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Application of Lean Thinking Development: Case Study over *Badan Pendapatan Daerah* (BAPENDA), South Tangerang Based on Lean Government

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Lean thinking is used to analyse manufacturing sector namely lean manufacturing over industrial process. In addition, the development lean thinking over government sector is a right choices to improve quality of government service. Thus, this aimed to test the Lean Government algorithm with Define, Measure, Analysis, Improve, and Control (DMAIC) and Lean Consumption Map (LCM) method over government service. By using comparison completion time over building tax object and registration file document at *Badan Pendapatan Daerah* (BAPENDA) South Tangerang. The result showed, Lean Government algorithm was successful to assess comparison method with Time Series Plot, Value Added Assessment, and Lean Consumption Map. In this study, we use qualitative research methods and interview with internal and external correspondence, respectively. We found that the DMAIC application and Lean Consumption Map inside the Lean Government algorithm will be improve the time of settlement document and service process over BAPENDA South Tangerang.

Keywords: Lean Thinking, Lean Government, Lean Six Sigma, Lean Consumption Map, and DMAIC.

1. INTRODUCTION

Definition of public services in accordance with Law regulation in Republic of Indonesia No. 25, 2009 is concern in the public services with explained that the public services must be fulfilled for Indonesian citizen and resident at administrative goods, services or services provided by public service providers. Meanwhile, the Minister of Administrative Reform No. 63, 2003 suppose to public service must be carried out by government agencies in central and regional levels to implementing the regulations [1]. The minimum standard of public service includes speed, accuracy, accuracy, cheap and friendly. Here, public service has three important elements namely organization/central government/ regional government.

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Furthermore, the second part is recipient of services and the third is satisfaction given and / or received by the recipient of the service [2]. In accordance with global competitiveness ranking of Asian countries issued by World Economic Forum (WEF) over 2016 to 2017, Indonesia is having 41st position from 138 countries. In this report, we have 16 problems to determine Indonesia ranking over WEF [3]. The problem is inefficient of government bureaucracy, insufficient supply and infrastructure also difficult access to finance and etc. Based on government problem, the ombudsman report in 2017 shows the city and district ranking of in providing services to the public has decreased especially over South Tangerang, West Java, Indonesia compared to 2016 [4]. Furthermore, to improve public service in South Tangerang, West Java the several methods propose Lean

Thinking application [5]. Many researchers have been studied to improve the process of public service by combining techniques Lean and Six Sigma [6]. This method, was proposed to organization and continuously improve value added to the waste (Waste to Value Ratio). The Waste Value Ratio of companies in Japan was around 50%. The Toyota company is around 57%, the best companies in the United States and Canada are around 30% where the best companies in Indonesia are still at 10% [7]. A company has been considered of Lean minimum Value to Waste Ratio has reached 30%. Based on observations and measurements using Lean Consumption Map, the Value to Waste Ratio in the service process for registering the New building Tax Object is 17% and 10% from Customer and Provider side, respectively. The appropriate of Lean Government as a method to improve the public service. Based on previous study, in the new process over building in the BAPENDA South Tangerang we found level of completion in new taxpayer decreased to 30% from January to September 2017. Thus, we use lean thinking application to improve public service over BAPENDA, South Tangerang, West Java, Indonesia in near future.

2. METHODOLOGY

2.1 Data and Location

In order to achieve the result, we registering the new building Tax Object at BAPENDA, South Tangerang based on qualitative research. Here, the data observation obtained from internal and external interviews also documents records or reports. The qualitative research is inductive due to use empirical data such as document record, interpret and report also draw the conclusions from investigation process [8]. This research is conducted to improve service quality to deep understand about the problems in community service. Based on information from correspondence, we measure service quality to improve performance service process. In this case, we use service process from service user community. Thus, we try to compare of size service quality at Current State (2016) with Future State (2017). Here, the investigation is beginning from determining of appropriate problem to developed research propositions (by applying guiding action based on supporting theory). Thus, we can get the result and can be applied over subsequent recommendations [9]. Thus, the determination from correspondence was selected to assess community service users and service providers to conduct a new observations and interview over building tax process. The registration service at BAPENDA South Tangerang, West Java, Indonesia based on viewpoint from service user community. The data sampling is carried out from June to September 2017. In order to achieve the result, the data collection is focused on identifying service processes. Here, service process time is used as a supporting data. However, we obtain the data observations from BAPENDA office in service hours or work hours (09.00 to 14.00 Indonesian local time). The internal and external correspondence are selected on non-probability basis namely the sampling data technique with certain considerations and carried out several times to avoid bias (see Figure 1).

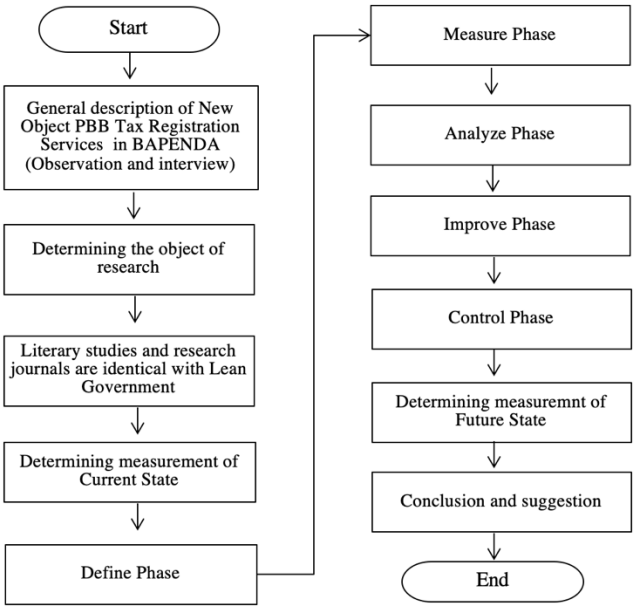


Figure 1. Flowchart research design over BAPENDA South Tangerang, West Java in January to September 2017

2.2 Operational Define, Measure, Analysis, Improve, and Control (DMAIC)

The define step is used to determine of implementation process and based Time Series and Supplier, Input, Process, Output and Customer (SIPOC) method. After the define method, we measure the problem by understanding process with help of Process Map, Cross Functional Flowchart, Flow Chart, Lean Consumption Map (LCM), Value Added Assessment (VAS). In next step, the analysis of validation and determines is directly have an impact inside focused of the problem to calculate failure rate. Thus, to improve failure rate, we determine proposed improvements for each root by potential testing LCM, VAS and Time Series Plot. The final step, is control the stage to determine steps from public service improvement with continuously maintained and consistently with SOP tools, Change Management Plan, and Out of Control Action Plan (OCAP). Based on multiple tools to assess public service, we suggest develop lean thinking over BAPENDA South Tangerang especially for building tax case study. Thus, the DMAIC mechanism need internal and external correspondence to see the comparison service over customer and provider side.

3. RESULT AND DISCUSSION

In this study, we use file completion time 30 days observation based secondary data in January to September 2017. Here, all the data obtained from average completion time is 56 days with average service performance on service outcomes where the realization reached 30% only (see Figure 2).

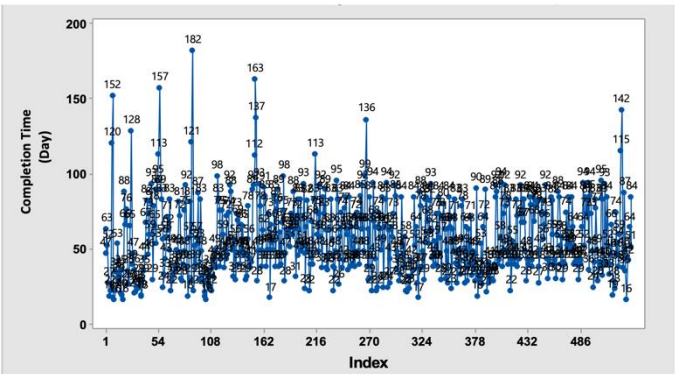


Figure 2. Realization of the New Tax Object (Building tax) Registration File over BAPENDA South Tangerang, West Java in January to September 2017

As can be seen in Figure 2, we found the completion time (daily) more than 100 days or equal 3.6 month. Here, we cannot expect that the customer must be waiting until 3.6 month to collect tax document. Based on waiting time from customer, we suppose SIPOC diagram to determine the boundaries and parties involved public service improvement program. Here, we use time series plot and SIPOC tools to get a good understanding of projects will be done. The building a new Tax Object Registration Service gave similar opinions to all teams related implemented project. The current conditions will be addressed and involved in the project. Thus, the time series plot and SIPOC tools are used as a reference in Define stage over DMAIC inside Lean Government method (see Figure 3).

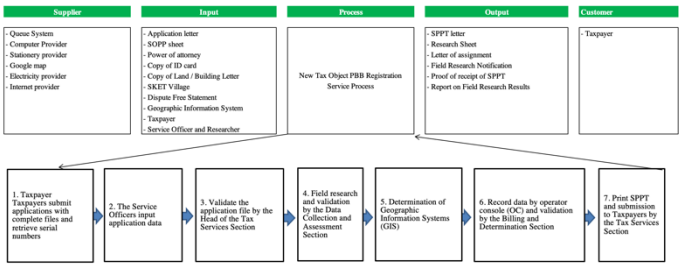


Figure 3. SIPOC block diagram in BAPENDA, South Tangerang over January to September 2017

As can be seen in Figure 3, the SIPOC diagram is used Lean Consumption Map to assess processing time of building tax document. Here, we obtain several activities need extra processing time to achieve tax document service over BAPENDA, South Tangerang. Provider need 2420 minutes of activities in Section Heads to Agency Heads while 1532 minutes for Data Collection and Assessment Officers with 594 minutes for correction Data Collection. In addition, we obtain processing time over customer side need 510 and 600 minutes to consultation provide by BAPENDA staff and Field Research, respectively. Here, indicates that the imbalance time between customer and provider activities. Thus, we need a potential bottle-neck to complete the document registration of building tax (see Figure 4).

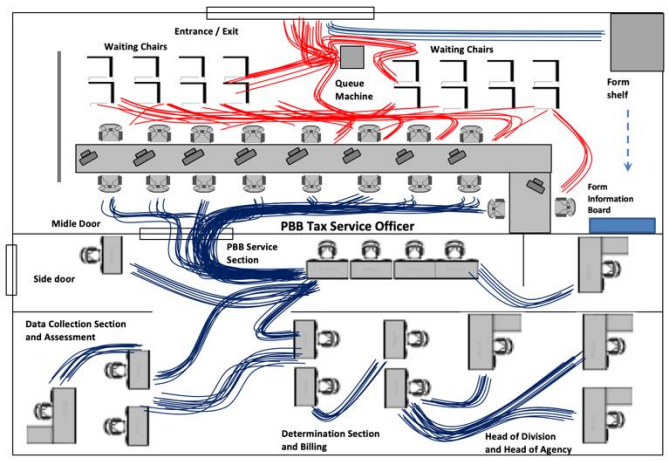
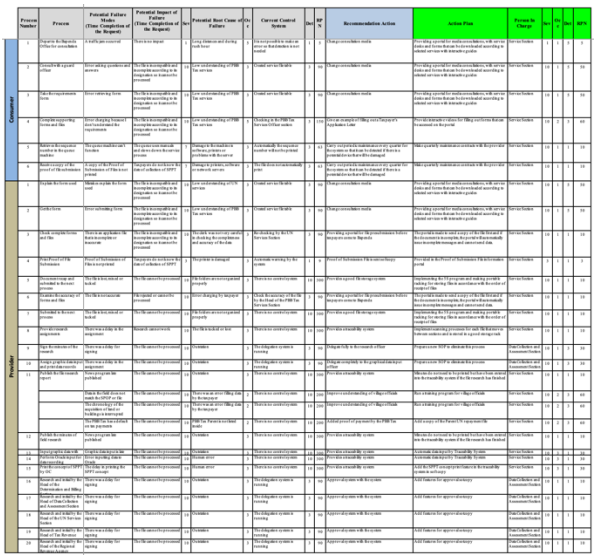


Figure 4. Flow Mapping of Building Tax Registration over BAPENDA South Tangerang, West Java in January to September 2017

As can be seen in Figure 4, the flow diagram has intersection points in the document tax service. Here, the intersection points inside flow diagram is a great potential for documents management to mix with document checks. Thus, we suggested to use Failure Mode Effect and Analysis (FMEA) technique for analyzing failure rate. Based on Research Desk (conducted by case study), FMEA method have several advantages to compared by Effect Diagrams. The advantages will be explained over five points as follows: First, the advantages obtained by FMEA is potential failures that have Effect Diagram only (discussed based failure rate). Second, the advantage of FMEA can be presented in the form with one table in Effect Diagram only. Third, the advantage FMEA is uses a rating approach to seen Severity (the level of serious impact), level of occurrence and Detection from 1 to 10 rating with RPN (Risk Priority Number) value. Fourth, the advantages of FMEA is explained to reduce RPN. Fifth, FMEA able to provide an overview of future risks after corrective actions. Furthermore, based on advantages of FMEA, we obtain 6 processes (see Table 1) over Customer side and 22 processes by Provider sides. The proposed improvements is summarized into 14 points in proposals over several process in Customer and Provider side.

Table I. Twenty Process of FMEA in document Tax over Object Registration in BAPENDA South Tangerang, West Java



Furthermore, the total number of proposed improvements is reached 14 point with Impact and Effort Matrix to determine terms of business. Here, we use Zone IV theory to reduce processing service. The first priority is Zone I then Zone II as a medium term and followed by Zone III as long term. The Impact and Effort Matrix diagram after use Zone IV method we can Value Added throughout the running process from both side (Customer and Provider) in BAPENDA, South Tangerang (see Figure 5).

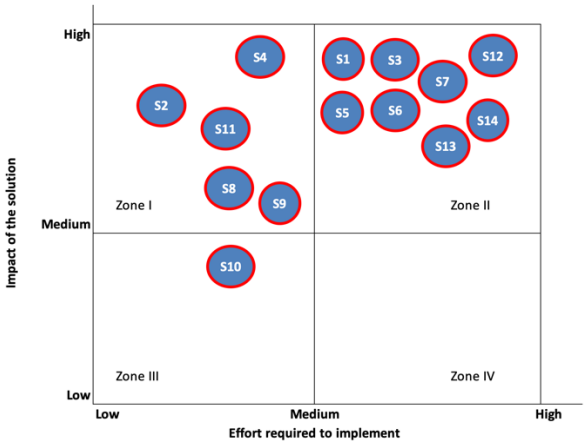


Figure 5. Impact and Effort Matrix of document Tax Registration over BAPENDA South Tangerang, West Java in January to September 2017

As can be seen in Figure 5, we proposed three zone to reduce processing time. This zone is representative the activity process over BAPENDA, South Tangerang to manage a new document tax (building tax). Here, the estimation of reducing time process can be carried out to obtain Value Added Assessment (VAS).

All parameter over data simulation is displayed based on observations by interviewed activity over internal correspondence. However, a service improvements overview will be obtained before proposed activities at BAPENDA, South Tangerang (see Figure 6).

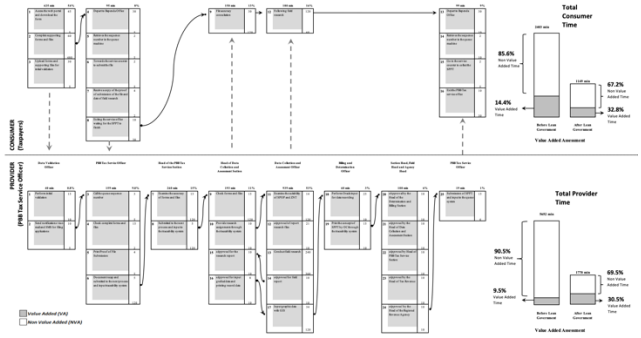


Figure 6. Lean Consumption Map After Lean Government over BAPENDA South Tangerang, West Java in January to September 2017

Figure 6 shows, the Customer have total improvement reached 1254 minutes or equal to 52% while the proportion of Value-Added Time increased 14.4% to 32.8% with initial Non-Value-Added Time decreased 85.6% to 67.2%. Furthermore, Provider total improvement around 3882 minutes or equivalent to 69%. Here, the proportion of Value-Added Time increased 9.5% to 30.5% while the initial Non-Value-Added Time was decreased (90.5% to 69.5%). Based calculation result, we obtain positive improvements over service process from Customer and Provider side, respectively. Thus, we obtained the Value to Waste Ratio is increased from 14% to 46% which is indicates that the improved service process can be improved to Lean class. The average management document file has been reduced in 16 days (from 56 days to 20 days). It's a look better than the target in the Define stage over DMAIC process (see Figure 7).

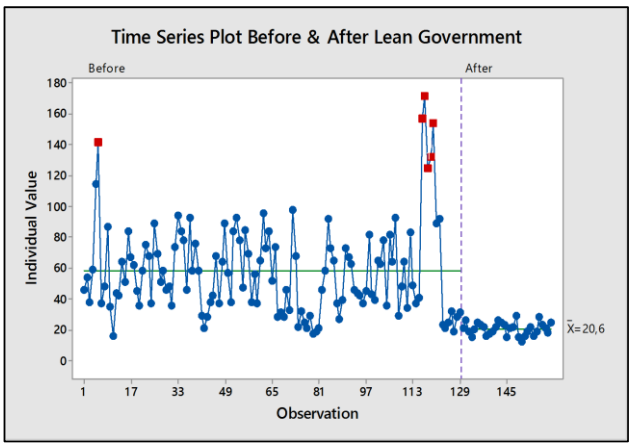


Figure 7. Before and After File Completion Time Lean Government

As can be seen in Figure 7, we found 12 service activity included random and derived trends from normal distribution. Here, the processed time of service activity has been decreased around 64%. The purpose of service activity Control to obtain solution and ensure by new standards. Thus, we suggest to develop a new Standard Operating Procedure (SOP) to reduce management building tax document with change management and Out of Control Action Plan (OCAP). After SOP upgrading to improve management building tax document, we the Change Management rule to Lean Government concept from all employees' levels to support culture over organization (BAPENDA, South Tangerang). Furthermore, OCAP method is used to implemented and to maintain the consistency of improvement achievement results. If the OCAP failures, we can switch in new process to achieve the service improvement. The Various possibilities for new failures should be discussed with the entire team to look customer response over BAPENDA. Based on OCAP results and discussion, there needs to implement Lean Government in BAPENDA structure of organizations. We proposed the three steps such as starting a Lean Government program, managing a Lean Government program, and maintaining the continuity of the Lean Government program. The advantages of Lean Government Program are implemented in stages to provide time and opportunity for all layers inside BAPENDA organization as a new culture of in the office. The understanding to get a new result must be requiring time for each member team to fully accept. The most vulnerable requiring level is first and fourth level which is have a huge impact on the success of the Lean Government program (see Table 2).

Table II. Waste to Value Ratio After Lean Government in BAPENDA South Tangerang, West Java

		Customer (Consumption Time)	Provider (Provision Time)
Total Time	(a)	1149	1770
Value Added	(b)	377	539
Non value Added	(c)	772	1231
% VA	= (b) / (a) * 100%	32.8%	30.5%
% NVA	= (c) / (a) * 100%	67.2%	69.5%
Value to Waste Ratio	= (b) / (c) * 100%	49%	44%

As can be seen in Table II, the fourth stage of each government agency its own criteria for selecting and improve the project. The Lean Government activity, is focuses on processes the biggest problem in internal or external government agency. The problems can include delayed of work, document process, complaints, funding, and bad performance. To consider enhancing projects with staff improvement, the stakeholder must be concerns or alleviate budgetary pressures. The strategic approach to selecting projects is improved with Lean Government activities which are seen in terms of limited budgets, unfinished funding problems, critical levels of achieving the government's mission, public complaints and productivity problems. The managing Lean Government program is consisting of three stages such as program planning, program implementation, and program follow-up. Thus, after an was successfully followed a Lean Government concept, the strategically about how to maintain improvements and spread of spirit Lean Government throughout the organization has been implemented. Here, we obtain four models to implementing Lean Government in organizations as along as with specific steps to maintain, and disseminate Lean Government activities. In order to achieve four model, we suggest to deploy lean government program over Figure 8 (Block diagram Lean Government Program).

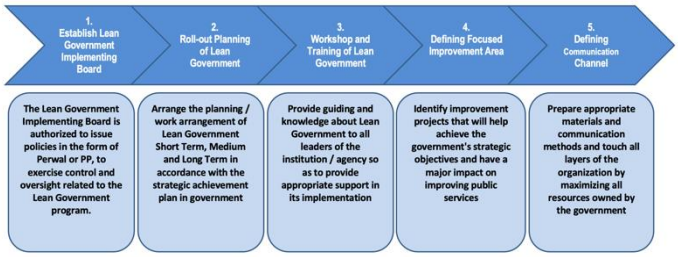


Figure 8. Block Diagram How to deploy Lean Government Program

As can be seen in Figure 8, the Lean Government Program is implemented in stages to provide time and opportunity for all layers of the organization to understand and accept Lean Government as a new culture to work. That understanding to get new results must be in a new way, the requiring time for each team member to fully accept. The most vulnerable stages are in the first and fourth stages which will have a huge impact on the success of the Lean Government program (see Figure 9).

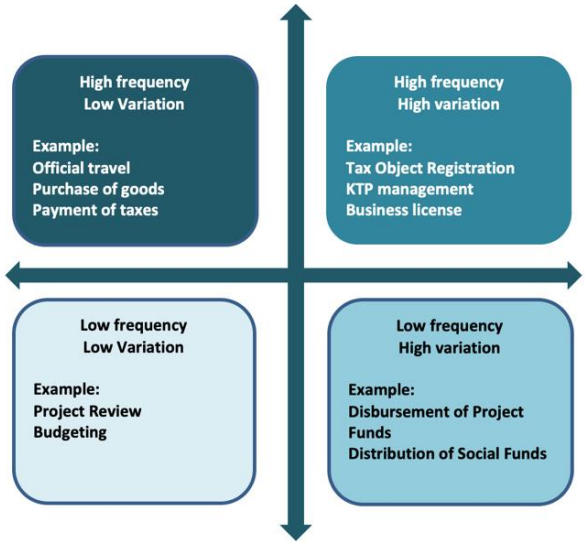


Figure 9. The Selection Steps of Lean Government Projects

Furthermore, as shown Figure 8 and 9 each government agency its own criteria for selecting an improvement project for a Lean Government activity, in the general every organization is focused over Lean Government activities in management processes that have the biggest problem over internally or externally aspect. There is a more strategic approach to selecting projects that will be improved with Lean Government activities which are seen in terms of limited budgets, unfinished funding problems, critical levels of achieving the government's mission, many public complaints and employees, productivity problems, backlogs and the number of pending jobs, administrative barriers and file delays, the existence of the head of the project team, availability of resources and employees and the type of process (frequency and variation). The running and managing the Lean Government program consists of three stages, namely program planning, program implementation and program follow-up. The first stage of program planning, which is over this stage is ensures that the Lean Government program is well planned in terms of its scope and human resources. From selecting teams to Lean Government improvement projects, forms of communication and project preparation are very important for the smooth running of the Lean Government project. The team will have a project sponsor, project leader, project supervisor and project team members. Each has a role and task in accordance with its portion (see Table III).

Table III. List of Problem Based on Project Duration and scope in BAPENDA South Tangerang, West Java

Nature of problem	Lean Government Level	Project Duration
Low (Basic task, 1 cell)	White Belt	0 - 1 month
Medium (Sub process – Process within 1 function)	Yellow Belt	1 - 2 months
High (Macro process – cross function)	Green Belt/	2 - 4 months
High (Macro process – End to End)	Black Belt	4 - 6 months

Table III shows the project duration and scope in BAPENDA South Tangerang, West Java is taking a long time to fix it. Thus, to improve the project duration we obtain second stage to implemented namely Lean Government activity. Here, this method is a journey that requires facilitation and guidance as well as hard work from a team that is highly committed. The project advisors are people who have theoretical knowledge and sufficient experience of Lean Government method . It can be taken from outside consultants due to internal organization has been changed. Thus, the several levels of DMAIC certification namely White Belt (base), Yellow Belt (medium level), Green Belt (continued level), Black Belt (advanced level), and Master Black Belt (expert) has been used in this study. This level is arranged based on level of difficulty and complexity of the problems with unique level. Every time over Lean Government program is a completes DMAIC stage and needs to evaluated by the project supervisor to ensure assistive devices by Lean Government project team is carried out to appropriately the Toll Gate Review (see Figure 10).

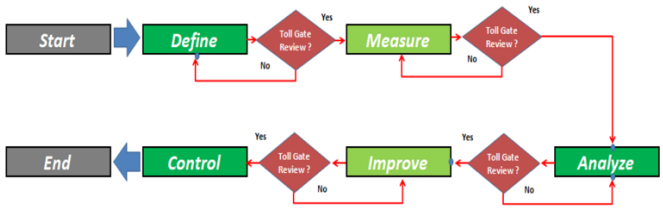


Figure 9. Review in the DMAIC Cycle based Lean Government Projects

Figure 9 shows the supporting compilation in second level need to follow-up after Lean Government project ends with effective follow-up is very important to complete in remaining or handed over action items over working team is being to processed, prevent setbacks, and maintain a focus-based improvement team continuously. The implementation in Lean Government model has presented in Figure 10.

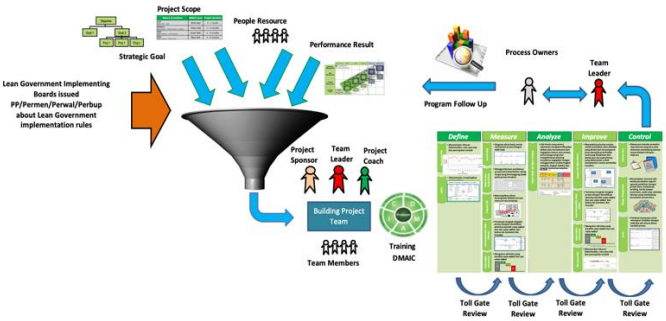


Figure 10. Implementation model Lean Government in BAPENDA South Tangerang, West Java

Figure 10 shows government agency (BAPENDA) South Tangerang, West Java is successfully to applied a Lean Government model to think the strategy about maintain improvements and desired level of Lean Government throughout to organization over BAPENDA, South Tangerang, West Java. Based on analysis result, we found the Agency-Wide Model over Department or Division Model which is Targeted inside the Model and Grass Roots Model (see Table IV).

Table IV. Deployment Model of Lean Government in BAPENDA South Tangerang, West Java

	Characteristics:	*Deployment Considerations:*
Agency-Wide Model	⇨ Top down driven ⇨ Comprehensive ⇨ Major culture change ⇨ Rapid, highly visible deployment	⇨ Solid leadership from the top management is essential ⇨ Large infrastructure and full-time staff ⇨ Significant planning and management ⇨ Integration with other management systems ⇨ Need for common language and problem-solving methodology ⇨ Need to address cross-agency processes ⇨ 5+ years to achieve lasting culture change
Department/ Division Model	⇨ Department leadership but agency management support ⇨ Department pilot for agency ⇨ Comprehensive at the department level ⇨ Culture change	⇨ Easier to start due to smaller scale ⇨ Slower pace is possible; scale up after initial success ⇨ Greater use of consultants and outside training ⇨ Less integration with management systems ⇨ Similar to agency-wide model but on a smaller scale ⇨ Risk of not getting beyond the department level
Targeted Model	⇨ Top management leadership ⇨ Focused on a few specific agency problems ⇨ Driven by a desire for strategic impact ⇨ Culture change is not a deployment objective	⇨ Easy to get started ⇨ Can work in smaller agencies ⇨ Quick results because problems are identified ahead of time ⇨ Infrastructure needs are small; use contracted resources ⇨ Risk of not sustaining the gains
Grass Roots Model	⇨ Originates at the bottom of the agency ⇨ Highly motivated individuals lead the effort ⇨ Project or problem specific ⇨ Culture change is not an objective	⇨ Relatively easy to do but difficult to sustain over time ⇨ Track record for sustainable improvement is not good ⇨ Very vulnerable to changes affecting staffing ⇨ Few if any infrastructure needs

4. CONCLUSION

The Lean Government algorithm with the DMAIC and LCM methods has been successful to improve service performance in the BAPENDA, South Tangerang. The improvement service performance is stand for a new tax document process with significant results. By using characteristics and organizational models, the Lean Government can be applied inside government or private agencies.

It is recommended that Lean Government suggestions were improve with ideal solutions for overall analysis especially over BAPENDA, South Tangerang. So that the bureaucracy to manage a new building tax document is better than before Lean Government. Thus, the Lean Government must be implemented over BAPENDA, South Tangerang in near future.

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