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The 2018 Technology Innovation Management and Engineering Science International Conference (TIMES-iCON2018) Creating Value Stream Mapping for Process Improvement on Human Resource Function: an Industrial Case Study Karina Angelica Nurheman, Tanti Octavia Industrial Engineering Department Petra Christian University Surabaya, Indonesia tanti@petra.ac.id Abstract— Continuous improvement is done on processes of human resource function at PT X which handles employees, the company's important assets using value stream mapping (VSM). There were four prioritized processes. Contact Centre was analyzed that medical status was inquired because of incomplete supporting documents so the list should be provided at medical claim application. Automatic tick for eligible family members for MBA can eliminate the questions. Talent review was improved with an integrated tool for 9-box, succession, movement, and data consolidation. Employee referral process was improved with consolidation of processes and weekly monitoring interview for backlog issue of hold candidates. Employee life cycle execution was improved with reducing number of validations and increasing number of system synchronization. Lead time efficiency obtained after mapping future state for employee contact centre, referral program, life cycle execution was 70%, 21% and 67%. Process time efficiency obtained for talent review was 32%. Index Terms—Continuous Improvement, Human Resource, Value Stream Mapping, Waste, Time Efficiency I. INTRODUCTION One of the leading manufacturers of consumer goods in Indonesia and also an affiliate of International Company aims to innovate and improve continuously to increase customer satisfaction. Continuous improvement at the company was not only done on production processes as the core business, but also on Human Resource (HR) function. This function has the task to find the right employee to be placed in an organization, develop and evaluate employees, and also provide welfare needs. The activities under the function are very important because they are closely related to human resources as the valuable assets of company. Based on the company's data in May 2016, HR must handle more than 30,346 employees spread across Indonesia. The processes carried out by HR function at this company are very varied. There were four processes in HR that are prioritized to be improved. The four processes were employee contact center, talent review, employee referral program, and employee life cycle execution. Employee contact center is the process where HR handles each phone or email that occur every day. Talent review is a process where HR

ensures that each individual employee has the right career path. The review process is conducted through three stages, namely: sub- functions, functions and company. Thus, it takes a long time. Referral program is a process where HR recruits prospective employees through referrals from employees of the company. The number of applicants is very high and should be given certainty rapidly by the HR. Employee life cycle execution is the process where HR change positions, salaries, location of employee, etc. This process involves many stakeholders including an affiliate from abroad. Lean concept is used to improve on these four processes. One of the Lean tools used as a method to see problem is value stream mapping (VSM). VSM is expected to describe the whole process and identify waste or issues. The result of VSM can provide improvement ideas that can make process to become more efficient and lean. II. RESEARCH METHOD Lean is a business strategy that is based on the customer satisfaction by providing a quality product or service that suits needs in the right quantities and prices. Sayer and Williams [1] stated materials, equipment, manpower and time used should be at the minimum to achieve. The goal

> **of lean is to** build **a culture** of **continuous improvement based on involvement** and commitment **of all** the **employees.** 2

Therefore, lean

> **has a strong focus on the processes for creating the results and the need to be systematic and to measure and report on results of improvement.** Lean is also **a** 2

management philosophy that provides improvement opportunities in terms of quality, cost and lead time. Moyano-Fuentes [2] mentioned the principles of Lean include customer value, value stream mapping, flow, pull, and perfection. Womak and Jones [3] defined

> **the value stream as the set of all the "specific activities required to design, order, and provide a specific product, from concept to launch, order to delivery, and raw materials into the hands of the customer. Value stream** 3

mapping (VSM) is one of lean tools for continuous improvement that describes the process for products and services. VSM helps to develop a common understanding of current process and highlights information for analysis.VSM also helps to make a transformation plan of process and to identify improvements that can be implemented. It defines vision of future process and serves as a goal for future lean activities. Therefore, the main purpose of VSM is to build same objective of every leaders and identifies possible areas for improvement and plans improvement activity. Value Stream Mapping attempts to identify and eliminate waste in the process. Activities considered waste is a time- consuming activity, but does not add value to the resources of a product or service from the customer's perspective. Seven types of waste according to Lean can be shortened to TIMWOOD comprised of Transportation, Inventory, Motion, Waiting, Overproducing, Overprocessing and Defects. An example of waste in the office for transportation is moving document

without changing it. An example of motion is looking for lost documents. An example of overprocessing waste is duplication of document [4]. In order to indicate the boundaries of VSM mapping, SIPOC charting should be applied. SIPOC stands for (S)upplier, (I)nput, (P)rocess, (O)utput, (C)ustomer. The

first step in creating the **SIPOC** diagram **is to** make **the process** boxes. **The** 1

second step is to determine the output and customer requesting the output. The third step is to determine the input and suppliers who supply these inputs. Supplier is the people, functions, and organizations supplying input [5]. VSM allows many improvement ideas to occur as waste or issues are identified. These improvement ideas need to be prioritized based on resources and time available ideas need to be prioritized based on resources and time available. Prioritization of improvement ideas use effect-effort matrix as seen on Fig. 1. Fig. 1. Effect-Effort Matrix Figure 1 helps to determine when the improvement idea will be carried out. If the effort needed is low with high effect, improvement idea should be carried out immediately. Improvements under category of high effort and effect are considered as long term actions. Improvements under category of low effort and effect can be done if the capacity is available. Improvement under category of high effort with low impact should not be done. Some industrial problems have been solved using VSM. Saurin et al. [6] proposed framework to adopt lean practices in manufacturing cells using an automobile case. Chen et al. [7] attempted to improve the productivity using VSM and kaizen. Byfuglien et al improved Human Resource Management using Lean [8]. In addition, the application of

Value stream mapping for administrative and office processes 1

also have been done to eliminate office waste [9]. III. RESULT AND ANALYSIS A. Employee Contact Center Operational excellence is the department that acts as contact center for inquiries related to HR matters. There were about 3000 topics asked in contact center via both email and phone monthly. Data shows that there are various topics about HR matters that need response from generalists. Fig. 2. Most Numbers of Topics Asked at Contact Center It is shown in Fig. 2 that the most topic asked in the contact center is about medical. Based on generalist's information, the mostly asked medical subtopics were medical status and tick eligibility Medical Benefit Administration (MBA). These two subtopics were chosen to be mapped in VSM. SIPOC for medical status and MBA are shown in Table 1 and 2, respectively. TABLE I. SIPOC DIAGRAM FOR MEDICAL STATUS (S

)upplier (I)nput (P)rocess (O)utput (C)ustomer 1

Employee HR Services Indonesia Medical Status Inquiries Medical Status Records Accept questions about medical status Find out about the medical status by coordination with other department Answer questions about medical status and close ticket Medical status informati on Ticket data Employee HR Services Indonesia and HR Shared Services Center (SSC) Asia TABLE II. SIPOC DIAGRAM FOR ELIGIBILITY MBA (S

)upplier (I)nput (P)rocess (O)utput (C)ustomer 1

Eligibility Employee MBA Inquiries Accept questions about eligibility MBA Informati on on Eligibilit Employee y MBA HR Services Indonesia MBA status of family members Coordinate with other department to tick eligible MBA Answer questions about eligibility MBA and close Ticket Data Indonesia and HR Shared Services Center (SSC) Asia PT X to fill positions at PT X candidate's candidate CV Accept referred candidate and reward employee HR Services A need of candidates Process referred Accepted PT X ticket D. Employee Life Cycle Execution B. Talent Review Employee life cycle execution is a process where employee Talent review (TR) is an annual process conducted by HR goes through several job changes such as relocation, promotion, function of PT X. There are three important activities take place salary increase. This process is conducted by Complaints & during talent review, namely 9-box calibration, career Benefits Services Team. As the process variation is huge, the movement and succession. The processes from talent review manager brainstormed and decided on domestic relocation with which were chosen to be mapped were pre-post and the day of promotion to be mapped. SIPOC for employee life cycle talent review. SIPOC diagram for talent review is shown in execution can be seen in Table 5. Table 3. TABLE V. SIPOC DIAGRAM FOR EMPLOYEE LIFE CYCLE EXECUTION (DOMESTIC RELOCATION WITH PROMOTION) TABLE III. SIPOC DIAGRAM FOR TALENT REVIEW (S

)upplier (I)nput (P)rocess (O)utput (C)ustomer 1

(S

)upplier (I)nput (P)rocess (O)utput (C) 1

ust omer Request Domestic Request on domestic Talent review Head Manager relocation Accept relocation with Manager Head of succession Conduct and career mini results for of with Request promotion Function movement for talent positions and Functio promotion letter and n and HR Subfunction positions and review employees within Subfun Function HR Execute the Updated HR of PT X employee (subfunct Database life cycle HR Function within ion level) function for ction of PT X requested Database PT X function next 3 years. PT X Generate Request on Talent review relocation succession results for Preside letter and President and career Conduct nt fulfill the Director and function positions and Directo requirements Regional movement for positions and talent employees r and Head employee review within company for Region within PT X next 3 years al Head E. Current State Value Stream Mapping Business Partner (BP) Previous Conduct & HR talent review PT X After SIPOC diagrams were created, the four processes were Services data talent then mapped into current state VSM can be seen in Fig. 3. The Indonesia review current flow of activities and time taken for each activity were described. The mapping was done together with manager, C. Employee Referral Program process doers, and customers. Employee referral program is conducted by talent CurrentState-Medical StatusviaEMAIL acquisitions team. Every employee of PT X can participate to HRS HR SSC Indonesia Asia seek for the right candidates to fill the vacant positions. When Complete Summary Medical Total PTT :ota2lP8T6 hours ≈ 36 m1a7n160day28s6 I-ticket data I-ticket data the candidate successfully enters the company, the employee as Tota DT : 660 hours ≈ 82 man days Employee Total LTT:ot9al4D6T hours ≈ 118 m3596a6706n00 da6964y06s Ask request Give solution referrer will receive certain amount of money as reward. This Generalist T(eamLeader) Generailst Generailst Generailst Generalist Generailst AdmniMedical AdmniMedical AdminMedcial Generalsit Generalsit process were mapped into VSM. Detail SIPOC can be seen in Legend Createticketandassign Analysethequestions

Checkstatusat Decidetheavailability Writesmallnotesabout Coordniatewithadmin Checkthesupporting Checksupportnig Givefurther ProcessBox Writesolutionon email medical documents/nomnial Close ticket Table 4. application ofthestatus therequest documentstocourier informationto DataBox claim Generailst emailtoemployee Customer Volumeomfotnitchkestper 242 Voulmemofotncithketsper 242 Voulmeoftciketsper /Suppleir month 242 Voulmemofotncitkhetsper 242 Volumeomfotnichtketsper 242 Volumeofitcketsper month 242 Volumemofonitctkhetsper 176 Voulmemofotncitkhetsper 88 Volumeoftickestper month 176 Volumeomfotnitchkestper 176 Voulmemofotncithketsper 176 ProcessFlow Processingtimein 3 Processingtimeni 1 Processingtimein Processingitmein Porcessingtimeni Processnigtmieni Processingitmein minutespertciket mniutesperticket mniutesperitcket 2 Processingtimein mniutesperitcket 2 minuetsperticket 1 minutesperticket 3 minutesperticket 5 Pmroniceutsessinpgetrimitcekient 120 minuetsperticket 5 Pmroicnuetsesisngpetrimtciekient 10 Processingtimein mniutesperitcket 1 Delaytpmieretinickmeitnutes 120 Delaytimeinminutes Delaytimein Delaytimeinminutes Delaytimenimniutes pertciket 0 mniutesperitcket 0 pertciket 0 perticket 0 Delaytimein 0 Delaytpimereiticnkmetniutes 60 Delaytimeinminutes Delaytmieniminutes Delaytmie niminutes Delaytimeinminutes TABLE IV. SIPOC DIAGRAM FOR EMPLOYEE REFERRAL PROGRAM minutesperticket pertciket 0 perticket 0 perticket 0 pertciket 0 Fig. 3. Current state of Medical status via email (S

)upplier (I)nput (P)rocess (O)utput (C)ustomer 1

Candidate’s Accept F. Evaluation Referrer CV and referred consent Reward Referrer candidate’s Waste, problems or issues identification process was carried form CV out during current state mapping. The identification process was done in the following manners: • Discuss each activity to identify waste or issues together with HR team in a meeting room. • Observe certain process that was demonstrated by the process doer to identify waste or issues. • Suggest ideas for improvement on waste or issues identified. • Record evaluation result which consists of waste/issues identified and improvement ideas. • Evaluation and improvements ideas on these processes have been agreed by HR team. Several issues identified from medical status process are: • Employee waited for a long time for almost 2-3 hours for a reply thus it was suggested to reply immediately about medical status checking. • There was a non-value added activity of making small note for coordination on paper so it was suggested to write on computer note and send to medical admin to minimize paper usage. • There was waiting time for medical admin’s response so there was a need for medical admin to allocate time to answer medical status inquiries from generalists. • Hardcopy documents can result in inventory waste thus it was suggested to convert them to softcopy ones for the long- term plan. • There were defect waste found where medical supporting documents needed are incomplete and documents were sent to wrong location. The suggestion was to add a feature of information of list of documents to be submitted at medical application and to socialize pooled collection of documents. The most significant improvement that affects the efficiency of process was the information feature of documents completeness that can reduce volume of tickets. Two issues identified on eligibility MBA process are: • There was one day waiting for global system to synchronize with local system for MBA status so it was suggested to provide information to all employees about it. Another improvement idea was to have automatic tick for eligible family member. • There was waiting time around 3-4 minutes for the ticket to close. The improvement idea was to work parallel. When generalist waits for the phone ticket to close, generalist can reply email in a new tab. The most significant improvement for process efficiency was the automatic tick eligibility MBA that can eliminate the question. Several issues identified from talent review process are: • There was long preparation time because of back and forth information between MOD and HR function (BP) so the suggestion was to set a mechanism standard. • There was scattered data which caused HR Services

Indonesia to consolidate data. There were many different kinds of means of data processing. 9-box calibration used manual wall. There was different tool for succession and movement. There was consolidation night. The improvement idea was to create a tool which integrates 9- box (eliminate physical wall), succession, movement, and to easily store and extract talent review data. The tool was expected to eliminate consolidation night. • Improvement suggestion was to create an integrated system to store and extract talent review data. • The photo used during talent review was inappropriate. There was a need to communicate to all employees to submit appropriate photo. • There was overproducing waste where people discussed unnecessary materials during talent review. There was an improvement idea to make a guideline for talent review discussion. • MoM taker finds it difficult to record all information discussed as people talk together at once. The improvement idea was facilitator helped to summarize discussion of each talent. • The process took long time as there were many people to be discussed. The improvement idea was to plan for lower grade talent review to be conducted by managers themselves without HR facilitation. This was the long-term plan. The short-term plan was to give prework to participants to accelerate discussion. • The three most significant improvement ideas for process efficiency were a creation of mechanism standard between MOD and BP, talent review discussion guideline and an integrated talent review tool. Several issues identified from employee referral process are: • Application A as one of registration method was not user friendly so there was an improvement idea to set email as the only registration method. • There was back and forth between referrer and ERP admin about completing the ERP form so there was a need to provide practical guideline to complete ERP form. • There was motion waste of checking whether candidate has been registered previously in application A. The improvement idea was to make a coding at ERP database which can highlight such errors. • There were several manual activities which should be improved. An automatic “Thank You” email from ERP admin should be created. Data which was collected at application A should extracted and used as ERP database. • There were backlog issues of hold candidates. The suggested idea was to have weekly monitoring interview to solve it. • There was delay time between processes which can be consolidated to reduce the delay time. Such processes are HR to user interview, and offering activities to inform supporting documents needed. • There was transportation waste for sending documents from talent acquisition team to HR Services Indonesia. There was a need to improve the access by creating a shared folder between two teams. • The most significant improvement ideas which affect process efficiency using low effort are collecting CV via email only, automated ERP database and email confirmation, and weekly monitoring interview to solve backlog issues. Several issues identified from employee life cycle execution process are: • Managers used wrong form and got confused so there was improvement idea to make macro-based guideline on how to use application C. • The location was not appeared specifically so there was a need to improve application C to display the specific location. • There was peer validation done by HR SSC Asia which was motion waste. The improvement was to delete the activity. • HR Services and Business Partners just noticed there were request changes after informed by HR SSC Asia. HR Services Indonesia can extract data from application B to get information about changes requested and so do the confirmation early. • There was waste motion where HR SSC Asia printed tickets so this activity was deleted. • HR Services conducted audit on each transaction for internal control purpose. It was improved to bundle validation as there were two steps of validation previously. • There was waiting time for letter to be generated. The improvement suggestion was to increase number of synchronization between local and global application from two to three times. • There was manual work on updating number of home visits. There was a need to synchronize between two applications to allow automatic update of information. The most significant improvement ideas which affect process efficiency are number of synchronizations of two applications is increased, bundle validation and macro tool guideline for application C. Each improvement idea was prioritized using effect-effort matrix. The improvement ideas were then converted into action plan. Action plan consists of level of effect and effort, duration, date of completion and

name of person responsible. G. Future State VSM Future state VSM described the conditions of improved process within a period of one year. Suggested improvements are expected to improve on efficiency of processes, such as reducing volume of tickets, number of steps and time taken. Future state VSM describes new steps and time taken for each activity. Future state of medical status process is shown in Fig. 4. FutureState-Medical StatusviaEMAIL Complete Summary TotalPT:136hours≈17mandays TotaDT:264hours≈33mandays TotalLT:400hours≈50mandays Legend Generailst(TeamLeader) Generali ts Generailst Createticketandassign emali Analysethequestions Replytoemployeethat thestatuswillbe checked Volumeoftciketsper month 88 Volumeoftciketsper month 88 Voulmeofticketsper month 88 Processing itmein minutespertciket 3 Delaytpimeerticinkmetinutes 120 Processing itmein minutespertciket Delaytimeinminutes pertciket 1 0 Processingtimein mniuetsperitcket Dealytmienimniuets peritcket 1 0 Medical records Askrequest Geneariist Geneariist Checkstatusat application Decdietheavaialbiltiyof thestatus Volumeofitcketsper monht 88 Voulmeofticketsper month 88 Processingtimein mniuetsperitcket 2 Dealytmienimniuets peritcket 0 Processnigtimein mniutesperticket 1 Dealytmienimniutes peritcket 0 HRS Indonesia Employee Generailst Generalsit Wrtiesmallnotesabout therequestoncomputer Coordniatewithadmni medical Volumeofitcketsper monht 88 Voulmeoftcikestper month 88 Processing itmein minutespertciket 1 Delaytimeinminutes pertciket 0 Porcessnigtmieni minutesperticket 3 Delayitmeinminutes perticket 0 HRSSCAsia I-ticketdata Givesolution AdminMedical Checkthesupportnig documents/nominal claim Voulmeoftciketsper month 88 Porcessnigtmieni minutesperticket 5 Delayitmeinminutes perticket 60 AdmniMedcial Checksupporting documentstocourier Volumeoftciketsper month 44 Pmroicneustseisnpgetrmitciekenit 120 Delay itmeinminutes pertciket 0 I-ticket data AdmniMedcial Generali ts Generalsit Gviefurtherinofrmationto Generalsit Wrtiesolutiononemail toempolyee Closetciket Volumeoftciketsper month 88 Voulmeofticketsper monht 88 Voulmeoftickestper month 88 Porcessnigtmieni minutespertciket 5 Delayitmeinminutes pertciket 0 Pmronicuetsessnipgetritmieckient 10 Dealytmienimniuets peritcket 0 Porcessnigtmieni minutesperticket Dealytmienimniutes perticket 1 0 Fig. 4. Future State VSM of Medical Status H. Savings Improvement suggestions which emerged during the evaluation process were expected to improve HR processes. Process improvement was based on time efficiency obtained. Parameters used are processing time, delay time and lead time. Processing time is the time when workers are actually doing the activity. Delay time influences the time for customer to receive the output. Lead time is the overall time required for each process. Summary of time efficiency obtained by four processes can be seen on Table 6. TABLE VI. SIPOC COMPARISON OF CURRENT AND FUTURE STATE VSM Parameter Processing time Delay Time Lead Time Medical Status Current (working days) 36 82 118 Future (working days) 17 33 50 Savings (working days) 19 49 68 Savings (%) 53 60 58 Eligibility MBA Current (working days) 2 30 32 Future (working days) 0 0 0 Savings (working days) 2 30 32 Savings (%) 100 100 100 TABLE VII. SIPOC COMPARISON OF CURRENT AND FUTURE STATE VSM (CONTINUED) Parameter Processing time Delay Time Lead Time Talent Review Current (working days) 795 - - Future (working days) 541 - - Savings (working days) 254 - - Savings (%) 32 - - Employee Referral Program Current (working days) 2 51 53 Future (working days) 1 41 42 Savings (working days) 1 10 11 Savings (%) 50 20 21 Employee Life Cycle Execution Current (working days) 171 354 525 Future (working days) 105 66 171 Savings (working days) 66 288 354 Savings (%) 39 81 67 Table 6 shows the savings of four processes in terms of processing time is more than 30%. The savings in terms of delay time is more than 15%. The savings in terms of lead time is more than 20%. These savings benefit the company by speeding up the processes, reducing overtime, optimizing time for value added activities and satisfying the customers. I. CONCLUSION Human Resource function at PT X has the tasks related to employees which are the important assets of company. There were four processes in HR analyzed with VSM. VSM helps to identify waste and develop improvement to improve processes to become more efficient and to add more value to the business. Contact centre process has high variation so medical status and eligibility MBA were the

mapping scopes selected. Issue found was the question was asked by the employee because of long time taken to claim medical benefit. This was caused due to incomplete supporting documents needed. The improvement idea suggested was to add a feature of list of supporting documents needed when submitting the claim form. Eligibility MBA question was analyzed and found that there was a need to have an automatic tick system for eligible MBA. This can eliminate the question at contact centre. Talent review process is an annual process that involves many people and takes time. Waste identified was long preparation time because it was required to coordinate between MOD and BP as the facilitators and also motion to consolidate data. The improvement idea was to create standard for both stakeholders and also invent on a practical talent review tool which integrates 9-box, succession, movement and talent review result. Employee referral process was analyzed and found that there was backlog issue of hold candidates. Another issue was some processes can be consolidated to reduce delay time. One of example was to consolidate HR interview with user interview. Manual work issues can also be reduced with improvement ideas, such as extract data from application A, which can then be used as ERP database. Employee life cycle execution process which was analyzed was domestic relocation with promotion. Waste identified was defect as manager used wrong form and got confused to fill at application C. The improvement idea was to make a guideline on how to use application C in the form of macro-tool. Another waste found was overprocessing for validation so there was a need to reduce number of validations. In addition to those, there was waiting time for letter to be generated so there was a need to increase number of synchronizations between two systems. REFERENCES [1] C. Barber & B. Tietje,"A Research Agenda for Value Stream Mapping The Sales Process", Journal of Personal Selling & Sales Management, Vol. 28 No. 2, pp. 155-165, 2008 [2] J. Byfuglien, H. Torstensen, & A. Trolie, "The Improvement of HR Management by using Lean", Norway Paper, pp. 1-7, 2012 [3] J.P. Womack, & D.T. Jones, "Lean Thinking", 2nd Edition, New York: Simon and Schuster, 2010 [4] C. Barber & B. Tietje,"A Research Agenda for Value Stream Mapping The Sales Process", Journal of Personal Selling & Sales Management, Vol. 28 No. 2, pp. 155-165, 2008 [5] D.P. Lynch, "Enhancing the Effectiveness of Value Stream Mapping", Quality Engineering Applications and Research, Paper 2014-2198, pp. 1-10, 2014 [6] T.A. Saurin, G.A. Marodin, and J.L.D. Ribeiro, "A framework for assessing the use of lean production practices in manufacturing cells", International Journal of Production Research, Vol. 48 No. 16, pp. 4215-30, 2010 [7] J. Chen, Y. Li, & B. Shady, "From Value Stream Mapping Toward a Lean/Sigma Continuous Improvement Process: an Industrial Case Study", International Journal of Production Research. Vol. 48, No. 4, pp. 1069-1086, 2010 [8] J. Byfuglien, H. Torstensen, & A. Trolie, "The Improvement of HR Management by using Lean", Norway Paper, pp. 1-7, 2012 [9] B. Keyte, & D.A. Locher, "The Complete Lean Enterprise: Value Stream Mapping for Administrative and Office Processes," New York: Productivity Press, 2004