

IMPLEMENTATION OF CONSOLIDATION STRATEGY TO IMPROVE PROCUREMENT PERFORMANCE IN GOVERNMENT HOSPITAL (A Case Study : Joglosemar Central Vertical Hospital)

Hery Suliantoro

Industrial Engineering Department, Faculty of Engineering
Diponegoro University
Semarang, Indonesia
suliantoro_hery@yahoo.com

Kirana Rukmayuninda Ririh

Research Centre for Policy and Management of Sciences, Technology and Innovation
Indonesian Institutes of Sciences
Jakarta, Indonesia
kirana.rukmayuninda.ririh@lipi.go.id

Sultan Arunizal

Industrial Engineering Department, Faculty of Engineering
Diponegoro University
Semarang, Indonesia

Abstract

One effective way to improve service performance is to improve procurement management. In terms of purchasing or purchasing itself, the cost spent reaches around 60% of the total budget. The better the procurement function is implemented, the more cost savings will be achieved. The procurement activities at the hospital have the aim to fulfill medical and non-medical needs in quality health services and to ensure continuity in health services. Hospital goods or services procurement itself is guided by policies regulated in Presidential Regulation Number 16 Year 2018 and LKPP Institution Regulation Number 9 Year 2018. Based on this, a strategic policy emerged in the procurement of goods/services aimed at achieving VFM, namely the implementation of a procurement consolidation strategy. This research used 11 main criterias to measure VFM through Analytical Hierarchy Process (AHP). Those are quality (19.4%), time (14.0%), costs (13.4%), efficiency (9.50%), effectiveness (8.80%), provider or supplier (8.40%), quantity (7.20%), risk allocation (6.90%), sustainability (4.70%), location (4.00%), and innovation (3.60%). As the results, an assessment of the performance of the implementation of the consolidation strategy in the procurement of goods / services of Joglosemar's Vertical Hospital obtained a value of 61,945 which included in the category of satisfying performance

Keywords

Collaboration, Health Services, Hospitals, Value for Money, Procurement Consolidation

1. Introduction

Health has been a core need of every individual. Health issues are important things to consider, especially in Indonesia, because the quality of life or citizen's life expectancy of a country is one of key factors of the national welfare. General hospital is one of the government agencies engaged in the public sector to meet the needs of the best health services for the community. However, problems still encountered systems of government hospital services such

as speed and accuracy of service, availability of medical equipment, guarantee of cost certainty during the service process and public trust in safe services (Indriani et al., 2015; Sondari, 2015; Setiawan, 2016; Kahlenberg et al., 2018).

Improving public service especially hospital service is including to the main government's agenda to achieve higher national satisfaction index and better level of healthiness. Poor public sector procurement planning has affected the quality of health service delivery and arose low satisfaction index (Asakeya, 2014). What often happens is that medical supplies are inadequate in supporting health service activities. The availability of affordable and good quality of goods or services played role in improving public services. Thus, one of strategic ways to improve service performance is to analyze and enhance procurement management (Jing et al., 2020).

Procurement is the main function in every organization (Saad et al., 2016). Procurement activities have a role in terms of cost savings, wider sustainable development, fulfillment of product diversity and improvement of an organization's services (Loader, 2010). The procurement process itself actually contributes a significant amount in the expenditure of an organization or company. In terms of purchasing or purchasing itself, the cost spent reaches around 60% of the total budget that must be spent (Geldermen and Van Weele, 2005). Therefore, procurement management is very important to be considered because the better the procurement function is implemented, the more positive impact will be in supporting cost savings (Schiele, 2007; Suliantoro & Ririh, 2019).

As one component of the government in the field of health, public hospitals needed to provide comprehensive quality of health services, guarantee patient health safety and support the whole community. Procurement activities in hospitals aim to fulfill medical or non-medical needs in quality health services and ensure continuity in health services. Public hospital goods or services procurement itself is guided by policies regulated in Presidential Regulation Number 16 Year 2018 and LKPP Institution Regulation Number 9 Year 2018. The regulation states that the implementation of government goods or services procurement can be carried out through self-management or through a supplier.

Public sector procurement has been criticized as inefficiency, waste, sources of leakage of funds and institutional loss. New demands arose for public sector organizations to pay attention the value for money (VFM) in carrying out their activities (Vaillancourt, 2017). This is the purpose of government procurement as stated in Presidential Decree Number 16 of 2018, namely the procurement of goods or services of the government must provide fulfillment of the maximum benefit value (value for money). Based on this, a policy strategy emerged in the public procurement aimed at achieving VFM, which is the implementation of a procurement consolidation strategy. Consolidation is a strategy for the procurement by combining several packages of goods or services procurement (LKPP Regulation 9/2018). The purpose of combining the procurement packages is to increase the government's bargaining position in the eyes of suppliers, which is expected to reduce the cost of procurement packages and reduce the price per unit.

The implementation of procurement consolidation strategy had been initiated, but problems of consolidation execution are still occurring (Badorf et al., 2019). In Indonesia, the current procurement consolidation strategy has only been implemented by a number of government agencies. One of them is the Joglosemar Central Vertical Hospital which has implemented consolidation procurement since 2017. The Joglosemar Central Vertical Hospital is a work unit consisting of 8 agencies operating in the surrounding areas of Jogja, Solo and Semarang. Implementing consolidation strategy could improve efficiency (Kim and Netessine, 2013), but uncertainties of production costs, quality and delivery time also played role in consolidation successfulness (Pyke and Johnson, 2003). Procurement consolidation can result in reduced prices and transaction costs (Murray, 2009), however consolidated procurement also had chances of high conflicts which led to time and cost consuming (Heuninckx, 2008). This phenomena should be avoided wherever possible

It was found that the implementation of procurement consolidation could provide conformity in product specifications for each hospital incorporated in consolidation process at relatively low prices. However, the consolidation process -from planning, preparation, until selection stages of suppliers- required a long time. In addition to the differences in the quality standards of each member of the consolidation is also often a debate in the process. It has also been stated by Huxham, et al (2000) in his research, that the implementation of consolidation is not easy. Potential conflicts can occur because between the collaborating parties have their respective priorities. Thus there will be an opportunity to lose the benefits to be achieved from the consolidation process.

Based on several facts mentioned above, it is necessary to examine the implementation of the consolidation strategy in the public procurement of goods or services. This research aims to measure the procurement performance during the implementation of the consolidation strategy especially in public hospital. In addition, this study will measure the benefits gained through consolidated procurement since VFM Framework was considered as a strategic way (Meehan et al., 2016). The framework will be analyzed using analytical hierarchy process and importance performance matrix to figure out the most important factors and their performance.

2. Literature Review

2.1 Procurement

Procurement activity is a process that includes the supply of goods and services needed with the desired quantity and quality, originating from the appropriate source, sent to the destination at the right price (Bailey, 2015). Previous researches stated that procurement is the acquisition of goods or services that are suitable and purchased with the best costs to meet the needs of buyers in terms of quality, quantity, time and location (Yukins and Schooner, 2006; Carril and Duggan, 2020). Moreover, the procurement of goods or services also defined as an activity to obtain goods or services in a transparent, effective, and efficient manner in accordance with user needs (Schotanus and Telgen, 2007).

2.2 Government Procurement

Government procurement is activities of procurement of goods or services by the Ministry / Institution / Regional Agencies financed by the State Budget / Regional Budget. The process starts from the identification of needs to the handover of work results. The mentioned process is regulated in Presidential Regulation Number 54 Year 2010 concerning Procurement of Government Goods and Services which is subsequently changed into Presidential Regulation Number 16 Year 2018. Generally, government procurement in Indonesia is illustrated in the diagram as can be seen in the Figure 1 below.

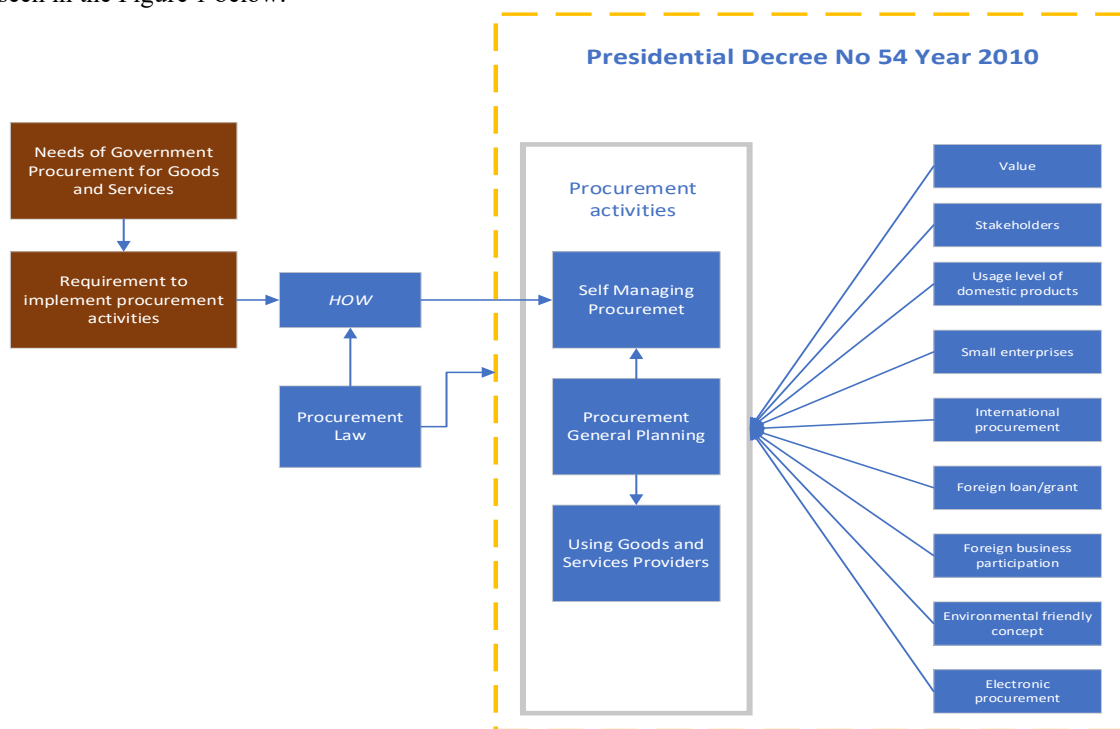


Figure 1. Outline of the Process for Government Procurement (Listiyanto, 2012)

Based on Figure 1 above, it is shown that efforts to meet the needs of government goods or services can be done through self-management and through suppliers. Procurement through self-management is procurement that are done alone by the government agencies. While procurement through suppliers is procurement that done by business agencies or individuals who committed to to provide the goods and services as required (Listiyanto, 2012). The implementation of a consolidation strategy helped to streamline procurement process through suppliers.

2.3 Procurement Consolidation

Procurement consolidation or collaborative procurement is a strategy that is seen as horizontal cooperation in the form of a unification of the functions of purchasing activities between two or more organizations (Essig, 2000). There are two main advantages of implementing consolidation. The first advantage is the increased effectiveness obtained through a focus on quality, learning in each other's activities and better use of resources (Jost et al., 2005; Schotanus and Telgen, 2007; Bakker et al, 2008). The second advantage is to increase efficiency through reducing procurement transaction costs and increasing economies of scale through merging the number of purchases (Torabi et al.,2018).

Supply Positioning Model (SPM) defined 4 categories of purchased items that are grouped based on the risk to the organization or company and the value of goods or services procurement expenditure (Zhenfeng et al., 2007). The four categories are critical, bottleneck, routine and leverage. The implementation of the consolidation strategy will cause item shifts in the SPM quadrant. Critical and Bottleneck items should be well noted since these type of items would cause high expenditure and risks to organization, meanwhile Routine and Leverage items might rate up the value of the consolidation -lower risk to organization- (Torabi et al., 2018). The illustration between SPM quadrant and the procurement consolidation strategy is shown in Figure 2 below.

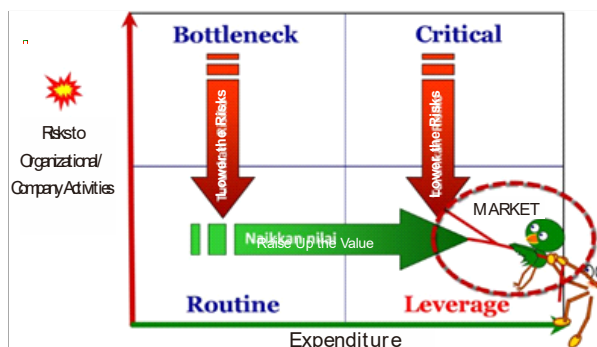


Figure 2. Illustration of SPM Quadrant and Consolidation Strategy (Zhenfeng et al., 2007)

2.4 Value for Money

Value for money (VFM) is a concept of public sector management that consisted of three main elements (3E) : economic, efficiency, and effectiveness. VFM is also an indicator that provides information whether the budget (funds) spent has produced a certain value or benefit. In general, the goal of VFM is providing the best balance between 3E in terms of achieving the best values (Jackson, 2012). The concept of VFM is measured from the optimal balance between inputs and outputs in the form of desired benefits. The benefits referred to in the VFM perspective consist of components of quality, quantity, time, price, location and source which also relevant to risk assessments, non-price attributes, and the corresponding total cost of ownership. Thus, VFM becomes one of the objectives among government procurements. Procurement consolidation is a strategy that optimizes all aspects and aims to achieve VFM in order to improve the procurement performance of an organization (Obura, 2020).

2.5 Analytical Hierarchy Process

Analytical Hierarchy Process (AHP) is a decision support model that break down complex multi-criteria problems into a hierarchy. Hierarchy determined a representation of a complex problem in a multi-level structure. The first level is the goal, followed by the level of factors, criteria, sub-criteria, and so on down to the last level of alternatives (Saaty, 2008). The AHP method has the ability to obtain the relative weights of the factors and can support alternatives based on these weights, also makes it possible to determine opinions within tangible qualitative criteria and real quantitative criteria (Badri, 2001; Torfi et al., 2010).

Expert Choice software, as AHP processing tools, helped to determine the decisions of the hierarchy structure and to solve problems based on relative measurements precisely (Saaty, 2008). Expert Choice supports collaborative decisions and the software systems facilitate more efficient, analytical and justified decision making. In addition, this tools also had advantages such as a more attractive interface, expert integrative opinions and unlimited level of the hierarchical structure (Erdogan et al., 2017).

3. Methods

This research was conducted in three hospitals included in the Joglosemar Central Vertical Hospital (There are Dr. Kariadi Semarang Public Hospital, Prof. Dr. Soeroyo Magelang Mental Hospital, and Dr. Soeradji Tirtonegoro Klaten Public Hospital). Respondents were Person in Charge (PIC) of the supplier selection process from procurement consolidation in each hospitals. Procurement performance assessment is carried out through questionnaires adapted from VFM Framework, which distributed to the Head of Procurement Services Unit (ULP) or the relevant Procurement Officer to determine the performance of the implementation of the procurement consolidation strategy.

There are 11 main criterias and 44 sub-criterias used in this study, that consisted of the components of procurement performance evaluation and assessment of supplier selection. The eleven main criteria for measuring

VFM were developed based on Presidential Decree No. 16 of 2018, LKPP Strategic Plan 2014-2019 and several previous research (Goggins, 2018; Obura, 2020; Carril and Duggan, 2020). The stage of the procurement consolidation activities -that was being assessed- were consisted of 3 points such as procurement planning, preparation of procurement of goods or services through suppliers and preparation of suppliers selection. In Figure 3 is the AHP hierarchical structure of the research variables with the VFM approach.

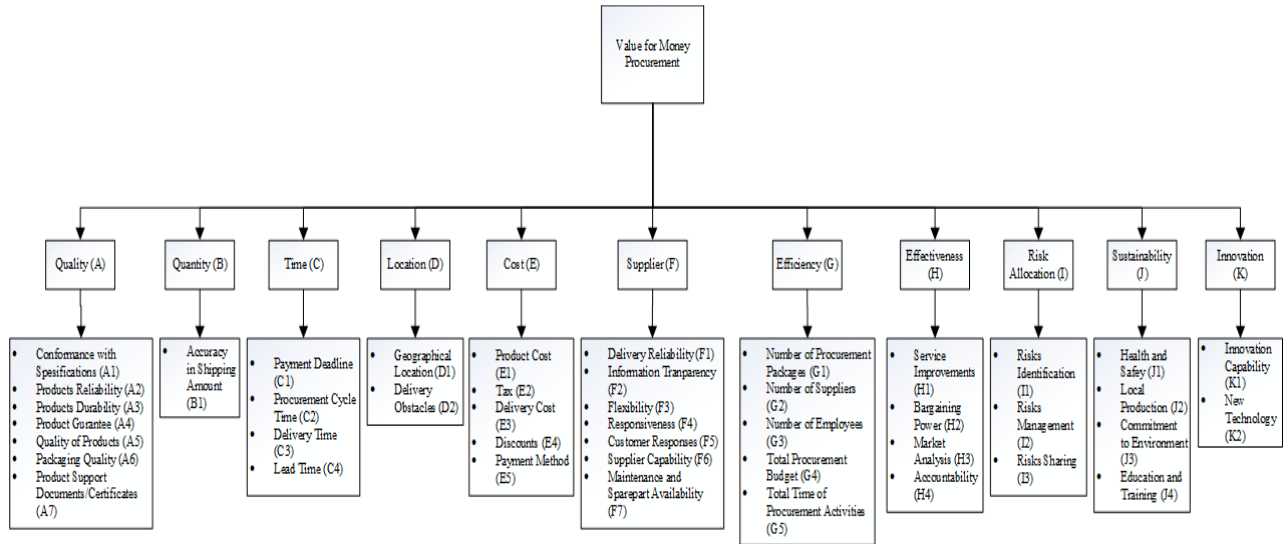


Figure 3. AHP Structure

The next stage is the weighting process of each criteria and sub-criteria that has been validated by the AHP method. In this event, pairwise comparisons are made between each of the main criteria and sub-criteria on the same main criteria. The results of the paired comparison questionnaire contain numbers 1-9 which indicate the importance of one element to other elements. If an element in the matrix has the same level of importance as the other elements, the comparison results are given number 1 (Saaty, 2008). Data that gathered from the paired comparison questionnaire results are being processed by Expert Choice software.

Then in the performance appraisal stage, the Method of Successive Interval (MSI) method is used to change the ordinal scale to an interval scale. Data will be used as input in data processing using the MSI method is the result of the procurement performance evaluation questionnaire. The data is ordinal data using 1-5 Likert scale, so the data obtained needs to be converted into interval data. In the MSI data processing process, researchers used the help of Additional Instrument (Add-Ins) found in Microsoft Excel software, which is the STAT97 menu.

To calculate the procurement performance index, it is obtained from the sum of the results of the procurement performance value after conversion multiplied by the global weight of each sub-criteria. After obtaining the value of the procurement performance using the VFM approach, the next step is to map the value of the procurement performance index into the government procurement performance index. The following are the categories of government procurement performance indexes (Wang et al, 2019) as in Table 1 follows.

Table 1. Categories of Government Procurement Performance Indexes

Index Value	Category
0 – 20 (Scale 1)	<i>Poor performance</i>
21 – 40 (Scale 2)	<i>Unsatisfactory performance</i>
41 – 60 (Scale 3)	<i>Average performance</i>
61 – 80 (Scale 4)	<i>Satisfactory performance</i>
81 – 100 (Scale 5)	<i>Good performance</i>

After obtaining the results of the procurement performance index, the next step is to analyze using the Importance Performance Analysis (IPA) method. The use of this method aims to determine the low performance value but has a high weight. Thus, it will be possible to choose decisions to maintain or improve the performance of the

implementation of the consolidation strategy in the procurement of goods or services at the Joglosemar Central Vertical Hospital.

4. Results and Discussion

4.1 Data Validation

In evaluating the performance of the implementation of the consolidation strategy in the procurement of goods or services using the VFM approach at the Joglosemar Vertical Hospital, validation of the research variables was carried out by distributing questionnaire 1 namely the questionnaire validation criteria and sub-criteria to experts in the field of goods or services procurement. In the questionnaire the experts were asked to provide an assessment of the suitability of each main criteria and sub-criteria with the VFM concept by providing a checklist (√) in the column provided. In addition, experts are also given the opportunity to discuss with other experts and are given the opportunity to add new main criteria or sub-criteria if necessary to be added. The experts who became respondents in validating the variables of this study were 5 (five), which are the PPK Support Team Dr. Kariadi Semarang Public Hospital, Head of ULP Prof. dr. Soerojo Magelang Mental Hospital, Head of the PPK Support Team Dr. Soeradji Tirtonegoro Klaten Public Hospital, Procurement Officer of the Magelang District Health Office and PPK of ULP Universitas Diponegoro.

The results of the assessment of the suitability of the 11 main criterias -quality, quantity, time, location, cost, supplier, efficiency, effectiveness, risk allocation, sustainability and innovation- are all in accordance with the VFM concept. As for measured sub-criteria, there are 4 sub-criterias which are not in accordance with the VFM concept. These sub-criterias are the payment deadline, payment method, the number of suppliers and the total procurement budget.

Based on interviews with experts related to the non-conformity of the four sub-criteria, for the elimination of the payment deadline and the payment method caused by the existing payment mechanism both in consolidated or not is the same. Which is can be carried out after the procurement process are completed or based on the terms agreed in the procurement contract. Thus, the two sub-criteria have no effect in evaluating the procurement consolidation performance. Then, for the elimination of the number of suppliers sub-criteria is caused by the various group of procurement items so that the number of suppliers in procurement on a consolidated basis adjust to the number of procurement item groups. While for the elimination of the total procurement budget relates to differences in the budget for procurement each year since the need for goods or services each year tend to be different both in terms of type and quantity.

4.2 Determining Weights of Criteria and Sub-Criteria

AHP method in this study is used to determine the weight of each of the main criteria and sub-criteria in evaluating the performance of the implementation of a consolidated strategy in the procurement of goods or services with the VFM concept approach at the Joglosemar Central Vertical Hospital. The data used as input in data processing using the AHP method is the result of questionnaire 2, namely the pairwise comparison questionnaire. In the pairwise comparison questionnaire each of the main criteria and sub-criteria on the same main criteria compared with each other. The first step in processing data using the AHP method is to distribute a paired comparison questionnaire to 5 predetermined respondents. The five respondents were selected based on their expertise in the field of procurement of goods or services. The results of the paired comparison questionnaire contain numbers 1-9 which indicate the importance of one element to other elements. After pairwise comparison data is obtained for each main criterion and sub-criteria, then the data is processed using Expert Choice software. In Figure 4 below is a weighting graph of the main criteria in evaluating the performance of the implementation of the consolidation strategy in the procurement of goods or services using the VFM approach at the Joglosemar Central Vertical Hospital calculated by the AHP method.

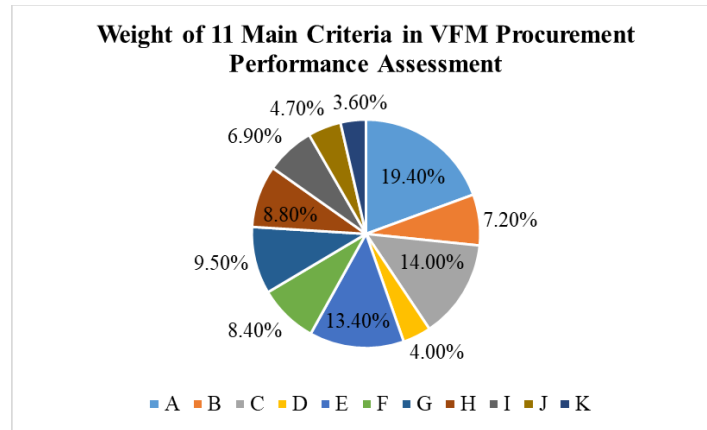


Figure 4. Weight of Main Criterias

The weight of the procurement performance appraisal is carried out on global sub-criteria assessment. Global weight is a comparison of the weights of one sub-criteria with other sub-criteria in each of the main criteria. Global weights are obtained by multiplying the weights of each main criteria by the weights of the sub-criteria in it. In evaluating the performance of the implementation of the consolidation strategy in the procurement of goods or services using the VFM approach, the sub-criteria that have the first and second largest weights are the conformity of specifications with a global weight of 7.682% and the accuracy in shipping amount with a global weight of 7,200%. This shows that in evaluating the procurement consolidation performance it is necessary to pay attention to the suitability of the specifications of the goods or services needed by each member of the consolidation and the accuracy of the amount of goods received.

According to stakeholder interviews, conformity of specifications is a matter that must be considered because each member of the consolidation has certain standards in supporting the quality of health services in their respective hospitals. Thus the need for discussion on equalizing the specifications of the goods or services which usually takes a long time. Furthermore, the reason for the accuracy in shipping amount becomes one of the things that must be considered. It happens because of the number of goods, both medical and non-medical goods, supports the continuity in health services. Thus if the number of goods received is equal to the number of goods ordered, the health service will continue without stopping due to out-of-stock problems. While the sub-criteria with the lowest weight are packaging quality with global weight of 0.563%. The overall graph of the global weights for procurement performance evaluation criterias are presented in Figure 5.

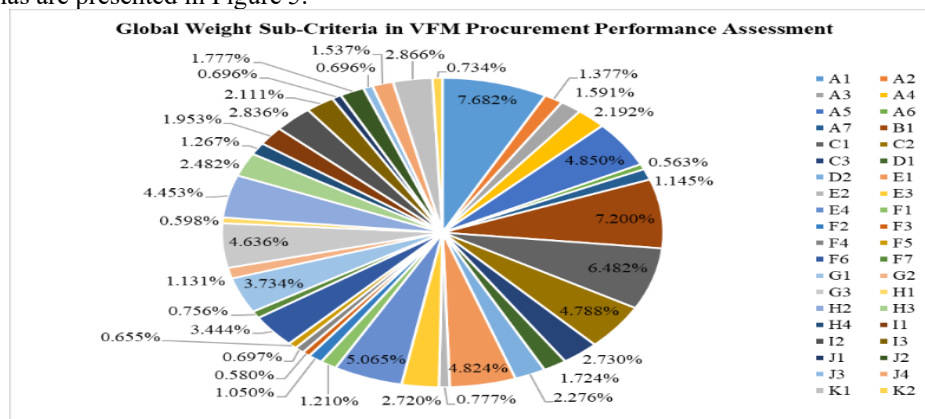


Figure 5. Global Weight Sub-Criteria

4.3 Assesment of Procurement Consolidation Performance

The procurement consolidation performance assessment is carried out by distributing questionnaire 3, namely the performance appraisal questionnaire to the Person in Charge (PIC) of suppliers selection in the consolidated procurement strategy conducted by Joglosemar Central Vertical Hospital. Performance assessment at this stage uses the Performance Rating method, which the rating uses a scale of 1-5 listed in the questionnaire. The purpose of this questionnaire is to find out the real condition of the implementation of the consolidation strategy in the procurement

of goods or services at the Joglosemar Central Vertical Hospital in an effort to fulfill the VFM of procurement. The questionnaire was filled in by 3 (three) respondents, which are the PPK Support Team Dr. Kariadi Semarang Public Hospital as respondent 1, Head of ULP Prof. dr. Soerojo Magelang Mental Hospital as respondent 2 and Head of the PPK Support Team Dr. Soeradji Tirtonegoro Klaten Public Hospital as respondent 3. From the results of the questionnaire that has been obtained, the initial data processing is then changed the rating scale from the ordinal scale to the interval scale. It is intended that the data obtained can be continued to the next processing stage. Changing the scale uses the MSI (Method of Successive Interval) method (Gunarto, 2017).

Procurement performance index calculation is done by multiplying the global weight of each sub-criteria with the converted results of the procurement performance evaluation. The procurement performance index calculation is done to determine the actual condition of the implementation of the goods or services procurement consolidation strategy in an effort to achieve VFM procurement. In the Table 2 is shown each index of the main criterias.

Table 2. Joglosemar Procurement Consolidation Performance Index

No	Main Criteria	Score
1	Quality	13,743
2	Quantity	5,301
3	Time	6,249
4	Location	1,330
5	Cost	9,263
6	Supplier	4,885
7	Efficiency	6,266
8	Effectiveness	5,844
9	Risk Allocation	4,277
10	Sustainability	2,556
11	Innovation	2,231
Total		61,945

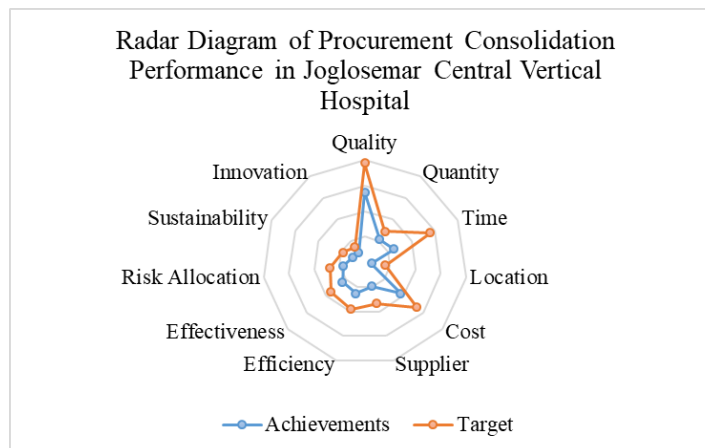


Figure 6. Joglosemar Procurement Consolidation Radar Diagram

The results of the performance evaluation of the implementation of the consolidation strategy in the procurement of goods or services at the Joglosemar Central Vertical Hospital are presented in Table 2 and Figure 6. The radar diagram shows the achievement index of the eleven main criterias for evaluating the performance of the consolidation strategy in the procurement process. Based on the calculation results of the procurement performance index at the Joglosemar Central Vertical Hospital obtained an index value of 61,945. Based on table 1 the value is in the category of "satisfactory performance" in the performance of government procurement in achieving VFM.

4.4 Importance Performance Matrix

The Importance Performance Analysis (IPA) method in this study is used to analyze recommendations from evaluating the performance of the implementation of the consolidation strategy in the procurement process. Based on what is presented in Figure 7, the matrix shows the relationship between global sub-criterion importance weights and performance index values per sub-criteria. The matrix called the Importance Performance Matrix is consists of 4 quadrants namely quadrant I top priority, quadrant II maintain performance, quadrant III low priority and quadrant IV excessive. Presentation into the matrix aims to provide ease of analyzing the improvement of the performance assesment index. In connection with the results of the procurement performance index value, to improve the performance of the implementation of the consolidation strategy in the procurement process, it is necessary to improve the performance of each sub-criteria. The sub-criteria that need attention are the sub-criteria that have a high weight but get a low performance value. This is indicated by the inclusion of sub-criteria into quadrant I, which is the first priority.

In quadrant I, the first priority, the result that there are still 3 sub-criteria which are classified as having high weight but having low performance value. Thus, the three sub-criteria are the top priority for performance improvement. These sub-criteria are all contained in the main criteria of time, which are the procurement cycle time (C1) with a value of 3.599 and a weight of 0.06482; delivery time (C2) with a value of 1,828 and a weight of 0.04788; and lead time (C3) with a value of 0.822 and a weight of 0.02730.

According to the respondents, giving a low score for the main criteria of time is due to the on of consolidation process which is to uniform the specifications of the goods or services needed from each work unit requires quite a long time. The process of collecting files such as the General Procurement Plan (RUP), the list of needs and HPS (Self Estimated Price), the draft contract and the Terms of Reference (KAK) of each consolidation member also requires time

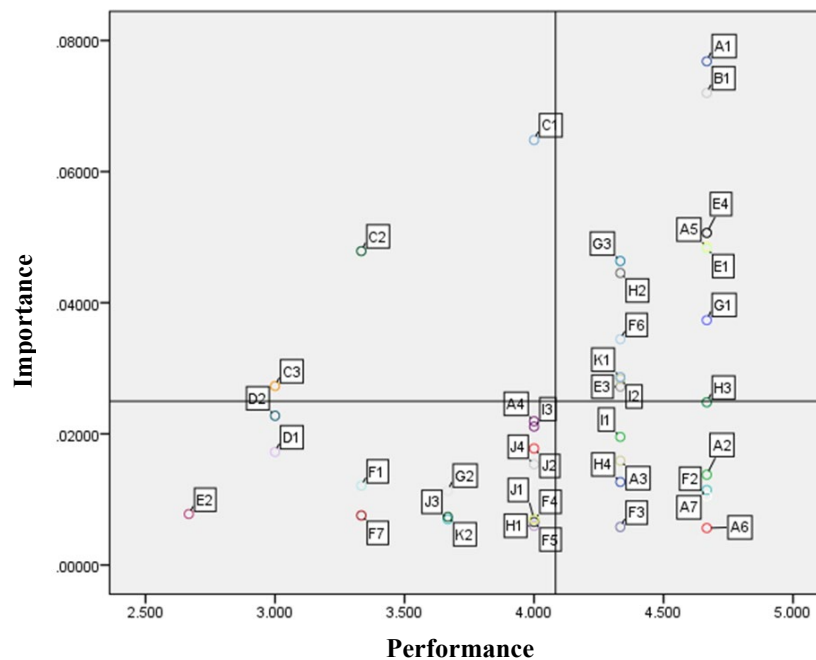


Figure 7. Importance Performance Matrix of Consolidation Procurement Assesment

5. Conclusion

From the calculation using the AHP method on the main criteria and sub-criteria in evaluating the performance of the consolidation strategy in the procurement process based on the VFM approach, it is found that the important priorities are ranked based on the biggest weights. There are quality (19.4%), time (14.0%), costs (13.4%), efficiency (9.50%), effectiveness (8.80%), provider or supplier (8.40%), quantity (7.20%), risk allocation (6.90%), sustainability (4.70%), location (4.00%), and innovation (3.60%). Moreover, the sub criteria that have the first and second largest weights are the conformance of the specifications and the accuracy in shipping amount, consecutively. While the sub criteria with the lowest weight are the quality of the packaging. Previous researches also stated that quality and cost were the top-two priorities in procurement consolidation (Kim & Netessine, 2013; Wang et al., 2019; Obura, 2020).

The performance index value of the implementation of the consolidation strategy in the procurement process at the Joglosemar Central Vertical Hospital in achieving VFM procurement is **61,945**. Based on the category of government procurement performance indexes and assessments that have been carried out, the status of consolidated procurement performance at Joglosemar's Vertical Hospital is satisfying. There are 3 sub-criterias that have high weights and low performance values (quadrant I the top priority in the Importance Performance Matrix), which also need to be attentioned. These sub-criterias are procurement cycle time, delivery time, and lead time, where the three sub-criteria are including in the main criteria of time (14%).

Based on the results, this research also recommends to form a joint commitment between stakeholders to achieve a successful procurement consolidation process and minimize personal or group conflict of interests in the process of consolidation. For implementing real time information in procurement consolidation activities, consolidated member can utilize information technology and internet of things therefore miscommunication will be avoided. Sharpening the market analysis is also important to do to see the location of the supplier so as to minimize the risk of late delivery of goods or services.

References

- Asakeya G. K. (2014). *Impact of Procurement Planning within Ghana Health Services: A Study of Ridge Hospital in Accra*. Kumasi: Kwame Nkrumah University of Science and Technology.
- Badorf, F., Wagner, S. M., Hoberg, K., & Papier, F. (2019). How supplier economies of scale drive supplier selection decisions. *Journal of Supply Chain Management*, 55(3), 45-67.
- Badri, M. (2001). A Combined AHP-GP Model for Quality Control Systems. *International Journal Production Economics*, 72, 27-40.
- Bailey, P. (2015). *Procurement, Principles & Management* (11th edition). Pearson Education Limited.
- Bakker, E., Walker, H., Schotanus, F., & Harland, C. (2008). Choosing an Organisational Form: The Case of Collaborative Procurement Initiatives. *International Journal of Procurement Management*, 1 (3), 297-317.
- Carril, R., & Duggan, M. (2020). The impact of industry consolidation on government procurement: Evidence from department of defense contracting. *Journal of Public Economics*, 184, 104141.
- Erdogan, S. A., Šaparauskas, J., & Turskis, Z. (2017). Decision making in construction management: AHP and expert choice approach. *Procedia engineering*, 172, 270-276.
- Essig, M. (2000). Purchasing Consortia as Symbiotic Relationships: Developing the Concept of "Consortium Sourcing". *European Journal of Purchasing and Supply Management*. 6, 13-22.
- Gelderman, C., & Van Weele, A. J. (2005). Purchasing Portfolio Models: A Critique and Update. *The Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, 19 - 28.
- Gunarto, M. (2017). Tranformasi Data Ordinal ke Interval dengan *Method Of Successive Interval* (MSI). *Researchgate*, 1-8.
- Goggins, G. (2018). Developing a sustainable food strategy for large organizations: The importance of context in shaping procurement and consumption practices. *Business Strategy and the Environment*, 27(7), 838-848.
- Heuninckx, B. (2008). A Primer to Collaborative Defence Procurement in Europe: Troubles, Achievements and Prospects. *Public Procurement Law Review*, 17(3), 123-145.
- Huxham, C., Vangen, S., & Eden, C. (2000). The Challenge of Collaborative Governance. *Public Management: An International Journal of Research and Theory*, 2(3), 337-358.
- Indriani, E., Larasati, E. & Lestari, H. (2014). Analisis Kepuasan Atas Kualitas Pelayanan Kesehatan di Rumah Sakit Umum Daerah (RSUD) Kota Semarang. *Journal of Public Policy and Management Review*, 4 (3), 555-568.
- Jackson, P. (2012). *Value for Money and International Development: Deconstructing Myths to Promote a More Constructive Discussion*. Paris: OECD Publishing.
- Jing, S., Hou, K., Yan, J., Ho, Z. P., & Han, L. (2020). Investigating the effect of value stream mapping on procurement effectiveness: a case study. *Journal of Intelligent Manufacturing*, 1-12.
- Jost, G., Dawson, M., & Shaw, D. (2005). Private Sector Consortia Working for a Public Sector Client—Factors that Build Successful Relationships: Lessons from the UK. *European Management Journal*, 23(3), 336-350.
- Kahlenberg, C. A., Nwachukwu, B. U., McLawhorn, A. S., Cross, M. B., Cornell, C. N., & Padgett, D. E. (2018). Patient satisfaction after total knee replacement: a systematic review. *HSS Journal®*, 14(2), 192-201.
- Kim, S.H. dan Netessine, S. (2013). Collaborative Cost Reduction and Component Procurement Under Information Asymmetry. *Management Science*, 59(1), 189-206.

- Listiyanto, A. (2012). Pembaharuan Regulasi Pengadaan Barang dan Jasa Pemerintah. *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, 1(1), 113-133.
- Loader, K. (2010). Is Local Authority Procurement Lean? An Exploration to Determine If Lean Can Provide a Useful Explanation Practice. *Journal of Purchasing and Supply Management*, 16(1), 41-50.
- Meehan, J., Ludbrook, M. N., & Mason, C. J. (2016). Collaborative public procurement: Institutional explanations of legitimised resistance. *Journal of Purchasing and Supply Management*, 22(3), 160-170..
- Murray, J. G. (2009). Public Procurement Strategy For Accelerating The Economic Recovery. *Supply Chain Management*, 14 (6), 429-434.
- Obura, C. O. (2020). Procurement planning: The principle of sound balance between procurement control and achieving value for money. *International Academic Journal of Procurement and Supply Chain Management*, 3(2), 19-27.
- Saad, S.M., Kunhu, N., Mohamed, A.M. (2016). A Fuzzy-AHP Multi-Criteria Decision Making Model For Procurement Process. *Int. J. Logist. Syst. Manag.*, 23, 1-24.
- Saaty T.L. (2008). Decision Making with the Analytic Hierarchy Process. *International Journal Services Sciences*, 1(1), 83-98.
- Schiele, H. (2007). Supply Management Maturity, Cost Savings, and Purchasing Absorptive Capacity: Testing The Procurement-Performance Link. *Journal of Purchasing & Supply Management*, 13(4), 274-293.
- Schotanus, F., & Telgen, J. (2007). Developing a Typology of Organisational Forms of Cooperative Purchasing. *Journal of Purchasing and Supply Management*. 13(1), 53-68.
- Setiawan, A. (2016). *Analisis Mutu Pelayanan Pasien Rawat Inap Berdasarkan Metode IPA (Importance, Performance Dan Analysis) di Rumah Sakit Umum Daerah Sukoharjo*. Surakarta: Universitas Muhammadiyah Surakarta.
- Sondari, A. (2015). *Analisis Kepuasan Pasien Rawat Jalan Peserta Jaminan Kesehatan Nasional (JKN) Di Rumah Sakit Umum Daerah (RSUD) Kabupaten Brebes Tahun 2015*. Semarang: Universitas Negeri Semarang.
- Suliantoro, H., & Ririh, K. R. (2019). Enhancing Usage Behavior of E-Procurement Through Organizational Values. *Jurnal Ilmiah Teknik Industri*, 18(1), 8-16.
- Torabi, S. A., Shokr, I., Tofighi, S., & Heydari, J. (2018). Integrated relief pre-positioning and procurement planning in humanitarian supply chains. *Transportation Research Part E: Logistics and Transportation Review*, 113, 123-146.
- Torfi, F., Farahani, R.Z., & Rezapour, S. (2010). Fuzzy AHP to determine the relative weights of evaluation criteria and Fuzzy TOPSIS to rank the alternatives. *Applied Soft Computing*. 10, 520-528.
- Vaillancourt, A. (2017). Procurement consolidation in humanitarian supply chains: a case study. *International Journal of Procurement Management*, 10(2), 178-193.
- Wang, N., Chen, X., & Wu, G. (2019). Public private partnerships, a value for money solution for clean coal district heating operations. *Sustainability*, 11(8), 2386.
- Yukins, C. R., & Schooner, S. L. (2006). Incrementalism: Eroding the Impediments to a Global Public Procurement Market. *Geo. J. Int'l L.*, 38, 529.
- Zhenfeng, Z., Danxia, G., & Liuming, D. (2007). Positioning model of purchasing based on Kraljic's purchasing portfolio matrix and factor analysis. *Globalization Challenge and Management Transformation*, 289(8).

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Biographies

Hery Suliantoro is a Senior Lecturer at the Department of Industrial Engineering, Engineering Faculty, Diponegoro University. He received his PhD in Management Science, Faculty of Economics and Business from Diponegoro University, Indonesia. He has taught a variety of courses in organizational management and supply chain management at undergraduate and postgraduate levels. His research interests focus primarily in the field of supply chain and procurement with a particular focus on public procurement. Specific topics include adoption technology, innovative process and government policy in public procurement. He also has actively taught a variety of short courses in public procurement as an expert trainer and senior consultant.

Kirana Rukmayuninda Ririh is a researcher at the Research Center for Policy and Management of Science, Technology and Innovation – Indonesian Institute of Sciences. Her research interest is in industrial management; with special preference to innovation management, project management, and entrepreneurship. Now she dedicates herself in broader research topics such as science, technology and innovation (STI) management, incubation practices, and technology transfer. She is also the member of The Institution of Engineers Indonesia and Indonesian Researcher Union. She has conducted several consulting projects, for example in Telkom Infra Indonesia and Directorate General of Construction Development. She actively involved in many joint research projects both national and international such as with Georgia Tech and Glasgow Caledonian University.

Sultan Arunizal is a fresh graduate as Bachelor of Industrial Engineering from Diponegoro University with specialty in Supply Chain Management and Human Resources Management. He has some organizational and event management experiences which allow him to develop his leadership and teamwork ability. He is confident, a person with commitment, eager to learn, capable to work under pressure and focus. He has interest in Automotive, Energy, and FMCG Industries.