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CONSTRUCTING A STRATEGY TO IMPROVE INDONESIAN REGENCY ROAD PERFORMANCE USING BALANCED SCORECARD

* Henri Siswanto[1*], Bambang Supriyanto[2], Pranoto[3], Muslich Hartadi Sutanto[4]

[1,2,3]The Faculty of Engineering, Universitas Negeri Malang, Indonesia
[4]The Faculty of Engineering, Universiti Teknologi Petronas, Malaysia

*Corresponding Author, Received: 29 Oct. 2019, Revised: 20 Nov. 2019, Accepted: 04 Feb. 2020

ABSTRACT: According to its administrative status, Indonesian road network system can be classified into national, provincial, and district (regency) roads. Although there has been continuous improvement of road conditions in Indonesia, district (regency) roads in Indonesia show the worst condition within the Indonesian road network system compared to that of provincial and national roads. As part of the effort to improve the condition, this study is focussed on formulating a strategy to improve district road condition by using balanced scorecard method (BSC). Analytical Hierarchy Process (AHP) was utilised in the weighting of strategic targets. Data was collected through questionnaires distributed to respondents from stakeholders of Public Works Department in seven districts in East Java Province, Indonesia. The result of this study indicates that, according the strategic targets to improve district roads performance, road user (customer) perspective is ranked as highest priority (34.4%); Followed by training and development (25.8%), financial (20.4%), and internal business process perspectives (19.4%).

Keywords: Strategy, Regency roads, Improve performance, and Balanced scorecards

1. INTRODUCTION

Road conditions in Indonesia continue to improve. Administratively, road management in Indonesia is divided into 3, national roads, provincial roads and district roads. National roads have the best conditions, followed by provisional roads and district roads at the lowest. The percentages of good and moderate road conditions for national, provincial and district roads are 89.38%, 69.82% and 56.93% respectively [1]. Based on this data, efforts should be made to improve the performance of district road conditions using the right strategy. The Balance Scorecard (BSC) approach, developed by Kaplan and Norton, is expected to be a useful tool to formulate the best strategy in improving district road conditions. Four perspectives were employed to achieve the goals: road user (customer), internal business process, financial, and training and development perspectives [2, 3].

BSC was initially used extensively in profit-oriented companies with a four perspective balance approach [4,5]. The application has then further expanded in non-profit oriented institutions, for example, educational institutions, hospitals, government institutions and other non-profit institutions [6–8]. The final goal of the four perspectives for profit-oriented companies is different from non-profit-oriented companies. Non-profit-oriented institutions prioritize products in the form of services for customers or the public. In addition to that, BSC in a non-profit oriented institution is dedicated more into the improvement of service and efficiency [7–9].

The utilisation of BSC to formulate the best strategy in maintaining district roads is expected to promote improvements in road condition, so that there is a balance of performance between national roads, provincial roads and district roads as a road network system. Therefore, this study is intended to develop a strategy to improve district road performance using BSC.

2. METHODOLOGY

The research was conducted in seven districts (regencies) in East Java Province, Indonesia: Lumajang, Pasuruan, Malang, Blitar, Tulungagung, Jombang and Pacitan Regency. Data was obtained through questionnaires distributed to 56 respondents from stakeholders of the district Public Works Department. BSC was prepared based on the vision and mission of the District Public Works Agency. Based on the vision and mission described in the four BSC perspectives, each of the perspective has one or several strategies as shown in Fig. 1**.** The strategy is formulated based on vision and mission of the road authority at regency level. The strategy is then elaborated into a more detailed strategic targets: Financial, Road User (Customer), Internal Business Process, and Training & Development. Key performance indicators can then be used to quantitatively asses the performance.

Based on the strategic targets of each perspective, BSC maps can be formulated to achieve the stated goal. The map illustrates the systematic steps that must be taken to achieve the goal. Each of the strategic target has a number of indicators of which each of the indicator is weighted to enable quantitative measurement. The weighting of indicators is done by using the analytical hierarchy process (AHP) method. AHP data was obtained by distributing questionnaires to stakeholders at the District Public Works Office. Each BSC perspective, namely the road user (customer) perspective, internal business process perspective, financial perspective, and training and development perspective, has several indicators. The relationship between each strategic target and the goal is illustrated in Fig. 2**.** The support strategy is reflected by the following perspectives: internal business process, training & development, and financial. Whereas the outcome strategy is reflected by road user (customer) perspective.

AHP analysis was started by preparing a hierarchy structure consisting of several levels of hierarchy. The highest hierarchy was the goal of the research and considering that there was only one parameter at this level, there was no need to weight it. The second level was the BSC which consists of four perspectives. Each perspective was compared to each other to get its weighting. Weighting in the AHP was needed to find out the hierarchy of a certain level. The third level was indicators in the BSC perspective. The indicators in each BSC perspectives were compared to obtain weighting. Cross-comparisons of the third level were not necessary in BSC perspectives because weighting was done only to determine the hierarchy of indicators in each perspective.

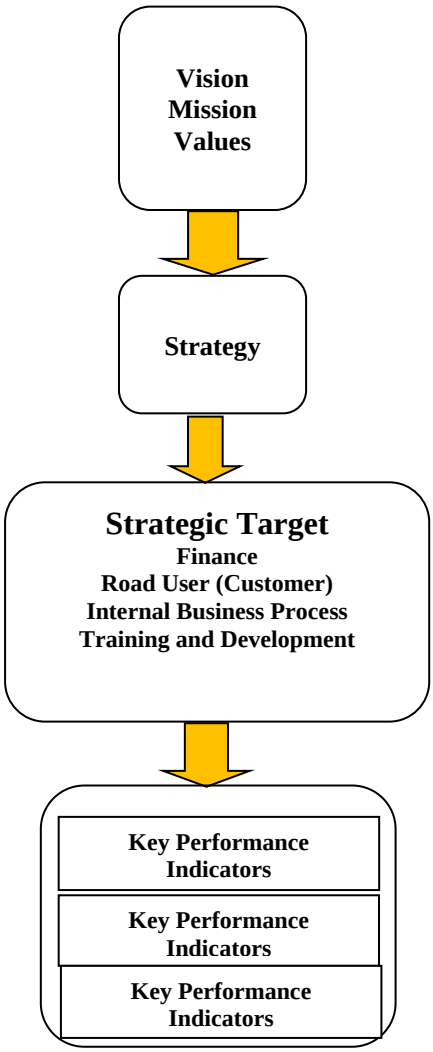

Fig. 1 Vision, mission, and strategic target

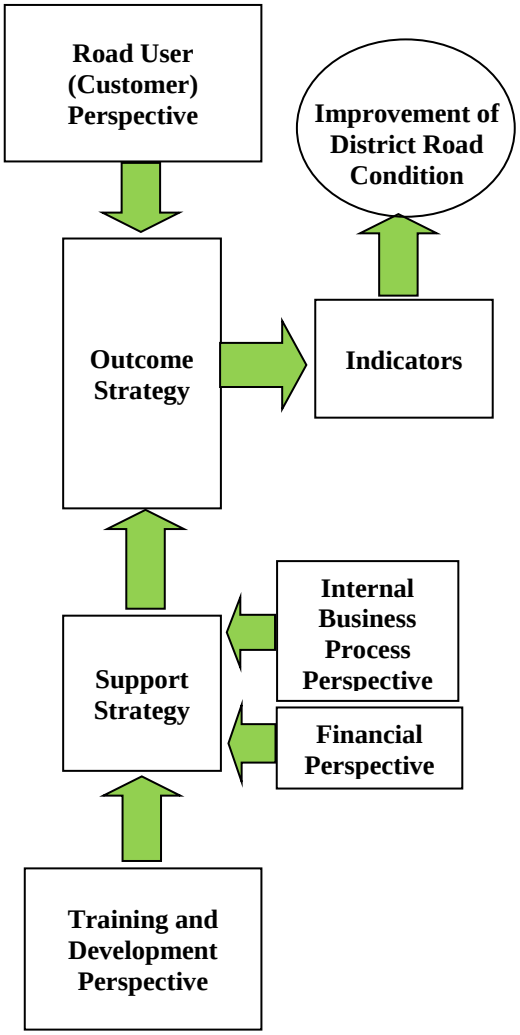

Fig. 2 Relationship between final goal and strategic target

3. RESULTS AND DISCUSSION

List of BSC perspectives and indicators is presented in Table 1, whilst the results from the weighting of the BSC strategic objectives are presented in Table 2. Target strategy from road user (customer) perspective to improve district road condition is the top priority to be achieved. The weight of this strategy target is very high: 0.344 out of the total weight of 1. It is followed by the training and development perspective that has strategic objective of increasing employee motivation and satisfaction at the second rank. Training and development perspective, financial perspective and internal business process are the support strategies that will lead to the targeted outcome of road user (customer) perspective in the achievement of superior district road condition.

The most important thing in the scorecards [10] is road user (customer) expectation [9]. In the implementation of BSC, road user (customer) satisfaction must be measurable even compared to other institutions [10]. The road user (customer) satisfaction indicator, in this case, is the improvement of road condition by increasing the percentage of roads that are in good and moderate conditions to the sum of all roads from year to year. The results of weighting indicators are presented in Table 3 to Table 6. Table 3 shows that routine road maintenance is the indicator that should be the highest priority, followed by periodic road maintenance, road rehabilitation, and road reconstruction indicator. Placement of routine maintenance as the highest priority is relevant with some literature [12]. Maintenance delays cause negative outcomes in both the medium and the long term [12, 13]. Even newly built roads must receive regular maintenance.

In the internal perspective of the process, implementation is the indicator that receives the highest priority, followed by monitoring, planning and road database. A good implementation per specifications will produce a road service life that matches the planned longevity. Good implementation is obtained from good supervision. Planning and database are next to be prioritized. Balance of database indicators, road planning, supervision of construction and implementation of road construction will better road performance. Quality data with cost-effective data collection is an asset that is useful in decision making. Easily accessible data increases the value of the data, the concept of 'collect once, use often' data needs to be an applied strategy [15]. The main tasks of road agencies are to plan, build, maintain and operate road infrastructures to the benefit of road users [16].

Table 1. BSC perspective and indicators

Perspective	Objective	Measure	Indicator
Road User (P1)	Improving district road condition (O1)	Road condition	Periodically maintained road (I11) Routinely maintained road (I12) Rehabilitated road (I13) Reconstructed road (I14)
Internal Business Processes (P2)	Improving road construction efficiency (O2)	Data availability Specification conformity Schedule conformity	Updating road condition data (I21) Road planning (I22) Road construction (I23) Road supervision (I24)
Finance (P3)	Increasing road construction funds (O3)	Adequacy of road construction funds	District funds (I31) Provincial grants (I32) National grants (I33) Funding utilisation (I34)
Training and Development (P4)	Improving employee motivation and satisfaction (O4)	Training program	Education and training (I41) Well-being and health (I42) Support facilities (I43)

Table 2. Weighting of target Strategy in BSC perspective criteria

	O1	O2	O3	O4	Weight	Rank
O1	1,00	2,04	1,62	1,12	0.34	1
O2	0,49	1,00	1,01	0,82	0.19	4
O3	0,62	0,99	1,00	0,82	0.20	3
O4	0,84	1,23	1,23	1,00	0.26	2
Consistency	0,003					

Table 3. Weighting for indicators on road user (customer) perspective

	I11	I12	I13	I14	Weight	Rank
I11	1,00	1,13	0,86	1,30	0.26	2
I12	0,89	1,00	1,65	1,49	0.30	1
I13	1,17	0,61	1,00	1,08	0.23	3
I14	0,77	0,68	0,93	1,00	0.20	4
Consistency	0,015					

Table 4. Weighting for indicators on road user internal business process perspective

	I21	I22	I23	I24	Weight	Rank
I21	1,00	0,90	0,71	0,68	0.19	4
I22	1,12	1,00	0,97	0,92	0.25	3
I23	1,42	1,04	1,00	1,63	0.31	1
I24	1,48	1,09	0,61	1,00	0.25	2
Consistency			0,013			

Table 5. Weighting on indicators for financial perspective

	I31	I32	I33	I34	Weight	Rank
I31	1,00	1,28	1,22	1,16	0.289	1
I32	0,78	1,00	0,97	1,07	0.236	4
I33	0,82	1,04	1,00	0,99	0.239	2
I34	0,86	0,93	1,00	1,00	0.236	3
Consistency				0,001		

Funding for road maintenance activities often hits obstacles. The funding sources for district road maintenance consists of 4 funding sources. In this research, the indicators of regional original funds are expected to be the main funding source, occupying the highest priority. If the original regional funds are sufficient for road maintenance, funding from other sources will not be needed. But adequate original funds for this region is a rare thing. This leads to the necessity of assistance funds. The central assistance fund occupies the second priority if the regional original funds are insufficient. Funding problems for the maintenance of road construction is a problem that is often faced by many road agencies [17]. Fund absorption is the next indicator that needs attention. Delay in the absorption of funds can be the cue that maintenance work was not immediately implemented. Delays to or late road maintenance risk financial losses as the road continues to degrade. Facilities and infrastructure for employee self-development are considered necessary for prioritization to adhere to the highest weight. Followed by education and training indicators. Welfare and health occupy the last two priorities. The training and development perspective has the strategic goal of increasing employee motivation and satisfaction. Strategic objectives in this perspective are supporting targets in realizing the strategic objectives of other perspectives. Human resources are variables that have a big influence on efforts to achieve better district road performance [18]. In learning and growth strategy, there are intangible assets that will play a role in organizational activities to achieve higher performance [19]. Intangible assets consist of human capital (employees' talents, skills, and knowledge), information capital (information systems, networks, databases, and technology infrastructure) and organization capital (leadership, teamwork, culture, employee alignment, and knowledge management) [20]. People in an organization will be the key to success in reaching the goal. In applying balanced scorecards, the challenges that must be tackled are preparations for difficult learning, hard work and fundamental cultural changes [10]. Some authors use the term intellectual capital which is part of the intangible assets. Intellectual capital investment is a key element that influences business performance improvement [20, 22].

Table 8 systematically displays perspectives, target strategies, measures and indicators. Road performance as the final target is expected to increase from year to year. Road performance can be measured by the large percentage of road conditions that are of moderate and good condition to the total roads in the district. Based on the strategic objectives and indicators, a strategy map can then be drawn up with the ultimate goal of road user (customer) satisfaction in the form of availability of district roads with the desired performance. The strategy map is presented in Fig. 3**.**

The strategy map illustrates how improvement in certain strategies can positively influence the achievement of the desired goals [18]. In balanced scorecards, a balance must also be achieved in several dimensions, including the balance between objective achievement and accountability.[10]

Table 6. Weighting for indicators on training and development perspectives

	I41	I42	I43	Weight	Rank
I41	1,00	1,19	0,89	0.34	2
I42	0,84	1,00	0,89	0.30	3
I43	1,13	1,13	1,00	0.36	1
Consistency				0,003	

Table 7. Perspectives of balanced scorecard, indicators and the ranks

Perpective	Rank 1	Rank 2	Rank 3	Rank 4
P1	I12	I11	I13	I14
P2	I23	I24	I22	I21
P3	I31	I33	I34	I32
P4	I43	I41	I42	-

Table 8. Weight of the target strategy in the BSC perspective and indicators

Perspective	Objective	Measure	Indicator
Road User	Improving district road condition, O1 (0.344)	Road condition	Periodically maintained road (I11) (0.263) Routinely maintained road (I12) (0.300) Rehabilitated road (I13) (0.233) Reconstructed road (I14) (0.204)
Internal Business Processes	Improving road construction efficiency, O2 (0.194)	Data availability Specification conformity Schedule conformity	Updating road condition data (I21) (0.199) Road planning (I22) (0.246) Road construction (I23) (0.308) Road supervision (I24) (0.247)
Finance	Increasing road construction funds, O3 (0.204)	Adequacy of road construction funds	District funds (I31) (0.289) Provincial grants (I32) (0.236) National grants (I33) (0.239) Funding utilisation (I34) (0.236)
Training and Development	Improving employee motivation and satisfaction, O4 (0.258)	Training program	Education and training (I41) (0.339) Well-being and health (I42) (0.301) Support facilities (I43) (0.360)

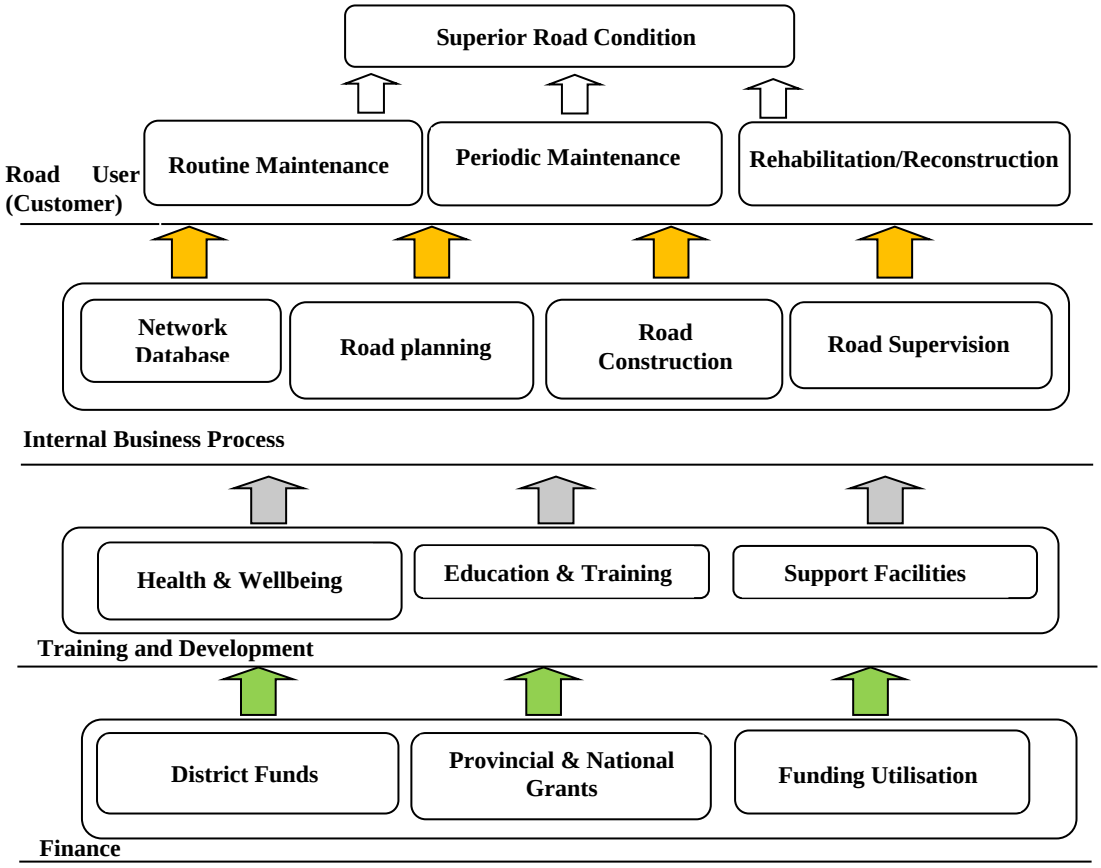

Fig. 3 Mapping of strategy

4. CONCLUSION

The results of this research show that road user (customer) perspective occupies the top priority and must receive attention. The road user (customer) perspective has the goal of providing high road performance in the district road network through routine maintenance initiatives, periodic maintenance, rehabilitation works, and road reconstruction works. The strategy to achieve such performance is carried out through a balance of steps in the driving strategy, namely financial perspective, training and development perspective, and internal perspective of the process. The financial perspective has several indicators which cover the availability of sufficient funds from various funding sources. Employee welfare and health, education and training, and supporting infrastructure are indicators that need attention in the training and development perspective. The internal process perspective has several indicators including comprehensiveness of the road

database, planning, implementation and supervision of road construction.

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