection of the four-year review period is included in the context of the incipient period of incentive rules.

2.2. Reference modes

In developing the SD model, it takes graphs or descriptive data that show the dynamic behavior of the problems that lie over time, until developed in the future. These descriptive graphs or data are called reference modes (Sterman, 2008). There are two things that will be examined as reference modes, they are:

1) behavior of empirical system behind IKA/IKU data; and

2) behavior of government empirical budget allocation for IKA/IKU.

The wood craft industry representing the IKA group is represented by wooden furniture commodities, while the leather craft industry representing the IKU group is represented by leather glove and leather handicraft commodities. Plotting the historical data of IKA revenue shows that reference modes of IKA dynamic behavior during the 22-year time horizon from 1992 to 2013 show the dynamic behavioral tendency of S-shaped growth with overshoot. Plotting data of IKU revenue with the same time period show the tendency of dynamic behavior of exponential growth.

Using the 2013 data, it can be estimated that the government's budget behavior always increases year after year, which is divided into two periods:

1) during the period from 1992 to 2009, a budget increase of about 6% from the previous year;

2) during the period from 2010 to 2013, the increase of budget is around 10%.

There are 2 important notes from the plotting reference modes:

1) reference budget modes, which has no difference in supporting the hypothesis that there is a need for budget relocation that is more proportional to IKA and IKU;

2) reference modes that have been identified both on the revenue sub-model and the fund allocation sub-model will be the representative reference to the simulation model built when the dynamic hypothesis is run.

2.3. Formulation of dynamic hypothesis

2.3.1. The development of initial hypothesis

The behavior shown by the IKA reference mode shows the basic model of dynamic behavior of
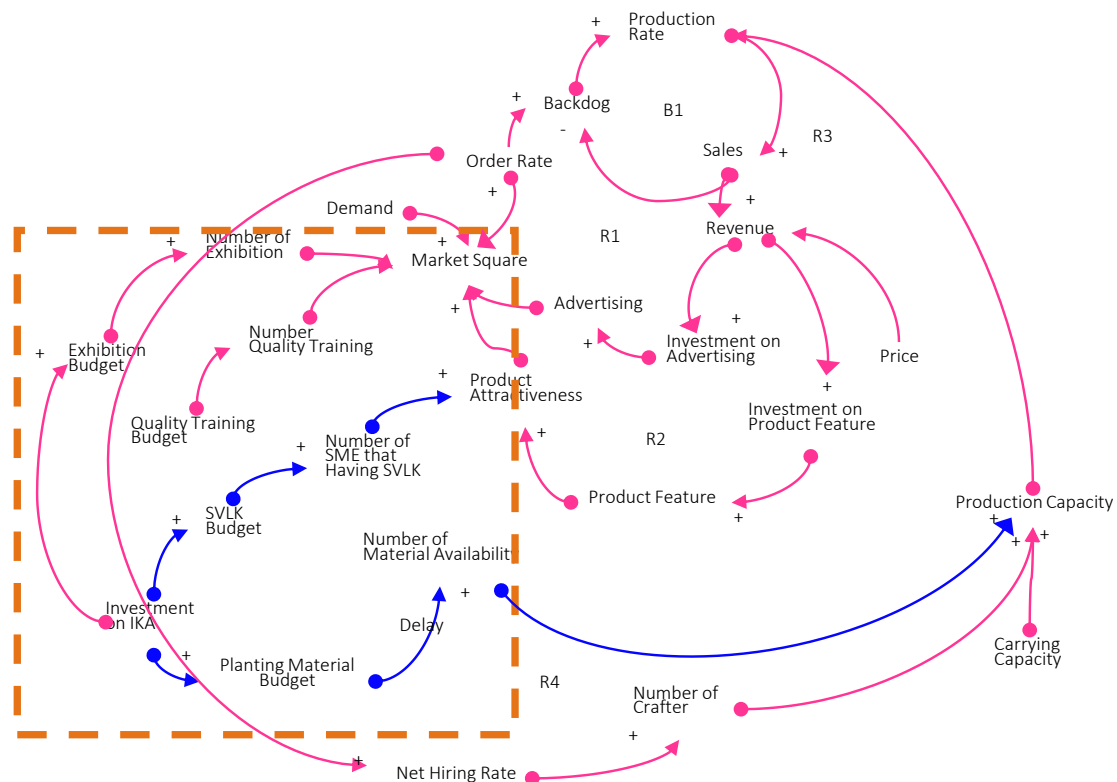
Figure 1. CLD combination of existing and improvement for IKA

growth with overshoots, while the IKU model shows the basic model of dynamic behavior of exponential growth. The dynamic hypothesis of the growth with overshoots and exponential growth models will follow the CLD basic model (Sterman, 2008).

2.3.2. Endogenous focus

The boundary diagram model from the potential growth dynamics of IKA craft industry business performance is planned for the industry. All the variables controlled by IKA and IKU industry level business systems will be included as endogenous variables, whereas the exogenous variables are demand, price, and carrying capacity both at MBD IKA and IKU.

2.3.3. The arrangement of CLD

CLD is arranged in two phases, which are the existing phase and the improvement phase. In each IKA and IKU model, CLDs developed under BSC-like framework are expected to be in accordance with their respective basic systems, as well as plotting historical data from reference modes. The

existing phase covers the mechanisms and issues of importance in the SMEs industry level of business systems both of IKA and IKU that include the business functions of marketing, research and development, production management, raw material supply chain, and human resource management. Improvement phase involves the budget innovation related to the proportion of government budget allocation that is considered appropriate to develop the IU IKA/IKU. This innovation will involve the budget alignment within the same framework of regional work unit and non-technical departments. The alignment is expected to support the strategic policy of IU development in Regulation of Ministry of Industry number 138-140/M-IND/PER/10/2009.

3. ANALYSIS RESULT

3.1. Model testing

Model testing that will be described in this paper is behavior reproduction, sensitivity analysis, and extreme conditions. Validation of statistical simulation model during 22-year time horizon showed

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that there was no significant difference between the actual model and the simulation model.

3.2. Sensitivity analysis

The first sensitivity analysis conducted is sensitivity to demand. The sensitivity of the model towards demand can be related to the concept of elasticity or not. Sensitivity to demand associated with elasticity will be closely related to price changes as the sensitivity of the model to the previous price. The sensitivity of the model to the demand without considering the elasticity factor will be tested on the model with the following conditions:

a) associated with the concept of elasticity of demand for revenue. Long-term elasticity will have a multiplier effect compared to short-term own price elasticity, since demand tends to be less elastic in the short term Baye (2010). As a basic rule, the average elasticity of furniture demand for income ranges from 1.5. The weakening of the rupiah by 40% from Rp 10.000/USD to Rp 14.000/USD for example analogue impact with increasing buyer buy by 40%, so that will trigger the increase of demand equal to 40%·1.5 = 60%;

b) unrelated to the concept of elasticity. A 60% sales decline will be tested as a sensitivity analysis parameter, since the revenue due to a 60% sales drop is still within the tolerable range of SMEs entrepreneurs, which is 1.5 to 3 times the fixed operating cost before deciding to stop the production. The result of the sensitivity analysis to demand shows that there is no significant change of dynamics pattern due to the change of the price.

The following sensitivity analysis conducted is sensitivity to price. Since that IKA/IKU exports are based on USD currency as a hard currency international price reference and its production system is based on MTO, the price unit in USD exchange rate may always be fixed. Therefore, the sensitivity of the model to price changes (in Rupiah) will be closely related to the weakening of the USD currency against the Rupiah. The 10% gain is predicted to affect the willingness to buy because the interest rate of FRB is only 4%, so if the Rupiah strengthens 50%, then it is 2.5 times FRB inter-

est rate. If the Rupiah is weakened, the willingness to buy theoretically will rise. The weakening of Rupiah in 2015 differs from its impact in 1998. The result of the sensitivity analysis on price shows no change of dynamics pattern which is significant due to the change of price.

The other sensitivity analysis conducted is sensitivity to Carrying Capacity (CC). CC is an undesirable output that will be managed to be controllable input. The sensitivity of the model to the CC change will be tested for a maximum of 75%. A 75% increase in CC does not have a major impact on the supply side of labor, but affects the supply of raw materials that affect the production rates due to the unavailability of raw materials. The results of the sensitivity analysis of the CC changes show that there is no significant change in the dynamics pattern due to the CC change of 75%.

When sensitivity analysis of these three conditions is incorporated in one graph, then the sensitivity level between the change of demand, price, and CC parameters will be different. For IKU the average change is −60.01%; 50.02%; −0.002%. The effect of demand, price, and CC change on revenue for IKA shows that the level of elasticity is chronologically −1.997; 5.002; 0.007, while for IKU is −2; 5.002; 0.

3.3. Extreme testing condition

Extreme tests will be performed by applying the extreme inputs to exogenous variables in the model both at the SMEs business system level and government level. At the SMEs business system level, extreme test for uncontrollable variable is applied, which are (1) if demand is zero, (2) if demand is bigger than carrying capacity.

The first extreme testing condition will be extreme demand test equal to zero. Under SFD, the value of demand = zero will result in order rate = zero, so production rate = zero. If the production rate = zero, then sales are also = zero, so the revenue is also = 0. The same condition also occurs when price = 0. Since the result must be zero, extreme test is not done because the result must be zero. From the extreme test when demand = zero, it can be concluded that the limitations of the developed model is for MTO condition, not for MTS (make to stock).

The following extreme testing condition will be extreme demand test 100 times of Carrying Capacity. Extreme testing when demand is much larger than CC in the model indicates that the dynamic behavior remains the same, although the gap is quiet large. There are two choices when demand is much larger than CC, namely (1) produce by order rate if production capacity is greater than order rate, (2) produce as much capacity if production capacity is less than order rate. From extreme test when demand is bigger than CC, it can be concluded that the limitations of the developed model are (1) the absence of maximal labor limit, so production capacity is always able to fulfill any demand, (2) the availability of raw materials is considered as always greater than demand.

The next extreme testing condition will be extreme test zero existing budget. Extreme test of the existing budget allocation of zero government budget is shown that budget support for the existing regional unit technical program is not very significant in improving the IU SME revenue growth performance, especially IKA. Two technical service programs in the form of marketing exhibition and quality improvement need to be seen for the effectiveness of its impact on the growth of export performance of SMEs.

3.4. Scenario test

3.4.1. Proportion of budget allocation scenario

Focusing on condition with improvement, the proportion of budget changes will be divided into three. They are (1) budget proportion between IKA and IKU, (2) proportion of IKA budget alignment program, (3) the proportion of IKU's align-

ment program budget. The COM budget is also assumed to be between 0 and 300 million, while the stabilization of raw materials refers to the existing thematic relocation of the budget (Figure 2).

The first scenario will be Scenario 1. Scenario 1 is a scenario of model improvement, where the proportion of the budget is in accordance with the existing proportion, which is 0.512 for IKA and 0.488 for IKU. In scenario 1, for IKA (S1.1) the following assumptions are applied:

1) the increase of budget funds since 2014 for non-technical departments and budget relocation of raw material effectiveness for IKA;

2) the budgetary budget added for technical guidance in 2014 amounts to 300 million;

3) the increase in budget starting in 2015 is assumed to be 20% for a period of 5 years or an average of 4% per year.

The addition of funds for technical program and the effectiveness of the wood raw material pattern will further affect the sub-model revenue of IKA as shown in Figure 3. Based on the simulation of scenario 1.1 in Figure 3, both IKA and IKU revenue shows the trend of increases over the next 16 years with almost similar gradient values until mid-year 2026–2029.

In scenario 1 for IKU, the following assumptions are applied:

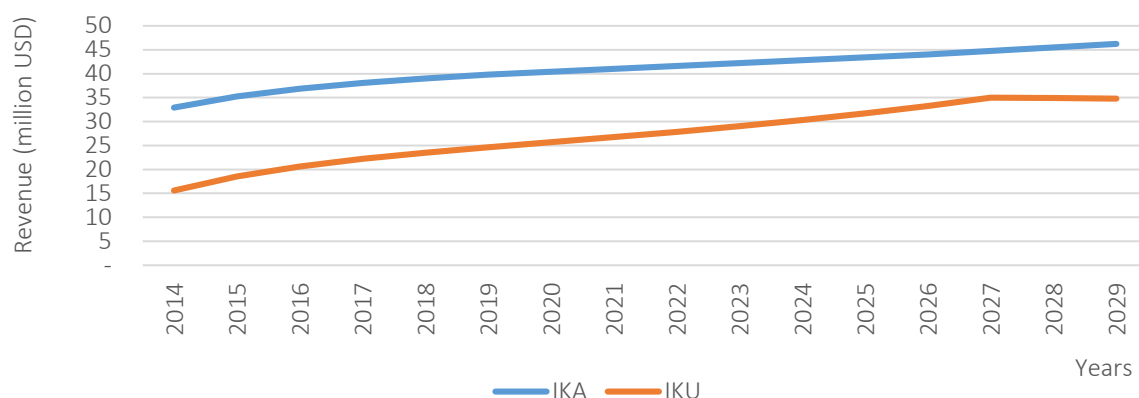1) the addition of budget funds from non-technical department in the form of Raw Material

Figure 2. Simulation graph of scenario 1.1

Stabilization program started in 2014, and COM from the central government began in 2015;

2) budget funds added to the stabilization of raw materials of leather started in 2014 in the form of budget relocation regional unit;

3) the central government's additional of COM funds are assumed to begin in 2015;

4) the increase in budget starting in 2015 is assumed to be 20% for a period of 5 years or an average of 4% per year.

The simulation results from scenario 1.2 are presented in Figure 3. Based on Figure 4, IKU's performance potential will increase beyond IKA until 2023, although revenue is still below IKA. From 2023 to 2028, IKU's revenue will surpass IKA with a sloping growth pattern as IKA. Both scenario 1.1 and scenario 1.2 will significantly improve the IKU growth performance.

In this scenario 1.3 of IKA and IKU, a combination of scenarios 1.1 and 1.2 will be implemented, assuming that the government will provide additional SVLK and COM funds simultaneously both for IKA and IKU. The changes in the fund allocation to IKA and IKU sub-model (Figure 5) produce the simulation graphs as shown in Figure 4.

The following scenario will be Scenario 2. The scenario combination scheme 2 (Table 3) and the reallocation of the budget to be reviewed every 4 years and the total revenue of IKA and IKU for scenario 2 each of the 4 annual review periods (Table 4). The result of the performance comparison revenue scenario 2 shows that IKA is quite dependent without

the help of government budget allocation. The addition of budget allocation to IKA did not improve the performance of IKA, instead, making the total performance of IKA IKU as IU was decreasing.

Table 3. Combination of scenario 2

Scenario	Resources allocation IKA	Resources allocation IKU
Scenario 2.1	55%	45%
Scenario 2.2	60%	40%
Scenario 2.3	65%	35%
Scenario 2.4	70%	30%

Table 4. Total of IKA and IKU revenue from scenario 2

Scenario	Total IKA and IKU
IKA 55%, IKU 45%	1,122,048,950.05
IKA 60%, IKU 40%	1,113,148,782.20
IKA 65%, IKU 35%	1,102,646,444.07
IKA 70%, IKU 30%	1,090,435,468.35

There are two limitation of capacity: 1) from the ability to draw the revenue, IKA and IKU are limited by the order of rate that depends on the demand which influences the market share. Market share cannot grow up to 100% due to the national and international competition. As a result, there are certain examples that make the performance of IKA has reached its peak, 2) in terms of the budget absorption, IKA and IKU are limited by the existing national budget.

The next scenario will be Scenario 3. In scenario 3, it will change the proportion of budget for each improvement program that will be run on IKA and IKU groups. Scenario 3 consists of scenarios
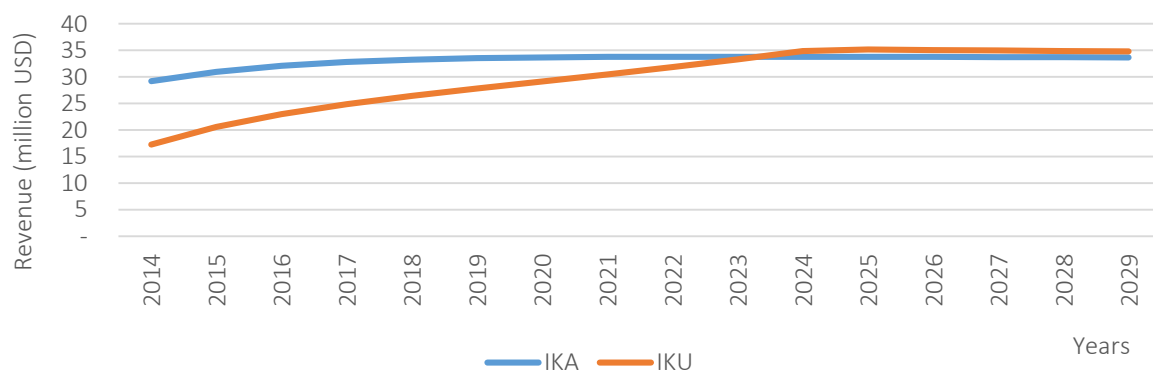

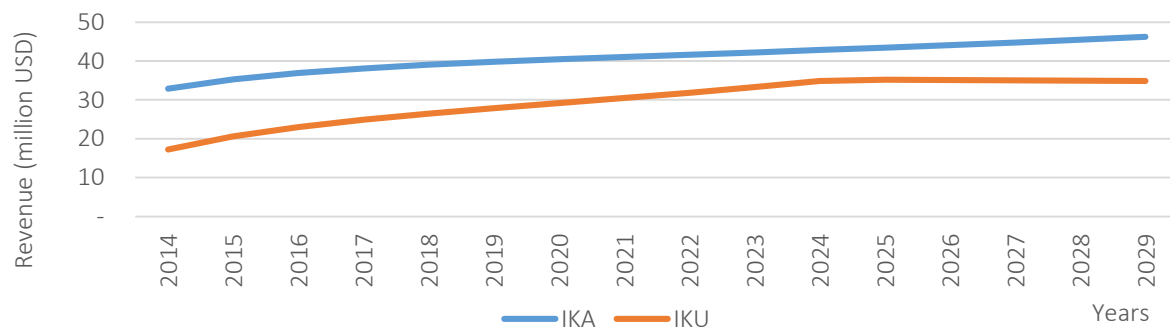**Figure 3.** Simulation graph of IKU scenario 1.2

Figure 4. Simulation graphic of IKA and IKU in scenario 1.3

3.1 and 3.2. Scenario 3.1 connects with the implementation of the combined budget improvement scheme in the IKA group, while scenario 3.2 is associated with the implementation of the combined budget improvement scheme in the IKU group.

In scenario 3.1, there will be a change in the proportion of budgets (Table 6) for programs that include technical and non-technical departments. As for the proportion of quality training, it is assumed to decrease annually due to the quality of the existing exports of SMEs product, which are considered as good, while the growth of export oriented in SMEs is relatively low. The budget for quality training can be transferred into the exhibition.

Table 6. Combination of scenario 3.2 with sub-budget program IKU

Scenario	Certificate of manufacturing	Stabilization of leather raw material
Scenario 3.2.1	18%	82%
Scenario 3.2.2	16%	84%
Scenario 3.2.3	14%	86%
Scenario 3.2.4	12%	88%

The result of simulation in the prediction of revenue performance with scenario 3.1 with certain value in Figure 6 and total revenue of IKA based on the combination of scenario 3.1 in Figure 6 shows that the result of allocation proportion by giving budget 34% to SVLK and 66% to planting pattern give the biggest turnover compared with other allocations value as shown in Table 6. This simulation result could be the basis to support the Regulation of the Minister of Trade No. 89 of 2015, which came up with the furniture and craft of SME's downstream from the obligation to have SVLK.
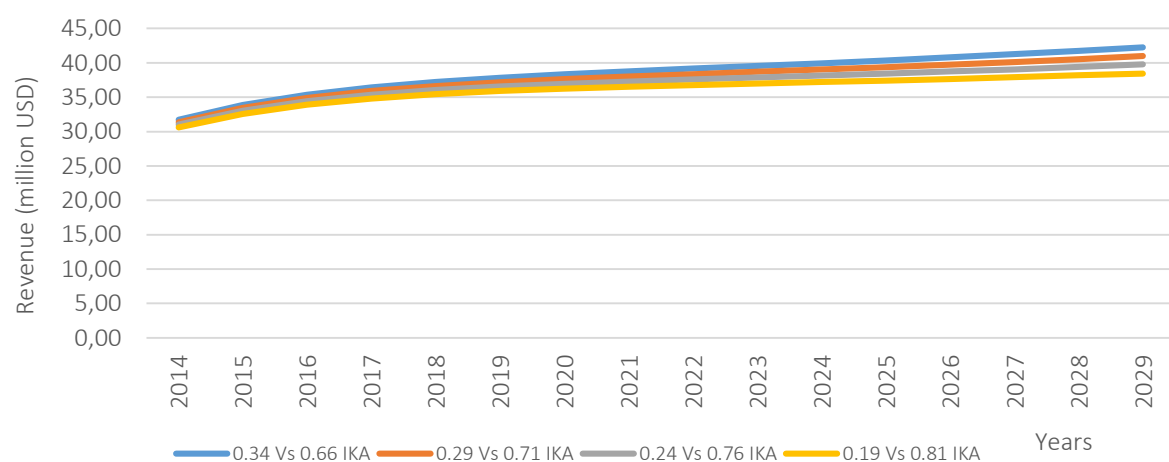
Table 5. Combination scenario 3.1 of sub-budget program of IKA

Scenario	SVLK	Planting pattern
Scenario 3.1.1	34%	66%
Scenario 3.1.2	29%	71%
Scenario 3.1.3	24%	76%
Scenario 3.1.4	19%	81%

Figure 5. Simulation result from scenario 3.1

In the scenario 3.2, existing allocation conditions for IKA are 18% for COM and 82% for raw material stabilization. With the similar assumption to the previous IKA, scenario 3.2 is implemented with a scheme as shown in Table 7. With a certain value, the simulation result show that the proportion allocation of scenario 3.2 by giving the funds of 18% to COM and 82% to stabilization of leather raw material provides the highest revenue impact compared to the other scenarios with the value.

Table 7. Total IKU revenue on scenario 3.2 based on proportion for 16 years

Stabilization of leather raw material vs COM	Total income
0.82 vs 0.18	1,479,996,775.76
0.84 vs 0.16	1,479,556,175.54
0.86 vs 0.14	1,479,117,963.28
0.88 vs 0.12	1,478,686,096.05

For IKA, the best revenue condition is given by the proportion of certification allocation (SLVK), which is higher than the existing con-

dition, it is above the proportion of 30.5% SVLK and 69.5% planting pattern. As for IKU certification, COM, the best revenue condition is given by proportion of existing budget allocation, which is 18% for COM and 82% for stabilization of raw leather material. The result of scenario 3 shows that the role of SVLK for IKA gives more impact on performance growth compared to COM for IKU.

The following scenario will be Scenario 4. Scenario 4.1 by varying the SVLK budget from Rupiah 300 million to zero assuming the relocation budget for effectiveness of the planting pattern will still produce the highest performance gap, which is USD 50 million. Scenario 4.2 by varying the COM budget from Rupiah 300 million to zero with the assumption that the relocation budget of stabilization of leather raw materials still produce the lowest performance gap, it is only USD 4 million. The scenario result in Figure 6 and Figure 7 show that central government assistance for SVLK is more dominant in impacting the IKA performance
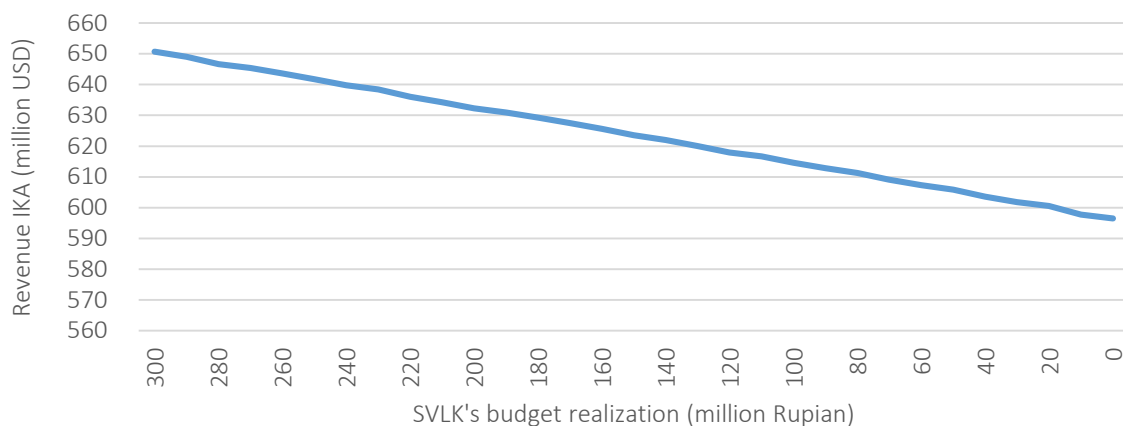

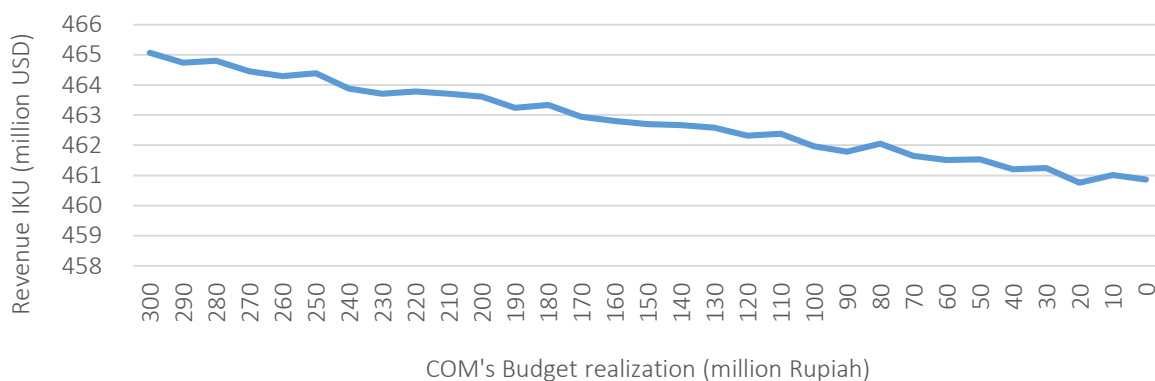**Figure 6.** Realization impact on SVLK allocation to IKA income

Figure 7. Realization impact on COM allocation to IKU income
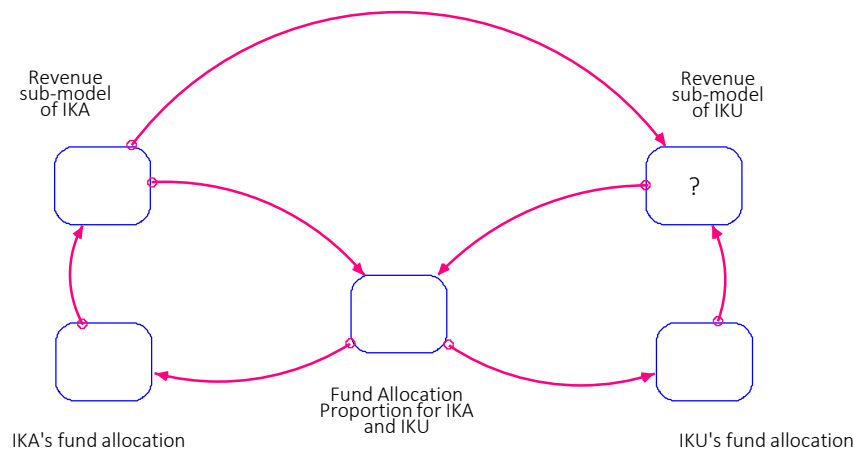
Figure 8. Framework S to S symbiosis effect

than COM for IKU as IU. This indicates that as a result of scenario 2, IKA is more independent than IKU.

3.4.2. Scenario of symbiotic effect

The innovation of budget allocation policy for IU with the potential symbiosis such as between IKA and IKU can be a redesign of IKU component involvement in IKA product. Redesign means to give the role of commodity industry group of furniture product and wooden product as leverage product for IKU product. If the IKA furniture product structure is enhanced for the role of its IKU component to become 30%, then intuitive growth performance of IKU will increase.
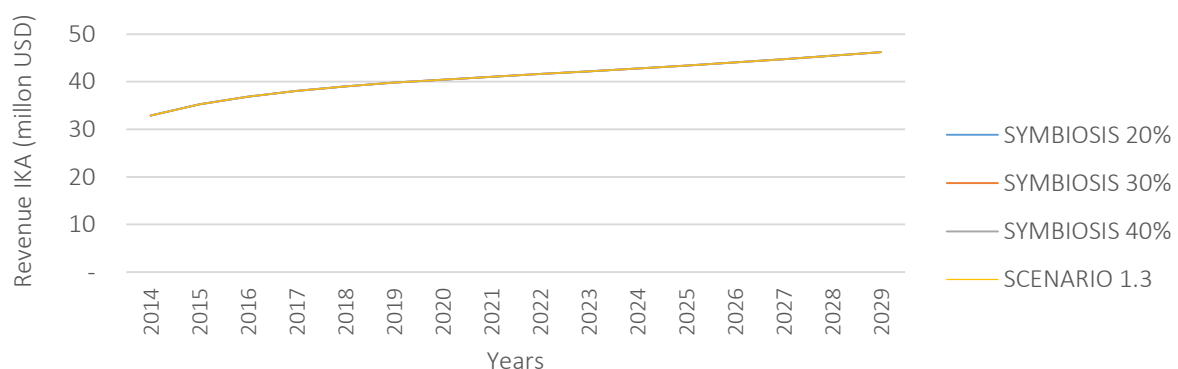

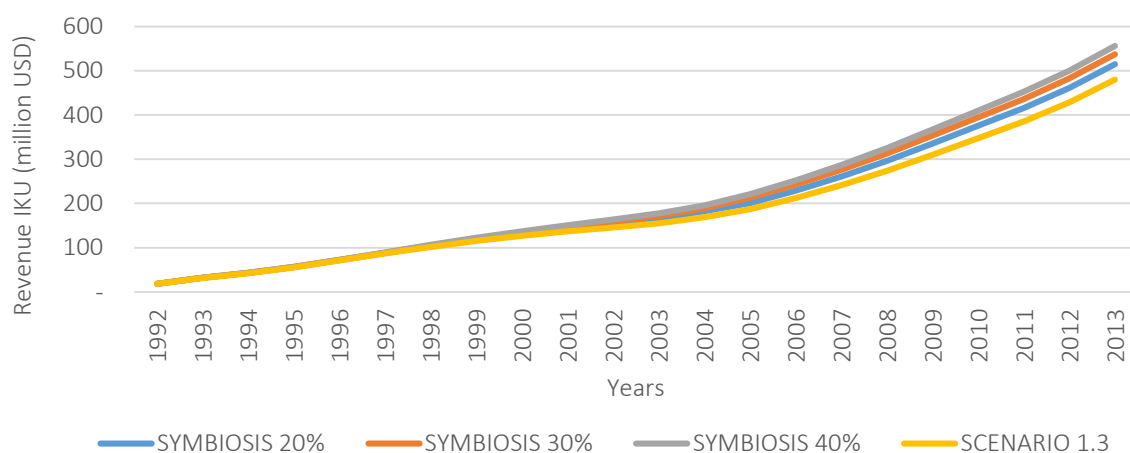**Figure 9.** Simulation of symbiosis model of IKA to revenue

Figure 10. Simulation of symbiosis model of IKU to revenue

This symbiotic model is built based on the assumption that within the IKA component can be found, so that IKU's component product, so that IKA's revenue will affect the IKU's revenue. Scenario designs, which are going to be implemented, are

1) the proportion of IKU component in IKA product is 20%;
2) the proportion of IKU component in IKA product is 30%;
3) the proportion of IKU component in IKA product is 40%.

The results of running simulated symbiotic scenario are shown in Figure 9 and Figure 10. The increase of IKU component in IKA product will increase IKU's revenue, which means IKA and IKU total performance will also increase. Based on the result of the previous scenario, the strategic thematic IU development that needs to be developed into quantitative strategic objectives in BSC framework is a component related to an urgent improvement/alignment model for non-technical programs, which is increasing the number of SME certification.

CONCLUSION

The results of the model test show that the simulation model is considered valid in representing the real condition and feasible used as the prediction method of IKA and IKU growth over the next 16 years. The dynamic behavior data pattern of the simulation model is also considered robust enough when applying extreme budget test = zero, as well as for extreme sensitive exogenous variables change.

The results of policy formulation in the form of scenario of allocation proportion come up with conclusion:

a) IKA is already quite independent without the help of government budget allocation. The addition of budget allocation to IKA did not increase the performance of IKA, but made the total performance of IKA IKU as IU decreased. As a result, performance trends change in proportional allocation scenario which come up in counterintuitive implementation of the S to S archetype for IKA and IKU;

b) The counterintuitive is caused by two things, they are:

• in terms of ability to draw revenue, IKA and IKU are limited by order rate, which depends on demand as uncontrollable exogenous variable affecting the market share;

• in terms of budget absorption, IKA and IKU are limited by the existing national budget potential, as well as the potential for central government budget assistance for SVLK and COM certification;

a) the result of the allocation proportion scenario also indicates that the most important and prioritized relocation of budget for improvement program is the marketing dimension of SVLK and COM as the key to increase export sales, which is eco-friendly;

b) since that IKA is more independent than IKU, so that COM certification is more priority to be budgeted.

The priority of COM certification gets in line with the issuance of the Regulation of the Minister of Trade No. 89 of 2015 on the elimination of furniture and handicraft of SME downstream from the obligation to have SVLK. The Regulation of the Minister of Trade No. 89 of 2015 does not alter the capabilities of the developed model, as it has been anticipated through the proportional allocation scenario.

The results of policy formulation in the form of symbiotic effect scenario come up with the conclusion:

a) the symbiotic effect scenario supports the conclusion of the allocation proportion scenario, which indicates that IKA is already dependent and able to become leverage for performance of IKU and total IU performance;

b) increasing the IKU component in IKA product will further increase IKU's revenue, which means IKA IKU's total performance will also increase. A symbiotic redesign policy is needed of IKA product to improve IKU product absorption. The strategies are replicable and applicable for all the craft industries in Indonesia.

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AUTHORS' CONTRIBUTIONS

Arman Hakim Nasution, Alva Edy Tontowi, Bertha Maya Shopa, and Budi Hartono performed the research, analyzed the data, and wrote the manuscript; Satria Fadil Persada supported the research process and gave the final review of the manuscript.

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