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Six Sigma Approach to Performance Management

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Abstract: In an age of diminishing resources, the effectiveness of a highly motivated workforce fundamentally determines an organization's destiny. Performance management has become a hot issue in recent years, because it helps an organization to achieve its business and strategic goals and at the same time assists people to reach their full potential. Equal attention should be paid to performance management practice to ensure its effect on organizational performance as well as avoid the opposite effect it might bring to organization. Through years' of research and practice, Six Sigma has grown into a mature quality control method as well as management concept. The concept and methodology of Six Sigma could be utilized to compensate for the defect of performance management and enhance the satisfaction of related parts. This study sets up a model of DL workforce performance management process using Six Sigma. Motorola Performance Management Simplification project demonstrates it with obvious cost and time saving every year. It is concluded that the six sigma method is an effective and cost-saving method in performance management.

Key words: Human resources, performance management, practice, six sigma, motorola

INTRODUCTION

While there are many criteria or standards against with the contributions of HR department can be assessed, they can be grouped into two categories: Doing the right things; and doing things right (Walker and Bechet, 1984). For many organizations, to enhance their competitiveness means to maximize their use of human resources, or to link their human resources management with their business goals. In human resources management, the core is performance management (Yunting, 2012). It has been recently applied to take the place of traditional performance appraisal. Over the past decades, performance management has been successfully carried out at many organizations in manufacturing and services industries, especially in solving problems related to productivity. If proceeding performance management is what Walker and Bechet (1984) statement called doing the right things, the problem of "doing things right" to carry performance management out in an effective way will accordingly be an issue of equal significance. The suitable forms and structures of performance management for an organization will require greatly consideration on the organization's structures and operation environment; otherwise it is meaningless (Xue *et al*., 2011). After reviewing the development and importance of performance management, it is suggested that Six Sigma being applied in performance management. Then, how Six Sigma is applied in Motorola's performance management Simplification project is demonstrated.

Based on the research of Six Sigma and Performance Management, this study proposes a model process for DL workforce performance management by illustrating a Motorola performance management simplification project. The time saving and cost saving are clearly shown. Finally, conclusions are drawn based on Motorola's experience.

REASONS FOR STUDYING PERFORMANCE MANAGEMENT AND PERFORMANCE MANAGEMENT PRACTICE

As increasing research has been conducted to human resources theory and practice, performance management gradually caught both academics and practitioner's attention. Researchers have good reasons for exploring the field of performance management and performance management practice and at least four relative but different reasons stand out:

First, performance management may affect employees whose performance will ultimately affect the performance of the organization. Performance management activities are regular experiences for many employees (Cascio, 2006), particularly, If s/he works in a larger organization. If performance management is better understood, both organizations and employees will be benefited. Otherwise, both might be harmed.

Second, there is strong evidence of dissatisfaction with performance management at the managerial and performer levels (Bernadin *et al*., 1998). Though thought

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to be critical aspect of organizational effectiveness (Cardy, 2004), for many people, performance management is one of the most awful things of the year. For managers, performance management is a costly and problematic activity (Nankervis and Compton, 2006). They commit their time and energy to the annual or even quarterly activity but wonder if the effort is worthwhile (Coens and Jekins, 2000). For employees who steel themselves to receive performance management as performers, performance management is sometimes dreaded out of its relation to payment and the possible inequity in the process. So, why is performance management so ill-favored? Is it possible to find a better way in which both the manager and the performer benefit from the experience?

Third, as a relatively recent term but largely applied concept, performance management received comparatively less research attention than performance appraisal which has been extensively expounded. By reviewing large company's performance management practices, Thomas and Bretz detected that during research, on the one side, it did little to increase the effectiveness of performance assessment as a management instrument; on the other side, organizations have liability for paying no attention to research findings that probably develop the assessment process (Thomas and Bretz, 1994). Nevertheless, it is courageous to note that willingness to experiment with performance management seems to be increasing (Aguinis and Pierce, 2008). These investigations and discoveries have identified performance management as a core research theme (Fletcher, 2001).

Fourth, among the inadequate discussions of performance management, performance management practice has been paid relatively less attention than other topics such as performance management system, performance management contents and so on. For organizations, any new concept would be regarded as useless if it isn't been put into practice and bring about tangible benefits. Therefore, it's always top priority for organizations to best practice performance management and seek every opportunity to save cost throughout the process. As a result, further research is needed for the sake of the customization of performance management.

To sum up, research on performance management will be meaningful for managerial theory and organizational interest.

PERFORMANCE MANAGEMENT ORIGIN OF PERFORMANCE MANAGEMENT

Performance management is rooted in performance appraisal. In the west, performance measurement was firstly introduced to Scotland by Robert Owens in the early 19th century. American military system began to apply performance appraisal in 1813 while federal government started to evaluate its civil servants' performance by performance appraisal in 1842. With the ardent of globalization and information age, both managers and researchers found that performance appraisal fell behind the development of modern enterprises. Expanding the connotation and extension of performance appraisal, practitioners in the 1970s began to use the term performance management in the place of performance appraisal.

In Beer and Ruh (1976) firstly used the term performance management system referring a system implemented at Corning Glass which was designed to manage, measure and improve the performance and potential for advancement of their managerial and professional employees (Beer and Ruh, 1976).

DEFINITION OF PERFORMANCE MANAGEMENT

It is generally accepted that performance may be categorized at three levels: Organization level, group level and individual level. Contents of performance vary at different levels. But there is no single view or definition of what performance means (Holton, 1999). No matter what the definition is, it is either regarded as a result or a process. However, when it comes to performance management, both input (process) and output (result) should be weighted.

Similarly, it is also difficult for scholars to agree upon a definition for performance management. Mondy and his colleagues defined it as a process that significantly affects organizational success by having managers and employees work together to set expectations, review results and reward performance (Mondy *et al*., 2002). Cardy utilized "system" to illustrate performance management that starting with the inputs made available to the performer, who then convert those inputs through different kinds of tasks to value-added outputs (Cardy, 2004). United Agency for International Development defined it as "the systematic process of monitoring the results of activities; collecting and analyzing performance information to track progress toward planning results; using performance information to inform program decision-making and resource allocation and communicating results achieved, or not attained, to advance organizational learning and to describe an organization's performance" (USAID, 2001).

Despite the difference of word using, two key words exist in almost all researchers and practitioner's mind in defining performance management: "Process" and "Systematic". Performance management offers a philosophy which embodies certain values and at the same time offers a technology which involves a systematic, learnable and repeatable series of concrete steps.

IMPORTANCE OF PERFORMANCE MANAGEMENT

In a changing context of globalization, a key factor to organizational success is its Human Resources (HR). Within the field of HR, including human resource management, human resource development and organizational development, as Ruona and Gibson (2004) pointed out, the most powerful force is the increasing importance of people to organizational success (Ruona and Gibson, 2004). And performance management serves as a key tool for connecting and aligning the performance results of people to that of the organization. As a core procedure through which task is completed, it is considered the "Achilles Heel" of human resources management (Pulakos, 2009) and should therefore be a top priority of managers (Lawler, 2008). Although, performance management systems may be problematic, it is of vital importance to both organizations and employees.

Performance in organizations accomplishes goals, delivers on expectations and produces results (Swanson, 1999). In complex organizations, performance management organizes, coo coordinates and motivates the behaviors needed for performance improvement at the employee and organizational levels (Boselie *et al*., 2001). Performance management is therefore critical business driver that can help produce business results. It motivates people to do better job in each position. This will in turn ensure the productivity of manufacturing-based organizations and the effectiveness of service-oriented organizations. As a result, the competency of an organization is finally enhanced. If viewed as a strategic tool, performance management can be a powerful addition to management action because it is the application of scientific method to employee management. Performance management redesign affects all other human resource management processes and drives the human resources agenda. In addition to competency-based recruitment and selection techniques, the restructuring of internal mobility, assessment and selection processes, the provision of training and development experiences and curricula each may be reconfigured to support and align with the new direction of development and performance enhancement. In a word, performance management is significant to organizations in that it helps to achieve the organization's business and strategic goals.

For employees, performance management is far beyond a way of assessing their performance during certain period or a way of rewards and compensation. A scientific performance management assists employees to recognize their strength and weakness. Employees may benefit from the process in fully realizing their potentials and developing better career lives. As global economic restructuring requires more workforce reductions, employee effort and loyalty are affected. Consciously or unconsciously, employees often do not work to their potential and allow confusion and uncertainty to paralyze their work lives. Goal setting, equity, employees' needs and expectations, employee's skills and abilities, job evaluation, training might all be included in performance management. Employees' efforts will be rewarded, their skills improved, their expectations considered and their weaknesses revamped in the process of performance management.

It is now safe to conclude that performance management should be a win-win strategy for both organizations and employees.

IMPLEMENTATION OF PERFORMANCE MANAGEMENT

Having recognized the importance of performance management, many organizations in the past decades have applied performance management to improve employee performance as well as organization performance and some successful ones have been outstanding in facing the fierce competition. Numerous literatures on human resources management have emphasized the implementation of performance management.

Kernaghan and Siegel (1996) in explaining human resources management, emphasizes the importance of merits and that the objective of performance assessment is to motivate employees to contribute better (Kernaghan and Siegel, 1996). Hughes (2004) in explaining personnel p erformance management, indicates the importance of having clear view of objectives, well-defined responsibility, adequate training and access to expert advice for managers at all level in performance management (Hughes, 2004). Hughes points out the difficulties in designing adequate, meaningful and parsimonious performance indicators. But both of them warned that performance management can achieve the opposite effect as job security may be considered to have been eroded. Although, performance evaluation is at the heart of performance management (Cardy, 2004), the full process extends to all organizational policies, practices and design features that interact to produce employee performance.

Performance management model is mainly composed of a series of stages such as performance goal setting, performance monitoring, performance appraisal and feedback and improved performance (Armstrong, 2000). In the past decade, a new paradigm has gained a lot of attention Total Quality Management. The paradigm emphasizes total commitment from an organization to seeking improvement, including all aspects of the organization and all employees, throughout every

function and level. It emphasizes quality process as well as quality results (Bounds *et al*., 1994).

Summarizing the above literature review, an effective implementation of performance management should be characterized as: (1) Effective internal communication is done to clearly define or assign the objectives/resp onsibilities to employees goal setting/planning, (2) Consequences, i.e., reward and punishment, should be linked to performance results, (3) Employees are motivated to embrace performance management rather than be anxious about it or resist it, (4) Managers should be well trained and supported in conducting performance management, (5) The organizational culture is good for sustaining and seeking continuous improvement.

SIX SIGMA APPROACH TO PERFORMANCE MANAGEMENT

General introduction to six sigma: In its origin, Six Sigma represents Motorola's quality goal of 3.4 Defects Per Million Opportunities (DPMO) where a defect opportunity is a process failure that is critical to the customer (Linderman *et al*., 2003). It has helped numerous organizations to save billions of dollars in waste, rework and reclaim costs. Motorola summarizes the philosophies of Six Sigma as: (1) Customer first, (2) People are the most valuable resource, (3) Continuous improvement, (4) "Gemba" focus. The six sigma management system focuses on customer, bases on data analysis, takes statistics as the break-through and implements a number of six sigma projects on SIPOC (Supplier, Input, Process, Output and Customer) to achieve the best outcome. By making use of the leading management achievements and tools, six sigma aims at enhancing organization's business and strategic goals with high quality and low cost. Tools used by Six Sigma include: QFD, DOE, Taguchi method, SPC, FME (C) A, TQC, Cause and Effect Diagram, Cause and Effect Matrix, Minitab etc. Methodologies such as DMAIC, DMADV and DFSS are most commonly used in specific cases.

APPLYING SIX SIGMA IN PERFORMANCE MANAGEMENT

Despite the importance and successful examples of performance management, dissatisfaction with the effectiveness of traditional performance management programs continues to grow. Pulakos (2009) observed that less than a third of employees believe that their company's performance management process assists them in improving their performance and performance management regularly ranks among the lowest topics in employee satisfaction surveys (Pulakos, 2009). At the same time, managers are also questioning the effectiveness of their company's performance management system.

As presented in part 3 of the study, there have been different methods or paradigms of performance management. This study proposes a new method of performance management the six sigma method. It is a feasible method in terms of both logic and technology.

A group/employee's performance can be briefly represented in the following equation: $P = f(X, Y)$. P represents "Performance," "f" is the symbol of function, "X" represents controllable factors that affect performance and "Y" represents uncontrollable factors that affect performance. Since, "Y" is uncontrollable, the equation will always in undulation. To reduce undulation is the most powerful weapon Six sigma has when it came into being. This is in tune with performance management logically. Thus, Six sigma can be deployed into performance management to control the performance fluctuation and increase satisfaction of related parts.

Besides, through years' of research and practice, the Six sigma has grown into a mature quality control method as well as management concept. Different methodologies such as DMAIC, DMADV and DFSS, are developed to solve different problems in specific context. In six sigma management, a project is usually selected to tackle a particular topic. The ultimate goal is to achieve high quality with low cost through process improvement or new process design. Performance management, on the other hand, is a systematic process which deserves continuous attention in organizations that seek endless profits.

To put it in practice, when performance management in the organization is resentful, it's better to form a six sigma quality team who is going to carry out projects to Fig out the root cause of the problem and find proper ways to solve it. In later part of the study, a case of Motorola Direct Labor (DL) workforce performance management simplification project is demonstrated to show how six sigma works in performance management.

MOTOROLA DL WORKFORCE PERFORMANCE MANAGEMENT SIMPLIFICATION PROJECT

Background: As a manufacturing based enterprise, Motorola has over 10,000 DL workforces whose performance, to a large extent, determines the performance of the company as whole. As a result, the performance management of its DL workforce becomes extremely critical. The large amount of number and the characteristics of DL workforce are challenges facing both managers and HR function in the process of performance

management. Compared with companies in the same industry like Foxconn, Samsung and Dell, Motorola's DL workforce management is special in that there is on-line performance management system for DL and that the performance management is conducted quarterly. However, there are numerous feedbacks from manufacturing leaders that the performance management system for DL and process are dissatisfactory because they took a lot of their time to do some value-added work. What lies behind these feedbacks is that present performance management system and process aren't cost effective. So, HR function of Motorola selects this six sigma DL workforce Simplification project to maximize the value of its performance management.

METHODOLOGY

In this Motorola DL workforce project, DMAIC is chosen as the methodology because it is a process improvement project. Define means to establish either customer's requirements or business requirements or both. Measure means to characterize performance in current process. Analyze means to decompose causes that lead to deficiency. Improve means to modify present performance. And Control means to ensure consistency in improvement. To be more specific, "Define" means to determine "what is important;" "Measure" means to realize "how are they doing;" "Analyze" means to find out "what is wrong;" "Improve" means to decide "what needs to be done" and "Control" means to make sure "how to guarantee performance."

ELABORATION ON THE PROJECT

Define: A six sigma project is customer centered, so the HR team working on this project begins with hearing the Voice Of Customer (VOC). Manufacturing leaders communicate with HR that the DL workforce performance management process is too complicated and they spend a lot of time doing performance management in each quarter. At the same time, SLT point out that the long process does not have value-added to the organization. Then, critical customer requirement is a simplified DL performance management process and reducing time of DL performance management in each quarter become critical to quality. What's critical to process is to improve the DL performance management process to be time saving and cost saving. Therefore, the goal of the project is finally set as simplify the DL performance management process to reduce its cycle time and ensure it is 100% complied with the country's legal requirements.

Measure: The Measure stage is a stage of examining the current DL performance management process in Motorola as Fig. 1 shown. Generally, the process begins with a plan in which managers set goals for their DL employees. In each quarter, there is a checkpoint to contemporarily summarize employees' performance and to adjust the plan to meet annual business goals. The SIPOC diagram shows that in planning stage, managers have to set goals for employees in the performance management system and print the study for employees to sign one by one. In the summary and checkpoint stages, managers have to update the goal status in the system and print study files for employees to sign again. Meanwhile, managers have to dialogue with each employee about the summary. Data collected from 40 supervisors in Motorola Tianjin site shows that a group of 30 employees' performance management takes 48.9 h/year. This amount of time is too much for managers who are supposed to do many other important jobs.

Analyze: There seems to be a once for good way to reduce time spending on DL workforce performance management to take it away. However, it is impossible to do so because the company needs to keep it for both business and strategic reasons as mentioned in part III of the study. Besides, it should be kept for purposes of rewards, PIP, or termination. Besides, it's estimated that little cost can be saved if the DL performance management is removed from the performance management system. The team is left to the alternate solution for the problem to reduce time of current process. The first thing to do is then to Fig out why present way is so time consuming. The Fish Bone diagram and Pareto Chart are applied simultaneously for the root cause. And the root causes are finally determined as: (1) There is no batch sign in the performance management system in use; (2) HR needs a lot of time to synchronize employees' commerce ID as core ID for them to sign in the system; (3) DL employees take on job training rather than Motorola University courses in improving their skills; (4) Managers need a lot of time to dialogue with employees.

Improve: From the point view of logic, each root cause for the long time performance management could be revised for shorter time. For example, team can: (1) Build batch sign in function in the performance management system; (2) Managers assign goals in the system while employees sign in study; (3) Cancel learning plan and development plan for DL employees; (4) Keep dialogue with employees but in a different way group dialogue for planning, dialogue with 30% employees for checkpoint and dialogue with all employees for summary. Based on all these possibilities, there are three potential solutions:

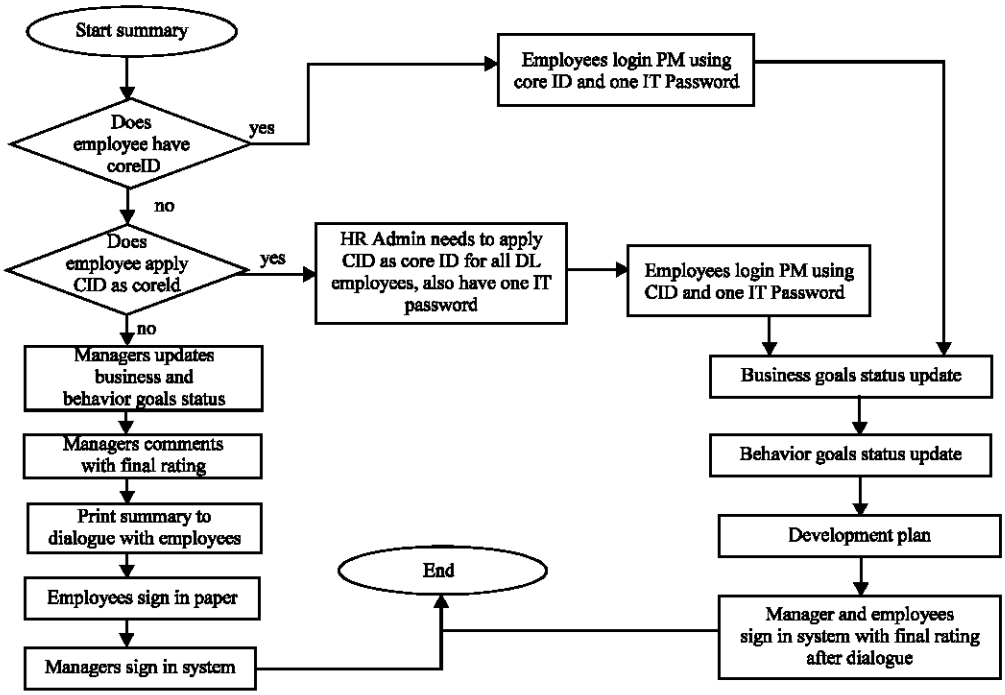

Fig. 1: Current motorola direct labor performance management process model

A keep the whole process in one-page study. Only keep ratings in the performance management system where managers sign as a batch. B keep the whole process in one-page study. Keep planning and ratings in the performance management system where managers sign in as a batch. C transform the whole one-page study into a screen in the performance management system. Studt file is also kept for employee signature. Keep planning and rating in the performance management system where managers sign in as a batch. Insert an option of numerical rating function in the system to facilitate tanking at the end of the year. In all three solutions, career planning and development and learning plan is cancelled. The quality team scored the three solutions from perspectives of time, feasibility and effect as Table 1 shown.

Solution B turns out to be the best choice. A pilot run of the improved process is carried out with the 40 supervisors who took part in the survey in the Measure stage. A "2 Sample t-test" is then conducted according to their feedback (Fig. 2). The result shows that 22.7 h will be saved in the improved process. This indicates a cost saving of 147.55k US dollars each year (Fig. 3). Therefore, the new performance management process is not only time-saving but also cost-saving.

Control: The last thing to do in the six sigma project is to guarantee the improvement which has been achieved in previous stages. In this case, a calendar is designed by the HR team to successfully put the new process in

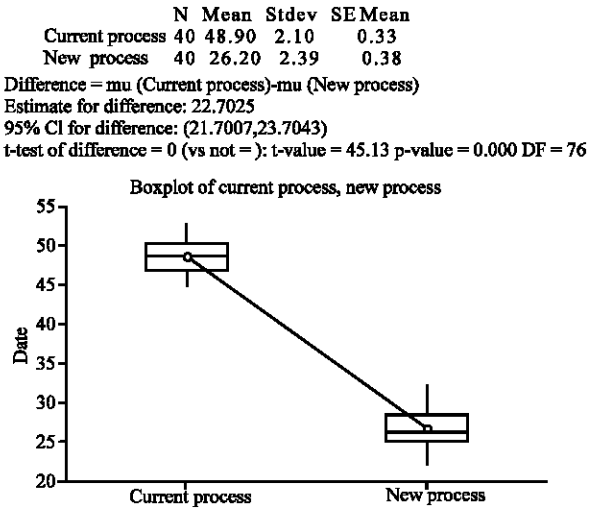

Fig. 2: Sample t-test result of motorola new performance management process

practice. Meanwhile, a new performance management distribution guideline is drafted to categorize employees' performance. In the coming years, Motorola DL workforce supervisors may choose to assign group or individual goals and can use the group processing worksheet to implement group final ratings in the system. Motorola HR will be responsible for legal issues and for helping DL employees with internet/computer related issues. A new future summary process will be applied at the end of the coming year as Fig. 4. The HR function is willing to watch

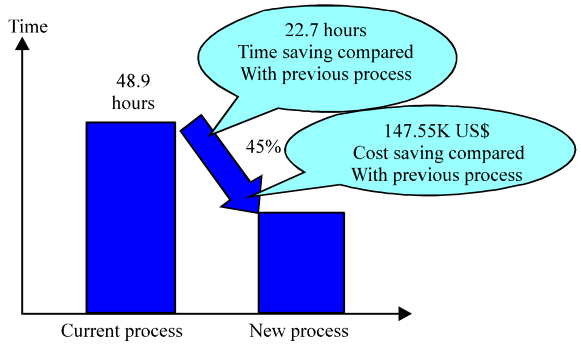

Fig. 3: Time and cost saving of motorola new performance management process

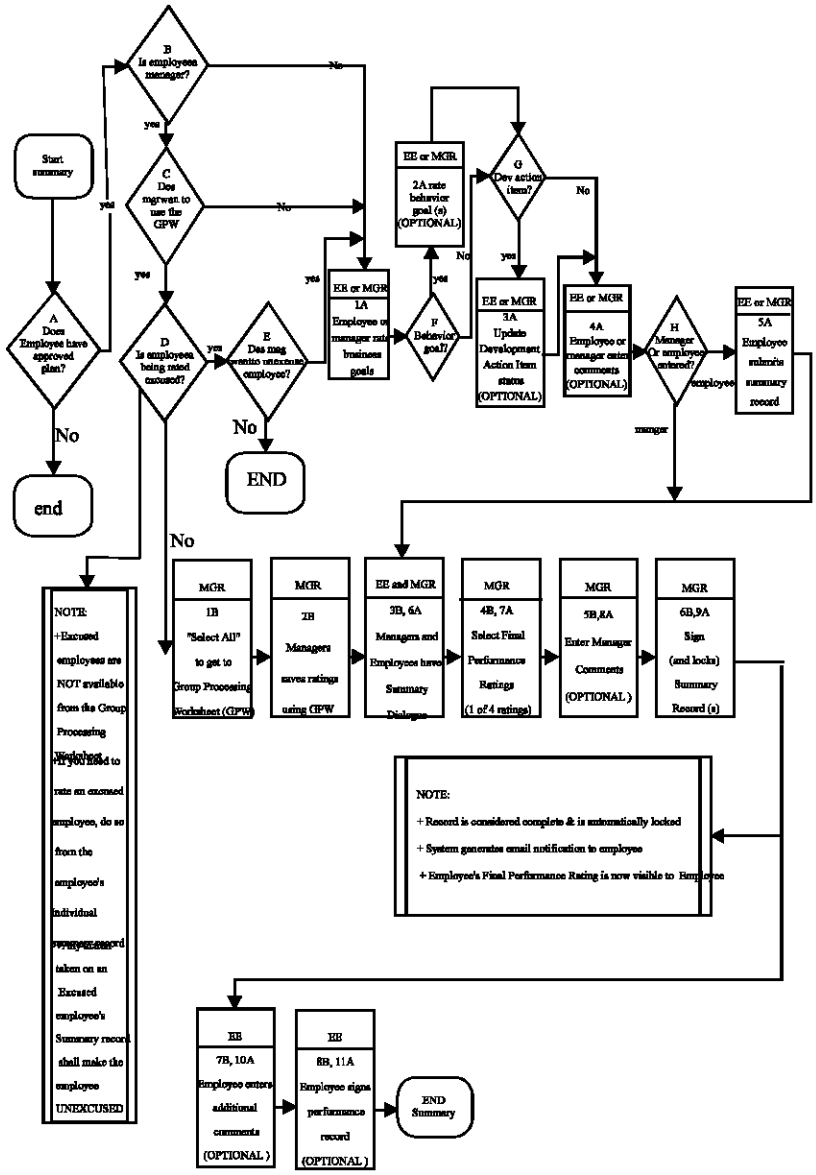

Fig. 4: Future motorola new performance management improvement summary process model

Table 1: Solutions' selection perspectives and best choice score

Solutions	Time	Feasibility	Effect	Score
Solution A: Keep the whole process in one -page paper. In the performance management system, only keep ratings. Mgr signed in as a batch.	5	7	4	16 ⊗
Solution B: Keep the whole process in one-page paper. In the performance management system, keep planning and ratings. Mgr signed in as a batch.	6	8	7	21 ○
Solution C: Transform the whole one-page paper into a screen in the performance management system. But still need to keep paper for employees' signature purpose. In the performance management system, keep planning and ratings. Mgr signed in as a batch. Need to insert as an op tion of numerical rating function to facilitate ranking at the end of the year.	7	5	7	19 ⊗

over the ongoing process and willing to seek other opportunities for an even better performance management process. In this way, the improvement is going to be sustainable and continuous.

RESULTS AND DISCUSSIONS

Performance management has becoming an interest of academics and practitioners due to its importance to both organizations and employees. Researchers are sparing their efforts to suggest best ways to put performance management. Inspired by previous research achievements, this study proposes a new method of performance management the six sigma approach and expounds it from both logic and technological perspectives. Motorola's DL Workforce Simplification project demonstrates the method well. However, it is merely an example of performance management process improving. There is still space left for future researchers on applying the six sigma method in every aspect of performance management. It is concluded that the six sigma method is an effective and cost-saving method in performance management. It deserves further research as well as practice.

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