THE OPERATION PROCESS REENGINEERING FOR RETAILER

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A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Engineering Program in Engineering Management

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วัตถุประสงค์หลักของการวิจัยฉบับนี้คือการปรับปรุงประสิทธิภาพการทำงานของแผนกสะดวกซื้อในด้านคุณภาพ ต้นทุน และการบริการเมื่อเทียบกับค่าเฉลี่ยก่อนการปรับปรุง ซึ่งจะนำไปสู่ความพึงพอใจของผู้บริโภค และมีวัตถุประสงค์รองคือการนำเสนอวิธีการในการป้องกันความเสี่ยงที่อาจทำให้กระบวนการทำงานใหม่เกิดปัญหาในอนาคต

ในการวิจัยฉบับนี้ ได้มีการแสดงถึงขั้นตอนการประยุกต์ใช้ การปรับรื้อกระบวนการการทำงาน ในธุรกิจสะดวกซื้อโดยเริ่มจากการศึกษาขั้นตอนการทำงานโดยรวม 8 กระบวนการตั้งแต่ การจัดเรียงสินค้า การตรวจหาสินค้าขาด การเปลี่ยนป้ายราคา การตรวจรับสินค้า การเติมสินค้าจากคลัง การสั่งซื้อสินค้า การขายสินค้าผ่านระบบ POS การขายสินค้าด้วยใบสั่งซื้อ และการเติมสินค้าสินค้าจากผู้ผลิต โดยได้เก็บมูลที่ประสิทธิภาพการทำงานในด้านต่าง ๆ นำข้อมูลที่ได้มาวิเคราะห์และเปรียบเทียบกับข้อมูลทางวิชาการ เพื่อใช้พัฒนากระบวนการทำงานใหม่จำนวน7โครงการอันได้แก่ การปรับรื้อกระบวนการทำงานโดยรวมของแผนก ตั้งแต่การรับสินค้าจากผู้ผลิต การเปลี่ยนป้ายราคา การตรวจรับสินค้า การขายสินค้าผ่านระบบ POS และการขายสินค้าด้วยใบสั่งซื้อ หลังจากที่มีการปรับใช้กระบวนการทำงานใหม่ ทีมงานได้ทำการเปรียบเทียบผลการทำงานก่อนและหลังการปรับปรุงเพื่อวิเคราะห์ผลการทำงานของกระบวนการใหม่ รวมทั้งนำเสนอวิธีการในการป้องกันความเสี่ยงที่สามารถทำให้กระบวนการทำงานเกิดปัญหาในอนาคต

จากผลการศึกษาพบว่าขั้นตอนการทำงานใหม่ทำให้มีผลการทำงานดีขึ้นอย่างมีนัยสำคัญ ด้วยการลดขั้นตอนการเปลี่ยนป้ายราคา จำนวนครั้งที่ลูกค้าร้องเรียนเกี่ยวกับราคาผิดของทุกสาขาลดลงมาก กว่า 40% โดยเมื่อคำนวณต้นทุนค่าจ้างพนักงานของกิจกรรมต่างๆในแผนกพบว่าลดลง 28.54% ผลจากการปรับปรุงขั้นตอนการเติมสินค้าและขั้นตอนการตรวจสอบสินค้าขาด พบว่าจำนวนสินค้าขาดในแต่ละสาขา ลดลงมากกว่า 36.93% ข้อมูลที่ได้สามารถนำไปใช้ในการพัฒนาแนวทาง และกลยุทธ์การดำเนินการป้องกันความเสี่ยงจาก การสื่อสารที่ผิดพลาด โปรแกรมการทำงานที่ผิดพลาด การทำงานที่ไม่ครบกระบวนการ เครื่องมือที่ขาดความพร้อม การบันทึกข้อมูลที่ผิดพลาด และผลที่ไม่คาดคิดจากการใช้ระบบ SAP

ศูนย์ระดับภูมิภาคทางวิศวกรรมระบบการผลิต ลายมือชื่อนิสิต……..

สาขาวิชา …การจัดการทางวิศวกรรม…… ลายมือชื่ออ.ที่ปรึกษาวิทยานิพนธ์หลัก……...…..…..

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The main objective of this study is to improve retailer‟s operation process in term of quality, cost and delivery when compare with average. The consequence of those improvements will lead to higher customer satisfaction. The second objective is to demonstrate tools for avoiding pitfalls in retail‟s new design process.

This research demonstrates the steps of applying consolidated business process reengineering methodology with retailer‟s operation reengineering. The redesign team study, measure performance and analyze 8 as-is processes including; Stock Arrangement, Out of Shelf Checking, Price Label Changing, Goods Receive, Replenish from warehouse, Stock Request, Selling Via Sales Order, Selling Via POS, and replenish from DC. The redesign team initiates 7 redesign projects to improve operation process performance including; Overall Business Process Activity Redesign from Replenishment Vendor, Goods Receive, Price Label Changing, Selling Via POS, Selling Via Sales Order, to Out of Stock Checking. The 7 new redesign processes are developed and implemented at Case Study Company. The data from before and after process transition is compared to analyze the new design processes. The action practices are developed to prevent new design processes from pitfalls.

The results indicated that operation‟s performances have significant positive linear improvement. By eliminating the activity of price change list printing, exist labels checking, and keying price change item, the average claim for incorrect price after process transition in every branch is reduced more than 40%. The calculated activity costs based is reduced more than 28.54%. As a result from the new replenishment and out of shelf checking process, the average out of shelf rate after process transition in every branch is reduced more than 36.93%. The practices to prevent redesign process‟s risks, from experiences of first two months after process transition, are suggested. The analysis also reveals some important strategies to improve operation process reengineering such as human errors, hardware failure risk, incorrect program parameter, and unexpected result from SAP.

The Regional Centre for Manufacturing Systems Engineering Student‟s Signature:……

Field of Study: …Engineering Management……. Advisor‟s Signature:…….

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INTRODUCTION

1.1 Background of the research

Retailers always try to find the better way to improve customer satisfaction. At the same time, difficulty of surviving in world-today competing business environment is much more furious than ever. In this sector of economy, Incremental development is not enough to achieve competitive advantage. The organization‟s opponents are not only other businesses in the same sector but also continuous extinction and evolution of the retail sector.

Trying to keep their prominent position, an organization need breakthrough creativity to differentiate themselves from competitors, sophisticate strategy to give a direction, productive routine operation to deliver value created from fundamental working-units through organization‟s supply chain, and effective project management to encourage business development. These impacts inspire experts to invent a number of approaches, tools and concepts for customer satisfaction improvement. This thesis emphasize on the application of one of those, Operation Process Reengineering.

1.2 Problem Statement: Retailer's Needs for Operation Process Reengineering

Because of the changing business nature and the complexity of business operation, retailers need Operation Process Reengineering.

1.2.1 The complexity of business operation

In "Retail‟s Complexity: The Information Technology Solution" (2006), SYNTEL.CO.LTD summarized the complexity of retail business which usually causes a number of customization in retail processes into product complexity, scale complexity, process complexity and supply chain complexity. A thousand of complex SKUs always moved place to place around stores. The degree of fluctuate seasonal and fashionable items hardens product hierarchy standardization. Different outlets and channels, multiple handling, and complicate replenishment require effective supply chain management. High number of transactions per day, driven by millions of customers, makes high level of scale complexity. Multiple touch points across business units in the value chain cause complex process coordination.

1.2.2 The changing business nature

In "The Changing Nature of Retail: Planting the seeds for sustainable growth Retail Growth Challenge Framework" (2006), Deloitee .CO .LTD, wrote about 5 changing factors of Retail business. Retail stocks took down with consumer spending shrinkage and no savings retrench. Changing demographic structure boosts hiring, training and retention cost. Innovation and merchandise category poaching make retailer less concentrate on strategic product category and weaken profitability growth. Consumers have more knowledge about products, pricing and features. The value of sales associate workers is reduced. More consumer become seller by using electronic commerce and delivery system.

1.2.3 The sector growth challenges and customer satisfaction

As presented in figure1.1, Deloitee .CO .LTD also mentioned about 6 key retail growth challenges as illustrated in figure1. Hyper-competitors, which have concentrate strategies on adding whole categories, launching new concepts and creating customer experiences, force traditional retailers to reinvent their strategies for sustainable growth. Smart retailers are looking for ways to drive customer conversion, shopping frequency, transaction size and wallet share from exist customer. They open to invest in modern technology to boost operational efficiency and drive expense productivity. With large volume of data and software analysis modern retailers can be much more precise on new product development, assortment management, pricing, and distribution channels and marketing. To enrich the brand experience across multiple channels, retailers have to leverage all channels and fulfill the shopper"s expectations. To define competition on the basis of who is trying to satisfy similar consumer needs, retailers have to spend more effort on measuring untapped customer needs.

Figure1.1: The Retail Growth Challenge Framework

Source: Deloitee .CO .LTD. 2006, The Changing Nature of Retail. United State of America: Deloitee .CO .LTD.

1.3 Objectives

In the order to improve customer satisfaction, this thesis proposes to study about 3 respects as follows;

1.3.1 To improve Retailer‟s Operation Process in term of quality, cost, and delivery, when compared with average.

1.3.2 To demonstrate a contribution of applying OPR as an information provider.

1.4.1 To demonstrate tools for avoiding OPR pitfalls in retail business.

1.4 Expected Benefits: The better way for setting the strategy with OPR

An essential intention of this thesis is demonstrating the contribution of OPR as an information provider for strategic planning. Even though process planning and managing are the key factors of doing business, there are innumerable obstacles which undermine the road to success. Two of them are the main inspirational resources of the thesis.

Firstly, there are countless failed strategic with uncompetitive process. Consuming energy, time, information and resource, strategic plan is created by the best people of an organization. Unclear and misleading process brings a company to regretful failures. Without immersed process planning, strategies are really hard to achieve success. In the case of ABC Company, the operational process is not clearly defined. This ambiguousness can mislead staff‟s effort. Many staffs found themselves stuck between requests from other stakeholders.

Secondary, inferior and inappropriate strategy wastes organization‟s limited resource. Successful business‟s root is a combination of strategy and execution process. It contains sets of relative operations and change management. Without suitable strategy, the best process is worthless. Without a detailed information background a strategy is inexplicit and easy to be distorted. This thesis will show how operation process can detect and report necessary information for strategic planning.

With the main concept of “converting OPR to be a data provider for strategic planning, this research will be useful for managers, subordinators and organizations. It will help managers to match an appropriate execution with their strategy by giving a practical guideline for controlling and planning process. It also makes subordinators understand the procedure, direction and the value of their job to the project. At the same time, it will help an organization on monitoring the performance of a department. Many pitfalls can be avoided with a systematic management.

1.5 Scope of the study

The study is focused on;

1. The current issue of OPR.
2. The application operational retailer process.
3. The shop-floor operation of the selected case study. (The DIY department of ABC Ceramic Co. Ltd.)
4. The performance evaluation of a new operation process
5. The suggestion for new strategy development

1.6 Research Methodology

The Methodology to reach the objectives is as follows.

1. A theoretical overview, explanation and discussion of BPR.
2. Developing a model for mapping and measuring current performance of the case study.
   Tools: Flow chart, Work Flow Analysis, Motion and Time Study, Business Process Mapping

3. Apply BPR principle to OPR for a case study.
   Tools: DMAIC, 5Why analysis, FMEA, Histogram, Ishikawa diagram, ECRS, The Consolidate BPR, SWOT

4. Select a set of department KPIs for the case study
   Tools: The operational dimension of Balance Scored Card

5. Evaluate the new process.
   Tools: Department KPIs

6. Summarize suggestion for strategic planning
7. Prepare the draft of the thesis report.
8. Attend the thesis examination.

1.7 Literature Review

In The Management of Business Logistics (2003), John J Coyle, Edward J. Bardi and C. John Lamgley Jr. integrated supply chain concept, focus on logistic business. It includes topics about demand management, Inventory, Transportation, Procurement, financing and customer service. The writers describe as supply chain approach as one of the latest developments in logistics management. Its concept focus blends logistics theory with practical applications. Material of latest transportation regulations and carrier pricing are updated. The literature can present the overall and detailed picture of supply chain that enforces retail business. It is useful for pointing the origin of problems that occurred with shop floor operation.

In Consumer Centric Category Management, John Karolefski and Al Heller provide an insight how leading companies, such as Hershey and Hewlett-Packard, have used category management to succeed. They demonstrate the guide line to apply their methods in other organizations. Retailers and their manufacturer partners will learn the way to succeed by offering the right selection of products. They will understand about marketing and merchandising, based on the consumer‟s requirement and organization commitment. When apply to the ABC case, the concept category management is very useful. The book can help retailer on planning for product treatment of each category in a store. The role and relationship of each product can be clarified monitored and treated to optimize their performance.

In Business Process Management Systems: Strategy and Implementation, James F. Chang presents almost every issue of the BPR and summaries of various BPM concepts, improvement practices, technologies application, data integration technologies, workflow analysis, and the way to manage data, systems, and people. The writer focuses on strategy and implementation. He demonstrates business management practices and the supporting technology. He mentions that BPM concept can bring success by synthesizing of radical and continuous change. The book includes many technologies that enable Business Process Management System (BPMS).

When apply to the ABC case, this book has many powerful tools for OPR. Although the context of the book cover much further than operational level, it principal can guide the way to configure and align each activity to create the standard process.

In Strategy Map (2003), Robert S. Kaplan and David P. Norton introduced a practical diagram for describing how an organization creates value through 4 perspectives; financial, internal process, customer and learning & growth. Developed from Balanced Scorecard objectives, strategy map can help an organization on creating value from intangible asset, and guide the way to deliver value to customers. Appropriate strategy will be configured from different point of views. The writers also demonstrate many cases of planning, preparing and applying strategy map in different sectors of business. When applied to OPR, the tool will guide necessary information for strategic planning.

CHAPTER II
THEORITICAL FRAMEWORK

This chapter covers theories related to further research. It present theoretical back ground of operation process reengineering, process mapping, FMEA technique and ECRS technique. The introduction, objective, implementation method, success factors, and accomplishments of operation process reengineering are described.

2.1 The introduction of Operation Process Reengineering

Operation Process Reengineering (OPR) is an Operational part of Business Process Reengineering (BPR). Invented by Michael Hammer and Thomas H. Davenport, BPR can be defined in different perspectives.

"... the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed." Hammer and Champy. (1993)

"…encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions". Thomas H. Davenport. (1993)"

"BPR, although a close relative, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a

strategic tool and a core competence of the organization. BPR concentrates on core business processes, and uses the specific techniques within the JIT and TQM "toolboxes" as enablers, while broadening the process vision." Johansson *et al*. (1993)

Driven by customers, competitors, and changes, businesses found that BPR is an appropriate solution for their fuzzy problems. Instead of abiding with small improvements, the method induces companies to reexamine about the roots of their business activities. With better knowledge and deeper understanding about their business logic, companies can totally reinvent their business model. They can redesign strategic and value added processes, to enforce organization's capability beyond its boundary. Since 1993 the development of BPR has been under gone a numbers of theoretical theories as shown in table 2.1

Table 2.1: Approaches to BPR and theoretical of BPR

Authors	Approaches or perspectives to BPR	Theoretical basis of BPR
Davenport and Short	Operational.	An extension of industrial engineering.
Davenport	Strategic and operational.	Combination of industrial engineering, quality movement and technological innovation.
Harrington	Strategic and operational.	Quality movement.
Hammer and Champy	Strategic, organisational and operational.	Change management, strategic IT and process innovation.
Rigby	Organisational.	Scientific management and value analysis.
Zairi and Sinclair	Strategic, organisational and operational.	Strategic management, strategic IT, industrial engineering, change management, process innovation and management.

SOURCE: SHARIFA, S. 2005. The Implementation of Business Process Management in the Hotel Sector. United States of America: Pearson Prentice Hall.

2.2 The Objective of BPR

"BPR is not downsizing, restructuring, reorganization, automation, or new technology. It is the examination and change of five basic business components: strategy, process, technology, organization, and culture." Mihail, S., Nimit, C., and Namchul, Shin. 2003. Investigation of the Methodologies of Business Process Reengineering. United States of America : Pearson Prentice Hall.

The objective of Business Process Reengineering is to create an effective process, which can transcend the as-is organization limit. By tailoring series of steps designed to produce a product or a service, a company can integrate act ivies and achieve the better way to deliver its value for customers. However there are many concerns about redesign procedure.

"Talking about the importance of processes just as companies have organization charts, they should also have what are called process maps to give a picture of how work flows through the company. Process mapping provides tools and a proven methodology for identifying your current As-Is business processes and can be used to provide a To-Be roadmap for reengineering your product and service business enterprise functions." Subramanian, M., Larry, W., and Hossein, C. 1999. Business Process Reengineering: A Consolidated Methodology. United States of America : Pearson Prentice Hall.

Staffs in an organization usually think of departments or individuals more often than an invisible process. A good process still needs a proper communication to gather collaboration from every business unit. Process name should imply all activities that must be done between start and finished. For example, "goods list checking" can be called "goods receive process".

Although a company has to analyze it process from the holistic point of view, it does not mean that a company has to do reengineering with every part of an organization. After logics and tasks of each process are examined and understood radically, a company can find the set of target processes for redesign.

"No company can take up the unenviable task of reengineering all the processes simultaneously."

Generally they make their choices based on three criteria:- dysfunction: which processes are functioning the worst?; importance: which are the most critical and influential in terms of customer satisfaction; feasibility: which are the processes that are most likely to be successfully reengineered." Hammer,M., Champy.J. (1993). Reengineering the Corporation: A Manifesto for Business Revolution., London: Harper Collins.

2.3 The Implementation BPR

A numbers of theorist suggest processes to implement BPR in many ways. For the example, Underdown, D. R., (1997), mentioned that BPR should be started with the sequence of vision & strategy defining, desired culture creating, enterprise integrating and technology solution developing.

In "BPR: a consolidated methodology", Subramanian Muthu, Larry Whitman, and S. Hossein Cheraghi summarized those contemporary methodologists and The consolidate BPR as shown in figure 2.1 And table 2.2

Table 2.2: A few BPR methodologies from contemporary literature

Activity#	Methodology #1	Methodology #2
1	Develop vision & strategy	Determine Customer Requirements &Goals for the Process
2	Create desired culture	Map and Measure the Existing Process
3	Integrate & Improve enterprise	Analyze and Modify Existing Process
4	Develop technology solutions	Design a Reengineered Process:
5		Implement the Reengineered Process

Activity#	Methodology#3	Methodology #4	Methodology #5
1	Set Direction	Motivating Reengineering	Preparation
2	Baseline and Benchmark	Justifying Reengineering	Identification
3	Create the Vision	Planning Reengineering	Vision
4	Launch Problem Solving Projects	Setting up for Reengineering	Technical & Social design
5	Design Improvements	As Is Description & Analysis:	Transformation
6	Implement Change	To-Be Design and Validation	
7	Embed Continuous Improvement	Implementation	

Source: Subramanian, M., Larry, W., and Hossein, C. 1999. Business Process Reengineering: A Consolidated Methodology. United States of America : Pearson Prentice Hall.

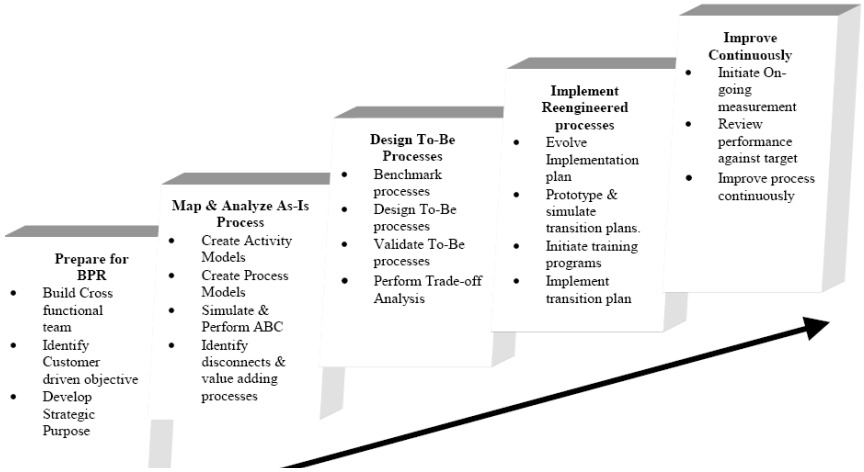


Figure 2.1: The consolidate BPR

Source: Subramanian, M., Larry, W., and Hossein, C. 1999. Business Process Reengineering: A Consolidated Methodology. United States of America : Pearson Prentice Hall.

2.4 The Accomplishments of BPR

2.4.1 Case of the City of San Diego

"The City has completed or is in the process of completing BPR studies for more than 40 functions and/or departments. Of these studies, 17 are in implementation, 14 are in managed competition and ten are pending approval." City of San Diego. 2009. Fiscal Year 2009 Annual Budget. United States of America: City of San Diego.

San Diego consolidated its previously disparate Fleet Services operation into one agile unit. The city could save $2.6 million annually and still meet the vehicle and equipment needs. The services could prepare 20 of the type 1 reserve engines instead of 1 engine as before. While saving more than $7 million annually, the BPR helped the city to centralize engineering functions, to streamline departments, to improve its efficiency. With processes streamlining, supervisory positions reducing and schedules modifying, Metropolitan Wastewater Department was consolidated and $21.6 million annually was saved

Case of Herbert Retail Ltd.

From "Business Process Re-engineering (BPR): An integrated business process that eliminates wastes and provider real-time management reporting", Liang Zong mentioned about the notable success of BPM implement. Herbert Retail Ltd. is a market leader of labeling and business solutions for major UK supermarkets, such as Tesco, Sainsbury's, and M&S.
The company has developed a nationwide manufacturing, equipment supplying, project managing, installing, and repairing. With BPR business process is integrated to eliminate wastes and provides real-time management. This BPR project aims to analyze current business processes, identify relationships, develop a business process model that

addresses the key business processes, implement new operating systems, and establish monitoring of the process efficiencies. With identifying and correcting low stock accuracy, profit is improved by 15,000 Pounds per annum. With invoicing accuracy improvement, over 75,000 pounds is released from the customers. The company also improves process in a logistics function critical to service delivery and creates a lean front end business process.

2.5 Factors that lead to successful of reengineering projects

In A Comparative Study of Business Process Reengineering in China, Xin James He mentioned that 95% of Chinese firms agree that the top 4 success factors of BPR are Management support, Improving Cross-functional communications, Cross-unit project team composition, and Measurable BPR objectives.

2.6 Factors that cause failure on reengineering projects

In A Comparative Study of Business Process Reengineering in China, Xin James He claimed that the top 6 failure factors in China are A culture that resists changes & new ideas, Lack of innovation incentives to SOEs, Seniority, not performance, based promotion, Unemployment pressure of process restructuring, Lack of senior management commitment and Lack of a coherent BPR strategy.

In Modelling and analysis of business process reengineering, A. GUNASEKARAN and B. KOBU, listed some of the factors that will prevent reengineering and hence innovation and growth are:

- correcting the process instead of changing it
- loss of nerve
- the barons
- change of company champion
- settling for minor results
- culture, attitudes and skill base
- skimping on resources
- pulling back when people resist change

2.7 The introduction of Process Mapping

Process mapping is a blueprint of how an organization is operated. With process mapping, a company will have an explicit description of the way an organization delivers its services. This will give managers a holistic picture of what works well and what doesn‟t, so a company can think about how to improve things that obstruct business process. In A Conceptual Framework for Intention Driven Flexible Workflow Modeling, 2004, S. Nurcan suggested about the objective of Business Mapping Process as following finding:

- The amount of detail to be handled in analyzing and improving BPs makes it difficult to master.
- Approaches and models offering the ability to describe, initially, the invariants of the BPs in terms of objectives and strategies before specifying the manner of making them operational, in a particular organizational context, facilitate to mastering these difficulties.
- A clear representation of the business objectives simplifies also the comprehension of the organizational change and the evolution of the business model.
- BPs can be roughly classified into two categories depending on their nature. The first concerns well defined and -often- repetitive processes having important coordination and automation needs. The second category concerns ill-defined processes.
- The importance of establishing and preserving the „best fit" between BP models and IS specifications is commonly accepted by stakeholders.

"Traditionally, BPM systems were used to support static BPs, in sense of, processes which do not change frequently. This has limited the scope of this management. Business process modeling management systems and languages that are able to describe and unroll dynamically changing processes are today necessary." Bentellis, M. and Boufaïda, P. 2004. Conceptual Method for Flexible Business Process Modeling. United State of America:

There are many types of mapping tools that can support OPR, such as Flow Chart, Process documentation, Process mapping software, Fox Prism, and EPC 5. Flow Chart represents organization"s processes with a clear picture of the functions and responsibility. This tool is useful for evaluating a weak link and value added activities tailoring. Process Documentation is a tool for setting the standard of business activities with a margin of tolerance. Process mapping software is a hi-tech computer program, which can automate business activities to eliminate human errors.

"Modeling tools should easily be understandable and Flexible so that process mapping and benchmarking can be carried out in a more visual manner for an effective reengineering business process. The Internet and WWW can be used for benchmarking business processes, including partnerships with other world class companies." GUNASEKARAN, J. and KOBU, U. 2005. Modeling and analysis of business process reengineering. United States of America: Pearson Prentice Hall.

Process mapping tools are useful for every organization, which interest in operation improvement. Since the smallest until the global business, process enable staffs to response for their role, accountability, function and efficiency. However process operation, planning and monitoring can be misunderstand with ineffective communication. An example of process mapping is shown in figure 2.2. Process mapping will encourage better awareness of high priority issues. In Using Process Mapping to Improve Efficiency in a Forensic Laboratory (2006), Julie French wrote about some benefits of business process mapping as follows:

- Creating a historical record of the unit to ensure continuity over time.
- Creating a documented, graphical demonstration of your current processes to improve communication of the operations and future of the unit.

- Experiencing a strong team building exercise, creating a sense of ownership.
- Developing a common language to discuss the lab process among scientists and managers.
- Creating a disciplined work environment that is constantly working towards self-improvement

"Allowing the BP to evolve in an agile manner require flexibility in the process definition. Flexibility is the adaptation to a changing environment. Flexibility exists under different forms. It can appear at built time or run time. It can be selective or adaptive. All that depends on, at what level we need flexibility" Saidani, J. and Nurcan, I. 2005. A role based approach for modeling flexible business processes. United States of America: Pearson Prentice Hall.

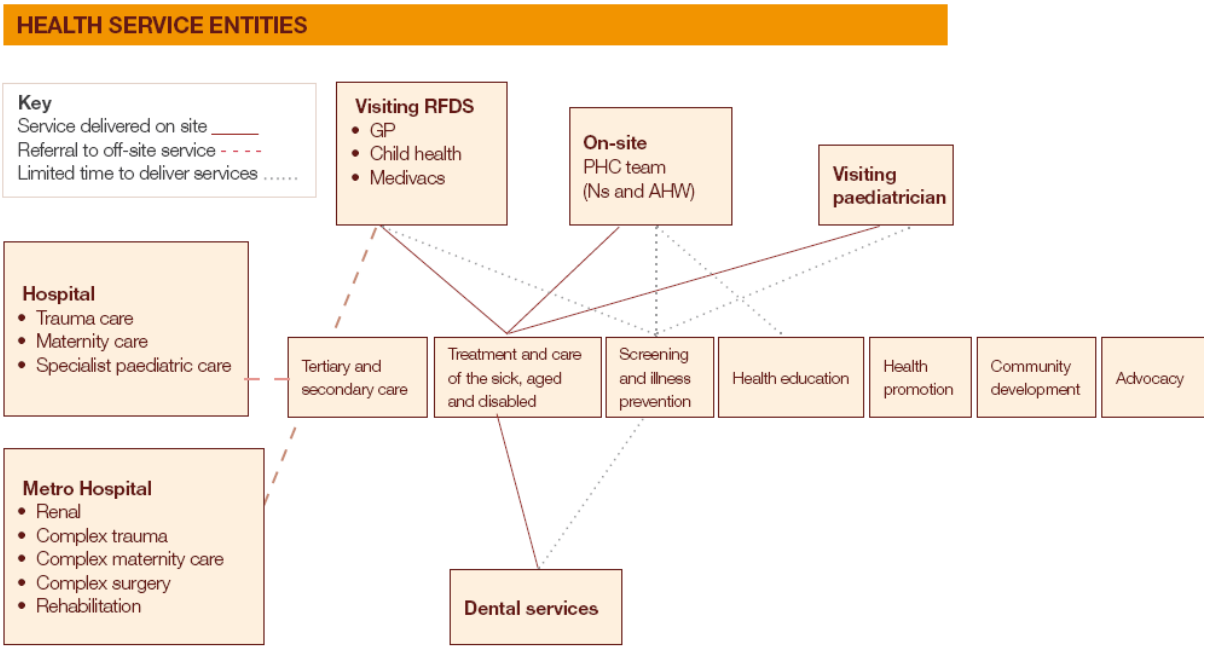


Figure 2.2: An Example of Business Process Mapping for Remote Community Health Services

Source: Office for Aboriginal and Torres Strait Islander Health. 2005. Service Toolkit. United States of America: Pearson Prentice Hall.

2.8 The introduction of DMAIC

DMAIC is a Six-Sigma tool for incremental process improvement. DMAIC stand for 5 data-driven improvement phases including, Define, Measure, Analyze, Improve, and Control. Define is identifying the Customer Critical to Quality, the scope of improvement, and process flow. By allowing free criticism thinking, this step will generate high volume of free thinking ideas. The useful tools for define step are Brainstorming, Project Selection Criteria, Team Charter, SIPOC - High Level Flowchart, VOC (Voice of the Customer) and CTQ (Critical to Quality) Tree. The purpose and scope of a project will be indentified. Measure is data collection and survey. Analyze is finding the root cause of defects, the gap of opportunities, and source of variation. Improve is

developing the solution for solving the problems of exploiting opportunities. Control is preventing the recurring of errors.

In "DMAIC Project Selection Using a Systematic Approach", Mark R. Tellier suggested that the DAMIC projection selection should be optimized by Structure-Conduct-Performance Model and SWOT analysis to filter down through the balance of the DMAIC project, minimize the risk of failure and utilize resources. The concept of a systematic approach is shown in figure 2.3.

"The S-C-P Model (Structure-Conduct-Performance) uses a top-down approach as a key to and effective project. Structure measures the economic value of the project. Conduct is the ability to exploit the maximum value from the project. Performance evaluates the potential for a successful project. SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) is an effective tool in bringing together a realistic assessment of relevant projects based on a specific thought process. The results of the SWOT analysis give an objective idea of the strongest projects that filter down to the pragmatic analysis that results in project choice." Mark T. 2006. DMAIC Project Selection Using a Systematic Approach. United States of America: Pearson Prentice Hall.

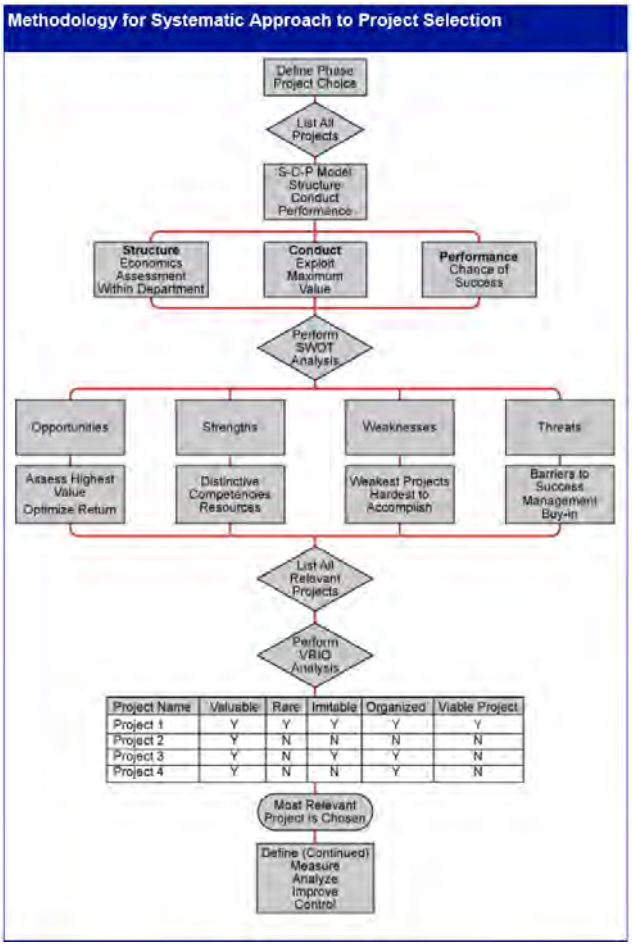


Figure 2.3: Methodology for Systematic Approach to Project Selection

Source: Mark T. 2006. DMAIC Project Selection Using a Systematic Approach United States of America: Pearson Prentice Hall.

Many experts discussed that in some cases DMAIC may be replaced with DMEDI process redesign approach. DMEDI is more creative approach to designing robust processes including Design, Measure, Explore, Develop and Implement. If the process does not exist or exist in a very lose form, DMEDI is the better way to implement as shown in figure 2.4. However DMEDI projects generally require a longer lead and resource time to complete. According to DMEDI or DMAIC? That is the Question (2006); Steven H. Jones proposed that deciding whether a project is going to follow a DMAIC improvement approach or a DMEDI design approach will be essential for real success. The different between DMEDI and DMAIC is presented in table 2.3.

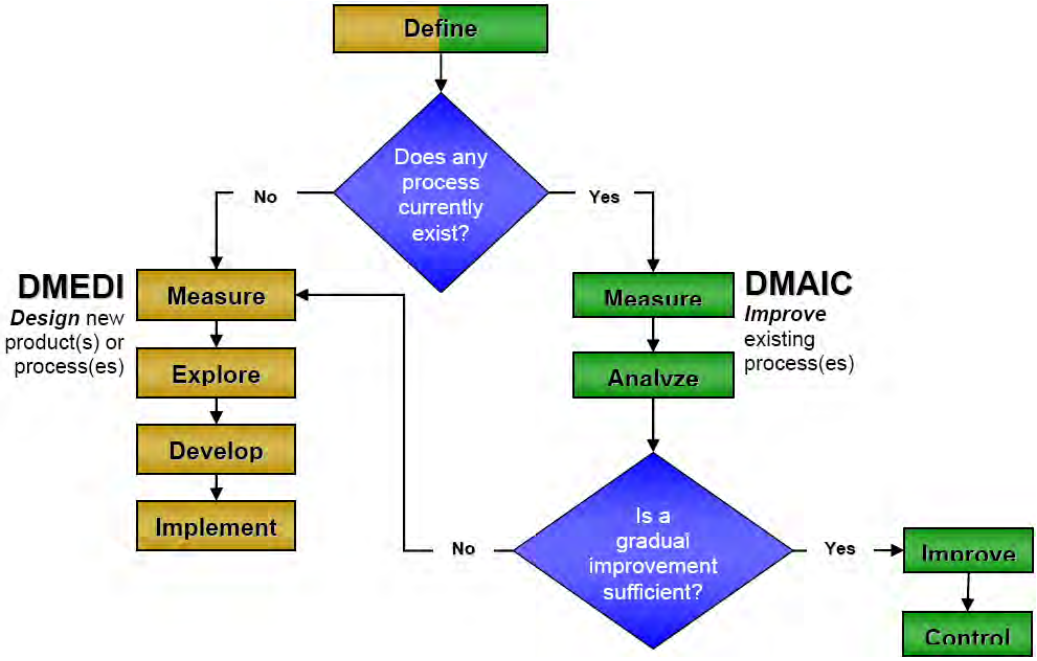


Figure 2.4: the decision for DMEDI or DMAIC

Source: Steven, J. 2006. DMEDI or DMAIC? That is the Question. United States of America: Pearson Prentice Hall.

Table 2.3 The different between DMEDI and DMAIC
Source: Steven, J. 2006. DMEDI or DMAIC? That is the Question. United States of America: Pearson Prentice Hall.

DMAIC	DMEDI
Define – Determine Project Scope, Objectives, Resources, Constraints	**Define** – Very Similar to DMAIC
Measure – Determine Customer Groups, Determine CCR's, Obtain Data to Quantify Process Performance	**Measure** – Define Customers and Needs Using VOC and QFD, Determine CCR's
Analyze – Analyze Data to Identify Tangible Root Causes of Defects	**Explore** – Develop Design Concepts, and High-Level Design
Improve – Intervene in the Process to Improve Performance	**Develop** – Develop and Optimize Detailed Design
Control – Implement a Control System to Maintain Performance over Time	**Implement** – Validate Design with Pilot, Establish Controls, Full Scale Implementation

2.9 The introduction of ECRS

ECRS is the concept for treating "MUDA" of waste. ECRS stand for 5 unconnected methods including, Eliminate, Combine, Rearrange, and Simplify. Eliminate is considering wastes in current process and finding the solution to reduce them. Combine is reducing non-core activities to reduce time and errors. Rearrange is redesigning the sequences of work activities to optimize the process. Simplify creating solution to reduce difficulties in a process.

2.10 The introduction of Failure Mode and Effects Analysis (FMEA)

FMEA is an analysis tool for errors and defects analysis. The tool can help a company on evaluating the root cause and effect of problems. It is useful for preventing the recurring the old threats. FMEA process starts with indentifying errors and defect the process, selecting the method for data collection, analyze the Risk Priority Number (RPN), creating the solving solution. The success FMEA needs continuous improvement to control the process in long term.

The method help process engineer to examine potential failure in products or processes. It allows engineer to anticipate process problems and consequences in a company. It also helps engineer to prioritize and to find the solution with effective control plan. The severity rating, occurrence rating, and detection rating will be assigned to failures as presented in table 2.6-2.7. The engineer could use the list of failure modes to allocate resources in action plan.

The importance of FMEA is the evaluation of high rank failure mode. The engineer could plan corrective and prevention action to prevent operation from failures. The analysis method and background reasons will be recorded systematical for further investigation or improvement. Theoretically FMEA is classified into Design FMEA and Process FMEA. According to Johnson (2002), the effective FMEA implementation steps could be planed as follows:

- Review the process
- Brain storm failure mode
- List potential effect of each failure mode
- Assign severity rating, occurrence rating, and detection rating
- Calculation the risk priority number
- Prioritize the failure modes for action
- Take action to reduce risk of high failure mode

Table 2.6: Severity Evaluation Criteria

Effect	Criteria: Severity of Effect on Product (Customer Effect)	Criteria: Severity of Effect on Process (Manufacturing/Assembly Effect)	Rank
Failure to Meet Safety and/or Regulatory Requirements	Potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation without warning	May endanger operator (machine or assembly) without warning	10
Failure to Meet Safety and/or Regulatory Requirements	Potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation with warning.	Or may endanger operator (machine or assembly) with warning.	9
Loss or Degradation of Primary Function (Major Disruption)	Loss of primary function (vehicle inoperable, does not affect safe vehicle operation).	100% of product may have to be scrapped. Line shutdown or stop ship.	8
Loss or Degradation of Primary Function (Moderate Disruption)	Degradation of primary function (vehicle operable, but at reduced level of performance).	A portion of the production run may have to be scrapped. Deviation from primary process including decreased line speed or added manpower.	7
Loss or degradation of Secondary Function (Moderate disruption)	Loss of secondary function (vehicle operable, but comfort/convenience functions inoperable).	100% of production run may have to be reworked off line and accepted.	6
	Degradation of secondary function (vehicle operable, but comfort/convenience functions at reduced level of performance).	A portion of the production run may have to be reworked off line and accepted	5
Annoyance (Moderate disruption)	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by most customers (> 75%).	100% of production run may have to be reworked in station before it is processed.	4
Annoyance (Moderate disruption)	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by many customers (50%)	A portion of the production run may have to be reworked in-station before it is processed.	3
Annoyance (Minor disruption)	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by discriminating customers (< 25%).	Slight inconvenience to process, operation, or operator.	2
No effect	No discernible effect.	No discernible effect	1

Source: Quality Associate International. 2009. Failure Mode and Effects Analysis. United States of America: Quality Associate International.

Table 2.7: Occurrence Evaluation Criteria

SUGGESTED DETECTION EVALUATION CRITERIA			
Opportunity for Detection	**Criteria: Likelihood of Detection by Process Control**	**Rank**	**Likelihood Of Detection**
No detection Opportunity	No current process control; Cannot detect or is not analyzed.	10	Almost Impossible
Not likely to detect at any stage	Failure Mode and/or Error (Cause) is not easily detected (e.g., random audits)	9	Very Remote
Problem Detection Post Processing	Failure Mode detection post-processing by operator through visual/tactile/audible means	8	Remote
Problem Detection at Source	Failure Mode detection in-station by operator through visual/tactile/audible means or post-processing through use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc.	7	Very Low
Problem Detection Post Processing	Failure Mode detection post-processing by operator through use of variable gauging or in-station by operator through the use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc.)	6	Low
Problem Detection at Source	Failure Mode or Error (Cause) detection in-station by operator through use of variable gauging or by automated controls in-station that will detect discrepant part and notify operator (light, buzzer, etc.). Gauging performed on setup and first-piece check (for set-up causes only)	5	Moderate
Problem Detection Post Processing	Failure Mode detection post-processing by automated controls that will detect discrepant part and lock part to prevent further processing.	4	Moderately High
Problem Detection at Source	Failure Mode detection in-station by automated controls that will detect discrepant part and automatically lock part in station to prevent further processing	3	High
Error Detection and/or Problem Prevention	Error (Cause) detection in-station by automated controls that will detect error and prevent discrepant part from being made	2	Very High
Detection not applicable; Error Prevention	Error (Cause) prevention as a result of fixture design, machine design or part design or part design. Discrepant parts cannot be made because item has been error-proofed by process/product design	1	Almost Certain

Source: Quality Associate International. 2009. Failure Mode and Effects Analysis. United States of America: Quality Associate International.

Table 2.5: Occurrence Evaluation Criteria

SUGGESTED OCCURRENCE EVALUATION CRITERIA			
Likelihood of Failure	**Criteria: Occurrence of Cause (Incidents per items/vehicles**	**PPK**	**Rank**
Very High	≥100 per thousand pieces ≥ 1 in 10	<0.55	10
High	50 per thousand pieces 1 in 20	≥0.55	9
	20 per thousand pieces 1 in 50	≥0.78	8
	10 per thousand pieces 1 in 100	≥0.86	7
Moderate	2 per thousand pieces 1 in 500	≥0.94	6
	.5 per thousand pieces 1 in 2,000	≥1.00	5
	.1 per thousand pieces 1 in 10,000	≥1.10	4
Low	0.01 per thousand pieces 1 in 100,000	≥1.20	3
	0.001 per thousand pieces 1 in 1,000,000	≥1.30	2
Very Low	Failure is eliminated through preventative control	≥1.67	1

Source: Quality Associate International. 2009. Failure Mode and Effects Analysis. United States of America: Quality Associate International.

2.11 The introduction of Performance Indicators and KEY Performance Indicators

Performance Indicators are numerical metrics that a company uses for measuring progress and performance of processes. Performance Indicators are the powerful tool for Business Activity Monitoring. KEY Performance Indicators (KPI) are essential metrics that derived from a set of performance indicators. KPI enables a business to bench mark target in time frame. Some potential performance indicators, which appropriate to retailer, are shown in table 2.4.

Table2.4: The Potential Performance Indicators for Retailer

Sales per SKU	Stock Turnover	Replenishment date	Pending time
Sales per Category	Numbers of Mismatch Items	Distribution Cycle Time	Numbers of returned items
Sales per Customer	Defect rate	Out of shelf rate	Service level
Sales per Period	Dead Spot	Out of stock rate	Customer satisfaction

CHAPTER III

THE CASE COMPANY: ABC Co., Ltd.

This chapter describes information of DIY department in ABC Company. The basic information of company background and the company organization are provided. Then in order to have more understanding of the company business market overview and risk factors of this business are described. This overview focuses on the company business, operation process, and business environment which are necessary for further analysis of problem.

3.1 Company Background

ABC Co. Ltd. is an expert of bathroom and kitchen products distributer, with more than 30 years of experience in this business. The company has 6 stylishly and imaginatively designed showrooms in Ratchadapisek, Rangsit, Pinkloa, Bangna, Thonburi-Paktor and Pattaya. With the size of over 2500 sq. meters, each branch displays more than 40,000 of high-quality items to customers, such as ceramic tiles, sanitary ware, bathroom and kitchen accessories, furniture marble, granite and other equipment. Its friendly and knowledgeable staffs are appreciative to serve customers with consultation and invaluable experience.

3.2 Market Overview and risk factors of housing retail business in Thailand

To demonstrate the environment of the Case Study Company, market overview and risk factor of retail business is described.

3.2.1 Classification of housing retail business

Home Product Center Plc. Classified housing retail business in Thailand into 3 groups including: Operators of home center specify store and large chain retail. Operators of home center are home improvement retailers who try to satisfy customer‟s demand in housing segment. Specify store retail businesses that focus on selling specific category such as bathroom ware, and kitchen ware (i.e. Boonthavorn, Grand Home Mart), Home decoration (i.e. Index Living Mall), and construction materials (i.e. Cement Thai Home Mart). Large chain retails are hypermarket that aim at selling of consumer products and have some overlap group of durable products.

3.2.2 Risk Factors housing retail business

Home Product Center Plc. also mentioned about 3 main risk factors including; competitive factor, business factor and legal factor. As described in previous sections, Competitive risk comes from direct and indirect competitors. Retails have to differentiate themselves by focusing on distribution of variety of products and providing expert services. Business risk comes from inventory, operation, investment and account receivables.

Legal risk comes from The Bangkok Metropolis Town Planning Law and The Trade Competition Act such as unfair fixing the prices, unfair requesting for economic benefit, unfair returning of goods, and unfair using of agreement of sell on consignment and coercion to Purchase or to pay for service fee.

3.3 Current status of D.I.Y. Department

The D.I.Y. department of ABC is a supermarket department in ABC Co. Ltd. Its business is quite different from other departments. Products are sold on shelves more than be sold directly by sale personals. In a period of fast growing in last five years, the department is transformed from a small convenient store into a super market store. The company invested a lot of money in technology and infrastructure. Product display is controlled with full schematic and planogram system. At the Rungsit branch, the store area is expanded from 250 sq. miters to 2000 sq. meters. After the renovation, the monthly sales volume is increased from 1,600,000 baths to 7,000,000 baths in 2 months. The sale growth of DIY is presented in table 3.1 and figure 3.1.

Table 3.1: Sales growth by category at Rungsit branch

Rungsit Branch	AUG		Growth
Cat. Group	2007	2008	Rate%
Tap and Shower	496,364	1,030,441	208
Kitchen appliance	7,990	77,200	966
Bath room appliance	146,296.5	463,520	317
Power tool	2,782	209,733	7,539
Toilet parts	11,656	47,817	410
Washbasin	3,657	3,750	103
Miserliness	150,418	516,720	344
Furniture		208,341	
Water treatment	3,882	145,240	3,741
Installation	207,454	876,817	423
Painting		1,336,510	
spare parts	236,309	369,058	156
Gardening	3,415	40,792	1,194
Kitchen accessories	93,796	257,548	275
Lighting		1,074,457	
Bathroom accessories	269,289	439,662	163

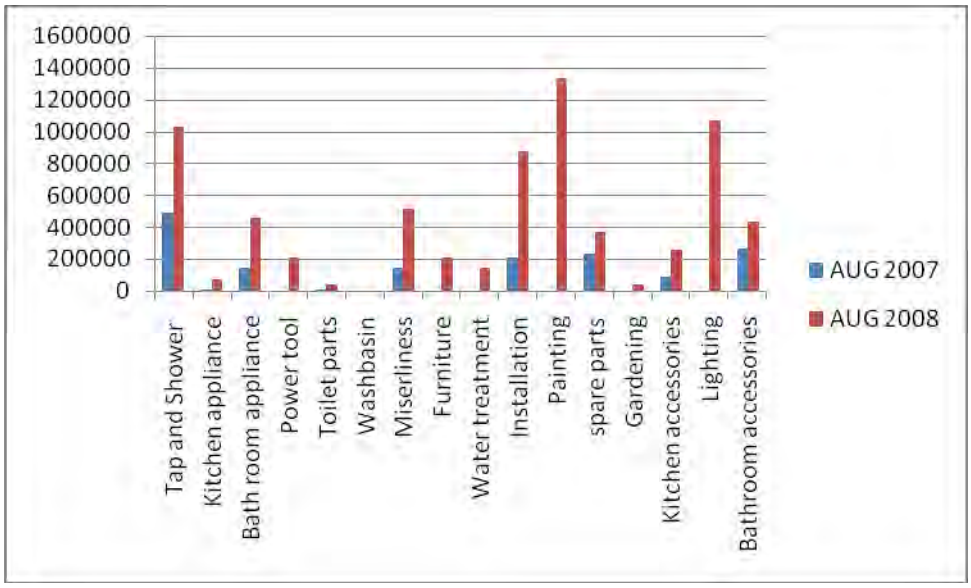


Figure 3.1: Sales growth by category at Rungsit branch

However, management problems are noticed in operation and strategy issues. The old operation process and strategy are just applied from showroom management. The D.I.Y. department stills not have the optimum operation process and strategy. This inappropriate process leads to many critical operational problems as follow.

1. Price labels cannot be updated on time.
2. Operation errors weaken the service level
3. Without training routine, staffs will not have an adequate or updated knowledge.
4. Staff are not monitored coached and evaluated in the right way
5. Staff cannot reach the necessary product information on time
6. A lot of product are out of shelves and waste selling opportunities
7. Without cycle count process, stock record is not accurate
8. Store branches have different service standard
9. Recurring errors discourage staff morale
10. Technology tools are not used in full capacity
11. The essential strategic information is not reported to management level
12. Goods return process takes too long.

These problems result in lower customer satisfaction. ABC realizes that it needs a different process for managing this new business. The record of returned items from every department between May and July 2008 is presented in table 3.2. The company intends to reengineer the operation process of D.I.Y department. Nevertheless before the new process is applied to the shop floor operation, the executives need the proper plan and process simulation for their decision. They want to be sure that the new process is suitable for business requirement and developed under sophisticate strategy.

Table 3.2: The record of returned items from every department between May and July 2008

Branch	BARTER		BROKEN		ILLEGAL		MISPRICED		UNMATCH	
	Bills	Items	Bills	Items	Bills	Items	Bills	Items	Bills	Items
BB	**5,062**	**7,659**	**72**	**83**	**239**	**250**	**3**	**3**	**32**	**45**
BP	**3,956**	**6,767**	**164**	**178**	**163**	**170**	**12**	**35**	**53**	**66**
BR	**1,774**	**2,299**	**5**	**5**	**24**	**28**	**3**	**19**	**35**	**52**
BY	**1,289**	**1,685**	**59**	**66**	**37**	**43**	**12**	**16**	**24**	**26**
BT	**2,041**	**2,580**	**4**	**5**	**27**	**27**	**6**	**9**	**7**	**7**
BT2	**926**	**1,262**	**4**	**7**	**1**	**1**	**1**	**1**	**5**	**6**
BRu	**5,652**	**8,322**	**110**	**113**	**147**	**170**	**2**	**4**	**13**	**15**

Table 3.3**:** SWOT Analysis

Strengths	**Weaknesses**
Brand royalty and customer amiability from more than 30 years experiences in this field of business	Less goods display area than competitors
Reputation of tile and bathroom ware variability draw customer to shop	Weak Brand Image in other provinces
Strong brand image and well known in midland of Thailand	Inefficient Business Processes
Staff and manager have expertise in this field of business	Redundant Processes cause human errors
Good relationship with Suppliers	Long customer pending time
Good Store position throughout Bangkok city	Out of shelf items and out of stock items waste selling opportunities
Leadership in bathroom ware and kitchen ware market	Inexplicit goods sourcing strategy
Sufficient area for goods display	Ineffective local marketing promotion
	Inconsistent goods order lead time
	No systematic staff training
	No systematic knowledge management
	No standard service procedure

Opportunities	Threats
Become Stronger Kitchen ware and bathroom ware leader	Unstable real estate market
New generation customers	Suppliers become new competitors
Contractors Market	Unconstructive Competition between branches
Expand branch to other provinces	Price War

As presented in table 3.3, SWOT Analysis illustrated the relationship between strengths, weaknesses, opportunities, and threats. ABC Company has a good image of a bathroom and kitchen expert retailer for more than 30 years of experiences. The image draw customers to ABC „s store in midland of Thailand. With a good vision ABC‟s stores are in the strategic positions throughout Bangkok city. Customers can feel continence and satisfied with wide range of products, which are displayed in a huge store.

However ABC‟s weaknesses still undermine business performance. Its stores still have less area than its leading competitors. The inefficient and redundant business processes waste time and expenses. Long customer pending time, out of shelf items and inconsistent order lead time dissatisfy customers. Fuzzy process procedures make staff has less time for training and self improvement. Among threats of unstable real estate market, former supplier competitors and prices war, the company tries to overcome its weaknesses and take advantages from opportunities.

Chapter IV

Application of Business Process Improvement in D.I.Y Department of ABC Company

This chapter describes the concept to apply operation process reengineering with D.I.Y Department of ABC Company. The concept evaluation is described to demonstrate the way to implement reengineering theory. Company capability to achieve reengineering success is analyzed in term of top management sponsorship, strategic alignment, compelling business case for change, effective change management, line ownership, and reengineering team composition.

4.1 Concept Evaluation

The idea to implement OPR with retail business is shown in figure 4.1

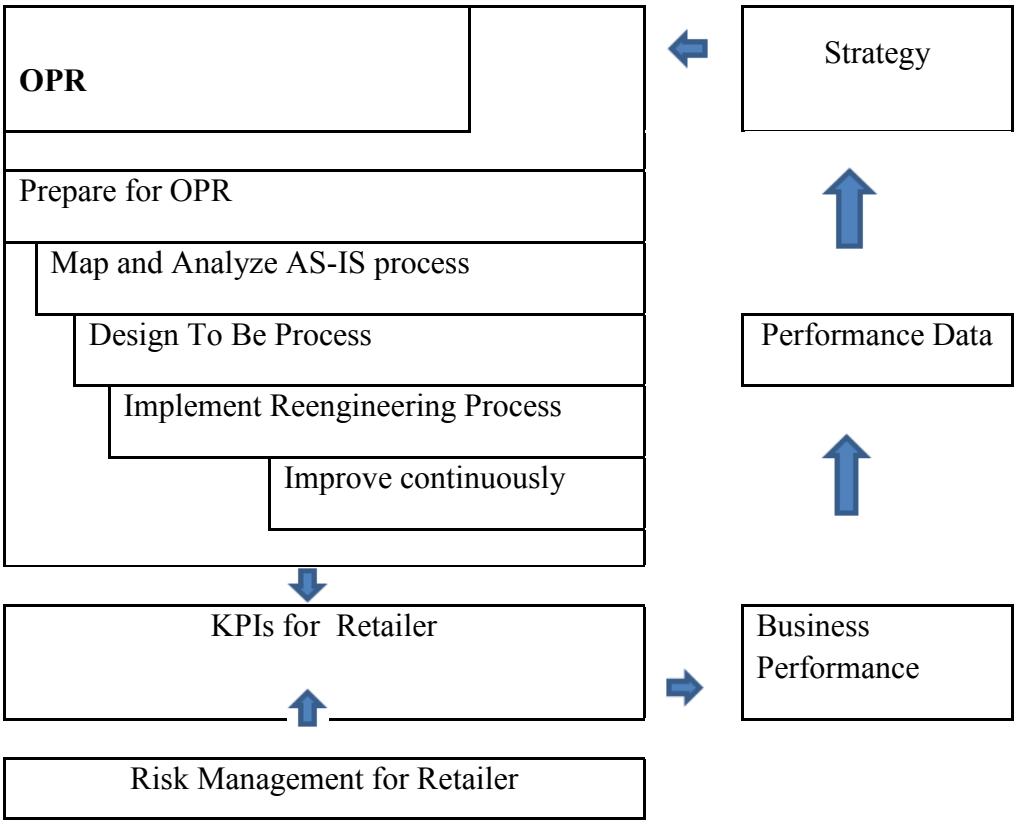


Figure 4.1**:** Primary idea about a loop of OPR

The concept of this framework starts with developing the new operation process with OPR for retail management. Along these steps, the issues of Operation, Analyze AS-IS process, Implementation and Continuous improvement will be analyzed to establish the process fundamental. After the operation process mapping is completed, a set of performance indicators will be considered and chosen to find the Key Performance Indicators.

A new operation process will be redesigned, with monitoring and continuous improvement procedure. When a new process is designed, it will be applied to the model of the case study. The performance and outcomes will be measured with KPIs of Balanced Scorecard and risk management. The performance, feedback and process requirement will be reported as a material for new strategic planning in form of suggestion. In the same way, the new strategy will give an explicit direction for the next loop of continuous process reengineering.

4.2 Company Capability

Before this concept will be implemented to the case study company, field interviews were constructed in the order to explore how the main concept will be applied. Six chief staffs and a department manager are interviewed. The success factors of OPR implementation and company capabilities, from literature review, are discussed to prevent implement project from failure.

According success factor from literature review and field interviews, the company capabilities should be discussed in term of top management sponsorship, strategic alignment, compelling business case for change, effective change management, line ownership, and reengineering team composition.

4.2.1 Top Management Sponsorship

Strong and consistent involvement from executives will facilitate process change with resource and leadership. Generally OPR projects will affect job role, technology, tradition process, and organization culture. Without executive‟s support, implementation efforts can be strongly resisted and ineffective.

“Managerial capabilities and leadership style of the project manager leading the execution of the investment project are among the most influential factor. Decisions are rarely based just on calculations. Projects steered by managerial decisions lead to different outcomes as many personality profiles can be identified for project managers.” Juha, K. 2009. Developing a strategic evaluation framework for technology and architecture asset information management project. United States of America: Pearson Prentice Hall.

4.2.4 Strategic Alignment

The reengineering project goal must be aligned with company strategic direction. Everybody, who gets involved with the project, should be able to understand the relation between business strategy and reengineering efforts. Without strategic alignment, key stakeholders and sponsors may not provide the significant level of support project needs in terms of money and resources.

"Strategic reengineering addresses this shortcoming by focusing on designing the organization to compete. This is accomplished by undertaking strategic initiatives at the start of the reengineering process. These initiatives seek to provide understanding of the markets, competitors, and the position of the organization within the industry. Critical success factors required to compete are identified and prioritized. Only then, is individual business processes addressed" Kehoe, U. and Louise, M. 1994. Down in the Dirt to Clean Up IBM/ Louise Kehoe Offers a Contrasting View of Business Process Re- engineering United States of America: Quality Associate International.

4.2.3 Compelling Business Case for Change

With measurable objectives, the change plan must be summarized in less than one page. If it need more than this, the project will be hard for communication and implementation. It should provide information about critical points, current state, and business impact. The drivers of changes, vision, plan, and specific commitments should be identified.

4.2.4 Effective Change Management

In the order to reduce resistance from implementers, change process must be managed with honest and frequent communication. Implementers must be allowed to show resistance, to raise issues, and to be afraid of changes. The better changes treated the less impact on reengineering efforts.

"A change process cannot be just implemented or as if there was nothing prior to the change. The reality is that there are factors considered to be critical for the success of a BPR effort, such as the need for the conduct of effective change management, the establishment of systems to ensure that staff from different functions work together, and the promotion of stakeholder involvement with effective planning and project management. Such factors reflect the need to implement changes within the existing framework of thins." Nugroho, Y. 2000. Business process reengineering: concepts, causes and effect. United States of America:

4.2.5 Line Ownership

Building partnership and accountability is the responsibility of stakeholders and re-design team. In the order to pair experiences of process owner and expertise of consultants together, Roles, ownership, and accountability must be clear.

"Creating effective process owners is never an easy task. It frequently means changing deeply ingrained management perspectives and behaviors. It also means spanning organizational silos and reorienting their management world view to focus on what links rather than differentiates functions." Gary, M and Vinay, N 2008. Process Ownership: The Overlooked Driver of Sustained BPR Success. United States of America:

4.2.6 Reengineering Team Composition

Re-design team members should be mixed up with different background staffs. A project need people who don't know the process at all, members that know the process inside-out, customers representative, impacted staff, technology gurus, and members from outside of your company to brainstorm and act in different role along project plan.

CHAPTER V
IMPLEMENTING OPERATION PROCESS REENGINEERING IN RETAIL BUSINESS

After the concept to implement operation process reengineering is explained to participants, this chapter demonstrate the way that the case study company implement the reengineering principal in the DIY department. The reengineering steps in this section are applied from the Consolidate Reengineering Methodology, which is mentioned in previous section.

5.1 Preparing for Operation Process Reengineering

The first activity of reengineering is preparing the redesign team and set the direction for reengineering projects. In this step the cross function team member, the project scope and the driven objectives, will be indentified.

5.1.1 Build Cross functional team

"As typical BPR projects involve cross-functional cooperation and significant changes to the status quo, the planning for organizational changes is difficult to conduct without strategic direction from the top. The impact of the environmental changes that serve as the impetus for the reengineering effort must also be considered in establishing guidelines for the reengineering project." Subramanian, M., Larry, W., and Hossein, C. 1999. Business Process Reengineering: A Consolidated Methodology. United States of America: Pearson Prentice Hall.

To ensure that the reengineering project will acquire cooperation from every part of the company and has enough necessary members, OPM Project must be started with building a cross functional team must be built. After the project proposal is approved from the board of executives, the reengineering team is appointed as follow;

- Project Sponsor Executives: The Operational Vice President
- Project Leader: DIY Cooperate Manager
- Project Facilitator: Planning & Development Manager
- Project Members: 6 DIY Branch Chief, 1 IT Administrator ,1 SCM Staff, and 1 Warehouse Branch Chief

5.1.2 Identify Driven objective

- To reduce operational cost of DIY department
- To reduce operation process time of DIY department
- To improve operation service of DIY department

5.1.3 Develop Strategic Scope and Purpose

"If BPR is carried out without understanding the way it is done, then the most likely outcome would be continuing less than-satisfactory current practice and automating outdated processes. This kind of practice misses opportunities for innovation and rationalization. The modeling and analysis of business processes along with business strategies and organizational structures are essential to study

the implications of BPR." GUNASEKARAN, H. and KOBU, G. 2005. Modeling and analysis of business process reengineering. United States of America: Pearson Prentice Hall.

The purpose of this project is to eliminate obstacles in operation process and to redesign an appropriate operation process for DIY department, instead of using applied showroom trading process like today.

The scope of this project only focuses on DIY core operation according to its value chain, not the supporting activities such as accounting, human resource management, and DC Operation.

5.2 Map & Analyze As-Is Process

The second activity of reengineering process is to study, record and analyze the legacy process. Redesign team will create the value chain, model activity model, and process model to record the activity in each process. The disconnections of each process will be indentified.

5.2.1 Create Value chain and Activity Models

In this step redesign team will identify the core activities of DIY department, to demonstrate how the department create and deliver value. As presented in figure 5.1 and 5.2, these models present the scope of the reengineering projects. They are also useful for project communication with people who not get involve with the project. In value chain model, the core values of DIY department are replenish, good display, sell, and distribution. The activity model presents the core activities of DIY department starting with goods replenishing from vendors, goods receiving, stock arranging, out of shelf checking, price label changing and selling.

Figure 5.1: DIY Department Value Chain

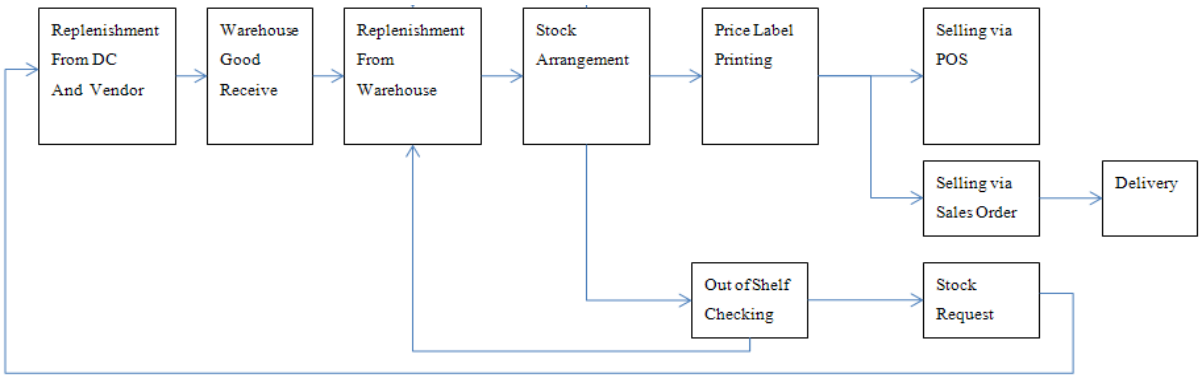


Figure 5.2: DIY Activity Model

5.2.2 As-Is Process Analysis and Disconnects Identification

- Replenishment from DC and Vendor process

Replenishment is a process of acquiring new inventory for daily selling. Computer system will calculate the most appropriate Min-Max value from 12 months sales consumption history. The unrestricted stock of every SKU will be calculated, at day end. If unrestricted stock is less than min value, the system will create back order that will replenish stock volume to Max level. If there are some stocks in DC, the system will create stock transfer request from DC to branch. If there is no stock in DC, the system will suggest SCM-Order Management team to create PO (Purchasing Order). SCM-Order Management team will send PO to vendors. After received and confirmed PO, vendor will prepare goods and send them to branch warehouse or DC.

Disconnects Identification

Although it is a system process, this replenish logic causes a big waste on good receives activity. When DIY goods are sent to a branch, all goods need to be check one by one and put away into warehouse. They need to wait there, until DIY request for replenishment. Warehouse staff has to pick them from storage and transfer to DIY. DIY staff has to recheck all good one by one again before receive them into a shop.

As presented in figure 5.3, this replenish logic used to be valid, when DIY department was only 250 sq. miters. However when it was renovated and expanded to 2000 sq. miters, this logic seems to be flaw. The amount of goods, come to replenish DIY, is increased from 300 items per weeks to 3,500 items per week. More than 85% of these goods need to be stored in DIY in that day. Because of greater volume for goods warehouse staff need more time to check, put away, and pick those stocks for DIY. Sometime this process takes more than three day, since goods sent to store until goods are transferred to DIY. These double handling transactions waste workforce, time and selling opportunity.

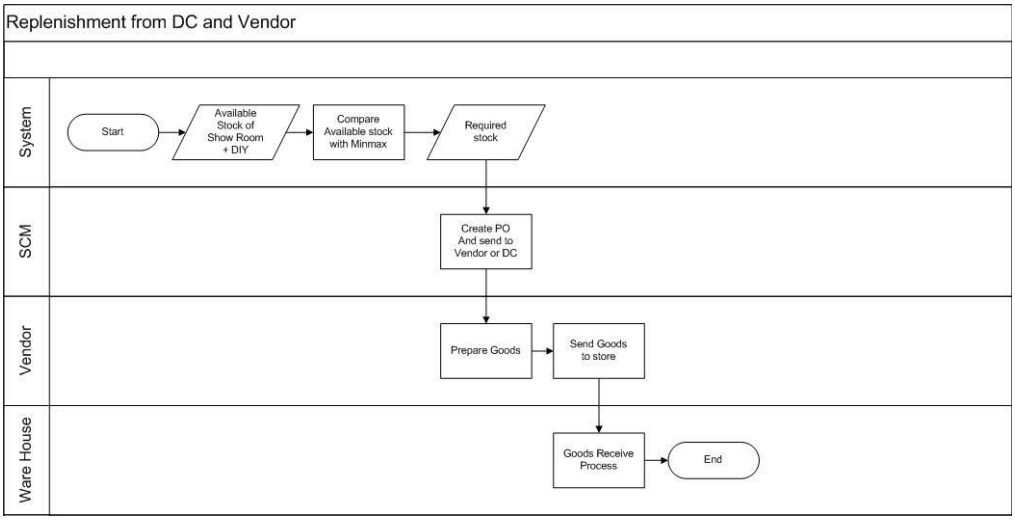


Figure5.3: Replenishment from DC and Vendor process

Measurement
As presented in table 5.1 and figure 5.4, time of warehouse stock preparing for DIY replenishment: This KPI measure the average time spent in warehouse stock preparing for DIY replenishment. Redesign team counts time since warehouse receive stock request from DIY, stock prepared, until stocks are sent to DIY. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Time of warehouse good receive for DIY stock: This KPI measure average time spent in warehouse good receive for product categories that sold in DIY. The time since vendor send goods, good receives until stocks are put away is measured. The average per day data is collected from 2 months history (since November 2009 – December 2009).

DIY Stock volume in warehouse: This KPI measure average DIY stock volume of specific product categories that sold in DIY. The average per day data is collected from 2 months history (since November 2009 – December 2009).

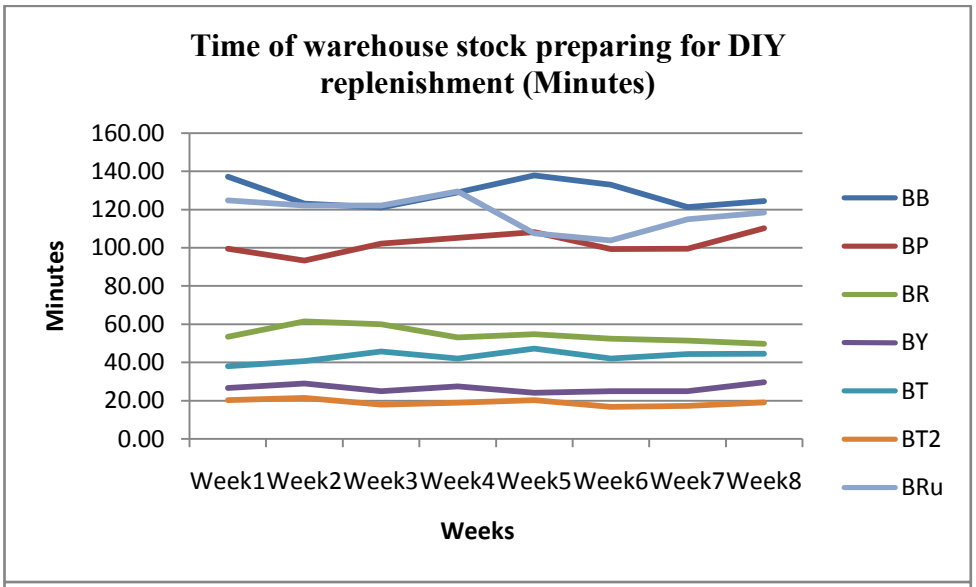
Table5.1**:** Time of warehouse stock preparing for DIY replenishment,

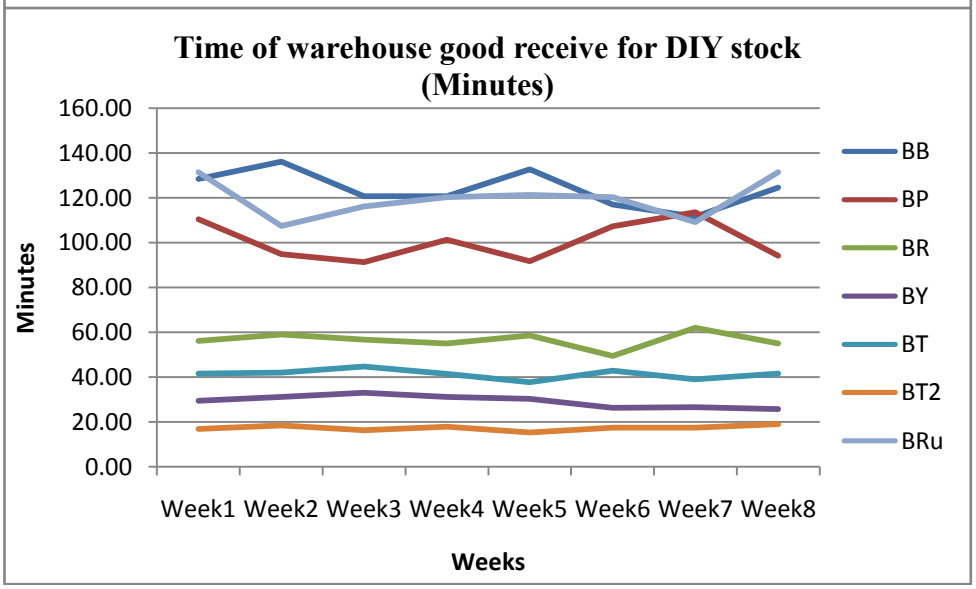
Time of warehouse good receive for DIY stock, DIY Stock volume in warehouse

	Time of warehouse stock preparing for DIY replenishment (Minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	137.23	123.04	121.01	128.96	137.87	132.91	121.11	124.44	128.32
BP	99.46	93.22	102.06	105.12	108.12	99.32	99.46	110.12	102.11
BR	53.45	61.45	59.91	53.14	54.83	52.45	51.45	49.76	54.56
BY	26.60	29.06	24.96	27.42	24.14	24.96	24.96	29.66	26.47
BT	37.89	40.56	45.69	41.89	47.22	41.89	44.36	44.56	43.01
BT2	20.14	21.32	17.74	18.87	20.14	16.63	17.22	18.97	18.88
BRu	124.64	122.08	122.08	129.39	107.47	103.82	114.78	118.43	117.84

	Time of warehouse good receive for DIY stock (Minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	128.43	136.12	120.75	120.75	132.68	116.90	111.54	124.59	123.97
BP	110.39	94.81	91.29	101.24	91.69	107.28	113.51	94.12	100.54
BR	56.11	59.11	56.80	55.05	58.55	49.39	62.06	55.05	56.52
BY	29.39	31.20	33.01	31.20	30.29	26.37	26.67	25.76	29.24
BT	41.53	41.93	44.68	41.43	37.68	42.81	38.96	41.53	41.32
BT2	16.84	18.41	16.30	17.77	15.23	17.38	17.38	18.98	17.29
BRu	131.35	107.39	116.12	120.23	121.23	120.23	109.10	131.35	119.63

	DIY Stock volume in warehouse (units)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	1495.55	1589.10	1449.68	1449.68	1588.10	1578.10	1313.26	1443.54	1488.38
BP	1085.40	1118.89	1325.58	1229.23	1266.02	1045.32	1302.80	1118.89	1186.52
BR	912.17	842.54	792.12	716.48	766.62	891.96	792.12	792.12	813.26
BY	353.03	384.72	310.77	300.21	300.21	381.62	374.15	321.34	340.76
BT	456.74	525.42	442.39	471.37	514.39	413.13	485.81	442.20	468.93
BT2	247.42	211.47	233.04	211.47	225.85	204.29	259.68	261.79	231.88
BRu	1489.29	1554.79	1536.89	1567.21	1523.75	1335.31	1558.89	1559.22	1515.67





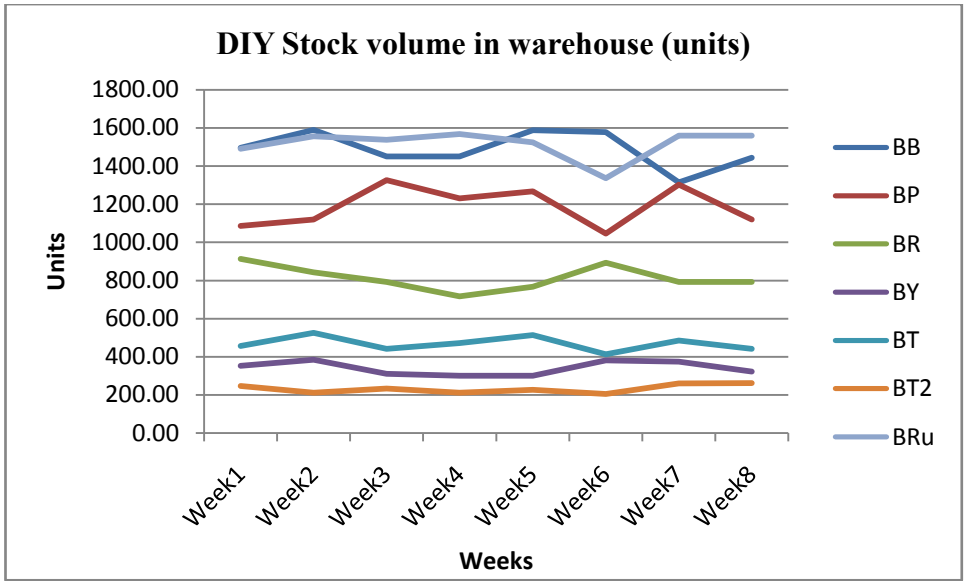


Figure 5.4**:** Time of warehouse stock preparing for DIY replenishment,

Time of warehouse good receive for DIY stock, DIY Stock volume in warehouse

2. Goods Receive

After vendor send goods to a branch warehouse with invoice paper, warehouse staff will compare it with PO. A list of goods in invoice will be confirmed. If any item in invoice is not existed in PO, it will be reject to vendor. Physical goods will be checked and put away to storage to warehouse. Goods will be kept in warehouse until customer order them or DIY department request for them with stock transfer request paper. With stock transfer request paper, good will be picked and transfer to DIY. Amount and condition of stock will be rechecked. Stock will be received and displayed in DIY shop.

Disconnects Identification

Two major problems of good receive process are time spent and human error. Goods receive is an important process, but no value added. The faster the process is done the more process is utilized. Every time that a stock is transferred from one department to another department, it is needed to be check one by one in term of amount and condition.

Generally DIY department has product more than 12,000 SKU. Many of them are very look alike. It is not easy for checker to discriminate each one. Human errors can cause false goods receive and undermine stock accuracy.

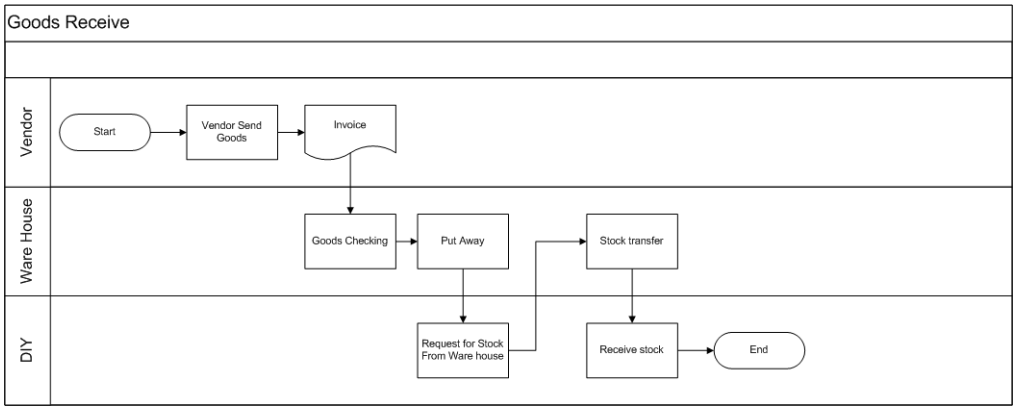


Figure5.3: Good Receive from Vendor Process

Measurement

DIY goods receive time: As presented in figure 5.4-5.5 and table 5.2-5.3, this KPI measures the average time since stock send to DIY until stocks are put away and stored in DIY shelf. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Table5.2: Time of DIY good receive (units)

	DIY goods receive (units)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	708.25	687.06	687.06	623.48	644.67	644.67	729.45	744.44	683.64
BP	662.94	722.94	663.39	578.64	583.99	643.54	643.54	623.69	640.34
BR	354.51	377.84	402.75	435.02	427.60	390.33	427.60	390.33	400.75
BY	186.32	177.59	164.41	177.86	181.52	188.84	166.89	172.38	176.98
BT	269.76	261.72	254.56	238.83	253.89	231.97	253.89	256.39	252.63
BT2	111.62	114.90	112.37	118.37	116.42	111.21	114.32	110.79	113.75
BRu	814.98	766.21	783.52	788.93	888.14	766.21	712.05	773.29	786.66

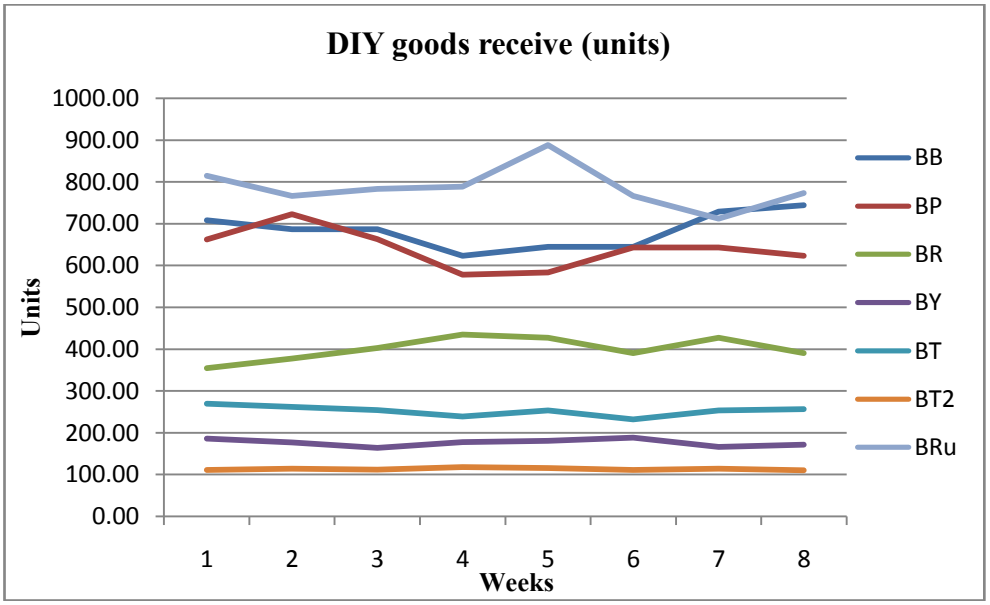


Figure5.4: Time of DIY good receive (units)

Table5.3: Time of DIY good receive (minutes)

	Time of DIY goods receive (minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	88.49	88.49	88.49	91.30	102.57	96.94	82.86	96.94	92.01
BP	68.22	82.62	68.22	75.42	82.62	77.82	70.62	82.62	76.02
BR	54.26	54.26	54.26	55.83	54.26	51.10	46.38	51.10	52.68
BY	20.41	23.76	21.75	24.43	20.41	21.75	22.42	19.74	21.83
BT	33.35	30.52	31.46	34.29	30.52	30.52	27.70	27.70	30.76
BT2	14.57	15.96	14.11	15.50	16.43	14.57	15.96	16.89	15.50
BRu	109.02	106.02	85.07	97.04	94.05	88.06	91.06	97.04	95.92

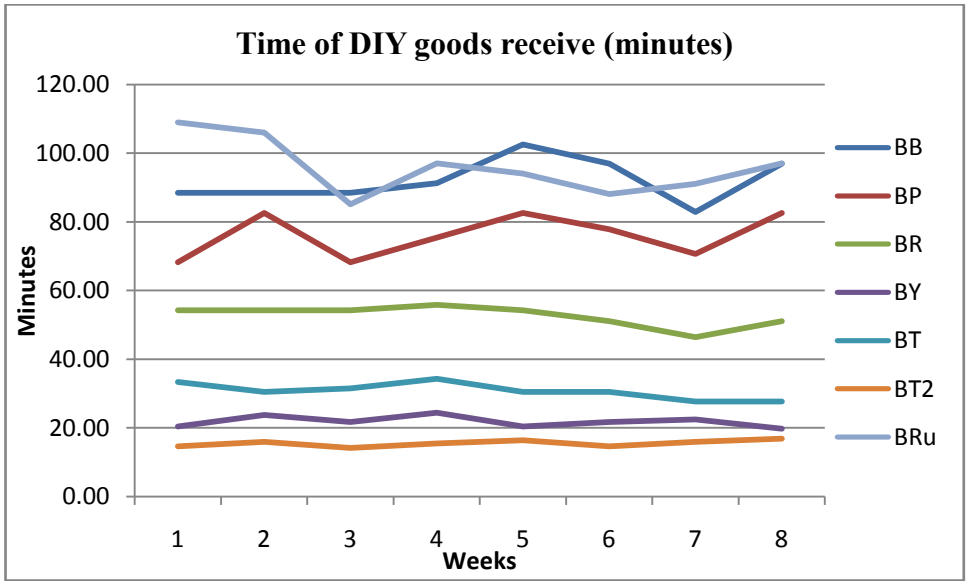


Figure5.5: Time of DIY good receive (minutes)

3 Out of Shelf Checking

Checking out of shelf is a process for finding the lack items that will need to be replenished. The activity starts with printing shelf stock list. Shelf stock is the level of stock volume, which should be remained in a store. The level is calculated and determined by merchandize team with planogram planning program. DIY staff will use this list to check with available stock on shelf. If the stock is existed in warehouse, it will be transferred to DIY. If there is no stock in warehouse, DIY chief staff will send stock request to SCM team.

Disconnects Identification

Out of stock checking is another non value added process. It consumes a lot of time and work force. One big problem is the as-is process treats out of stock and out of shelf in the same way. Out of stock is a lack item, which stock volume does not exist in stock information. Out of shelf is a lack item, which stock volume exists in stock information, but the physical stock is absent. In the order to replenish stock, DIY staff has to check for both cases, while the number of replenishing stock can be calculated from available stock in DIY and unrestricted stock in warehouse.

Measurement

Time of out of shelf checking: As presented in figure 5.6-5.7 and table 5.4-5.5, this KPI measure the average time of checking out-of-shelf items. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Table5.4: Out of shelf checking (units)

	Out of shelf checking (units)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	888.95	861.53	834.11	806.69	998.63	943.79	998.63	861.53	899.24
BP	811.72	835.30	764.55	835.30	858.89	693.80	811.72	717.39	791.08
BR	539.35	476.67	445.33	539.35	461.00	555.02	461.00	570.69	506.05
BY	216.46	203.10	189.75	209.78	243.16	203.10	196.43	189.75	206.44
BT	273.63	341.03	321.77	312.14	331.40	312.14	283.26	273.63	306.13
BT2	151.96	165.60	133.77	138.32	161.05	151.96	156.51	142.87	150.26
BRu	1051.08	1021.41	843.35	932.38	1051.08	962.06	1080.76	1080.76	1002.86

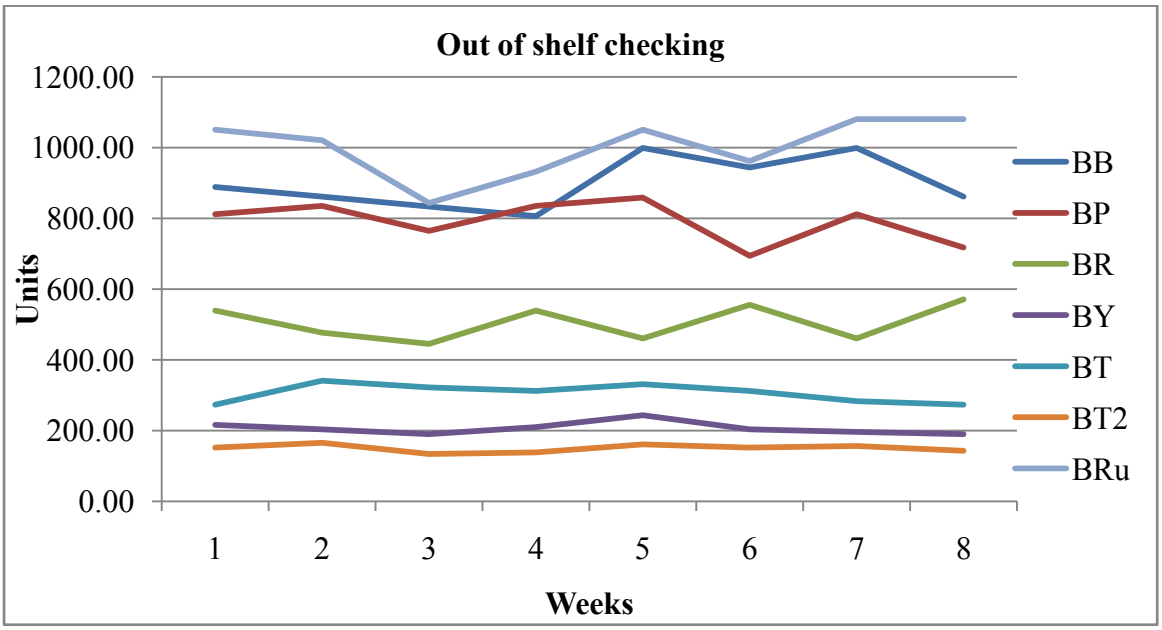


Figure5.6: Out of shelf checking (units)

Table5.5: Out of shelf checking (Minutes)

	Out of shelf checking (Minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	183.80	153.52	163.61	168.66	168.66	163.61	173.71	148.47	165.51
BP	145.03	149.80	149.80	168.87	149.80	135.50	140.27	149.80	148.61
BR	87.18	99.45	102.52	105.59	90.25	111.73	105.59	96.39	99.84
BY	49.69	48.25	51.13	49.69	43.92	52.58	46.80	45.36	48.43
BT	53.34	60.35	62.10	63.86	53.34	63.86	55.09	58.60	58.82
BT2	26.93	32.24	26.93	27.82	25.16	31.36	26.93	30.47	28.48
BRu	182.68	182.68	194.31	188.50	188.50	200.13	176.87	171.05	185.59

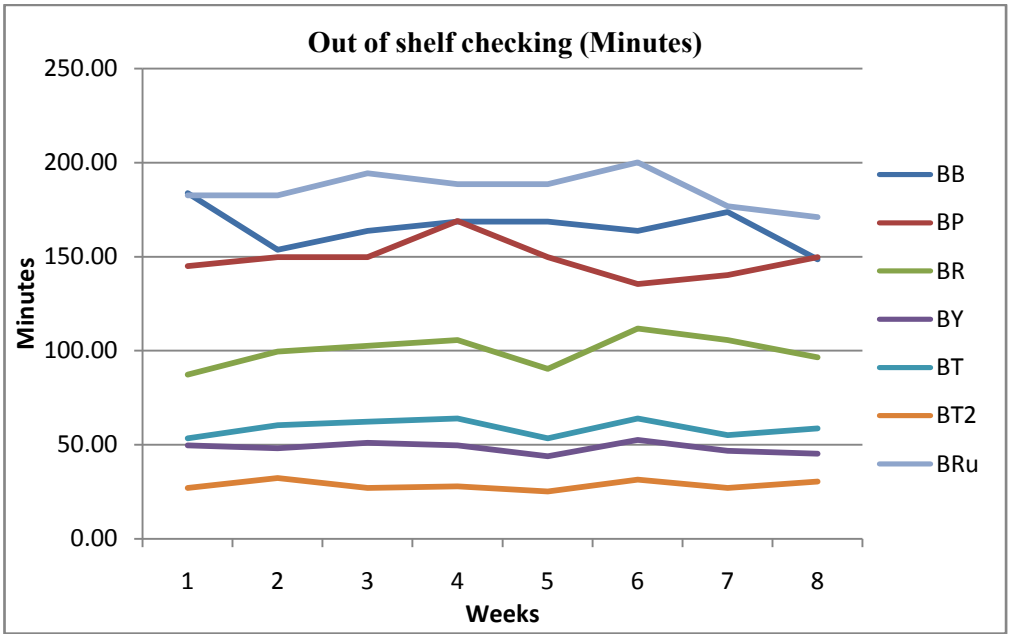


Figure5.7: Out of shelf checking (Minutes)

4. Replenish from warehouse

Replenish from warehouse is a process of request unrestricted stock from warehouse until DIY receive stock.

After DIY staff got a list of lack items from out of shelf checking. A list will be checked with unrestricted stock in warehouse. DIY Staff will fill the stock transfer request form and ask for approving from DIY Chief. Warehouse staff will verify the signature of DIY chief and prepare goods for DIY. All stock in a list will be send to DIY for replenishment.

Disconnect Identification

Major disconnect in this process is the workforce of warehouse staff. Warehouse staffs have a lot of job to do all the time. They have to receive goods from vendors, receive goods from DC, pick goods from customer orders, prepare goods for shipments, and prepare goods for DIY. When some staffs are absent, DIY replenish will be last priority job to be completed.

Measurement

Stock transfer between DIY and showroom: As presented in figure 5.8-5.9 and table 5.6-5.7, this KPI measures the average stock moving between DIY and show room in term of units and SKU. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Table5.6: Stock moving between DIY and warehouse (SKU)

	Stock moving between DIY and warehouse (SKU)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	253.40	253.40	197.74	253.40	218.61	246.45	239.49	211.66	234.27
BP	257.77	235.93	221.38	228.66	257.77	257.77	206.82	214.10	235.02
BR	171.61	176.75	176.75	171.61	176.75	181.88	161.34	166.48	172.90
BY	67.81	65.78	59.69	71.86	59.69	57.66	69.84	61.72	64.26
BT	84.88	87.86	102.79	90.85	90.85	99.81	102.79	99.81	94.96
BT2	40.44	41.81	40.44	48.69	39.06	48.69	45.94	45.94	43.87
BRu	299.64	326.54	272.74	326.54	326.54	281.71	281.71	290.68	300.76

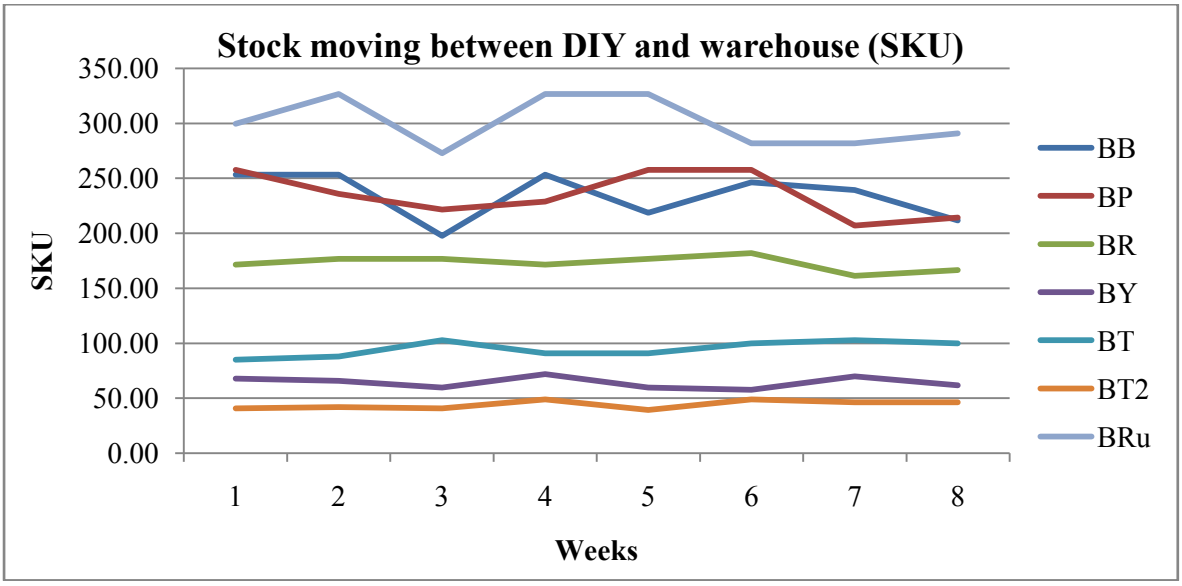


Figure5.8: Stock moving between DIY and warehouse (SKU)

Table5.7: Stock moving between DIY and warehouse (units)

	Stock moving between DIY and warehouse (units)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	1357.55	1588.27	1588.27	1680.56	1542.13	1311.40	1634.42	1357.55	1507.52
BP	1045.63	1229.60	1229.60	1045.63	1045.63	1303.18	1192.80	1339.98	1179.01
BR	918.72	716.91	817.82	716.91	817.82	843.05	893.50	767.37	811.51
BY	374.06	374.06	352.93	384.62	300.13	363.49	342.37	300.13	348.97
BT	427.31	485.41	441.83	441.83	427.31	427.31	514.46	470.88	454.54
BT2	247.05	254.23	211.16	211.16	247.05	218.34	203.99	225.52	227.31
BRu	1382.04	1335.06	1616.92	1335.06	1382.04	1710.88	1569.94	1522.97	1481.86

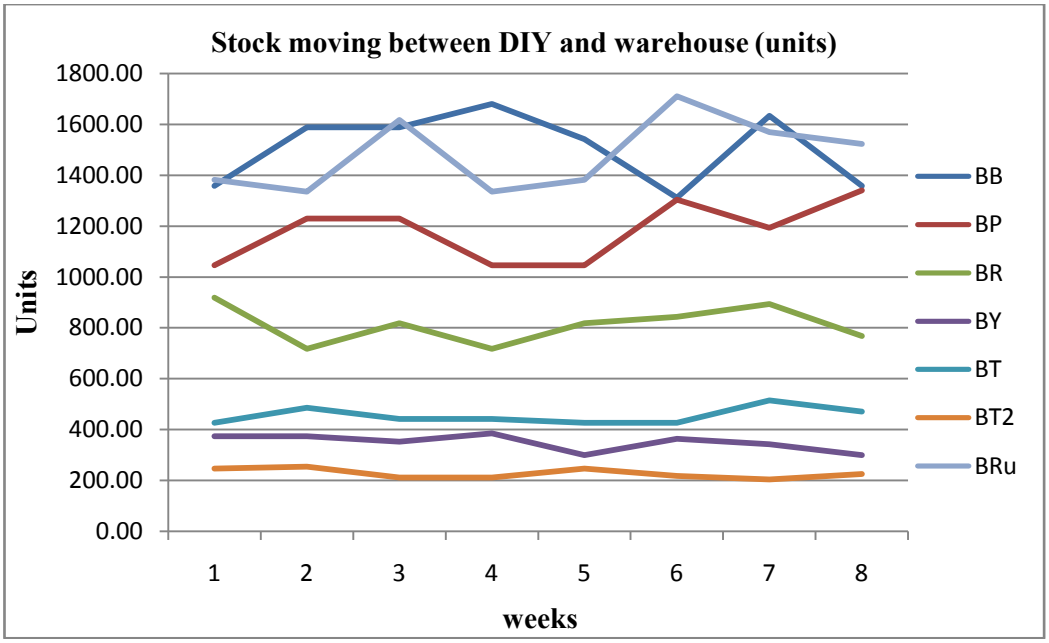


Figure5.9: Stock moving between DIY and warehouse (units)

5. Stock Request

As presented in figure 5.10, in the case that there is no unrestricted stock in warehouse, DIY staff will fill the stock request form and ask for approving from DIY Chief. DIY chief will approve the stock request and create stock request record in a system. The request record will send to SCM Order Management team. After that SCM Order Management team will create purchasing order and send it to vendor.

Disconnect Identification

The problem of stock request process is uncontrollable time of vendor. Although ABC Company has high growth in last few years, it still has less momentum of bargaining power than its vendors. The company still does not have penalty regulation for vendors, who deliver goods late from a deliver date in purchasing order. This problem causes out of shelf problem and delay delivery for customer orders.

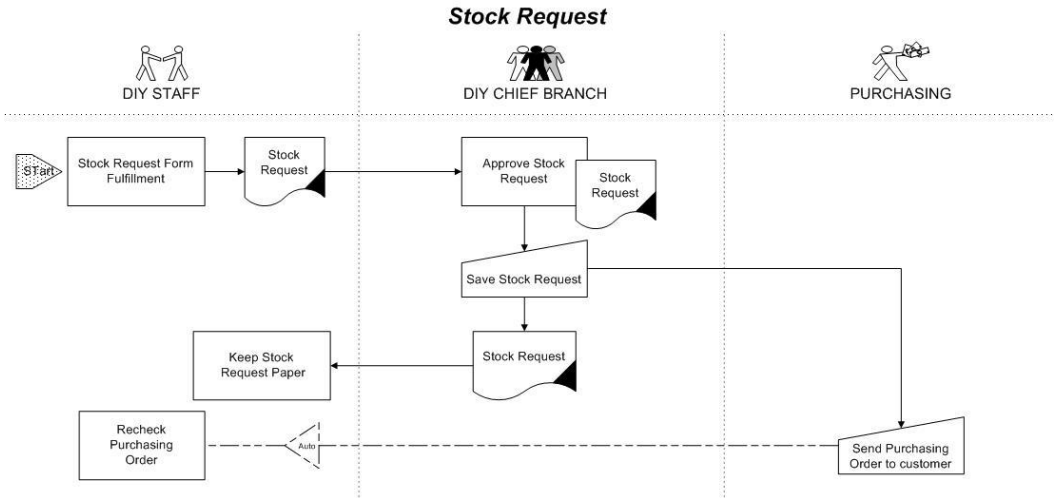


Figure5.10: Stock Request Process

6. Price Label Changing

As presented in figure 5.11, price changing is an important process; because a company may get sued or DIY staff may have to pay penalty for an out of date price labels. The process starts with printing daily price change list. DIY staff will use it to check validity of price labels in store. A list of out of date labels will be noted. DIY staff will key those items one by one in price labels printing program. Out of date price labels will be replaced with new price labels.

Disconnect Identification

Generally there are a hundred of price labels, which are needed to be change per day. In some case like the beginning of a month, more than one thousand price labels are needed to be changed. Moreover there is a serious problem about the price change list. Because of wrong logic program, both sell price changed items and cost changed items are shown in the list. Absolutely DIY staffs have nothing to do with cost change items, but they also do not know which items in the list are real price changed. DIY Staff has to walk around a store and check every label one by one. With a limit workforce, it is really hard to finish price labels changing on time at the beginning of a month. In the same way of out of stock checking process, price label changing logic can be calculated from stock and price conditions.

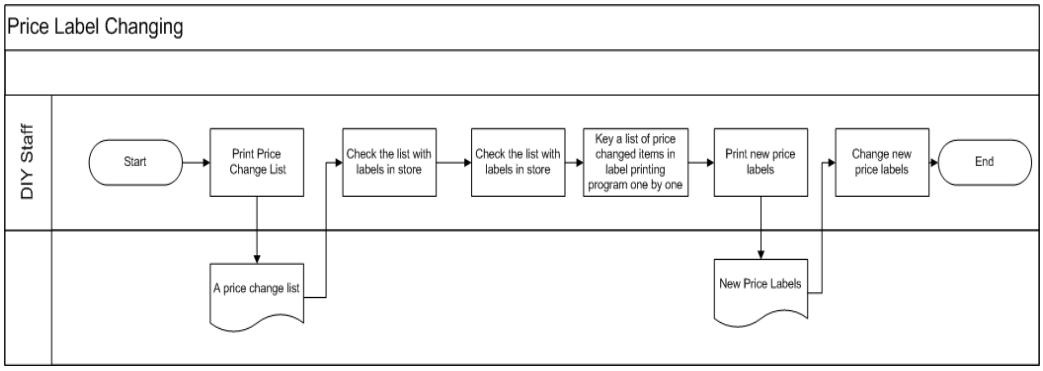


Figure5.11: Price Label Printing Process

Measurement

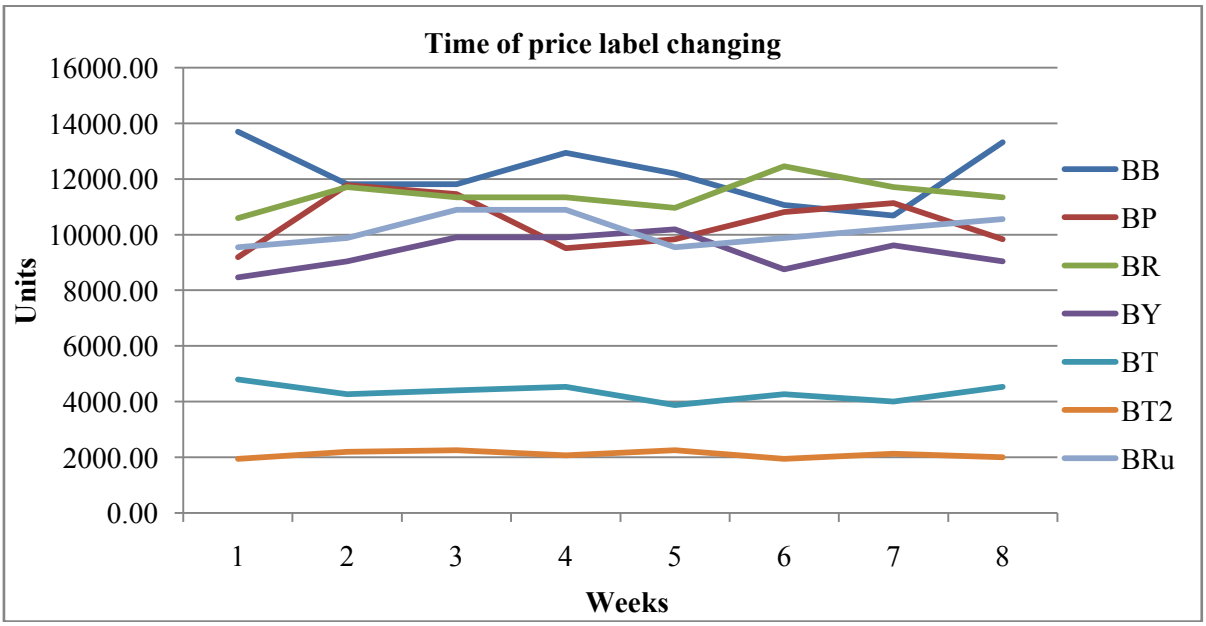
Time of price label changing: As presented in figure 5.12 and table 5.8, this KPI measures average time spent in price changing process. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Table 5.8: Time of price label changing, All Items in DIY and New Price Items

	Time Price label changing (All Items)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	13703.15	11821.85	11821.85	12950.63	12198.11	11069.33	10693.07	13326.89	12198.11
BP	9195.31	11783.77	11460.21	9518.86	9842.42	10813.09	11136.65	9842.42	10449.09
BR	10599.29	11718.17	11345.21	11345.21	10972.25	12464.10	11718.17	11345.21	11438.45
BY	8469.34	9045.11	9908.76	9908.76	10196.64	8757.23	9620.88	9045.11	9368.98
BT	4803.27	4275.72	4407.61	4539.50	3880.06	4275.72	4011.95	4539.50	4341.67
BT2	1947.55	2195.49	2257.48	2071.52	2257.48	1947.55	2133.51	2009.54	2102.52
BRu	9548.16	9884.14	10892.06	10892.06	9548.16	9884.14	10220.11	10556.09	10178.11

	Time Price label changing (New Price Item)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	324.09	353.19	275.60	314.39	333.79	324.09	314.39	324.09	320.46
BP	245.84	262.55	287.62	295.98	245.84	245.84	295.98	237.48	264.64
BR	186.21	175.07	202.93	163.92	163.92	169.49	163.92	180.64	175.76
BY	83.84	74.37	86.21	74.37	72.01	76.74	72.01	67.27	75.85
BT	112.20	112.20	112.20	101.82	98.35	101.82	112.20	122.58	109.17
BT2	48.10	54.64	49.73	53.00	53.00	48.10	48.10	59.54	51.78
BRu	298.24	298.24	340.22	329.73	350.72	361.21	340.22	361.21	334.98

	Time Price label changing (Minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	171.11	137.30	137.30	142.13	156.62	142.13	151.79	161.45	149.98
BP	158.83	149.86	145.37	149.86	127.44	149.86	154.34	136.40	146.49
BR	107.88	87.14	107.88	87.14	98.99	107.88	84.18	107.88	98.62
BY	43.22	38.34	40.78	34.68	43.22	42.00	42.00	44.44	41.08
BT	56.93	62.54	60.67	53.19	58.80	64.41	56.93	66.29	59.97
BT2	25.95	30.22	29.36	24.25	27.66	25.95	26.80	25.10	26.91
BRu	165.21	165.21	182.06	204.52	159.59	182.06	204.52	176.44	179.95



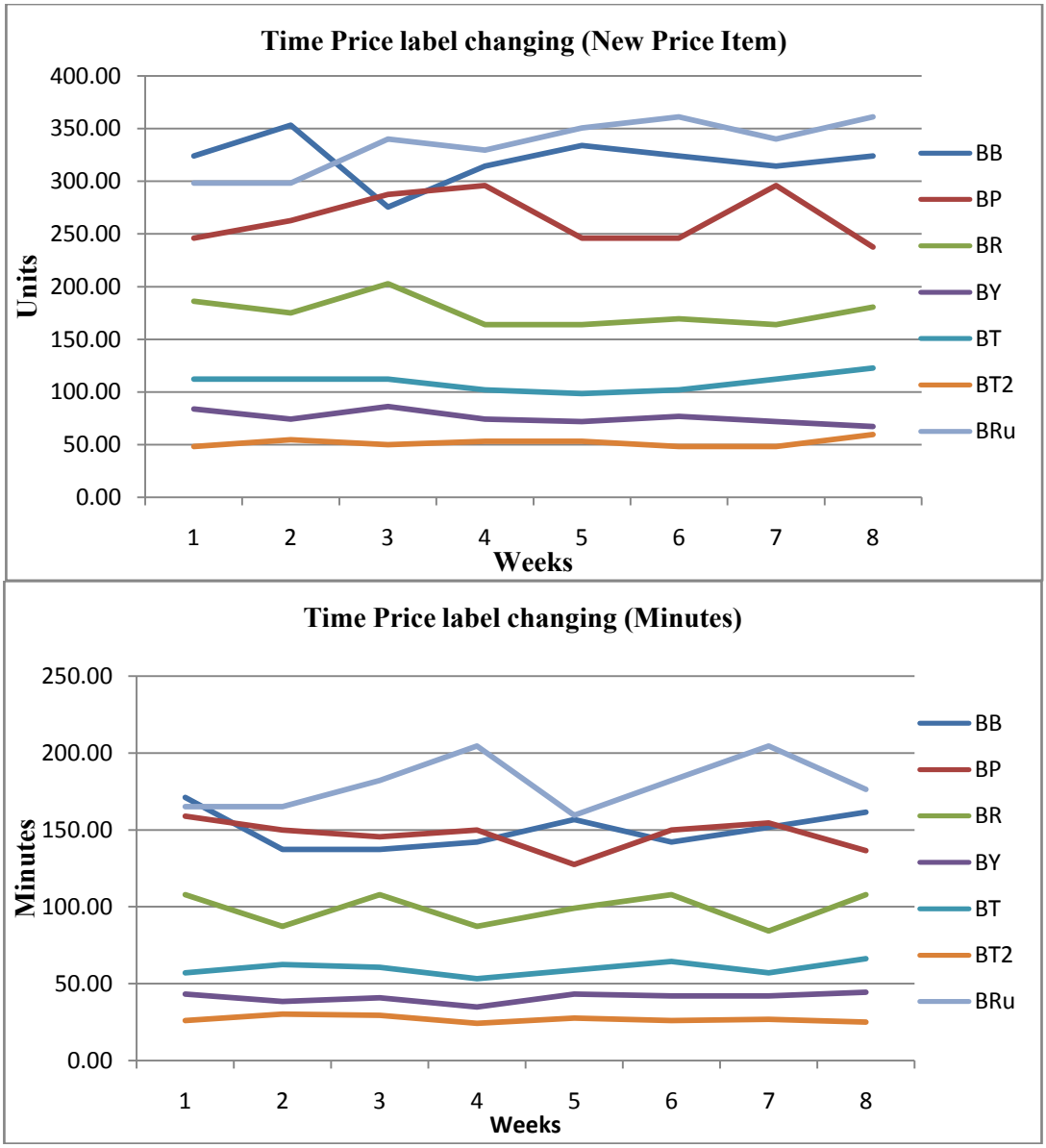


Figure5.12: Time of price label changing, All Items in DIY and New Price Items

7. Stock Arrangement

Stock arrangement is a process of putting away stock into DIY shop. Because it uses system and storage concept from warehouse, stock will be kept in storage location. After goods received, DIY staff will put stock to specific location on a shelf. Each location has storage location ID. DIY staff will record those storage-IDs into stock transfer document. When stock arrangement is finished, this document will be returned to warehouse. At the end, warehouse staff will save those locations into a system.

Disconnect Identification

Storage ID is a useful concept for warehouse, because system logic can determine where to put or pick stock. However it is inappropriate for the case of DIY. In DIY, after stock is put away, customer is the one who pick items. Logic program will never be able to determine which storage ID will be picked. If stocks of 1 SKU are kept in two storage-IDs, stocks will be issued from the wrong storage ID

randomly. In the other words, the concept of 2 storage-IDs for 1 SKU has no benefit for DIY. It only wastes time and workforce.

Measurement

Time of DIY stock arrangement: As presented in figure 5.13-5.14 and table 5.9-5.10, this KPI measures average time spent in DIY stock arrangement. The average per day data is collected from 2 months history (since November 2009 – December 2009).

Table5.9: Average time of stock arrangement per day

	stock arrangement (items)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	849.15	938.79	1028.43	1028.43	1028.43	908.91	1028.43	938.79	968.67
BP	858.48	781.42	781.42	832.79	858.48	884.17	935.55	858.48	848.85
BR	553.21	536.15	570.28	570.28	519.08	502.02	484.96	553.21	536.15
BY	265.27	250.70	228.85	250.70	265.27	214.28	265.27	265.27	250.70
BT	330.03	309.02	340.53	361.54	382.55	298.52	319.53	319.53	332.66
BT2	169.93	179.80	169.93	150.18	150.18	140.31	145.25	179.80	160.67
BRu	983.30	1047.95	918.65	950.98	1047.95	918.65	1015.63	1080.28	995.43

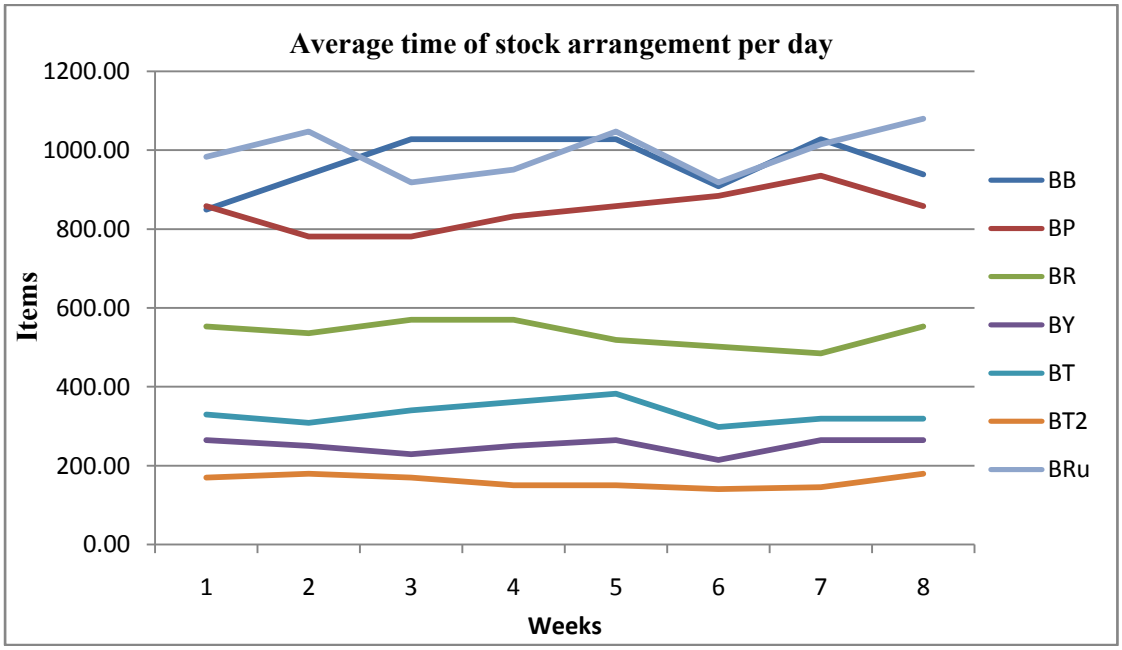


Figure5.13: Average time of stock arrangement per day (items)

Table5.10: Average time of stock arrangement (minutes)

	stock arrangement (minutes)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	256.49	248.57	224.84	264.40	232.75	240.66	240.66	232.75	242.64
BP	217.43	231.27	238.19	231.27	252.03	196.67	245.11	210.51	227.81
BR	190.18	179.74	148.40	164.07	184.96	148.40	174.51	158.85	168.64
BY	64.37	68.74	70.93	66.56	66.56	77.50	73.12	73.12	70.11
BT	98.83	108.91	102.19	115.63	105.55	105.55	112.27	98.83	105.97
BT2	48.59	48.59	51.89	60.15	46.94	53.55	48.59	58.50	52.10
BRu	266.33	257.85	240.90	291.76	249.38	240.90	308.71	291.76	268.45

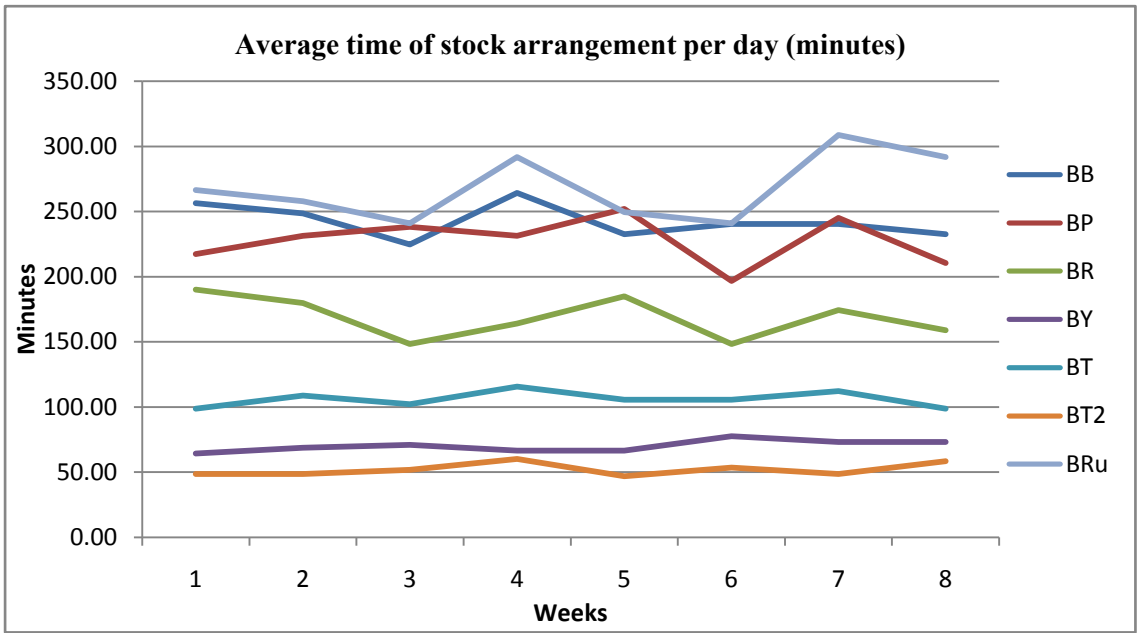


Figure5.14: Average time of stock arrangement per day (minutes)

8. Selling Via POS

As presented in figure 5.15, generally 85% of DIY sales volume is sold via POS (Point of selling) system. The process starts with, DIY staff presents product to customers or answer customer question. Customer will bring goods to POS cashier for payment. Cashier will receive money and issue 2 copies of ABB Invoice (short form invoice).

If customer does not request for full form invoice, the process will end here. If customer requests for full form invoice, DIY cashier will create customer account and give ABB invoice to DIY staff. After that DIY staff will bring ABB invoice to cashier at showroom department. Showroom cashier will issue full form invoice for customer. The ABB invoice will be kept for accounting department at day end.

Disconnect Identification

Because of lending system from showroom, DIY has to issue its full form invoice by voiding ABB invoice and use showroom"s cashier to issue full form invoice. It means that DIY staff has to go to showroom and waste man-hour for customer service. Moreover creating customer record at cashier is not a good solution. Next customer has to wait much longer, while cashier is creating customer record.

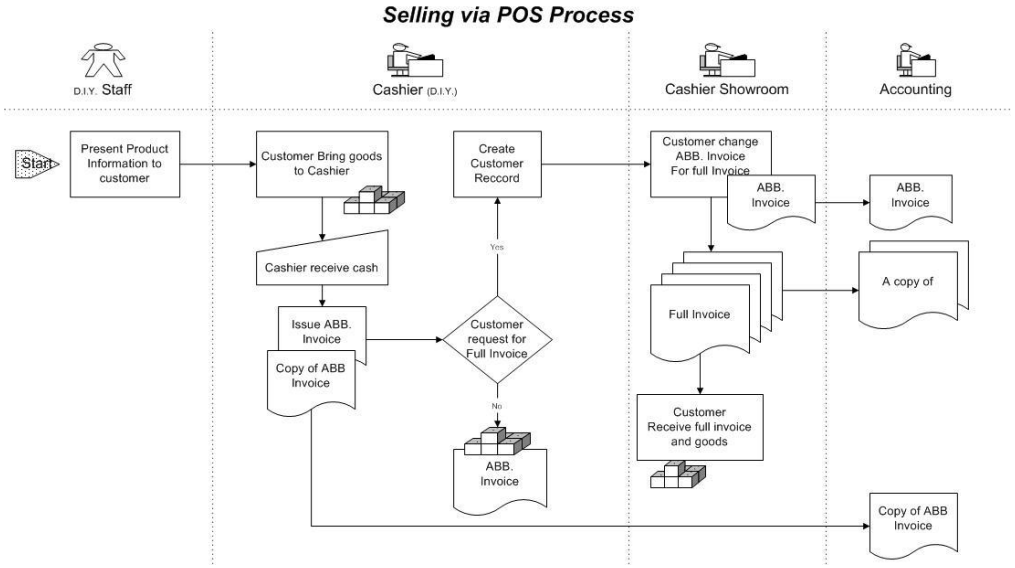


Figure 5.15: Selling Via POS Process

Measurement

Time of issuing full form invoice: As presented in figure 5.16 and table 5.11, this KPI measures average time spent in full form invoice issuing, since customer request full form invoice until customer receive full form invoice. The average per transaction data is collected from 2 months history (since November 2009 – December 2009).

Number of full form invoice bills: As presented in figure 5.17 and table 5.12, this KPI measures average number of full form invoice issued per day. The data is collected from 2 months history (since November 2009 – December 2009).

Table5.11: Issuing Full Form Invoice via POS Issuing (Bills)

	Issuing Full Form Invoice Via POS (bill)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	16.08	18.91	17.21	17.78	20.60	17.21	19.47	18.34	18.20
BP	14.17	13.69	16.10	15.14	13.69	15.62	16.10	16.10	15.08
BR	16.62	13.42	14.34	15.25	15.25	12.97	15.71	15.25	14.85
BY	4.35	4.96	4.51	5.27	5.58	5.42	4.96	5.42	5.06
BT	5.55	7.11	6.53	6.33	5.75	5.94	6.14	6.72	6.26
BT2	3.16	3.06	3.47	3.68	3.68	3.47	3.78	3.57	3.48
BRu	18.28	18.28	20.69	20.09	21.29	19.49	19.49	21.89	19.94

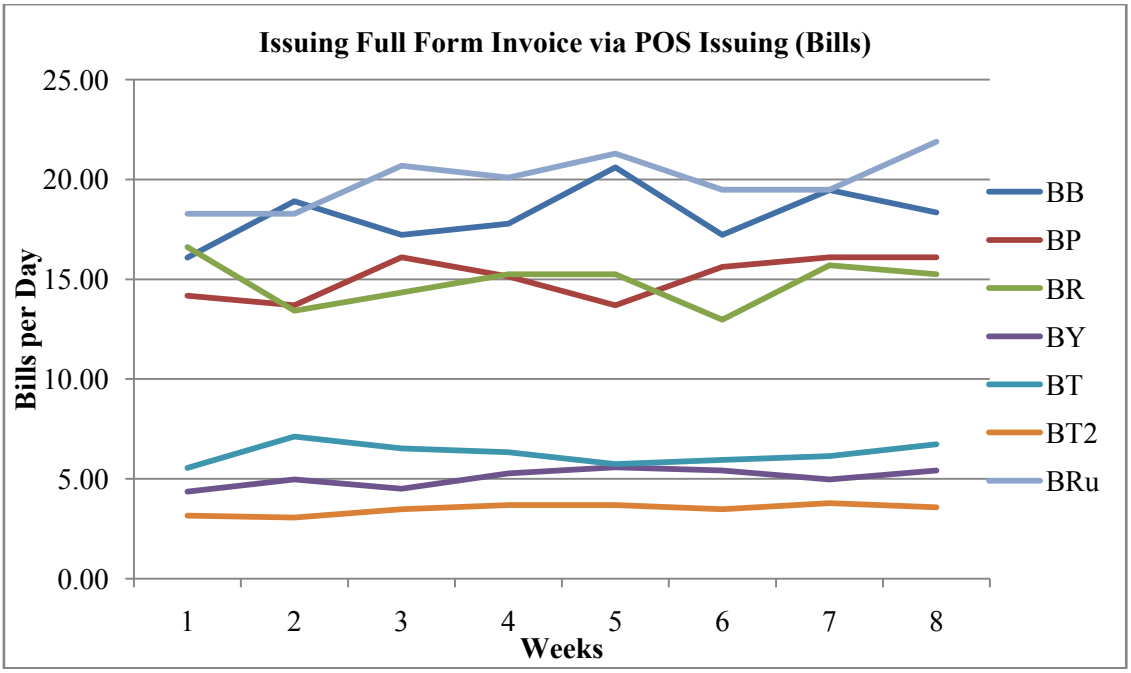


Figure 5.16: Issuing Full Form Invoice via POS Issuing (Bills)

Table5.11: Issuing Full Form Invoice via POS Issuing (Minutes/Bills)

	Issuing Full Form Invoice Via POS(Minutes/bill)							
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**
BB	4.19	3.71	3.46	3.83	4.32	3.95	3.58	3.71
BP	3.70	4.08	3.58	4.21	3.70	4.46	4.46	3.95
BR	3.91	4.28	4.28	3.78	3.66	3.66	4.03	4.15
BY	3.52	3.40	3.40	4.24	3.64	3.88	4.12	4.36
BT	4.14	3.87	4.96	4.28	4.00	4.28	4.55	4.68
BT2	4.50	3.96	4.50	4.36	4.36	3.82	4.36	4.09
BRu	4.47	4.47	4.34	3.69	4.08	4.47	4.21	4.47

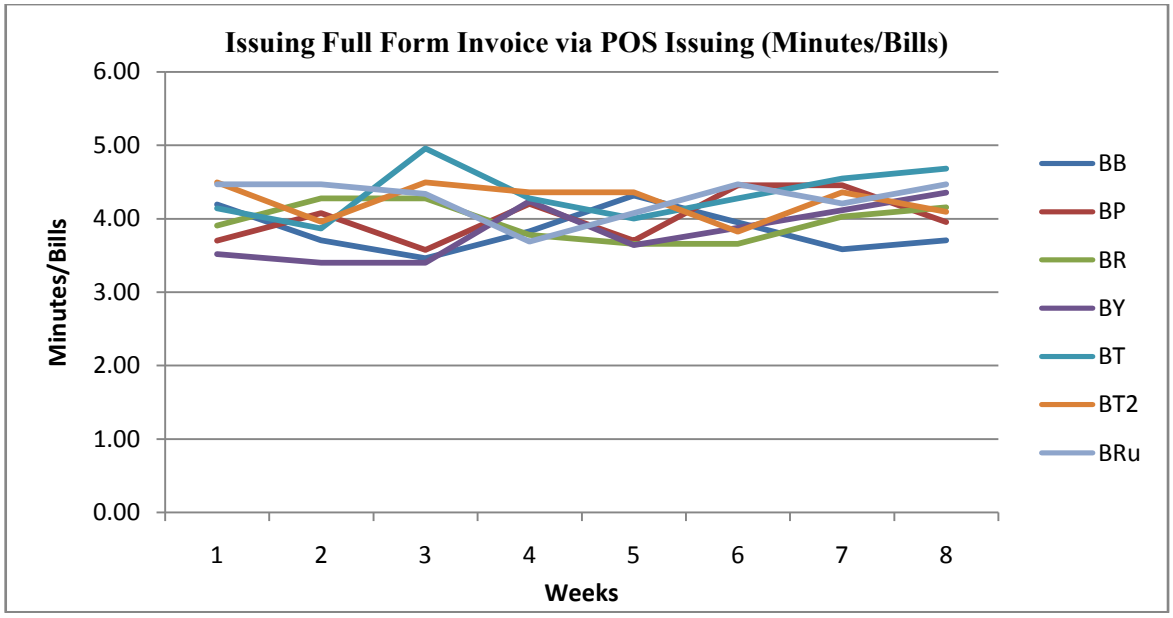


Figure 5.17: Issuing Full Form Invoice via POS Issuing (Minutes/Bills)

9. Selling Via Sales Order

As presented in figure 5.18, generally 15% of DIY sales volume is sold via sales order system. In case that a shop does not have a stock that customer want or customer needs delivery. DIY Staff will recheck stock in warehouse. If there is no available stock, DIY staff will ask customer whether delivery period can be accepted or not.

If customer can accept delivery period, DIY staff will create sales order and will lead customer to showroom cashier for payment. Showroom cashier will issue 3 copies of invoice and give one to customer. After that assist DIY chief will approve invoice and create stock request. The remained two copies of invoice will be kept at DIY department and account department. Customer will go back and wait for goods. The remained two copies of invoice will be kept at DIY department and account department. When goods are sent to warehouse, DIY staff will make a call to customer and confirm delivery date. In the case that customer will come back for receive product by himself, customer will show Invoice to DIY staff at delivery date. DIY staff will verity invoice and issue stock for customer.

Disconnect Identification

In the same way of full form invoice problem, DIY has no system for create sales order by itself. Again DIY staff has to go to showroom and waste man-hour for customer service.

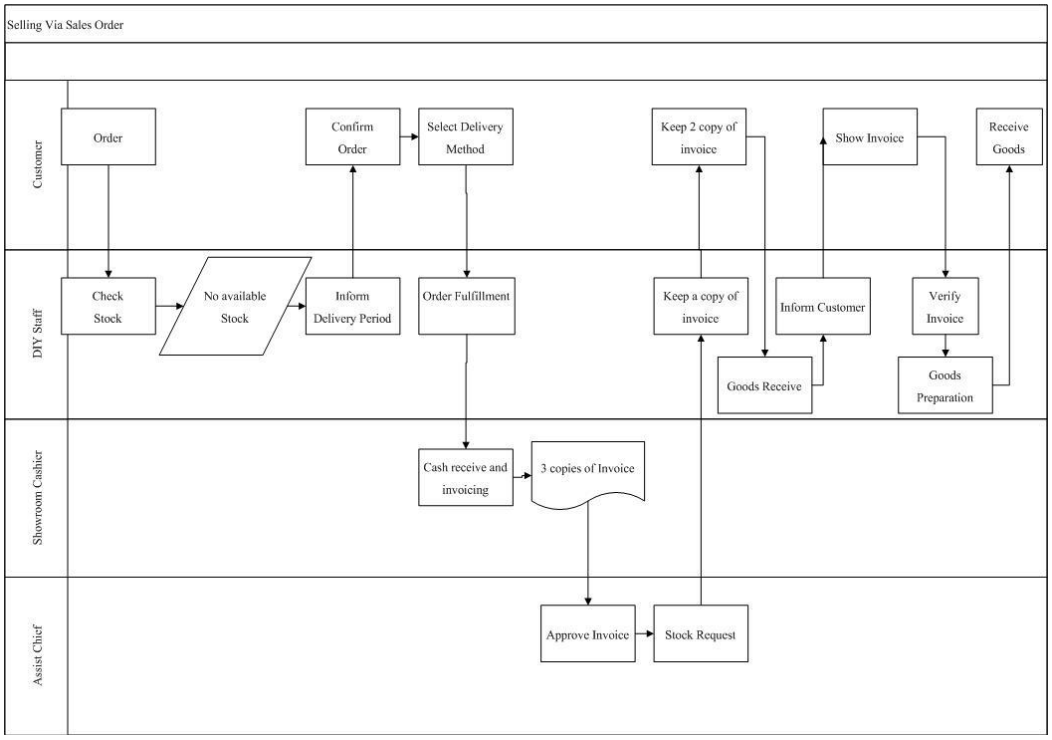


Figure5.18: Selling Via Sales Order Process

Measurement

The time of creating sales order: As presented in figure 5.19 and table 5.12, this KPI measures average time spent in DIY sales order creating, since customer confirms order until customer receive full form invoice. The average per transaction data is collected from 2 months history (since November 2009 – December 2009).

The number of DIY sales order: As presented in figure 5.13 and table 5.20, this KPI measures average bills of DIY sales order creating. The billing data is collected from 2 months history (since November 2009 – December 2009).

Table5.12: DIY Sales Order (Bills)

	DIY Sales Order (Bills)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	199.56	193.59	199.56	181.65	175.68	175.68	193.59	193.59	189.11
BP	226.59	257.39	234.29	226.59	241.99	272.80	265.10	218.88	242.95
BR	244.56	260.64	292.79	228.48	252.60	252.60	252.60	292.79	259.63
BY	57.11	62.56	53.47	55.29	51.65	55.29	58.92	53.47	55.97
BT	90.11	84.87	74.40	87.49	90.11	84.87	84.87	74.40	83.89
BT2	50.60	45.92	56.85	44.36	55.28	49.04	52.16	47.48	50.21
BRu	254.40	212.49	240.43	233.44	240.43	254.40	254.40	219.47	238.68

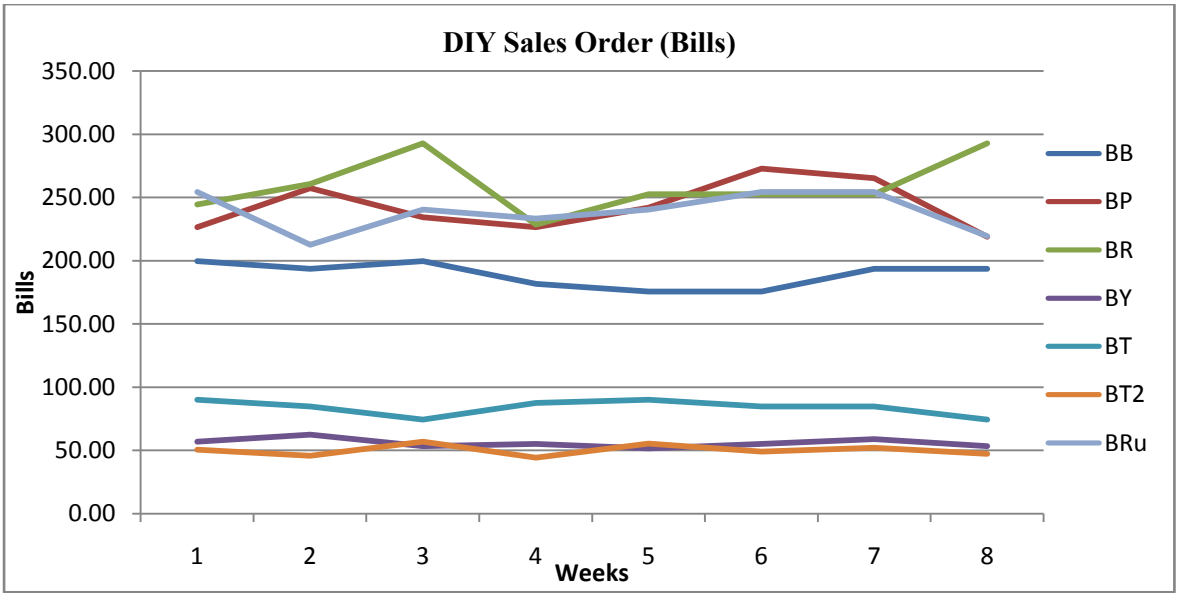


Figure 5.19: DIY Sales Order (Bills)

Table5.13: DIY Sales Order (Minutes/Bills)

	DIY Sales Order (Minutes/bill)								
Branch	**Week1**	**Week2**	**Week3**	**Week4**	**Week5**	**Week6**	**Week7**	**Week8**	**AVG.**
BB	4.40	4.65	3.76	4.27	4.65	4.27	3.76	4.14	4.24
BP	4.23	3.97	3.71	4.62	4.10	4.36	3.71	3.84	4.07
BR	4.36	4.22	4.64	4.78	4.50	4.22	4.50	5.06	4.54
BY	4.22	4.49	4.62	3.81	4.89	3.81	4.08	4.49	4.30
BT	4.78	4.22	4.64	5.06	4.92	4.36	4.22	4.64	4.61
BT2	4.39	4.95	4.81	4.53	4.95	4.25	4.95	4.53	4.67
BRu	4.77	4.91	4.48	4.62	4.62	4.20	4.34	4.48	4.55

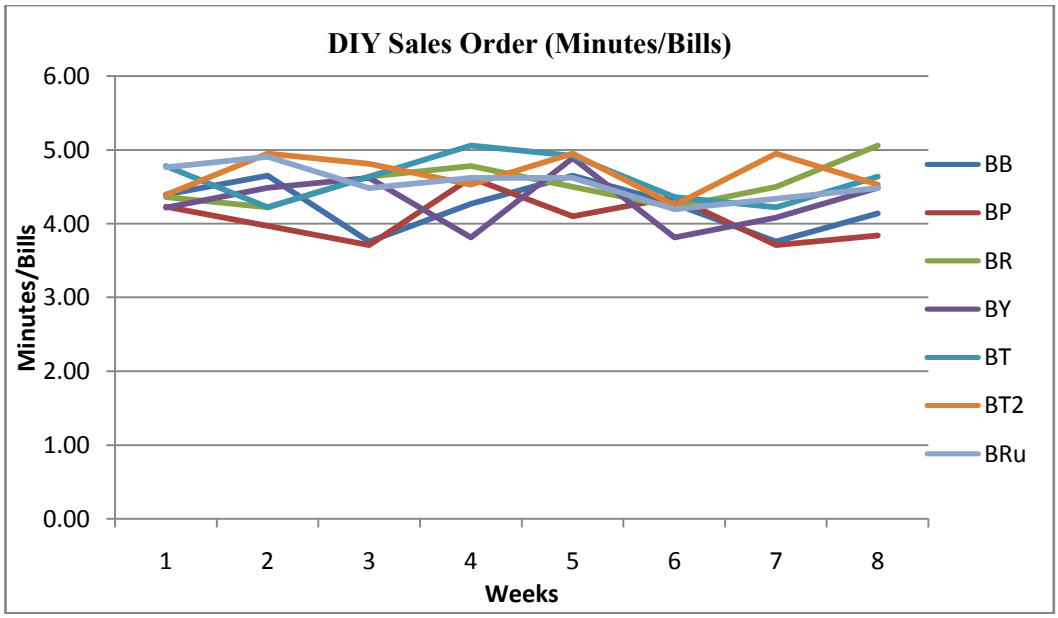


Figure 5.20: DIY Sales Order (Minutes/Bills)

5.2.3 Summary of Disconnects Identification

As presented in table 5.14, disconnect Identification in previous section shows the gaps for improvements and redesign. Disconnect of each process is summarized in table. However there is another big point which needs a redesign process. The department still has no systematic report and measurement system. Branch manager of ABC Company only monitor DIY Department performance from sales report and stock report. Many operational key performance indicators are hard to be traced and ignored from time to time. If the all process will be redesigned measurement system and monitoring report are necessary and dispensable.

Table5.14: The summary of disconnects identification

Process	**Disconnects Identification**
Replenishment from DC and Vendor	Double handling transactions waste workforce, time and selling opportunity.
Goods Receive	Every time that a stock is transferred from one department to another department, it is needed to be check one by one in term of amount and condition. Human errors can cause false goods receive and undermine stock accuracy.
Out of Shelf Checking	The as-is process treats out of stock and out of shelf in the same way
Replenish from warehouse	When some staffs are absent, DIY replenish will be last priority job to be completed.
Stock Request	The company still does not have penalty regulation for vendors, who deliver goods late from a deliver date in purchasing order.
Price Label Changing	Because of wrong logic program, both sell price changed items and cost changed items are shown in the list.
Stock Arrangement	The concept of 2 storage-IDs for 1 SKU has no benefit for DIY. It only wastes time and workforce.
Selling Via POS	Creating customer record at cashier is not a good solution. Next customer has to wait much longer, while cashier is creating a customer record.
Selling Via Sales Order	DIY has no system for create sales order by itself.
Measurement System	The department still has no measurement system

5.2.4 Why-Why Analysis

Referred to process mapping and disconnections analysis previously applied during team brainstorming, the root causes of customer dissatisfaction can be specified. As presented in figure 5.21, disconnections are discussed and categorized into 4 main causes including; all staff engage, stock shortage, incorrect price label, and long pending time.

The redesign team has a consensus that every staff usually engaged because of unpractical processes. The team also investigates the causes of staff unavailability and summary the causes into;

- the redundant business activity model
- slow goods receive
- redundant vendor replenishment
- intricate replenishment from warehouse

In the same way, stock shortage problem is occurred because of out of stock items and out of shelf items. The root causes of these problems are;

- slow stock arrangement
- intricate replenishment from warehouse
- slow out of shelf checking

From the root cause of intricate price label changing process, the incorrect price labels problem is occurred because of;

- Cost change item
- Input wrong item code in printing program
- Late price label changing
- Check wrong item

As the last cause of customer dissatisfaction, customers usually have to wait for earlier customers, full form invoice and sales order. The root causes of these problems are inappropriate full form invoice process and inappropriate sales order process.

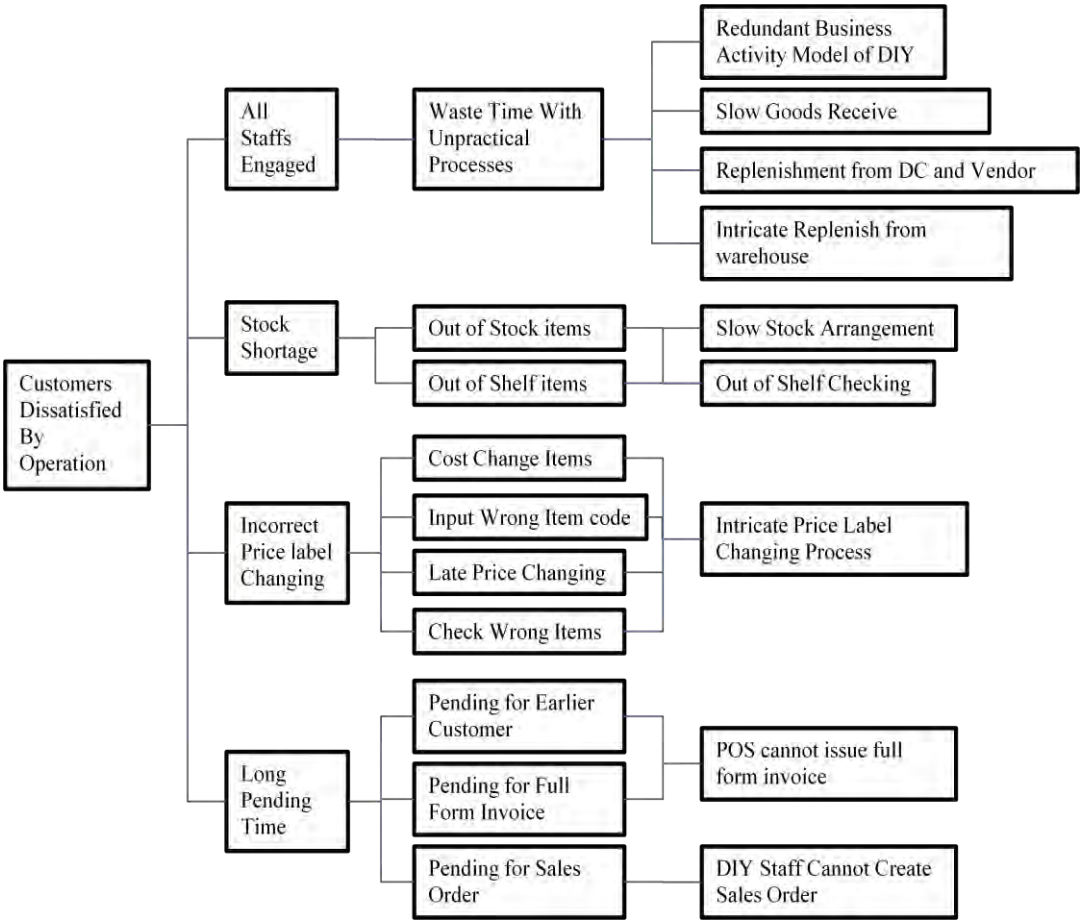


Figure 5.21: Why-Why Analysis

5.2.5 FMEA Analysis

The scope of FMEA Implementation focuses only Price changing process, because the process effect directly to the quality problem of incorrect price labels. Team members are given the description and flow chart of target process. The team leader explains all team members about the concept, scope, objective and expectation to ensure that everybody understand FMEA concept in the same direction. The criteria to quantify severity, occurrence and detection are presented in table 5.16-5.18. However the redesign team has a consensus that the standard scoring of FMEA Edition 4th is not applicable to the case. The team decided to adjust the severity scoring criteria as presented in table 5.15. The qualification and experience of team members are as follow.

- DIY Cooperate Manager: Has a bachelor degree in Industrial Engineer and has been working with the company for 2 years. He has been consult and supervise reengineering project for 4 years. He has main responsibility to redesign and to improve DIY operation process.
- Planning & Development Manager: Has a bachelor degree in Industrial Engineer and has been working with the company for 25 years. He has main responsibility to redesign and to improve operation process of ABC Company.

- 6 DIY Branch Chiefs: They have joined with the company more than 5 years. They have main responsibility to supervise all operation of DIY department in each branch.
- 1 IT Administrator: He has joined with the company more than 7 years. He has main responsibility to monitor and solve program problems for all company.
- 1 SCM Staff: He has joined with the company more than 6 years. He has main responsibility to monitor and solve inventory problems for Rungsit branch.
- 1 Warehouse Branch Chief: He has joined with the company more than 8 years. He has main responsibility to monitor and solve warehouse operation problems for Rungsit branch.

Form previously analyzed, redesign team brainstorms potential failure mode of DIY processes. The team analyses each component and subsystem of the product for the failure modes. The potential effects of each failure mode are listed. Because FMEA in this thesis cover wide range of process and the implement project has very limit time and resource, the list of failure mode of each process has to be limited only in the most important failure of each process. Cause and effect of important failure mode in each process are presented in table 5.15. The team assigns a severity rating, occurrence rating, and detection rating of each effect. If the team cannot agree on a rating, a vote has to be carried out. The team addresses how likely it is for a failure to occur and lists all controls currently to prevent those effects.

Table 5.15: Cause and effect analysis

OP	Process Description	Failure Mode	Effect	Cause
1	Replenishment from DC and Vendor	Replenished goods have to wait for showroom operation before send to DIY	Double handling transactions waste workforce, time and selling opportunity.	Replenished goods for DIY and Warehouse are summed together
2	Goods Receive	Cannot complete goods receive on-time and Receive wrong items	Human errors can cause false goods receive and undermine stock accuracy. Selling opportunities are wasted.	Intricate goods receive process. Varieties of SKU.
3	Out of Shelf Checking	Cannot check out of shelf on-time	Delay on stock replenishment. Waste time for customer service	The as-is process treats out of stock and out of shelf in the same way
4	Replenish from warehouse	Unrestricted stocks are not replenished to DIY	Waste selling opportunities	When some staffs are absent, DIY replenish will be last priority job to be completed.
5	Stock Request	Out-of-date stocks from vendors	Waste selling opportunities	The company still does not have penalty regulation for vendors, who deliver goods late from a deliver date in purchasing order.
6	Price Label Changing	Cannot change price labels on time	Customer complaints about out of date price labels	Because of wrong logic program, both sell price changed items and cost changed items are shown in the list.
	Stock Arrangement	Slow stock arrangement	Waste selling opportunities.	The concept of 2 storage-IDs for 1 SKU wastes time and workforce.
7	Selling Via POS	DIY Staff must walk to showroom to issue full form invoice	Customer complaints about pending time	DIY cannot issue full form invoice by itself
8	Selling Via Sales Order	DIY Staff must walk to showroom to create sales order	Customer complaints about pending time	DIY cannot create sales order by itself

Table 5.16: The severity evaluation criteria

Effect	Criteria	Score
Hazardous effect	Loss less than 80%-100% of average time to complete the process and the process has be stopped	10
Serious effect	Loss less than 70%-79% of average time to complete the process	9
Extreme effect	Loss less than 60%-69% of average time to complete the process	8
Major effect	Loss less than 50%-59% of average time to complete the process	7
Significant effect	Loss less than 40%-49% of average time to complete the process	6
Moderate effect	Loss less than 30%-39% of average time to complete the process	5
Minor effect	Loss less than 20%-29% of average time to complete the process	4
Slightly effect	Loss less than 10%-19% of average time to complete the process	3
Very slightly effect	Loss less than 0%-9% of average time to complete the process	2
no effect	Slight inconvenience to operation or operator or no effect	1

Table 5.17: The detection evaluation criteria

SUGGESTED DETECTION EVALUATION CRITERIA			
Opportunity for Detection	**Criteria: Likelihood of Detection by Process Control**	**Rank**	**Likelihood Of Detection**
No detection Opportunity	No current process control; Cannot detect or is not analyzed.	10	Almost Impossible
Not likely to detect at any stage	Failure Mode and/or Error (Cause) is not easily detected (e.g., random audits)	9	Very Remote
Problem Detection Post Processing	Failure Mode detection post-processing by operator through visual/tactile/audible means	8	Remote
Problem Detection at Source	Failure Mode detection in-station by operator through visual/tactile/audible means or post-processing through use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc.	7	Very Low
Problem Detection Post Processing	Failure Mode detection post-processing by operator through use of variable gauging or in-station by operator through the use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc.)	6	Low
Problem Detection at Source	Failure Mode or Error (Cause) detection in-station by operator through use of variable gauging or by automated controls in-station that will detect discrepant part and notify operator (light, buzzer, etc.). Gauging performed on setup and first-piece check (for set-up causes only)	5	Moderate
Problem Detection Post Processing	Failure Mode detection post-processing by automated controls that will detect discrepant part and lock part to prevent further processing.	4	Moderately High
Problem Detection at Source	Failure Mode detection in-station by automated controls that will detect discrepant part and automatically lock part in station to prevent further processing	3	High
Error Detection and/or Problem Prevention	Error (Cause) detection in-station by automated controls that will detect error and prevent discrepant part from being made	2	Very High
Detection not applicable; Error Prevention	Error (Cause) prevention as a result of fixture design, machine design or part design or part design. Discrepant parts cannot be made because item has been error-proofed by process/product design	1	Almost Certain

Table 5.18: The occurrence evaluation criteria

Effect	Failure rate	Criteria	Score
Almost certain	10%	Failures almost certain to occur and inefficiencies show in process record.	10
Very high	5%	Very high frequency of failures occur	9
High	2%	High frequency of failures occur	8
Moderately High	1%	Frequent failure occur	7
Medium	0.002%	Moderate number of process inefficiencies	6
Low	0.0005%	Occasional Number of process failure occur	5
Slight	0.0001%	Few process failure	4
Very Slight	0.00001%	Very few process failure	3
Remote	0.000001%	Failure almost unlikely to occur	2
Almost Never	Failure rated is eliminated	Failures unlikely to occur	1

As shown in table 5.19, the information can be used for calculating Risk Priority Number (RPN) for each effect. RPN is an important reengineering decision tool based on severity, occurrence, and detection. The team prioritizes failure mode and action to find where improvement plan should be developed. The new redesign process will eliminate or reduce important failure to simplify business activity. The criterion for severity, occurrence and detection, and control of this thesis are shown in table. The score 1-10 is mostly used since it provides ease of interpretation of the ranking. After the team identifies the severity, occurrence, and detection in the analysis, failures are prioritized via Risk Priority Number (RPN). According of its defined scores RPN value will be between 1 and 1000.

Table5.19: FMEA Analysis

OP	Process Description	Failure Mode	Severity	SEV	Occurrence	OCC	Detection	DET	RPN
1	Replenishment from DC and Vendor	Replenished goods have to wait for showroom operation before send to DIY	Loss less than 40%-49% of average time to complete the process	6	The current work procedure could not be applied with failure	8	Few process failure	4	192
2	Goods Receive	Cannot complete goods receive on-time and Receive wrong items	Loss less than 40%-49% of average time to complete the process	6	The current work procedure could be applied with the failure but could not detect failure effectively.	7	Few process failure	4	168
3	Out of Shelf Checking	Cannot check out of shelf on-time	Loss less than 20%-29% of average time to complete the process	4	The current work procedure could not be applied with failure	8	Few process failure	4	128
4	Replenish from warehouse	Unrestricted stocks are not replenished to DIY	Loss less than 40%-49% of average time to complete the process	6	Current controls detect the failure with low likelihood	6	Moderate number of process inefficiencies	6	216
5	Stock Request	Out-of-date stocks from vendors	Loss less than 40%-49% of average time to complete the process	6	The current work procedure could be applied with the failure effectively. Control documents are generated. Might not perform procedure strictly.	5	Very few process failure	3	90
6	Price Label Changing	Cannot change price labels on time	Loss less than 70%-79% of average time to complete the process	9	Current controls detect the failure with low likelihood	6	Occasional Number of process failure occur	5	270
7	Stock Arrangement	Slow stock arrangement	Loss less than 40%-49% of average time to complete the process	6	Current controls detect the failure with low likelihood	6	Few process failure	4	144
8	Selling Via POS	DIY Staff must walk to showroom to issue full form invoice	Loss less than 50%-59% of average time to complete the process	7	Current controls detect the failure with low likelihood	6	Very few process failure	3	126
9	Selling Via Sales Order	DIY Staff must walk to showroom to create sales order	Loss less than 50%-59% of average time to complete the process	7	Current controls detect the failure with low likelihood	6	Very few process failure	3	126

As presented in table 5.19, in this analysis there is no failure with more than 5 score of severity and very low occurrence score or detection score. Because of no failure modes with high conflict between occurrence, severity, and detection, The RPN is calculated with multiplication of scores. The redesign team decides to solve the failure mode based on 90% confidence. This means the RPN with score higher than 100 will be focused.

In table 5.19, failure modes with the RPN Scores of each process are shown. However the RPN of late stock sending from vendor in stock request process has only 90 scores. The redesign team has a consensus that the process still does not need improvement at this time. The team decides to cut stock arrangement process from redesign project and carry the failure of the other 8 failures out further.

5.2.6 Simulate & Perform Activity based costing analysis.

To estimate activity based costing of DIY department, the redesign team agreed to simplify the case by focus only Rungsit branch, as a model for activity cost calculation. The assumption for cost calculation is identified as followed.

- The major cost pool is salary cost of DIY staff and time consumed in each activity.
- At Rungsit branch there are 9 DIY staffs, 3 Assist DIY Chief, and 1 DIY Staff Chief.
- Because of the nature of retailing business, DIY Staff Chief and Assist DIY Chief also help DIY staff to do their job in rush hour. The man-hour of DIY Staff Chief and Assist DIY Chief is considered as one of DIY staff „s man-hour
- The estimate salary expenses of staffs in DIY department are ฿15,000 for DIY staff, ฿18,000 for Assist DIY Chief, and ฿22,000 DIY Staff Chief.
- Each staff works for 8 man-hour per day according to labor law
- The branch opens at 8.00 AM and closes at 20.00 PM or 12 hours per day
- From these assumptions the average salary cost of DIY department can be calculated as shown in table.
- The average salary expense per Man-Hour can be calculated from Salary Expense per day divided by Cumulative Man-Hour per Day as shown in table.
- From the average salary expense per Man-Hour we can estimate for activity base costing as shown in table5.20.

Table5.20: Calculation for average salary expense per Man-Hour

Salary Expense per day at Rungsit Branch				
	Staff	Salary	Cumulative salary	
DIY Staff	9	15,000	(9 X 15,000) =	฿135,000
Assist DIY CHIEF	3	18,000	(3 X 18,000) =	฿54,000
DIY Chief	1	22,000	(1 X 22,000) =	฿22,000
SUM			(135,000 + 54,000 +22,000) =	฿211,000
Salary Expense per Day			(211,000 / 30) =	฿7,033.33

Table 5.21: Cumulative Man-Hour per Day

Cumulative Man-Hour Per Day				
	Staff	**Man-hour**	**Cumulative man-hour**	
DIY Staff	9	8	(9 X 8) =	72
Assist DIY CHIEF	3	8	(9 X 8) =	24
DIY Chief	1	8	(9 X 8) =	8
Cumulative Man-Hour Per Day			(72 + 24 +8) =	104

Average salary expense per Man-Hour		
AVG. salary expense per Man-Hour	(7033.33 / 104) =	฿67.63

Table5.22: Activity Based Costing Analysis

Process list	**Average hour spent per day**	**Average staff needed**	**Average Man-Hour per day**	**Activity cost Per month**
Stock Arrangement	2.81	6	16.86	(16.86 X 30 X 67.63) = ฿34,207.25
Out of Shelf Checking	1.66	6	9.96	(9.96 X 30 X 67.63) = ฿20,207.84
Price Label Changing	1.64	5	8.2	(8.2 X 30 X 67.63) = ฿16,636.98
Goods Receive	0.88	4	3.52	(3.52 X 30 X 67.63) = ฿7,141.73
Repelnish from Buffer	1.85	4	7.4	(7.4 X 30 X 67.63) = ฿15,013.86
Stock Request	0.5	1	0.5	(0.5 X 30 X 67.63) = ฿1,014.45
Selling Via Sales Order	all day			
Selling Via POS	all day			
Replenishment from DC and Vendor process	system process			

From activity based cost analysis, the rating of activities cost per month is estimated. The most consume resource process are stock arrangement, out of shelf checking, and price label changing. It also reveals that 46.44 man-hours per day of all 104 man-hours per day are spent on shop preparing activities. The department left only 57.56 man-hours per day for serving 300 customers per day. Obviously if the department could reduce time spent on each process, it can utilize resource and gain more time for customer service.

5.3 Design To-Be Processes

In this phase, the information from legacy process analysis will be utilized to redesign the new to-be process. Failure modes of each process will be analyzed with ECRS method to find the appropriate direction of process improvement.

5.3.1 Design To-Be processes

"Having identified the potential improvements to the existing processes, the development of the To-Be models is done using the various modeling methods available, bearing in mind the principles of process design." (Subramanian Muthu, Larry Whitman, and S. Hossein Cheraghi, Business process reengineering: a consolidated methodology, 1999)

In the order to redesign business process, the redesign team review disconnections and develop from benchmarking in previous sections. Those ideas are analyzed and developed 7 redesign projects as following.

In case of ABC Company, the legacy system of Oracle based system will be replaced with a new SAP based system. This decision from the board of directors will make all legacy system obsolete at the day that new SAP based system is go-lived. It makes very small different between "the cost of recreating legacy-logic program on a new SAP based system" and "the cost of changing new logic program". With explicit program logic and program outcome, the costs of two alternatives are almost the same. Before the redesign, the team review legacy process analysis from previous section. The ways to improve each process with ECRS technique are delivered as follow;

1 Redesign activity model for DIY Department

Objective: To eliminate double handling transactions that waste workforce, time and selling opportunity.

Scope: Rearrange the business activities of DIY operational process since replenishment from DC and Vendor until price label changing.

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate stock transferring transactions between departments
- Combine DIY stock checking at warehouse and DIY

Principal and Concept: From the holistic point of view, this project aim to redesign DIY business activity. The benefit of this process is reducing double handling between DIY and warehouse in replenishment process. The concept of this project will start with redesign "replenishment from DC and vendor process". The changes of replenishment logic will be described in detail in the next section. Min-Max system will be separated for DIY and warehouse. This means vendor and DC will be able to send some amount of goods to DIY directly, instead of sending all goods to warehouse and wait for stock transfer as usual. DIY staff will be able to receive all goods and arrange them much earlier than before. The exceed stock, which cannot put into DIY shelf, will be transferred to warehouse. They will be kept here until DIY request or customer order.

Validate New Design: The costs and benefits of this project are as following;

- Cost of separating picking process at DC and Vendor: In the order to separate Min-Max replenishment system DC and Vendor have to separate their goods, which will send to ABC Company, for DIY and Showroom. They may have to pick some group of products, which are sold through both DIY and showroom, twice time instead of one time. However sales history shows that only less than 10% of 100,000 ABC Company"s SKUs are sold from both DIY and showroom. The majority of 90% SKUs will not cause twice picking at vendor or DC. The process changes at DC and vendors will be only Job separation.
- Cost of testing and proving of new Min-Max replenishment system: According to the implementation of new SAP based system, the new Min-

Max replenishment system has to be created, simulated and proved to serve new logic.

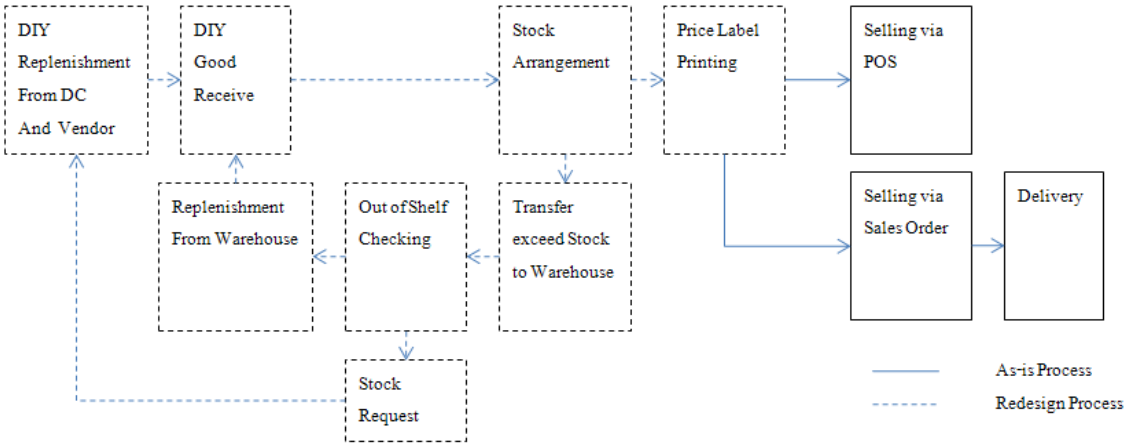


Figure5.24: Redesign activity model for DIY Department

2 Replenishment from DIY and vendor process

Objective: To separate Min-Max values of a branch into DIY Min-Max and Showroom Min-Max

Scope: Separate Min-Max values and create SAP Based Min-Max system with new program logic

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Rearrange by sending goods to DIY directly
- Simplify by separate Min Max between DIY and showroom

Principal and Concept: With separated Min-Max values, the system will compare available stock of DIY and showroom with their own Min-Max. After that it will suggest SCM to created PO for each shop. Those PO will be send to DC and vendors. At last DIY and Showroom will obtain their stock separately.

Validate New Design: The costs and benefits of this project are as following;

- Cost of separating Min-Max value: To obtain separated min-max value for DIY and Showroom, ABC Company has to recalculate those values in different ways. For showroom department, the 12 month sales history of showroom channel must be recalculated with legacy system. This practice will take 2 man-days of IT application admin staff for running legacy system calculation. For DIY department, Min-Max values form recalculating DIY sales history cannot be used instantly. Those values must be compared with the size limit of shelf-stock in each branch, whether the Max values exceed shelf-stock limits or not. The practice to collect shelf-stock limited of each branch will need 5 man-days of DIY

staff and one laptop computer with handheld barcode reader. DIY staff will use excel software and handheld to read item‟s barcode and record shelf-stock limit from counting. This practice will take 2 man-days for the first recording, 2 man-days for record rechecking, and 1 man-day for correction.

- Benefits of Min-Max configuration: Separating Min-Max of DIY and showroom allow ABC company to configure Min-Max for DIY and showroom with different condition. 90% of SKUs in DIY and showroom are different. The nature of these products are different too, therefore the calculation of Min-Max should be configured with different parameters.

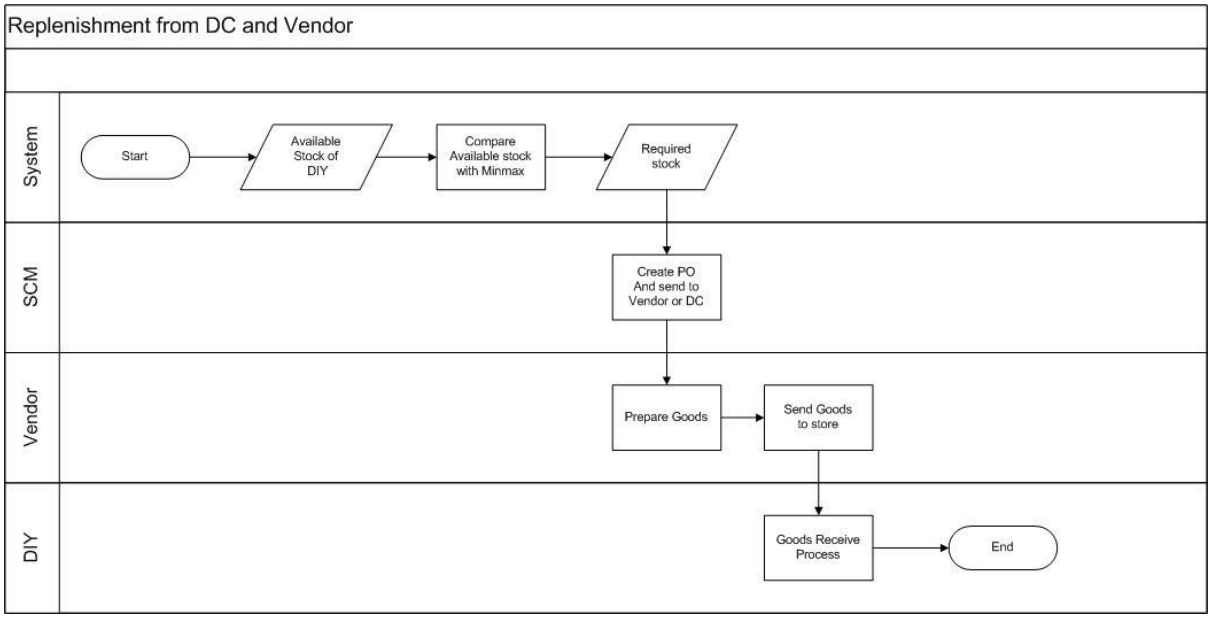


Figure5.25: Redesign Replenishment from DC and Vendor Process

3 Redesign Goods Receive Process

Objective: To simplify goods receive steps and to improve goods checking accuracy

Scope: To rearrange good receive process and create “goods receive with handheld program”.

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate by reduce manual stock checking
- Combine DIY stock receiving at warehouse and DIY
- Rearrange by receiving stock to DIY directly before send exceed stock to ware house
- Simplify by developing a program for goods receive with handheld

Principal and Concept: This project simplify good receive process, by allowing DIY to receive goods from vendors itself and develop new goods receive program to increase goods receive accuracy. The process of warehouse goods receive for DIY is eliminated. The wasting time of keeping DIY stock in warehouse and double handling will be reduced. Almost every SKU in DIY department has UPC (Universal Product Code), which could indentify each item. New goods receive with handheld program will help DIY staff on checking goods, by reading their barcode and convert those barcode into company"s items code. The description of product will be shown. DIY staff will be able to identify each product easily.

Validate New Design: The costs and benefits of this project are as following;

- Cost of development of a new goods receive with handheld program: The new goods receive with handheld program can be developed, by using .NET Framework program as an interface mask for UPC conversion and calling BAPI program to send information to SAP System. This solution will take less risk and effort than modifying the standard MIGO program of SAP. It will take 5 man-days of .NET programmer and 2 Man-days of ABAP programmer.
- Benefit of time saving: The time warehouse goods receive for DIY and wasting time of keeping DIY stock in warehouse will be reduced
- Benefit of more time for customer service

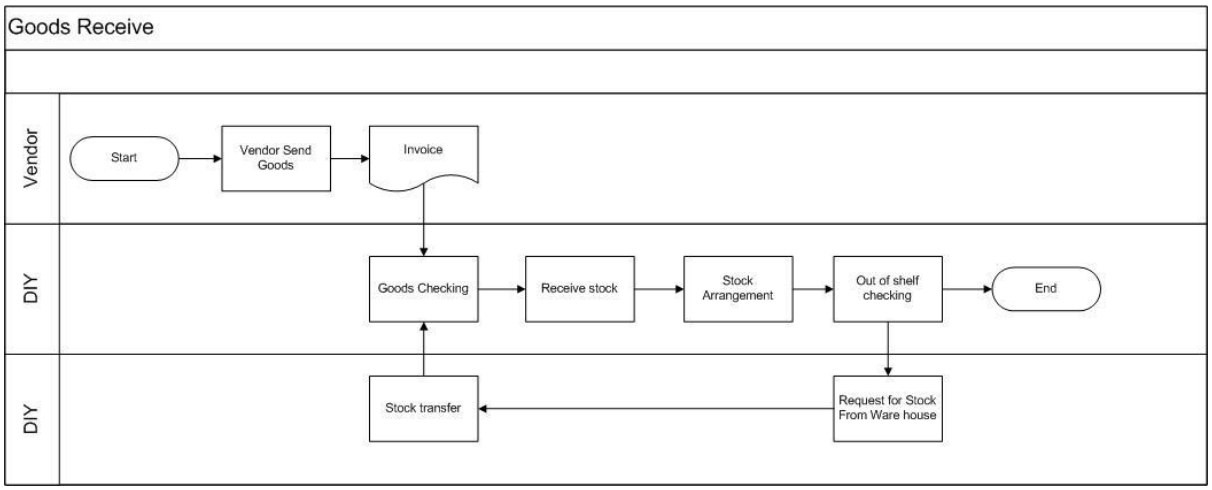


Figure5.26: Redesign Goods Receive Process

4 Redesign Price Label Changing Process

Objective: To reduce steps of price labels printing process

Scope: To change logics of price label printing program.

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate cost change labels and price list checking steps.
- Simplify by listing price change items by program, instead of manual

Principal and Concept: This project is about eliminating some steps of Price Label Changing Process by changing new logic in label printing program. To filter cost changing labels, the new logic will shows only those labels that have new sell price start date equal to input date from user. To eliminate steps of printing price change list, check price change list with exist labels and keying price change into printing program, the new logic will check price change list with shelf stock automatically. If an item in price change list does not have shelf stock value, its label will not printed out. DIY staffs can print new price labels by only select a price start date. They can change those price labels instantly and reduce process time from 10 man-hours into 2 man-hours.

Validate New Design: The costs and benefits of this project are as following;

- Cost of developing new price label printing programs: In the same way of developing new good receive program, new price label printing programs can be developed, by using .NET Framework program as an interface mask for receiving in input data and calling BAPI program to send information to SAP System. The form of price label will be designed and stored with crystal report program. It will take 3 man-days of .NET programmer, 2 Man-days of ABAP programmer, and 2 man-days of crystal report programmer.
- Benefit of time saving: The time of printing price change list, check price change list with exist labels and keying price change into printing program will be reduced.
- Benefit of more time for customer service

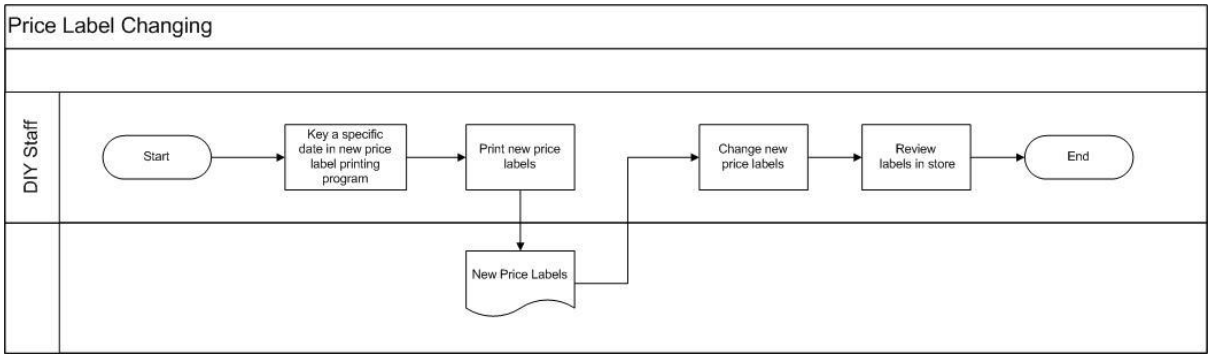


Figure5.27: Redesign Price Label Printing Process

5 Redesign Selling via POS Process

Objective: To reduce step of selling via POS process

Scope: To create new POS system with full form invoice feature.

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate step of walking to showroom
- Rearrange by completing new process in DIY
- Simplify by developing a full form invoice program for DIY

Principal and Concept: This project will simplify selling via POS Process, by allowing DIY Department to issue full form invoice report by itself. After confirmed with the revenue department of Thailand, the redesign team ensured that issuing full form invoice with POS is allowed. All the New POS program has to do is combining customer record from SAP and sales record form POS together to print the full form invoice or credit note. When customer asks for a full form invoice, DIY staff will create new customer record and issue full form invoice or credit note. The ABB invoice will be kept at DIY department and send to accounting department for recording.

Validate New Design: The costs and benefits of this project are as following;

- Cost of cost of new feature POS development: The New POS program can be developed by using visual basic program as an interface mask for receiving in input data and calling BAPI program to call information from SAP System. The form of invoice and credit note will be designed and stored with crystal report program. This feature will take 3 man-days of visual basic programmer, 2 Man-days of ABAP programmer, and 2 man-days of crystal report programmer.
- Benefit of time saving: The time of walking to showroom will be reduced
- Benefit of faster customer service

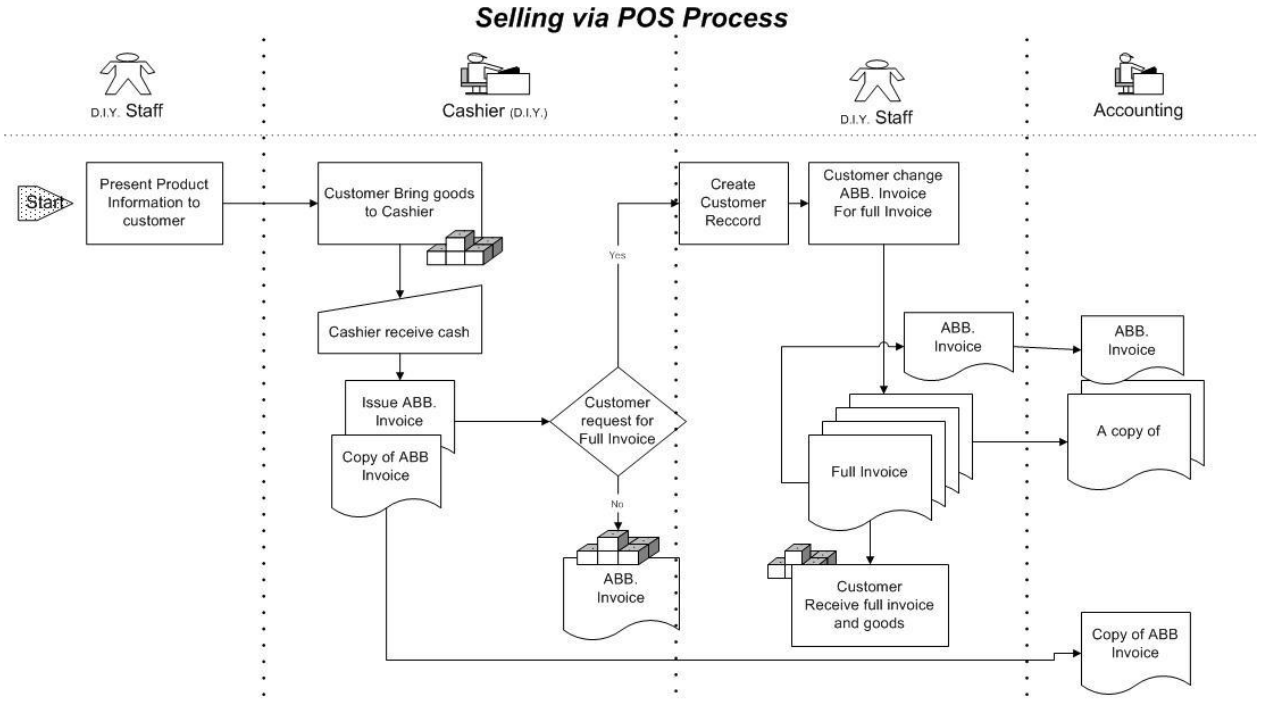


Figure5.28: Redesign Selling via POS Process

6 Redesign Selling via Sales Order Process

Objective: To reduce step of selling via sales order process

Scope: To allow DIY staff to create sales order by themselves

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate step of walking to showroom
- Rearrange by completing new process in DIY
- Simplify by developing a sales order program for DIY

Principal and Concept: By creating sale personal record for DIY department, DIY staffs will be able to create sales order by themselves. They can use showroom‟s sales record program to create sales order and issue sales invoice for customers. This change will reduce the time that DIY staffs have to walk to showroom to create sales order.

Validate New Design: The costs and benefits of this project are as following;

- Benefit of time saving: The time of walking to showroom will be reduced
- Benefit of faster customer service

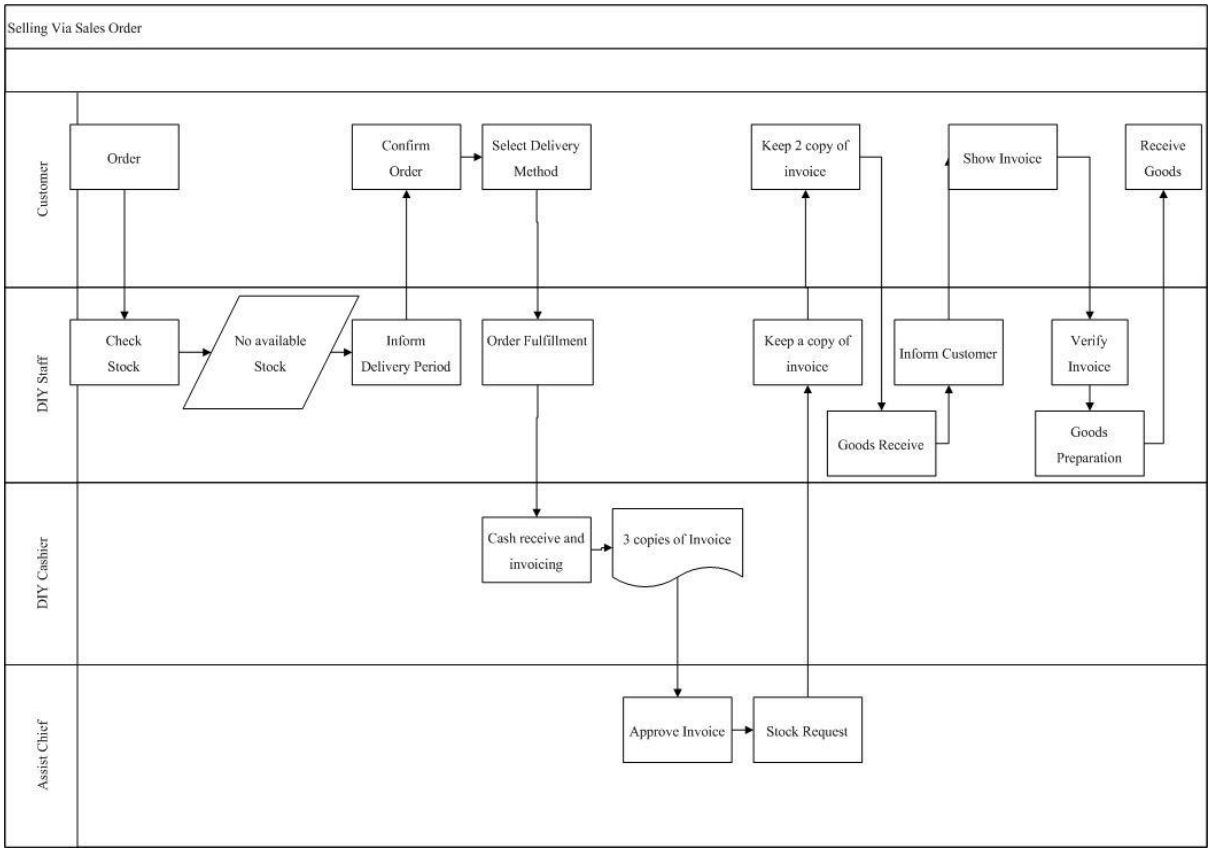


Figure5.29: Redesign Selling via Sales Order Process

7 Redesign out of stock checking

Objective: To separate the solution for out of stock problem and the solution for out of shelf problem from each other

Scope: Develop a program for out of stock checking report

ECRS technique application: The ECRS technique could be applied to this process by following practices;

- Eliminate time spent for out of stock checking
- Rearrange by separating out-of-stock and out-of-shelf checking
- Simplify process by developing a out of stock program

Principal and Concept: As mentioned in "out of shelf checking process", Out of stocks are lack items that available stocks are less than shelf stock limit. Instead of checking by DIY staff manually, a simple program can solve this problem easily in 2 steps. 1st the out of shelf checking program will compare DIY available stock with shelf stock limit, to find the amount of lack items. 2nd the program will find the min-value between amount of lack items and unrestricted stock in warehouse. This min-value is the amount of stocks, which will be replenish to DIY. Only assign warehouse staff to run out of shelf report and pick stocks in the list for DIY, more than 50% of out of shelf checking process will be reduced.

Validate New Design:

- The out of stock checking program can be developed by using .NET Framework program as an interface mask for receiving in input data and calling BAPI program to call information from SAP System. The form of out of stock report will be designed and stored with crystal report program. It will take 1 man-days of .NET programmer, 2 Man-days of ABAP programmer, and 2 man-days of crystal report programmer.
- Benefit of time saving: The time of walking around the shop to check out of shelf is reduced
- Benefit of faster customer service

In table 5.23 the summary of ECRS technique from each reengineering project is presented. This table is a good tool for communication with people who does not get involve with the project.

Table5.23: The summary of ECRS technique in each process

OP	Description	Eliminate	Combine	Rearrange	Simplify
1	Replenishment from DC and Vendor	Reduce stock transferring transactions between departments	Combine DIY stock checking at warehouse and DIY	Send goods direct to DIY	Separate Min Max between DIY and showroom
2	Goods Receive	Reduce manual stock checking	Combine DIY stock receiving at warehouse and DIY	Receive stock to DIY before send exceed stock to ware house	Develop a program for goods receive with handheld
3	Out of Shelf Checking	Reduce time spent for out of stock checking	-	Separate out-of-stock and out-of-shelf checking.	Develop a out of stock program
4	Replenish from warehouse	Reduce DIY request for out-of-stock replenishment	-	Push stock to DIY before out of shelf checking	Warehouse staff check out-of-stock with program
6	Price Label Changing	Eliminate cost change labels and price list checking steps.	-	-	List price change items by program, instead of manual
7	Stock Arrangement	-	-	-	Use only 1 storage-IDs for 1 SKU in a store
8	Selling Via POS	Eliminate step of walking to showroom	-	new process can be completed in DIY	Develop a full form invoice issuing program for DIY
9	Selling Via Sales Order	Eliminate step of walking to showroom	-	new process can be completed in DIY	Allow DIY to create sales order by itself

The redesign also conducts the costs and benefits comparing to find the necessary cost that the company has to pay for each project. In table 5.24, the development cost, disconnections and benefits of each project are addressed. The team presents costs of expected benefits which will solve disconnection problems to the board of directors. The financial support and the project development are approved.

Table 5.24: Comparing costs and Benefits of redesign projects

NO.	Project	Disconnect Identification	Cost (Man-days)	Benefit
1	Redesign Business Process Activity	When some staffs are absent, DIY replenish will be last priority job to be completed.	Cost of separating picking process Cost of testing and proving of new Min-Max replenishment system	The time warehouse goods receive for DIY and wasting time of keeping DIY stock in warehouse will be reduced
2	Redesign Replenishment from DC and Vendor	Double handling transactions waste workforce, time and selling opportunity.	5 of DIY Staff 4 of IT application admin	Separating Min-Max of DIY and showroom allow ABC company to configure Min-Max for DIY and showroom with different condition.
3	Redesign Goods Receive	Every time that a stock is transferred from one department to another department, it is needed to be check one by one in term of amount and condition. Human errors can cause false goods receive and undermine stock accuracy.	5 of .NET programmer 2 of ABAP programmer	The time warehouse goods receive for DIY and wasting time of keeping DIY stock in warehouse will be reduced
4	Redesign Price Label Changing	Because of wrong logic program, both sell price changed items and cost changed items are shown in the list.	3 of .NET programmer 2 of ABAP programmer 2 of crystal report programmer.	The time of printing price change list, check price change list with exist labels and keying price change into printing program will be reduced
5	Redesign Selling Via POS	Creating customer record at cashier is not a good solution. Next customer has to wait much longer, while cashier is creating a customer record.	3 of visual basic programmer 2 of ABAP programmer 2 of crystal report programmer.	The time of walking to showroom will be reduced
6	Redesign Selling Via Sales Order	DIY has no system for create sales order by itself.	No development cost	The time of walking to showroom will be reduced
7	Redesign Out of Stock Checking	The as-is process treats out of stock and out of shelf in the same way	1 of .NET programmer 2 of ABAP programmer 2 of crystal report programmer	The time of walking around the shop to check out of shelf is reduced

Table5.25: Calculation for man-day cost

Resource	Estimated Salary	Working days per month	Calculation	Man-day cost
DIY	15000	25	(15000/25)=	600
.NET programmer	30000	25	(30000/25)=	1200
crystal report programmer	25000	25	(25000/25)=	1000
ABAP programmer	50000	20	(50000/20)=	2500
SAP functional consultant	40000	20	(40000/20)=	2000

Table5.26: Estimated Program development cost

NO.	Project	Cost (Man-days)	Activities/projects/ programs	Calculation	Development Cost
1	Redesign Business Process Activity	Cost of separating picking process Cost of testing and proving of new Min-Max replenishment system	Test separate picking process at DC Inform vendors for preparation Prepare new process manual Demonstrate project plan to stake holders		
2	Redesign Replenishment from DC and Vendor	5 of DIY Staff 4 of IT application admin 5of SAP functional consultant	Indentify new program spec Develop new replenishment system Test new replenishment system	(5x600+4x1000+5x2000) =	฿17,000
3	Redesign Goods Receive	5 of .NET programmer 2 of ABAP programmer	Indentify new program spec Develop New program Test new program	(5x1200+2x2500) =	฿11,000
4	Redesign Price Label Changing	3 of .NET programmer 2 of ABAP programmer 2 of crystal report programmer.	Indentify new program spec Develop New program Test new program	(3x1200+2x2500+2x1000) =	฿10,600
5	Redesign Selling Via POS	3 of visual basic programmer 2 of ABAP programmer 2 of crystal report programmer.	Indentify new program spec Develop New program Test new program	(3x1200+2x2500+2x1000) =	฿10,600
6	Redesign Selling Via Sales Order	No development cost	Indentify new program spec Develop New program Test new program		
7	Redesign Out of Stock Checking	1 of .NET programmer 2 of ABAP programmer 2 of crystal report programmer	Indentify new program spec Develop New program Test new program	(1x1200+2x2500+2x1000) =	฿8,200
	sum of development cost				฿57,400

In table 5.25 and table 5.26, the Calculation for man-day cost and estimated program development cost are presented. The man-day cost is calculated from average salary divided by the average working day per month. The average salary is calculated from all staff in each position who gets involve with the project. Working day is the contractual working day per month of each position. The estimate program development cost is calculated from the summation of average man-day cost and necessary man-day multiplication. The estimate program development cost of ฿57,400 is reported to the board of directors for improvement.

5.4 Implement Reengineered processes

In this step, the redesign team create implementation plan, communicate the to-be process with other staff in the company, and create enabling environment for implementation.

5.4.1 Create implementation plan

As presented in table 5.27,The redesign team plans the major activities that have to be conducted. The process description, period, and participant are identified. The major activities are separated into 3 activities including; Communication and Request for Cooperation, Creating enabling environment for implementing the To-Be design, and Process Implementation and Monitoring.

Table5.27 : Major Activities of Implementation plan

No.	Major Activities	Description	Period	Participant
1	Communication and Request for Cooperation	Organizing awareness and consensus building meetings Establishing an Implementing team Developing performance plan Developing performance measurement Developing cut-over plan	(2weeks)	Branch manager Redesign team Assist Branch Manager Supervisors DIY Staff
2	Creating enabling environment for implementing the To-Be design	Program Specification Logic testing with Excel simulation Program Development Preparing required infrastructure: Computer, Hand held, printer, preprint form Program testing Providing training Conduct Simulation	(6weeks)	Redesign team DIY Staff **IT application staff** IT development staff
3	Process Implementation and Monitoring	Deploying people and financial resources Monitoring via regular review and weekly meeting	(2 weeks)	Redesign team DIY Staff

5.4.2 Communication and request for cooperation

To communicate with other staff in the company, the team organizes awareness & consensus building meetings, establishes an implementing team, and develops performance plan as presented in table 5.28.

- Organizing awareness and consensus building meetings: After achieve approving from board of directors; the first activity is building awareness through an organization. This can be done by providing information from previous study and benchmarking. In this step redesign team will present stakeholders about business pressure, challenge, process disconnections and benefits of each redesign projects. The commitment of executives will be pronounced to rise confident among staffs.
  "Laggards are making changes. Without continual improvements, your position is not secure. Increase collaboration among internal stakeholders; especially call center, control desk, parts depot, field technicians, and accounting." (The Multi-Channel Retail Benchmark Report, Aberdeen*Group*, 2005)

- Establishing an Implementing team: The variation of members in the implementation team is needed for bringing different expertises to the project. To share tasks and responsibilities of implementation steps, redesign team recruit and assign more human resource. In this step redesign team need to share the ownership with the remaining process owners. 4 programmers are recruited as an IT expert and program developer. 4 DIY staffs and 1 assist staff chief from 7 branches are recruited as a process owner and a program tester. They will be separated in to 7 groups. Each group responsible for each project. These members will get involved in a project since program specification, prototype testing, simulation, until end user training. With a good team management, this practice will smooth project communication and process transition.
- Developing performance plan: In the order to conduct process to success, the performance plan must be created as a road map. It will describe the method, time limit, cost limit, participants and milestone of each step in major activities. The cost limit is estimated from man-days of participants in each step. From previous calculation the man-day cost of redesign is around ฿ 10,200. The man-day of implementation team (4 DIY staff and 1 assist DIY chief) is around ฿3200. These numbers could be used for cost estimation in each step. For an example, the cost of program specification with re-design team and implementation team for 5 days is around (฿10,200+฿3,200) x 5 = ฿ 67,000. Form table, the estimated implementation cost of these projects is around ฿642,400

Table5.28: Performance Plan

Major activity: Creating enabling environment for implementing the To-Be design				
Step	Period	Required Output	Cost	Participant
Program Specification	17/11/2009 -23/11/2009	Detailed Program spec	฿ 67,000	
Logic testing with Excel simulation	24/11/2009 - 30/11/2009	Logic proved program specs	฿ 51,000	
Program Development	1/12/2009 - 9/12/2009	Complete programs	฿ 60,000	Redesign team
Preparing required infrastructure	10/12/2009 - 16/12/2009	Check and acquire infrastructure	฿ 65,000	DIY Staff
Program testing	10/12/2009 - 16/12/2009	Systematic tested program	฿ 67,000	IT application staff
Providing training	17/12/2009 - 23/12/20009	Ensure trained with confident	฿ 93,800	IT development staff
Conduct Simulation	24/12/2009 - 29/12/2009	Full loop simulation and last configuration	฿ 93,800	
Major activity: Process Implementation and Monitoring				
Activity	Period	Required Output	Cost	
Deploying people and financial resources	2/1/2010	Go-live and complete process transition	฿ 93,800	Redesign team
Monitoring via regular review and weekly meeting	2/1/2010 -15/1/2010	Process performance monitoring	฿ 51,000	DIY Staff
Estimate cost summation			฿ 642,400	

5.4.3 Creating enabling environment for implementing the To-Be design

"The first step in transforming the organization is to develop a plan for migrating to the new process. We need a path to get from where the organization is today, to where the organization wants to be. Migration strategies include: a full cutover to the new process, a phased approach, a pilot project, or creating an entirely new business unit. An important point to consider is the integration of the new process with other processes." (Successful BPR implementation strategy, Dr. S. Balasubramanian, PH.D.,2005)

- Program Specification: In this step, the spec of each program will be identified. From initial concepts, the group of 1 DIY chief, 1 assist DIY chief, and 4 DIY staffs will brainstorm about what program should be. They will discuss about purpose, scope, description, environment, input, output and logic of each program in detail. The specification of those programs will be record systematically by following program specification checklist as shown in figure 5.3.

Table5.30: General program specification checklist
Source: U.S. Department of Housing and Urban Development

REQUIREMENT		To be completed by Author		To be completed by Reviewer		
		AUTHOR X-REFERENCE Page #/Section #	AUTHOR COMMENTS	COMPLY Y	COMPLY N	REVIEWER COMMENTS
1.0	**GENERAL INFORMATION**					
1.1	**Purpose:** Describe the purpose of the Program Specifications.					
1.2	**Scope:** Describe the scope of the Program Specifications as it relates to the project.					
1.3	**System Overview:** Provide a brief system overview description as a point of reference for the remainder of the document, including responsible organization, system name or title, system code, system category, operational status, and system environment or special conditions.					
1.4	**Project References:** Provide a list of the references that were used in preparation of this document.					
1.5	**Acronyms and Abbreviations:** Provide a list of the acronyms and abbreviations used in this document and the meaning of each.					
1.6	**Points of Contact:**					
	1.6.1 **Information:** Provide a list of the points of organizational contact that may be needed by the document user for informational and troubleshooting purposes.					
	1.6.2 **Coordination:** Provide a list of organizations that require coordination between the project and its specific support function (e.g., installation coordination, security, etc.). Include a schedule for coordination activities.					

REQUIREMENT		To be completed by Author		To be completed by Reviewer		
		AUTHOR X-REFERENCE Page #/Section #	AUTHOR COMMENTS	COMPLY Y	COMPLY N	REVIEWER COMMENTS
2.0	**[PROGRAM IDENTIFIER]:**					
	(Each program should be under a separate section. Repeat this section for each program in the system, the next program being described in section 3.0, and so on. Each program (section) should correspond sequentially to the programs listed in sections 1.7.1-1.7.x.) Provide a program identifier here for each program in the system to establish a frame of reference for the remainder of the document.					
2.1	**Program Description:** Provide a brief description of the program.					
	2.1.1 **Software Unit Description:** Provide a description of the software unit and its significance within the system.					
	2.1.2 **Software Unit:** Describe the functions of the program and/or software units, as well as the relationship to each program.					
	2.1.3 **Accuracy and Validity:** Provide a description of accuracy requirements imposed on each software unit of the program.					
	2.1.4 **Timing:** Provide a description of the timing requirements imposed on each software unit of the program.					
	2.1.5 **Adaptability:** Provide a description of the capability to be incorporated for adapting the program/software unit to changing requirements.					

REQUIREMENT		AUTHOR X-REFERENCE Page #/Section #	AUTHOR COMMENTS	COMPLY Y	COMPLY N	REVIEWER COMMENTS
2.2	**Environment:**					
	2.2.1 **Support Software Environment:** Provide a description of the support software with which the system is to interact.					
	2.2.2 **Interfaces:** Provide a description of the interfaces with other application software, including those of other operational capabilities and from other organizations.					
	2.2.3 **Storage:** Provide a description of the software storage requirements for the program (software unit).					
	2.2.3.1 **Internal Storage:** Describe and illustrate the use of internal storage areas, including indexing and working areas.					
	2.2.3.2 **Device Storage:** List by device type all peripheral storage required and any constraints imposed on storage requirements by each storage device.					
	2.2.3.3 **Offline Storage:** Describe the form, media, and storage requirements of all offline storage.					
	2.2.3.4 **Temporary and Permanent Storage:** Describe the allocation of storage into permanent and temporary areas.					
	2.2.4 **Security:** Describe the security classifications of the software.					
	2.2.5 **Communications Environment:** Describe or refer to an appendix that describes communications requirements for the programs/software units being documented.					

REQUIREMENT		AUTHOR X-REFERENCE Page #/Section #	AUTHOR COMMENTS	COMPLY Y	COMPLY N	REVIEWER COMMENTS
2.3	**Design Details:**					
	2.3.1 **Input:** Provide a detailed description of all input recorded. Where the information is available in a data element dictionary or database specification, refer to that document rather than include an extract.					
	2.3.1.1 **Input Records:** Refer to the SDM to produce the appropriate table(s).					
	2.3.1.2 **Input Data Elements:** Refer to the SDM to produce the appropriate table(s).					
	2.3.2 **Output:** Provide a detailed description of all program (software units) output. Where the information is available in a data element dictionary or database specification, refer to that document rather than include an extract.					
	2.3.2.1 **Output Reports:** Refer to the SDM to produce the appropriate table(s).					
	2.3.2.2 **Output Data Elements:** Refer to the SDM to produce the appropriate table(s).					
	2.3.3 **Software Relationships:** Describe the interrelationships of the program (software unit) with the database to show how these files and tables are used in each function of the software.					
	2.3.4 **Software Unit Logic:** Describe the logic of each software unit in the program.					

- Logic testing with Excel simulation: After the program spec of **7** projects are recorded**,** redesign team will use software program logic to create excel simulation. They will generate a set of possible inputs from business cases to run testing with simple excel model. This practice will ensure the realistic and output of developing program. Some logical errors will be reviewed before real program development. Moreover these sets of input and output values will be very useful for real program testing step and simulation step.
  The example of set of input values and output values for "Out of Stock Checking Program" is presented in table. The possible business case inputs are shown in the left of the table 5.31.

Table5.31: The set of input values and output values for "Out of Stock Checking Program"

Business Case Input			**Expected Output**	
DIY	**Shelf-stock**	**Warehouse**	**Transferable Stock**	**Report**
6	5	0	0	Not show
6	5	3	0	Not show
2	5	0	0	Show
2	5	3	3	Show
2	0	6	0	Not show
2	5	6	3	show
0	0	0	0	Not show
0	5	0	0	Show
0	0	3	0	Not show
0	5	3	3	Show
0	5	6	5	show

- Program development: With logic proved specification and set of expected output, programmers can develop each program systematically. At the same time, redesign team will generate testing-data for program testing in the next step and prepare required infrastructure. Necessary data will be collected for process transition.

- Program testing**:** After programs are developed, redesign team and implement team will test them with testing-data and testing scenarios from previous sections. Test results will let redesign team know about the way to fix errors, bugs, and unexpected performance of each program. Without business case input and expected output from previous section, testing result will be ambiguous and unreliable.

- Providing training**:** Training is another critical step for process reengineering. A well design process can be fail, because users do not accept or understand the new way to complete their jobs. Redesign team will be separated into 7 teams. Each team will responsible for communication and training 7 programs at 1 branch. It 5 days every end user must understand and be familiar with new design processes.

- Conduct Simulation: To ensure process synchronization and to recheck program performance for the last time, a full business activities simulation will be arranged on each site. Redesign team will create a set of business scenario from business case input values and expect output values. Redesign team will use result from simulation for the last configuration. After last configuration is completed, its result will be reported to the board of directors for go-live decision.

5.4.4 Process Implementation and Monitoring

- Deploying people and financial resources: Before the go-live day, redesign team will be responsible for data transfer from legacy system to the new SAP based system. Infrastructure will be rechecking on site for the last time. At the night of go-live cut over plan will be completed.
- Monitoring via regular review and weekly meeting: After go-live redesign team and implementation team will monitor process as a process owner. The detailed ongoing measurement will be explained in the next section.

5.2 Improve Continuously

5.5.1 Initiate Ongoing Measurement and Performance Review

As presented in 5.32, after process transition is implemented, it is the time to monitor new process performance. Redesign team will analyze data from first 2 months of year 2010. New process will be review to find configuration points or rooms of improvement. Redesign projects will be measured with Process Measurement Indicators as shown in following table. Business performance will be measured with KPI to find the result of new process Implementation. These data and Implementation experience are necessary resource for creating pitfall prevention plan and operational strategic plan.

Table 5.32: Matching Redesign Projects and Process Measurement Indicators

Project	**Process Measurement Indicators**			
Redesign Business Process Activity	Time of warehouse stock preparing for DIY replenishment (Minutes)	Time of warehouse good receive for DIY stock (Minutes)	DIY Stock volume in warehouse (units)	
Redesign Replenishment from DC and Vendor	Stock moving between DIY and warehouse (units)	Stock moving between DIY and warehouse (SKU)	stock arrangement (items)	stock arrangement (minutes)
Redesign Goods Receive	DIY goods receive (units)	Time of DIY goods receive (minutes)		
Redesign Price Label Changing	Time Price label changing (All Items)	Time Price label changing (New Price Item)	Time Price label changing (Minutes)	
Redesign Selling Via POS	Issuing Full Form Invoice Via POS (bill)	Issuing Full Form Invoice Via POS(Minutes/bill)		
Redesign Selling Via Sales Order	DIY Sales Order (Bills)	DIY Sales Order (Minutes/bill)		
Redesign Out of Stock Checking	Out of shelf checking (units)	Out of shelf checking (Minutes)		

CHAPTER VI
RESEARCH RESULT

In the order to measure new process performance, the redesign team collect the process performance data and compare it to the as-is process performance. The history records of 16 weeks since the project is started until two months after process transition are plotted into charts. The team also examines the trend of performance to determine the signal of improvement. The KPIs of DIY department is compared in term of before and after process transition. Based on the research objectives and literature review, the results of business process reengineering are presented in this section.

6.1 Redesign Process Performance

6.1.1 Performance of redesign business process activity

- **Time of warehouse stock preparing for DIY replenishment:** This KPI measure the average time spent in warehouse stock preparing for DIY replenishment. Redesign team counts time since warehouse receive stock request from DIY, stock prepared, until stocks are sent to DIY. The average per day data is collected from 4 months history (November 2009 – February 2010). As presented in table 6.1, the time of warehouse stock preparing for DIY replenishment reduced more than 30% in every branch. The trend of reduction is presented in figure 6.1 significantly.

Table 6.1: Time of warehouse stock preparing for DIY replenishment (Minutes)

Time of warehouse stock preparing for DIY replenishment (Minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	128.32	72.45	-43.54
BP	102.11	43.88	-57.03
BR	54.56	33.06	-39.40
BY	26.47	18.49	-30.15
BT	43.01	23.08	-46.34
BT2	18.88	9.50	-49.68
BRu	117.84	64.86	-44.96

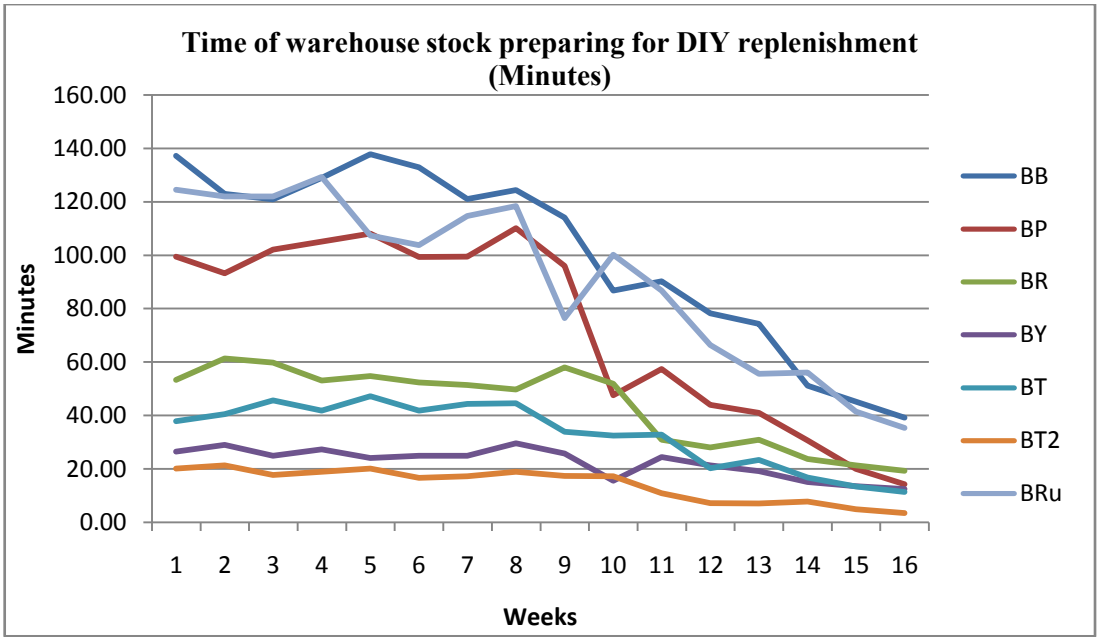


Figure 6.1: Time of warehouse stock preparing for DIY replenishment (Minutes)

Time of warehouse good receive for DIY stock: This KPI measure average time spent in warehouse good receive for product categories that sold in DIY. The time since vendor send goods, good receives until stocks are put away is measured. The average per day data is collected from 4 months history (November 2009 – February 2010). As presented in table 6.2, the time of warehouse goods receive for DIY replenishment reduced more than 40% in every branch. The trend of reduction is presented in figure 6.2 significantly

Table 6.2: Time of warehouse good receive for DIY stock (Minutes)

Time of warehouse good receive for DIY stock (Minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	123.97	72.96	-41.15
BP	100.54	44.31	-55.93
BR	56.52	26.87	-52.45
BY	29.24	15.31	-47.62
BT	41.32	21.95	-46.87
BT2	17.29	7.39	-57.23
BRu	119.63	48.56	-59.40

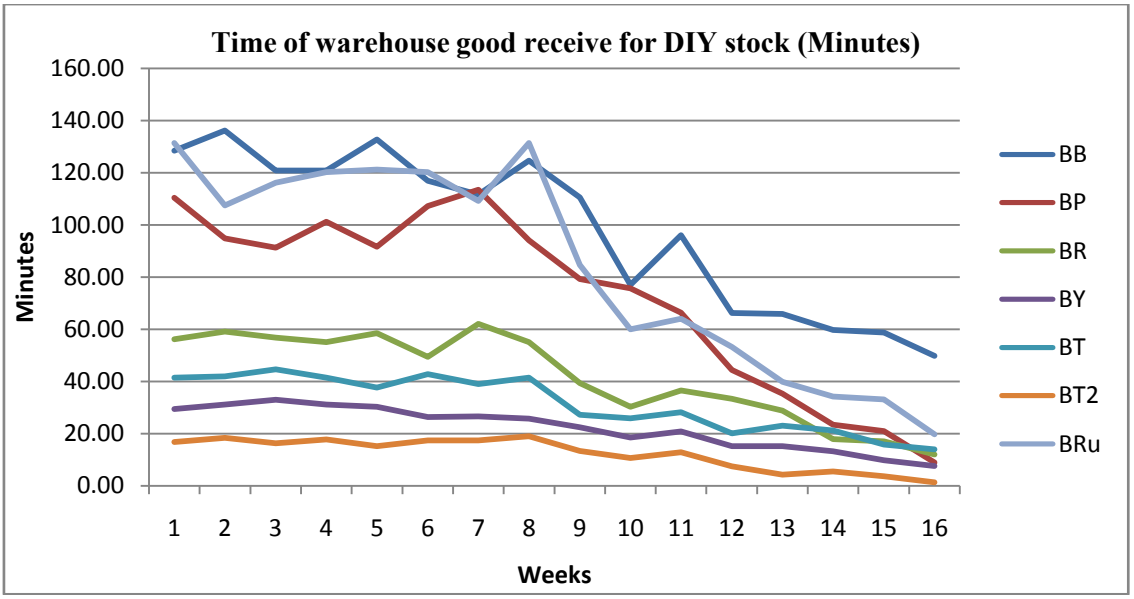


Figure6.2: Time of warehouse good receive for DIY stock (Minutes)

DIY Stock volume in warehouse: This KPI measure average DIY stock volume of specific product categories that sold in DIY. The average per day data is collected from 2 months history (since November 2009 – December 2009). The average per day data is collected from 4 months history (November 2009 – February 2010). As presented in table 6.3, the DIY stock volume in warehouse reduced more than 13% in every branch. The trend of reduction is presented in figure 6.3 significantly. The team has a consensus that the reduction of DIY stock volume in warehouse is not much rapid, because the high volume of DIY stock still remains in warehouse since December 2009. The team also expects from explicit trend of reduction in figure 6.3 that the stock volume will be decreased continuously.

Table 6.3: DIY Stock volume in warehouse (units)

DIY Stock volume in warehouse (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	1488.38	1287.53	-13.49
BP	1186.52	943.96	-20.44
BR	813.26	597.64	-26.51
BY	340.76	292.86	-14.06
BT	468.93	397.85	-15.16
BT2	231.88	162.12	-30.08
BRu	1515.67	1224.56	-19.21

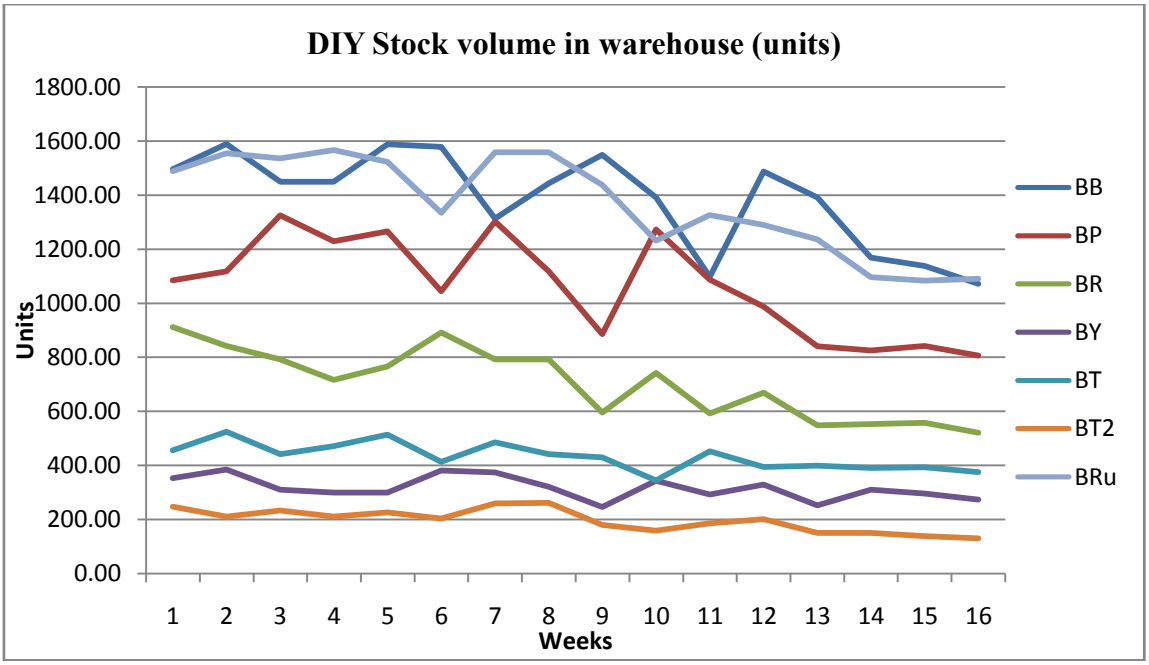


Figure6.3: DIY Stock volume in warehouse (units)

6.1.2 Performance of redesign goods receive process

DIY goods receive volume: This KPI measures the average volume of DIY stock which has to be received each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.4, the time of DIY goods receive dose not reduced or increased. No trend of reduction is presented in figure 6.44 significantly. This KPIs record shows that DIY department"s stock demand does not changed. This KPI could guarantee that the time of DIY goods receive is reduced because of process efficiency not the lower volume of transaction.

Table6.4: Measurement of Redesign Goods Receive (units)

DIY goods receive (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	683.64	689.89	0.91
BP	640.34	615.34	-3.90
BR	400.75	407.09	1.58
BY	176.98	174.63	-1.33
BT	252.63	281.98	11.62
BT2	113.75	116.40	2.32
BRu	786.66	746.25	-5.14

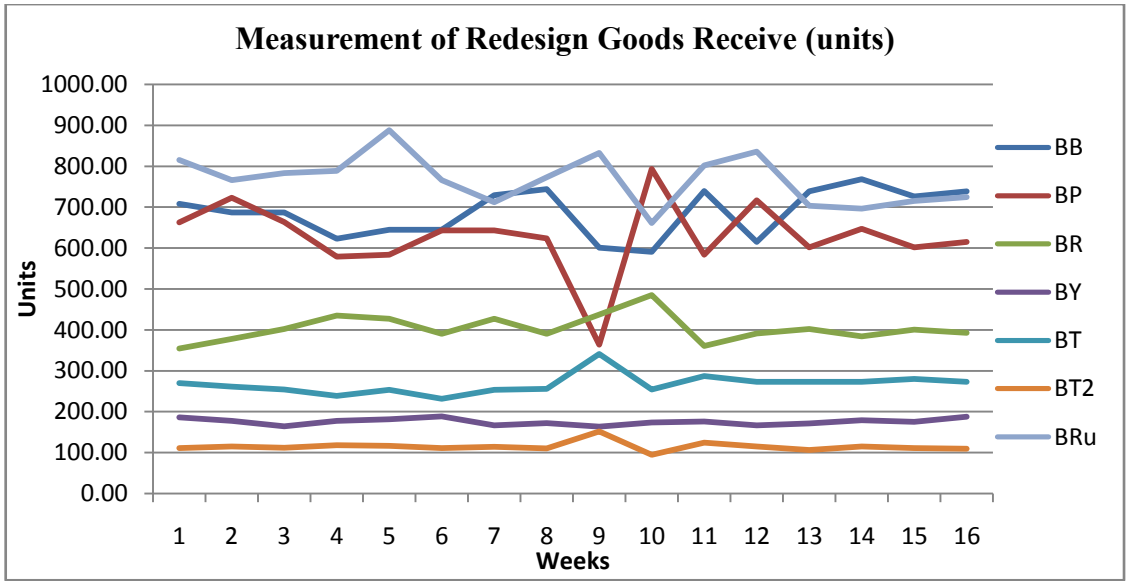


Figure6.4: DIY goods receive (units)

DIY goods receive time: This KPI measures the average time since stock send to DIY until stocks are put away and stored in DIY shelf. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.5, the goods receive time reduced more than 33% in every branch. The trend of reduction is presented in figure 6.5 significantly. The team has a consensus that the reduction of DIY good receive time should be continue**.** When DIY staff and IT staff accustom to SAP system they could finish they process much faster.

Table6.5: Time of DIY goods receive (minutes)

Time of DIY goods receive (minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	92.01	61.55	-33.10
BP	76.02	46.40	-38.96
BR	52.68	30.57	-41.96
BY	21.83	12.85	-41.16
BT	30.76	19.32	-37.18
BT2	15.50	8.75	-43.57
BRu	95.92	52.22	-45.56

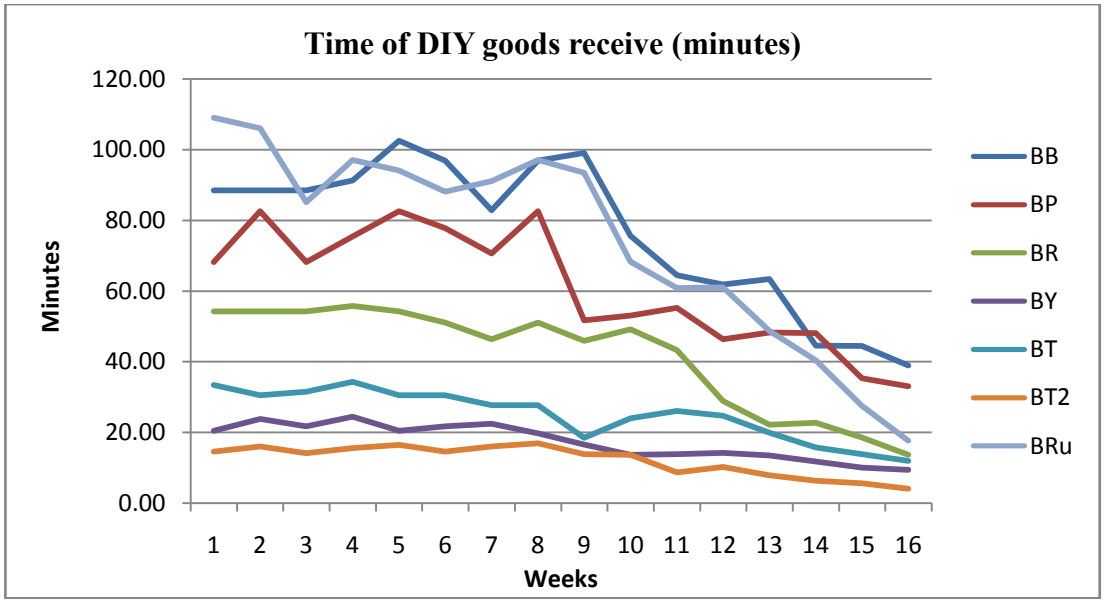


Figure6.5: Time of DIY goods receive (minutes)

6.1.3 Performance of redesign out of shelf checking process

Out of shelf items: This KPI measure the average out-of-shelf items. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.6, the average out of shelf items reduced more than 32% in every branch. The trend of reduction is presented in figure 6.6 significantly. The team has a consensus that the reduction of out of shelf items will be reduced, when the staffs have better skill. The strong signal of reduction will be more explicit.

Table6.6: Out of shelf checking (units)

Out of shelf checking (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	899.24	524.21	-41.70
BP	791.08	492.84	-37.70
BR	506.05	318.48	-37.06
BY	206.44	110.06	-46.69
BT	306.13	180.80	-40.94
BT2	150.26	101.29	-32.59
BRu	1002.86	563.18	-43.84

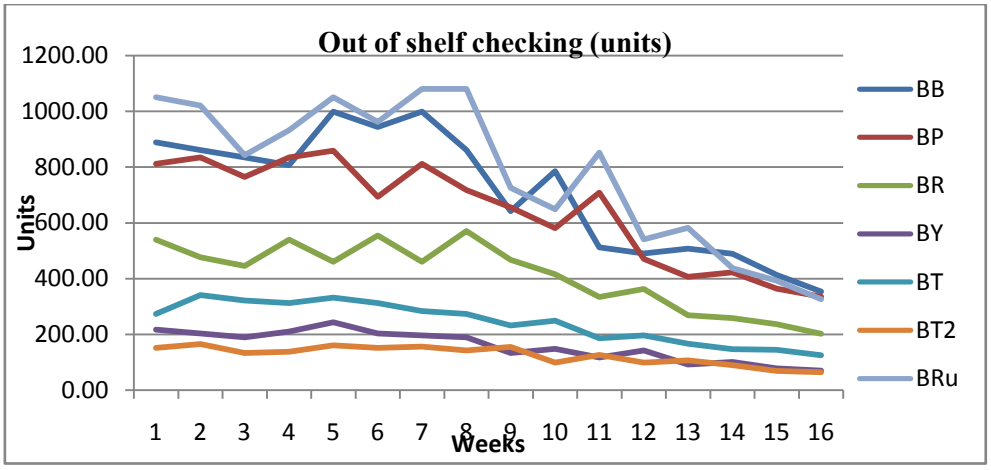


Figure6.6: Out of shelf checking (units)

Time of out of shelf checking: This KPI measure the average time spent in out-of-shelf checking process. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.7, the average out of shelf items reduced more than 30% in every branch. The trend of reduction is presented in figure 6.7 significantly. The team has a consensus that the reduction of out of shelf checking time will be reduced, when the new SAP replenishment system working with full efficiency.

Table6.7: Out of shelf checking (Minutes)

Out of shelf checking (Minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	165.51	101.66	-38.58
BP	148.61	72.01	-51.54
BR	99.84	69.33	-30.56
BY	48.43	29.64	-38.79
BT	58.82	31.09	-47.13
BT2	28.48	14.34	-49.64
BRu	185.59	99.76	-46.25

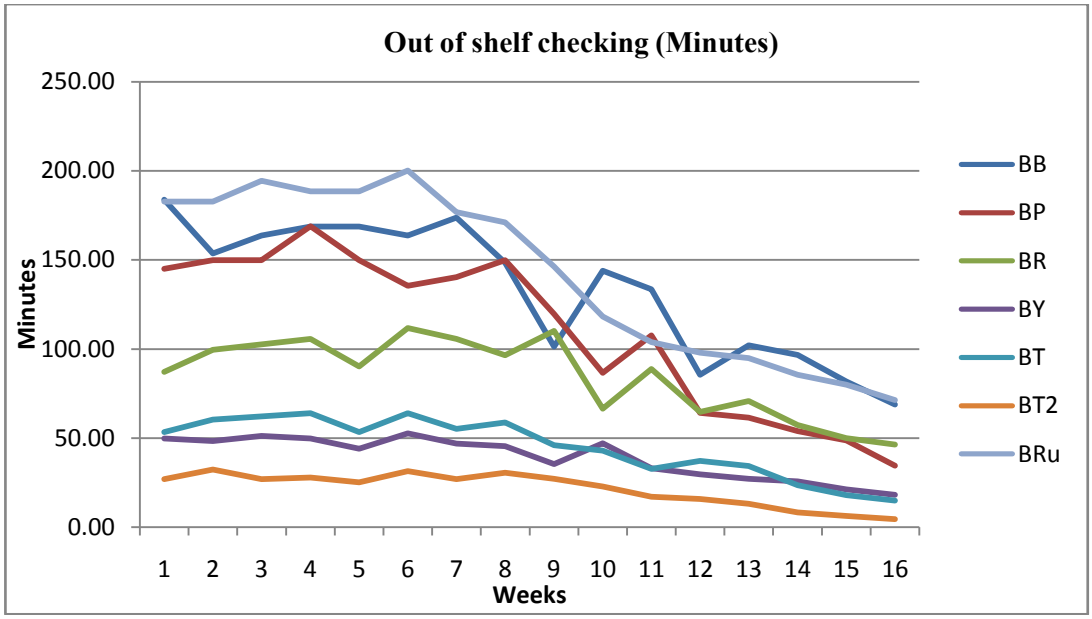


Figure6.7: Out of shelf checking (Minutes)

6.1.4 Performance of redesign replenishment from dc and vendor process

Stock moving between DIY and showroom (SKU): This KPI measures the average stock moving between DIY and show room in term of SKU. The average per day data is collected from 4 months history (November 2009 – February 2010). As presented in table 6.8, the average stock moving items by SKU reduced more than 35% in every branch. The trend of reduction is presented in figure 6.8 significantly. The team has a consensus that the stock moving could be eliminated, in two or three months after SAP system is implemented successfully.

Table6.8: Stock moving between DIY and warehouse (SKU)

Stock moving between DIY and warehouse (SKU)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	234.27	107.82	-53.98
BP	235.02	126.05	-46.37
BR	172.90	101.62	-41.22
BY	64.26	35.37	-44.95
BT	94.96	47.79	-49.67
BT2	43.87	28.23	-35.66
BRu	300.76	160.97	-46.48

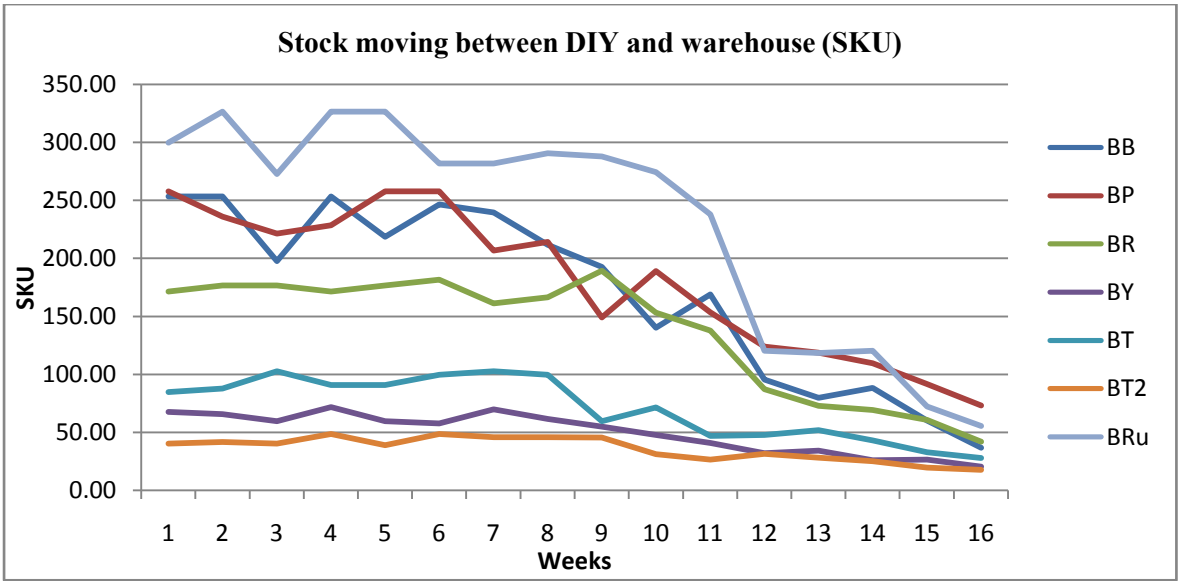


Figure6.8: Stock moving between DIY and warehouse (SKU)

Stock moving between DIY and showroom (units): This KPI measures the average stock moving between DIY and show room in term of unit. The average per day data is collected from 4 months history (November 2009 – February 2010). As presented in table 6.9, the average number of stock moving by unit reduced more than 40% in every branch. The trend of reduction is presented in figure 6.9 significantly. The team has a consensus that the stock moving could be eliminated, in two or three month after SAP system is implemented successfully.

Table6.9: Stock moving between DIY and warehouse (units)

Stock moving between DIY and warehouse (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	1507.52	695.57	-53.86
BP	1179.01	551.85	-53.19
BR	811.51	480.07	-40.84
BY	348.97	202.27	-42.04
BT	454.54	203.00	-55.34
BT2	227.31	127.97	-43.70
BRu	1481.86	740.53	-50.03

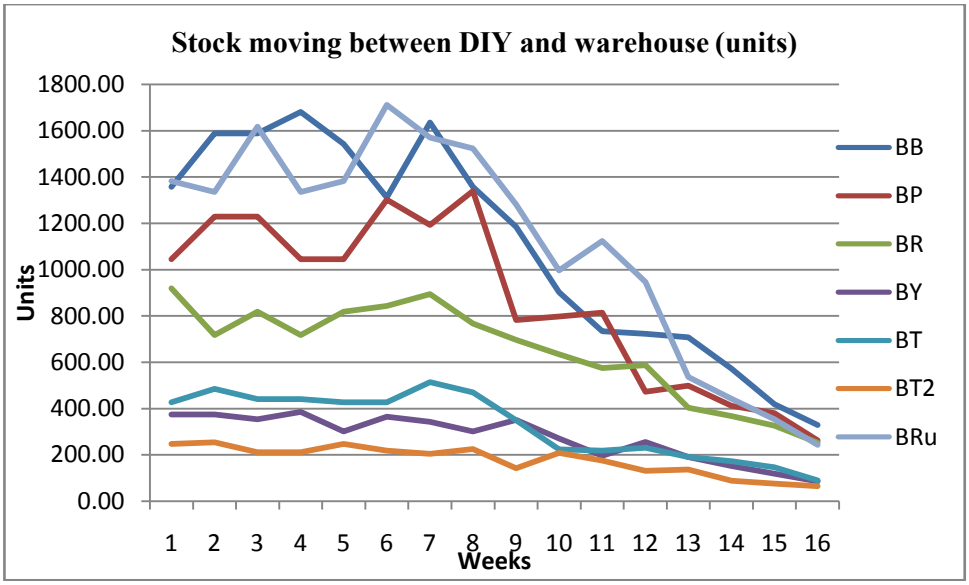


Figure6.9: Stock moving between DIY and warehouse (units)

6.1.5 Performance of redesign price labels changing process

Number of all items: This KPI measures average number of all items in DIY department. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.10, the average out of shelf items by unit reduced more than 32% in every branch. No trend of reduction is presented in figure 6.10 significantly.

Table6.10: Number of All Items

Number of All Items			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	12198.11	11581.96	-5.05
BP	10449.09	10352.31	-0.93
BR	11438.45	12112.25	5.89
BY	9368.98	8958.19	-4.38
BT	4341.67	4139.01	-4.67
BT2	2102.52	2003.20	-4.72
BRu	10178.11	9914.61	-2.59

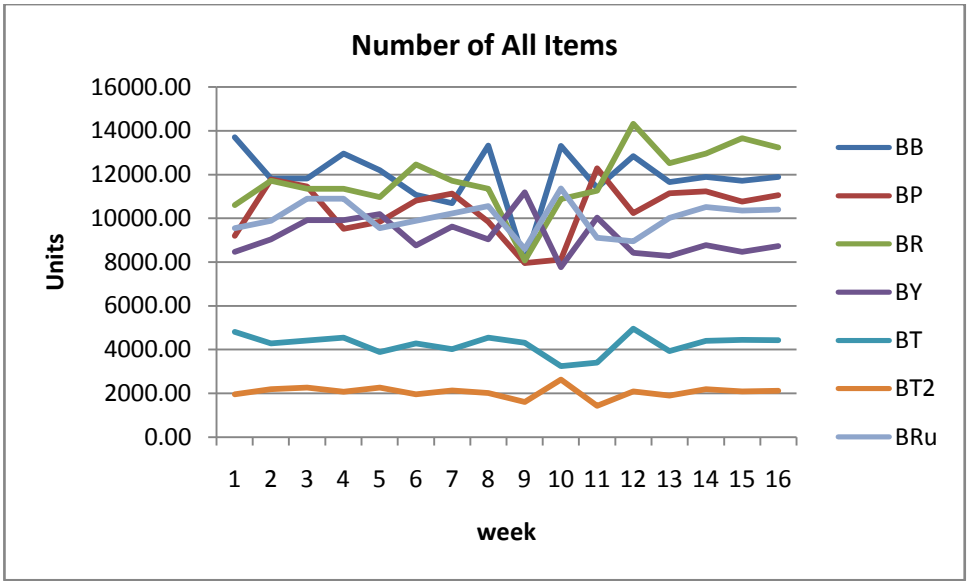


Figure6.10: Number of All Items

Price change Items: This KPI measures average number of price changed items in DIY department. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.11, the average out of shelf items by unit reduced more than 32% in every branch. No trend of reduction is presented in figure 6.11 significantly.

Table6.11: Price change item

Price change item			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	320.46	323.46	0.94
BP	264.64	259.75	-1.85
BR	175.76	179.02	1.85
BY	75.85	79.69	5.06
BT	109.17	119.92	9.85
BT2	51.78	51.58	-0.38
BRu	334.98	343.25	2.47

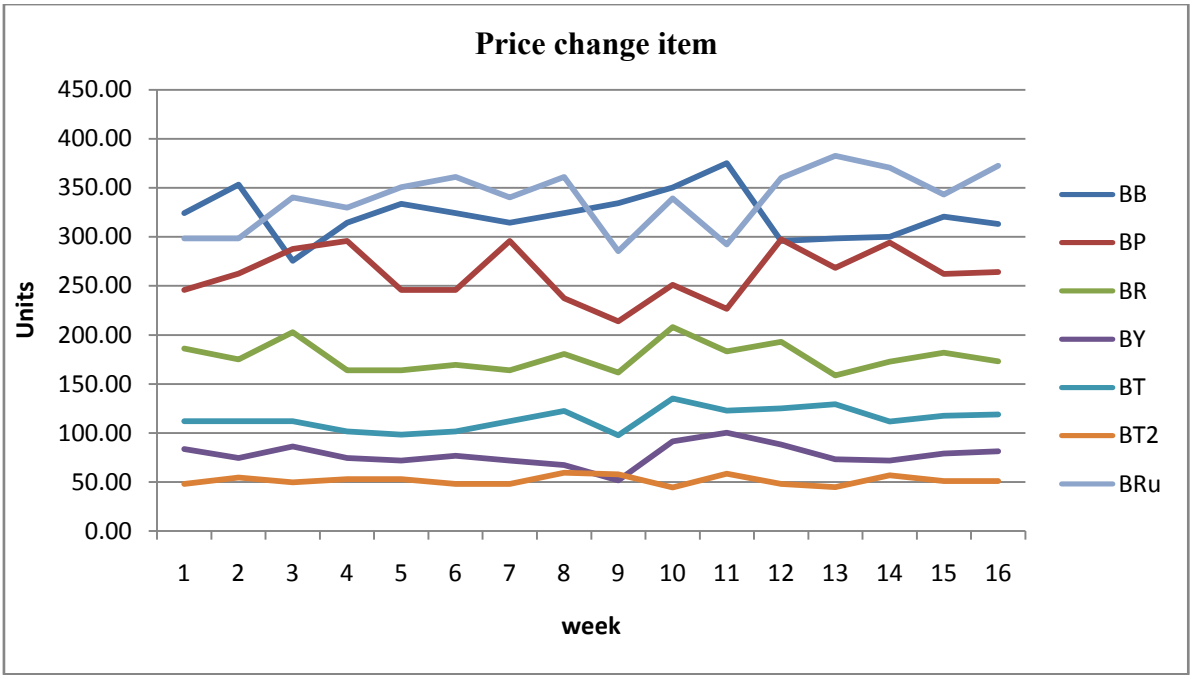


Figure6.11: Time Price label changing (New Price Item)

Time of price label changing: This KPI measures average time spent in price label changing process. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.12, the average out of shelf items by unit reduced more than 32% in every branch. The trend of reduction is presented in figure 6.12 significantly. When compare with the number of all items and the number of items with price changed in each day, the average time of price label changing is the only KPI that reduce significantly. According to steady number of all items in DIY and number of price change items, the team has a consensus that the average time of price label changing reduce because of the new process efficiency.

Table6.12: Time Price label changing (Minutes)

Time Price label changing (Minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	149.98	83.94	-44.03
BP	146.49	99.07	-32.37
BR	98.62	59.26	-39.91
BY	41.08	17.74	-56.82
BT	59.97	28.19	-52.99
BT2	26.91	12.92	-52.01
BRu	179.95	112.77	-37.33

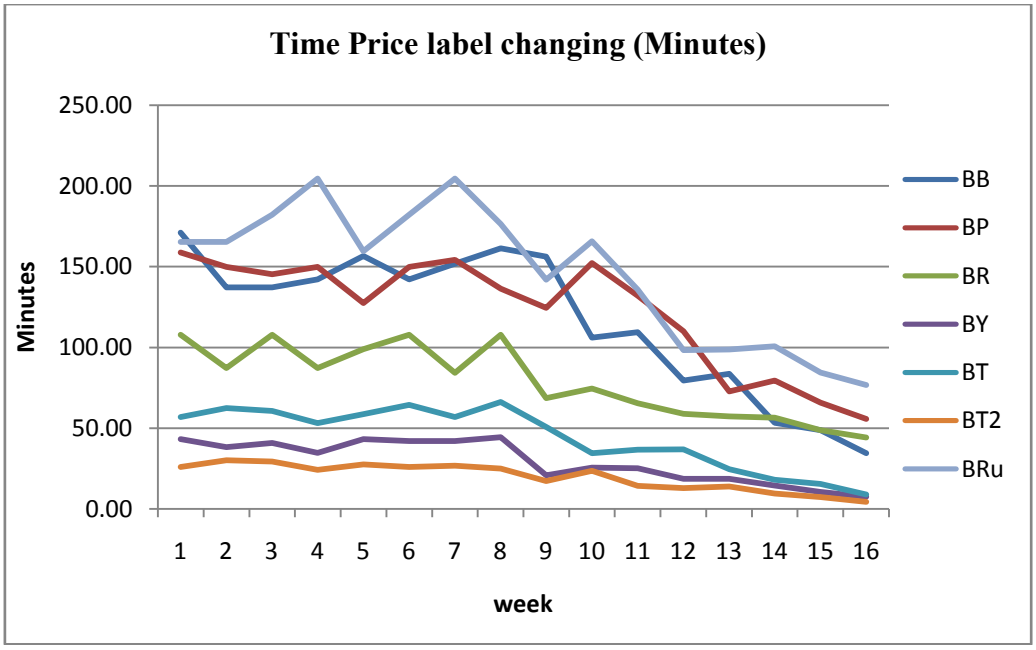


Figure6.12: Time Price label changing (Minutes)

6.1.6 Performance of Redesign Replenishment from DC and Vendor

Number of DIY stock arrangement: This KPI measures average number of DIY stock which is put away to DIY shelf each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.13, the average number of DIY stock arrangement does not reduced or increase significantly. No trend of reduction is presented in figure 6.13 significantly. This KPI could guarantee the efficiency of new replenishment process.

Table6.13: Measurement of Stock Arrangement Process

stock arrangement (items)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	968.67	971.38	0.28
BP	848.85	808.09	-4.80
BR	536.15	545.43	1.73
BY	250.70	234.34	-6.53
BT	332.66	345.60	3.89
BT2	160.67	172.49	7.35
BRu	995.43	981.44	-1.40

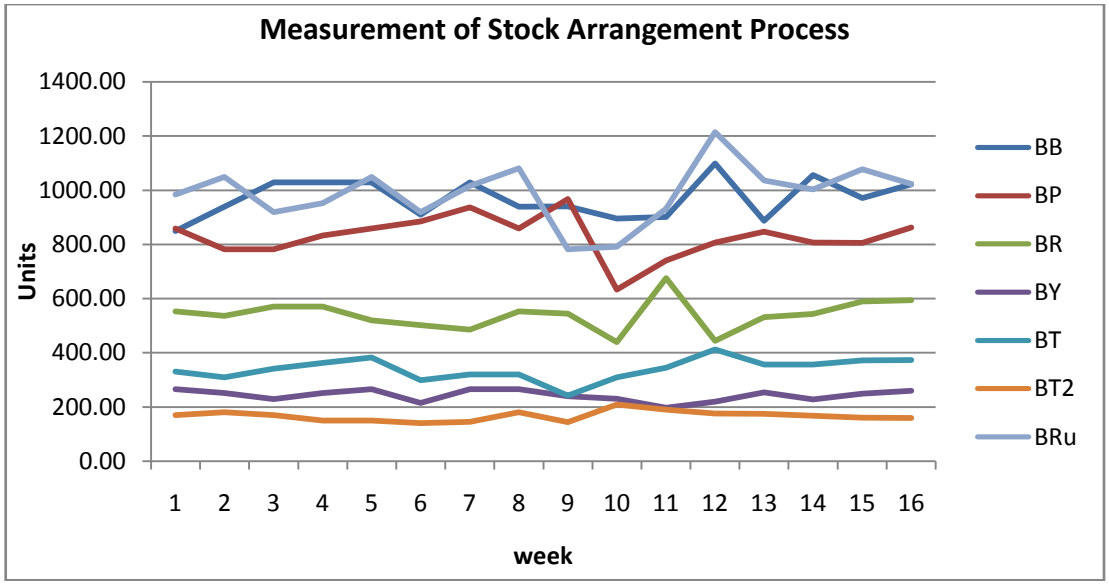


Figure6.13: stock arrangement (items)

Time of DIY stock arrangement: This KPI measures average time spent in DIY stock arrangement. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.14, the average time of DIY stock arrangement reduced more than 10% in every branch. The trend of reduction is presented in figure 6.14 significantly. When compare with the number of DIY stock arrangement, the average time of DIY stock arrangement is reduced significantly. According to steady number of DIY stock arrangement, the team has a consensus that the average time of DIY stock arrangement is reduced because of the new process efficiency.

Table6.14: stock arrangement (minutes)

stock arrangement (minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	242.64	212.12	-12.58
BP	227.81	191.22	-16.06
BR	168.64	148.65	-11.85
BY	70.11	61.78	-11.89
BT	105.97	84.79	-19.99
BT2	52.10	43.44	-16.63
BRu	268.45	225.17	-16.12

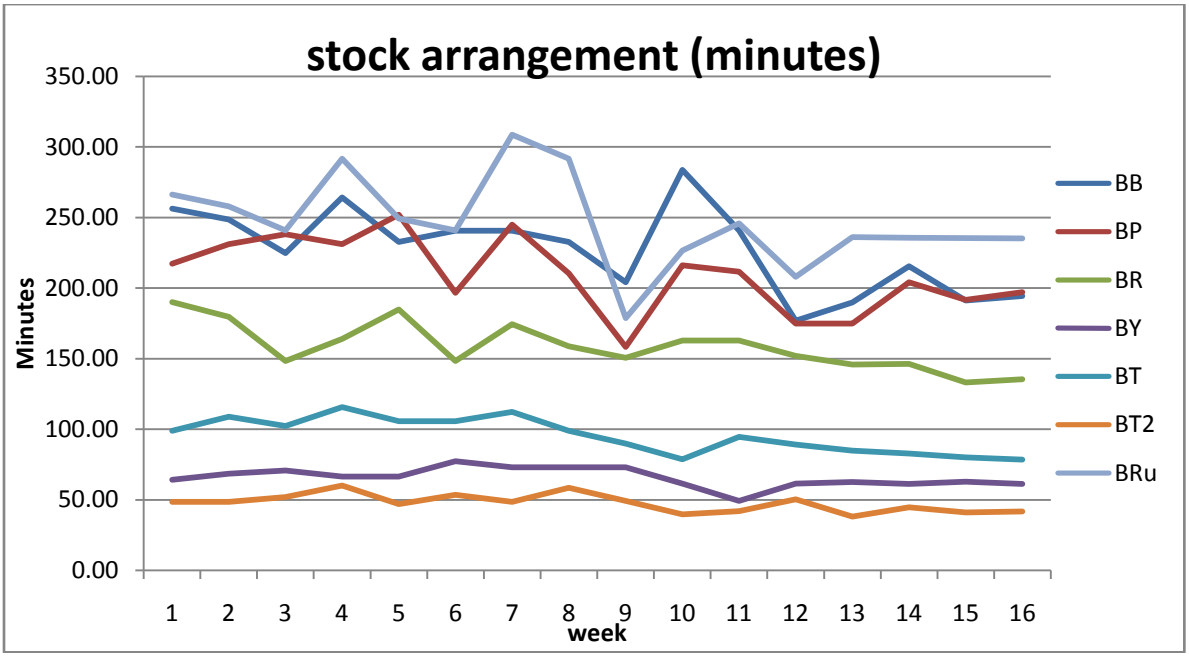


Figure6.14: stock arrangement (minutes)

6.1.7 Performance of redesign selling via POS process

Issuing Full Form Invoice via POS (bill): This KPI measures average number of full form invoice via POS (bill) in each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.15, the average number of full form invoice via POS (bill) does not reduced or increased significantly. No trend of reduction is presented in figure 6.15 significantly. This KPI could guarantee the efficiency of new selling via POS process.

Table6.15: Measurement of Redesign Selling Via POS

Issuing Full Form Invoice Via POS (bill)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	18.20	18.21	0.04
BP	15.08	14.87	-1.34
BR	14.85	14.75	-0.69
BY	5.06	6.03	19.15
BT	6.26	6.33	1.19
BT2	3.48	3.71	6.52
BRu	19.94	19.47	-2.36

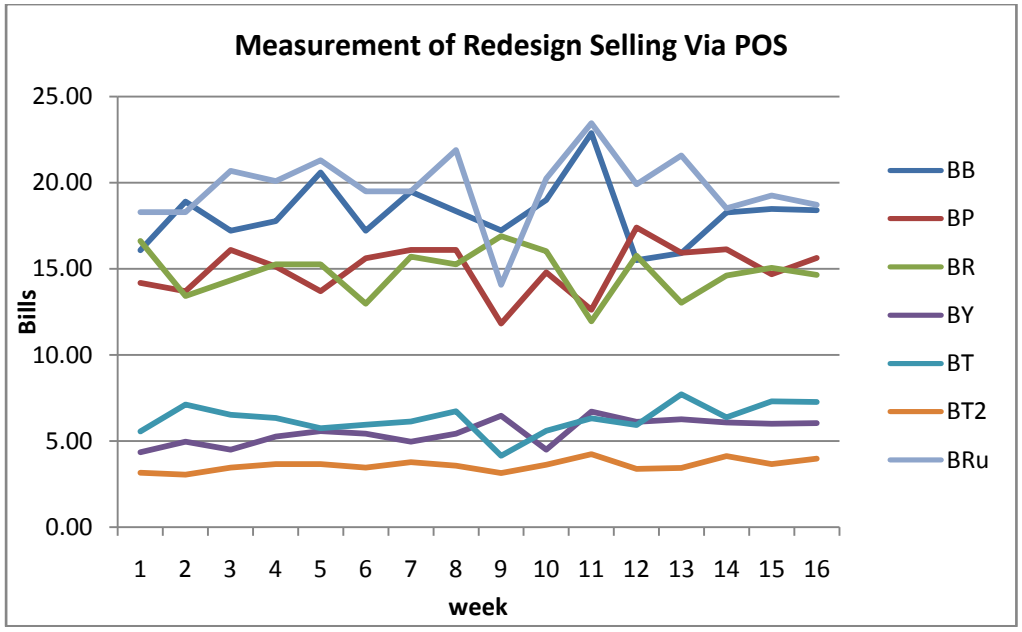


Figure6.15: Issuing Full Form Invoice via POS (bill)

Issuing Full Form Invoice via POS (minutes/bill): This KPI measures average time of issuing full form invoice via POS (minutes/bill) in each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.16, the average time of DIY stock arrangement reduced more than 8% in every branch. The trend of reduction is presented in figure 6.16 significantly. When compared with the number of issuing full form invoice (bill), the average time of issuing full form invoice via POS (minutes/bill) is reduced significantly. According to steady number of issuing full form invoice (bill), the team has a consensus that the average time of issuing full form invoice via POS is reduced because of the new process efficiency.

Table6.16: Issuing Full Form Invoice Via POS(Minutes/bill)

Issuing Full Form Invoice Via POS(Minutes/bill)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	3.84	3.17	-17.59
BP	4.02	3.68	-8.29
BR	3.97	3.07	-22.55
BY	3.82	3.26	-14.76
BT	4.34	3.52	-18.85
BT2	4.24	3.39	-20.24
BRu	4.28	3.24	-24.28

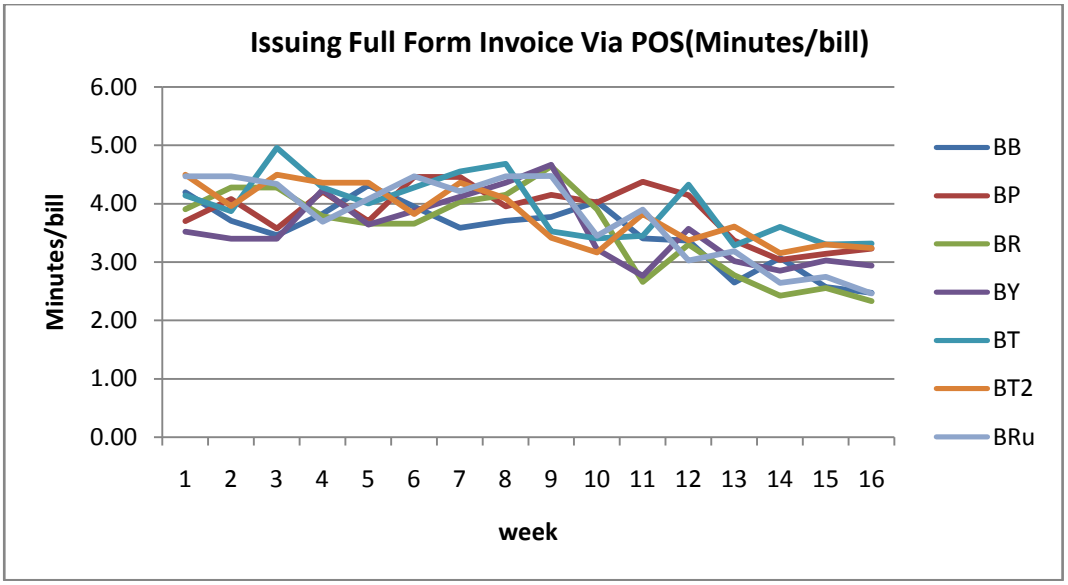


Figure6.16: Issuing Full Form Invoice via POS (Minutes/bill)

6.1.8 Performance of redesign selling via sales order

DIY Sales Order (Bills): This KPI measures average number of DIY sales order (bills) in each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.17, the average number of DIY sales order (bills) does not reduced or increased significantly. No trend of reduction is presented in figure 6.17 significantly. This KPI could guarantee the efficiency of new selling via sales order process.

Table6.17: DIY Sales Order (Bills)

DIY Sales Order (Bills)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	189.11	187.58	-0.81
BP	242.95	214.47	-11.72
BR	259.63	257.71	-0.74
BY	55.97	57.45	2.65
BT	83.89	85.79	2.26
BT2	50.21	51.12	1.81
BRu	238.68	248.62	4.17

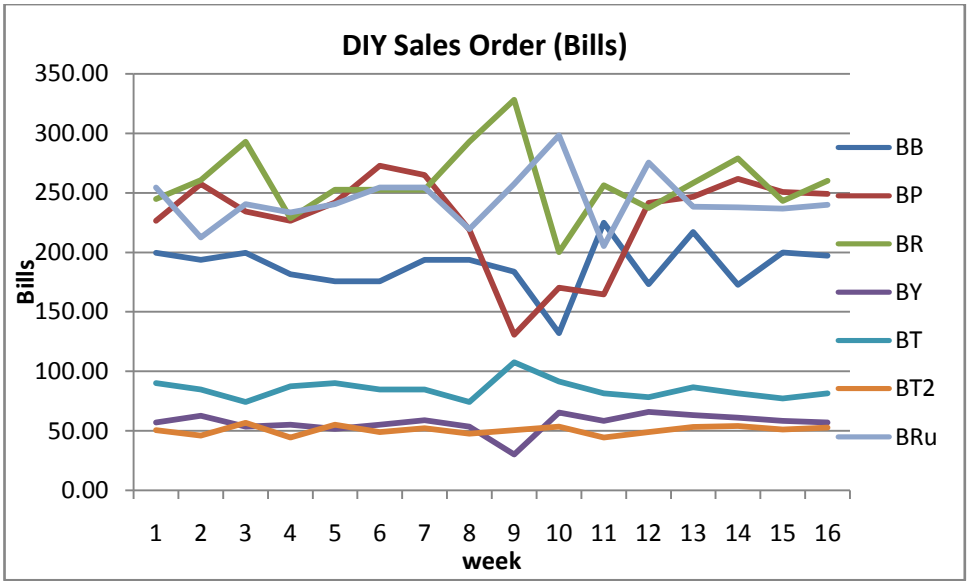


Figure6.17: DIY Sales Order (Bills)

DIY Sales Order (Minutes/bill): This KPI measures average time of selling via sales order (minutes/bill) in each day. The average per day data is collected from 4 months history (since November 2009 – February 2010). As presented in table 6.18, the average time of selling via sales order (minutes/bill) reduced more than 12% in every branch. The trend of reduction is presented in figure 6.18 significantly. When compared with the number of selling via sales order (bill), the average time of selling via sales orders (minutes/bill) is reduced significantly. According to steady number of selling via sales order (bill), the team has a consensus that the average time of selling via sales order (minutes/bill) is reduced because of the new process efficiency.

Table6.18: DIY Sales Order (Minutes/bill)

DIY Sales Order (Minutes/bill)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	4.24	3.59	-15.22
BP	4.07	3.53	-13.15
BR	4.54	3.59	-20.97
BY	4.30	3.76	-12.55
BT	4.61	3.92	-14.91
BT2	4.67	3.52	-24.73
BRu	4.55	3.52	-22.76

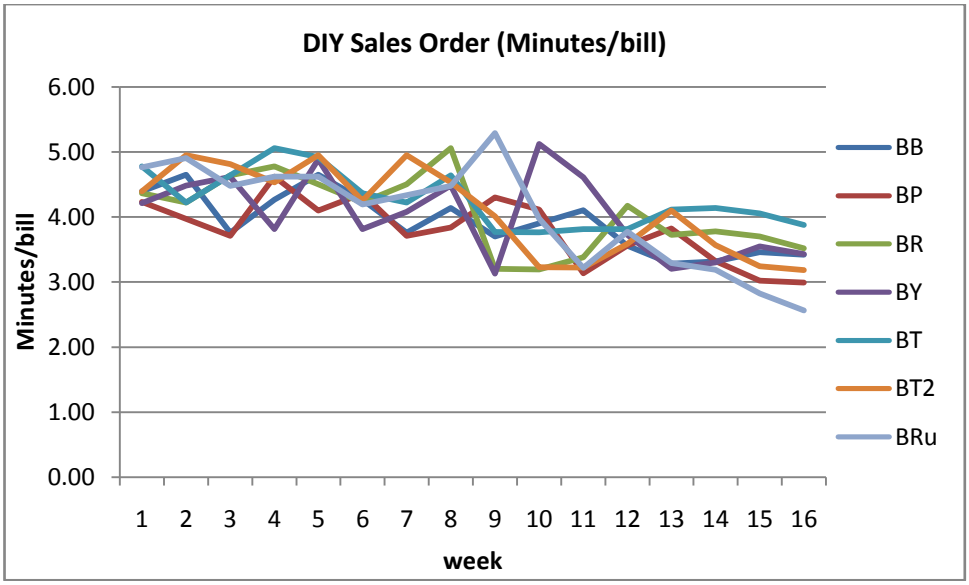


Figure6.18: DIY Sales Order (Minutes/bill)

6.2 KPIs for Retailer and Business Performance

6.2.1 Monthly sales (million Baths)

Monthly Sales is the comparing record of DIY sales between the period of before and after process transition. The average sales data of week 1-8 was collected since 1 November 2009 until 31 December 2010. The set of performance before process transition was exported from oracle system. The average sales data of week 9-16 was collected since 1 January 2009 until 26 February 2010. This set of performance after process transition was exported form SAP system. As shown in following table and figure, the trend of monthly sales was very slightly increased. The branch which a monthly sale was most reduced was BR at -1.43%. The branch which average time was most increased was BB at 6.30%. However redesign team and board of directors consider this slightly change as a result from general seasonal sales pattern. From 5 years record the sales volume of February usually increased from January. Monthly Sales affect average sales per area and sales per employee in the same way.

Table6.19: Monthly sales (million Baths)

Monthly sales (million Baths)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	12.68	13.48	6.30
BP	9.04	9.10	0.66
BR	8.30	8.18	-1.43
BY	3.07	3.10	1.17
BT	4.88	5.02	3.02
BT2	2.13	2.23	4.71
BRu	14.77	15.44	4.58

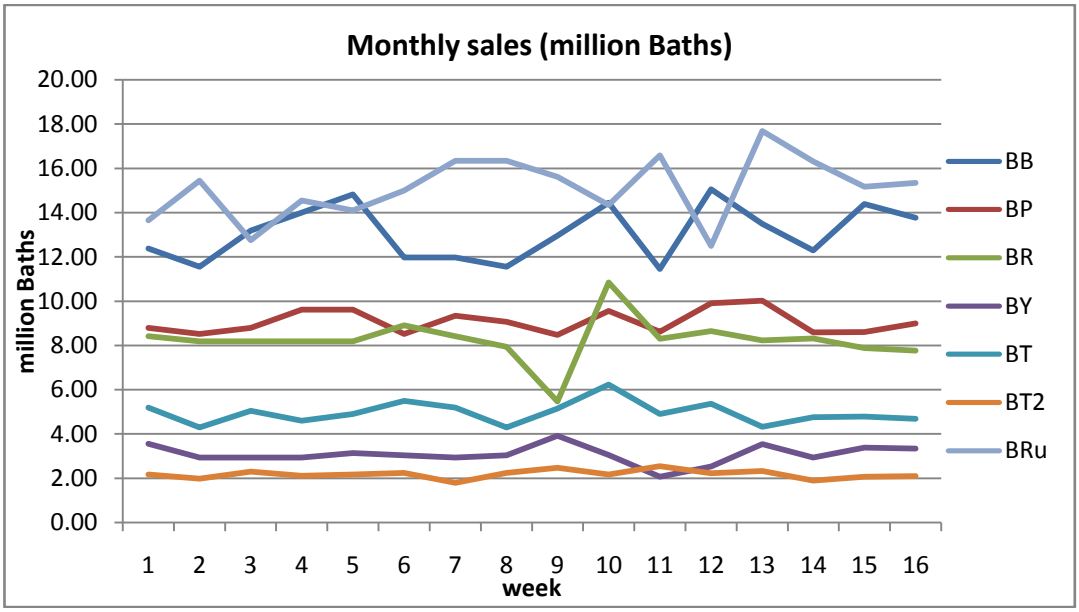


Figure6.19: Monthly Sales (Million Baths)

Table6.20: Average sales per area (Baths/Square Meter)

Average sales per area (Baths/Square Meter)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	140.91	149.79	6.30
BP	150.61	151.61	0.66
BR	138.36	136.38	-1.43
BY	51.11	51.71	1.17
BT	135.46	139.54	3.02
BT2	118.31	123.88	4.71
BRu	273.46	285.98	4.58

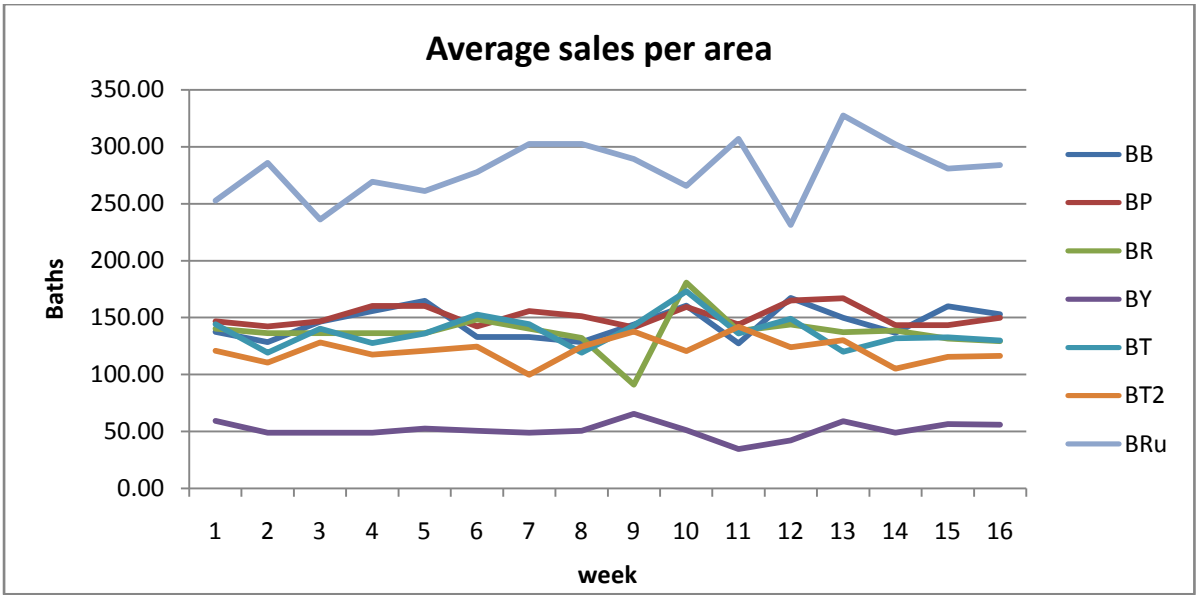


Figure6.20: Average sales per area (Baths/Square Meter)

Table6.21: Average sales per area (Baths/Square Meter)

Sales per employee (Million Baths/Man)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	0.79	0.84	6.30
BP	0.82	0.83	0.66
BR	0.64	0.63	-1.43
BY	0.28	0.28	1.17
BT	0.81	0.84	3.02
BT2	0.53	0.56	4.71
BRu	0.92	0.97	4.58

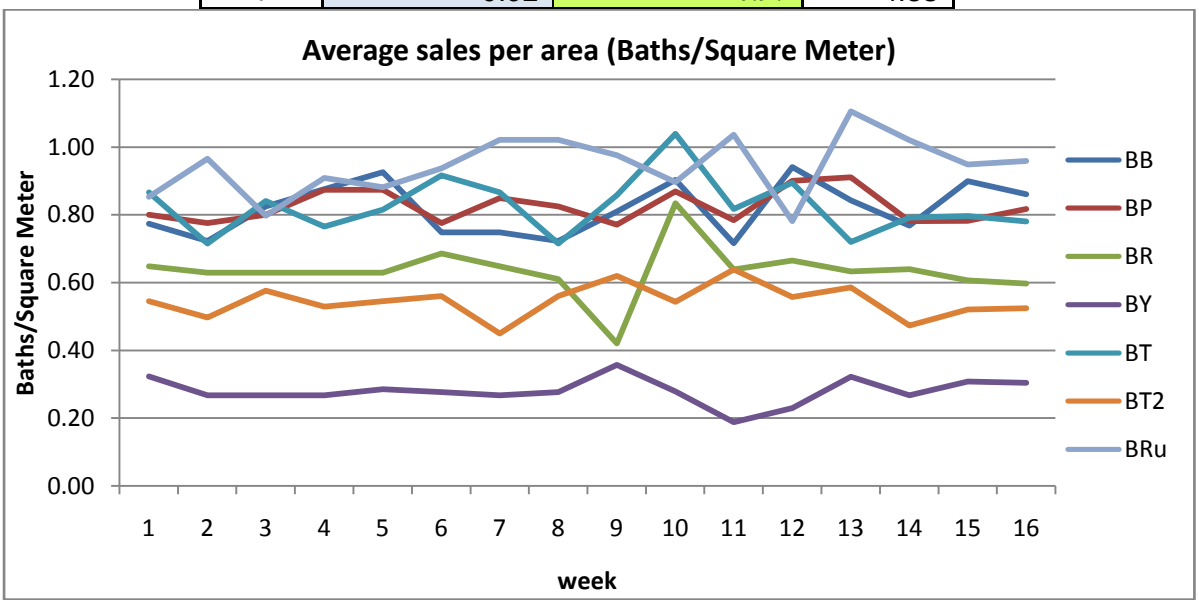


Figure6.21: **Sales per Employee (Million Baths/Man)**

6.2.2 Customer Pending Time (Minutes)

Customer Pending Time is the comparing record of customer waiting time in the process of issuing full form invoice, between the period of before and after process transition. The waiting time in week 1-8 was collected since 1 November 2009 until 31 December 2010 as the set of performance before process transition. The waiting time in week 9-16 was collected since 1 January 2009 until 26 February 2010 as the set of performance after process transition. As shown in following table and figure, the trend of average customer pending time has been reduced significantly. The branch which average time was most reduced is BP at -18.55%. The branch which average time was least reduced is BT at -7.1%.

Table6.22: Customer Pending time (Minutes)

Customer Pending time (Minutes)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	3.49	3.10	-11.09
BP	3.99	3.25	-18.55
BR	3.51	2.95	-16.13
BY	3.68	3.07	-16.50
BT	3.64	3.27	-9.94
BT2	3.85	3.58	-7.10
BRu	3.85	3.21	-16.82

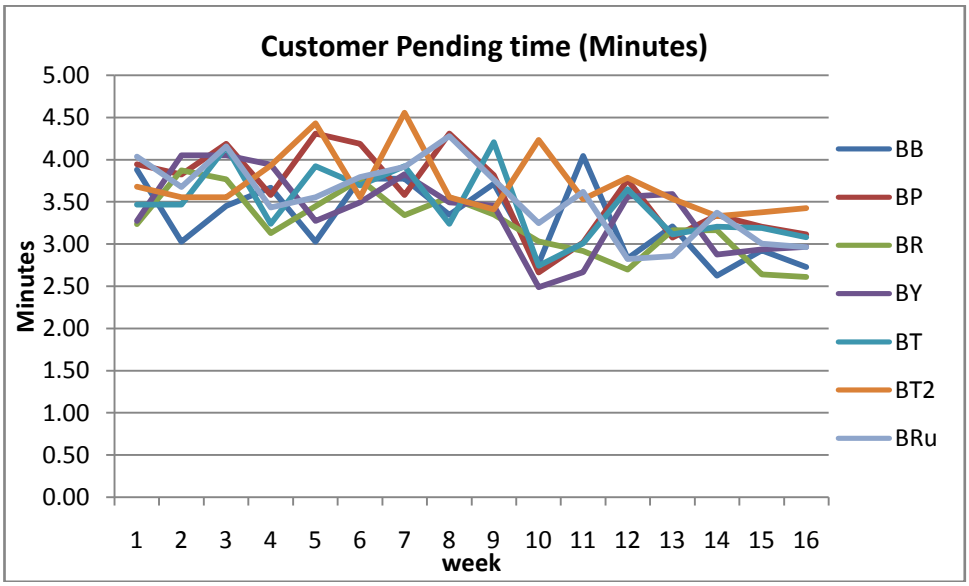


Figure6.22: Customer Pending Time (Minutes)

6.2.3 Out of shelf rate (units)

Out of shelf rate is the comparing record of out of shelf items in DIY department, between the period of before and after process transition. The out of shelf data in week 1-8 was collected since 1 November 2009 until 31 December 2010 as the set of performance before process transition. The out of shelf data in week 9-16 was collected since 1 January 2009 until 26 February 2010 as the set of performance after process transition. As shown in following table and figure, out of shelf rate has been reduced significantly. The branch which out of shelf rate was most reduced was BRu at -43.84%. The branch which out of shelf rate was least reduced was BT at -32.59%.

Table6.23: Out of shelf checking (units)

Out of shelf checking (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	899.24	524.21	-41.70
BP	791.08	492.84	-37.70
BR	506.05	318.48	-37.06
BY	206.44	110.06	-46.69
BT	306.13	180.80	-40.94
BT2	150.26	101.29	-32.59
BRu	1002.86	563.18	-43.84

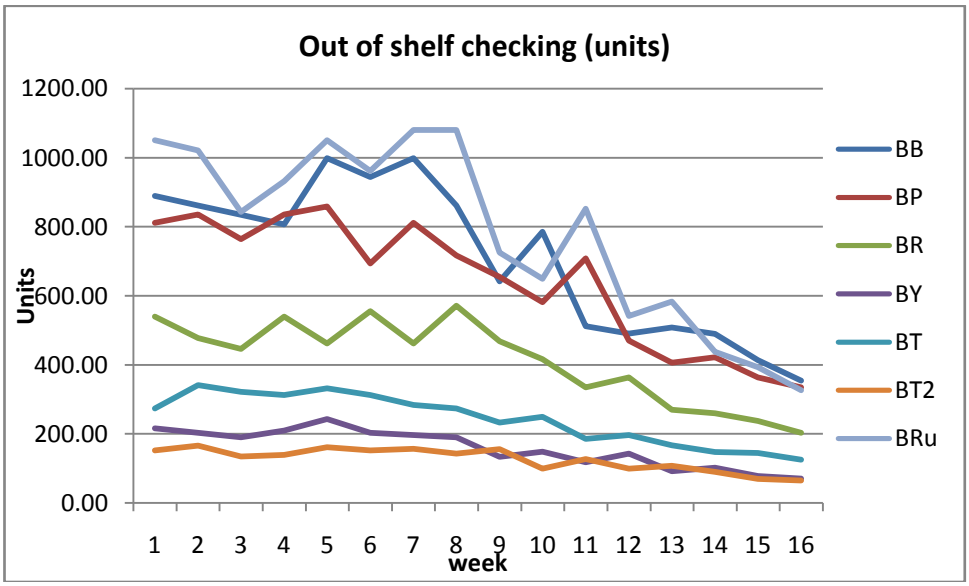


Figure6.23: Out of shelf rate (units)

6.2.4 Average transaction value (Baths)

Average transaction value is the comparing record of DIY sales per bill between the period of before and after process transition. The average sales data of week 1-8 was collected since 1 November 2009 until 31 December 2010. The set of performance data before process transition was exported from oracle system. The average sales data of week 9-16 was collected since 1 January 2009 until 26

February 2010. This set of performance data after process transition was exported form SAP system. As shown in following table and figure, this record of average transaction value has no significant trend. The most increase average transaction value was 7.38% at BT. The most reduced average transaction value was -4.87% at BY. However this slightly changes was also considered as an effect from general seasonal sales pattern.

Table6.24: Average transaction value (Baths)

Average transaction value (Baths)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	664.77	690.93	3.94
BP	429.93	447.58	4.10
BR	406.04	408.65	0.64
BY	160.32	152.51	-4.87
BT	234.46	251.77	7.38
BT2	104.37	111.92	7.24
BRu	764.06	761.85	-0.29

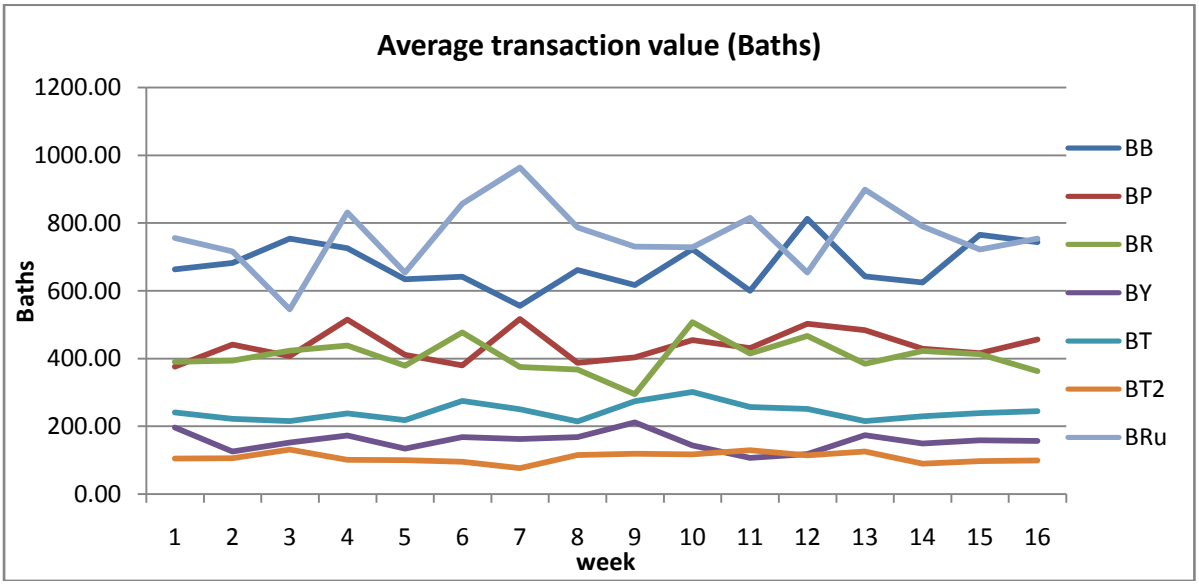


Figure6.24: Average transaction value (Baths)

6.2.5 Average age of Inventory (Months)

Average age of Inventory is the comparing record of out of shelf items in DIY department, between the period of before and after process transition. The Average age of Inventory data in week 1-8 was collected since 1 November 2009 until 31 December 2010 as the set of performance before process transition. Average age of Inventory data in week 9-16 was collected since 1 January 2009 until 26 February 2010 as the set of performance after process transition. As shown in following table and figure, Average age of Inventory has been reduced significantly. The most reduced average age of inventory was -12.69% at BY. The least reduced average age of inventory was -5.75% at BT.

Table6.26: Average age of Inventory (Months)

Average age of Inventory (Months)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	1.85	1.67	-9.95
BP	2.09	1.90	-8.73
BR	1.89	1.73	-8.56
BY	1.85	1.61	-12.69
BT	2.03	1.91	-5.75
BT2	1.98	1.86	-5.86
BRu	1.89	1.71	-9.84

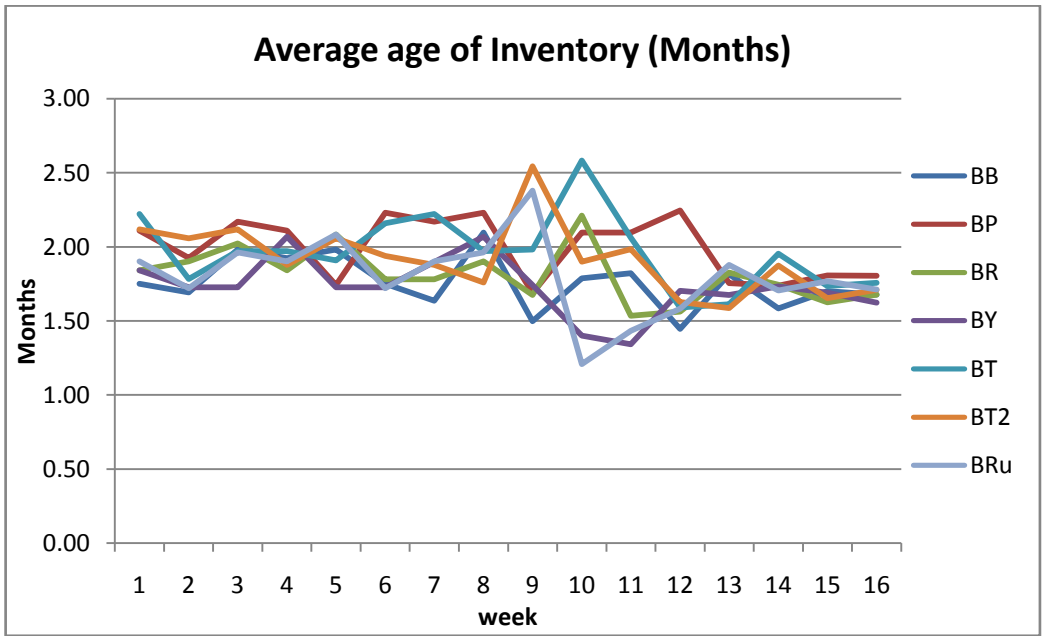


Figure6.27: Inventory turnover Months

6.2.6 Claim for Incorrect Price (time/month)

Claim for Incorrect Price is the comparing record of incorrect price claimed by customers in DIY department, between the period of before and after process transition. The claim records in week 1-8 were collected since 1 November 2009 until 31 December 2010 as the set of performance before process transition. The claim records in week 9-16 were collected since 1 January 2009 until 26 February 2010 as the set of performance after process transition. As shown in following table and figure, claim record has been reduced significantly. The most reduced average claim record was -44.24% at BT2. The least reduced average age of inventory was -41c.17% at BRu.

Table6.28: Claim for Incorrect Price (times/month)

Claim for Incorrect Price (times/month)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	16.07	9.29	-42.20
BP	26.58	15.09	-43.24
BR	13.93	7.61	-45.36
BY	2.05	1.16	-43.48
BT	5.58	3.16	-43.23
BT2	11.27	6.28	-44.24
BRu	82.68	48.64	-41.17

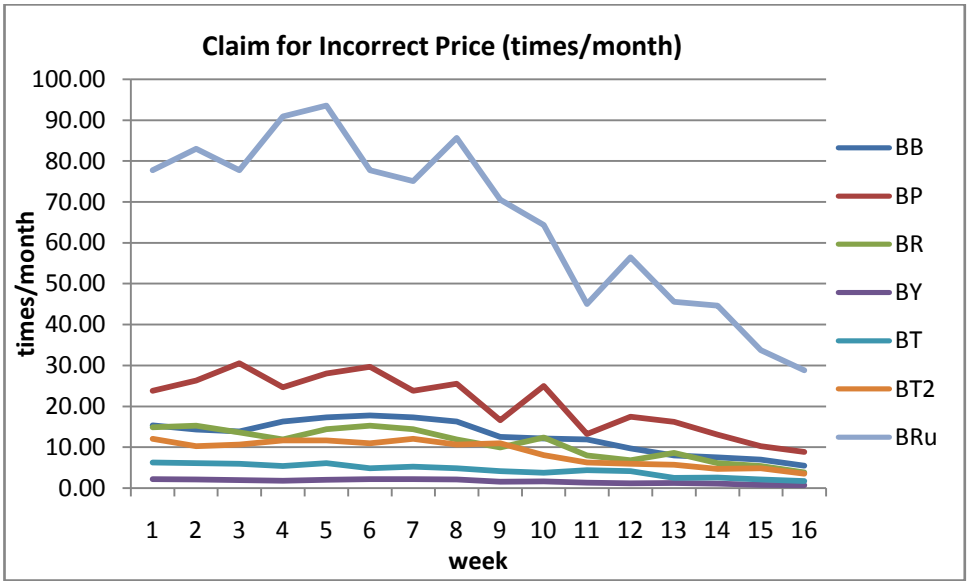


Figure6.28: Claim for Incorrect Price (time/month)

6.3 Operation Strategy from research result

With information from literature reviews and this study, redesign team could develop suggested operation strategy, which could maintain prominent operational performance. Those strategies could be summarized into 3 category including operation maintaining strategy, operation risk prevention strategy, and operation process improvement strategy.

6.3.1 Operation Maintaining Strategy

The objective of operation maintaining strategy is to maintain the level of daily operation performance. After data analysis and brain storming redesign team suggests the way to strengthen routine operation with daily report monitoring, morning walk, cycle count and sampling check.

- Daily report monitoring is assigning a routine job for every staff to monitor a set of additional daily reports. Those reports will enable necessary information flow through the company. They will show uncommon signs of incomplete tasks and will urge responsible person to complete them. A list of important daily reports is shown as follow.

Price change list report: A list of price changed items will be used by staffs and supervisors to recheck price changed items. As a routine task DIY staff will print this report from price label printing program every morning. Every afternoon supervisor will recheck this report.

Manual Obsolete price label checklist: This checklist is created for supervisor to recheck out-of-date price labels. The summary result from this checklist will tell DIY staff how many out-of-date price labels are not changed.

Record of price label changing time: This simple record will tell DIY staff and supervisor about the performance of price label changing process. Every morning, DIY staff will write the start time and the number of price changed units down in a paper before change those labels. After they finish price label changing they will write finishing time down in a record.

Out of stock checking report: This report is a list of out of stock items in DIY. DIY staff will use this report to find which items could be replenished with stock in warehouse. DIY supervisor will use this report to recheck DIY staff performance.

Manual out of shelf check list: This simple check list is used by DIY staff and DIY supervisors to check out of shelf items. By walking around the store DIY staff will record those out of shelf items and use SAP standard function to find the reasons. Those reasons will be reported to DIY supervisor and headquarter to fix those problems.

Incomplete goods receive report: This SAP standard report will help DIY staff to recheck incomplete good receive PO. In also help DIY supervisor and headquarter to recheck this process performance.

Incomplete transaction report: This SAP standard report will help DIY staff to recheck incomplete stock transfer transaction. In also help DIY supervisor and headquarter to recheck this process performance.

- Morning walk is assigning a routine job for DIY staff and supervisor to walk around a store and check store availability. They will check general problems such as out of shelf, defect products, out of date labels, and cleanness. Those problems will be fixed or reported early to supervisor. Moreover headquarter representative will randomly walk around store weekly to recheck operation performance. This double check will strengthen the stability of DIY operation.

- Cycle count is a routine stock checking in small part of a store. With good understanding and carefully management it is one of the best tools for monitoring DIY operation performance. More than half of DIY operation performance relate to stock accuracy. If stock missing or exceeding are found, supervisors could trace those errors back to find their roots of problems. This practice will ensure stock accuracy and help DIY staff on performance monitoring.

- Sampling Check is random transaction rechecking. By random recheck suspected DIY operation transactions from error‟s root assumption, supervisor and headquarter will be able to find incomplete transaction done by shop floor staffs.

6.3.2 Operation Risk Prevention strategy

The objective of operation risk prevention strategy is to avoid risk that could corrupt operation performance. After data analysis and brain storming redesign team suggests the way to strengthen routine operation as shown in previous section. The summary of risk prevention practices are presented in following table.

6.1 Operation Process Improvement Strategy

The objective of operation process improvement strategy is to improve process and maintain long term operation performance. No process could be optimum forever. When driver and environment are changed, operation process must be developed. With better technology, knowledge, and creative, the same job could be done easier. After data analysis and brain storming redesign team suggests the way to maintain long term optimization with Kaizen incremental improvement and periodical reengineering cycle.

CHAPTER VII

CONCLUSIVE FINDING AND RECOMMENDATION

This chapter discusses the conclusions to prove research objectives. The operation process performance indicators of DIY Department, from before and after process transition, are compared together. The evidences from research results are described.

7.1 Discussion on Objective Finding

Based on the research objectives and the literature review, research propositions are evaluated to answer the objective of this study. Two research questions are developed: 1. Do DIY"s performance have significant improvement signal? and 2. How could the company avoid new process pitfalls in the future? The summary of before and after performance are shown as below.

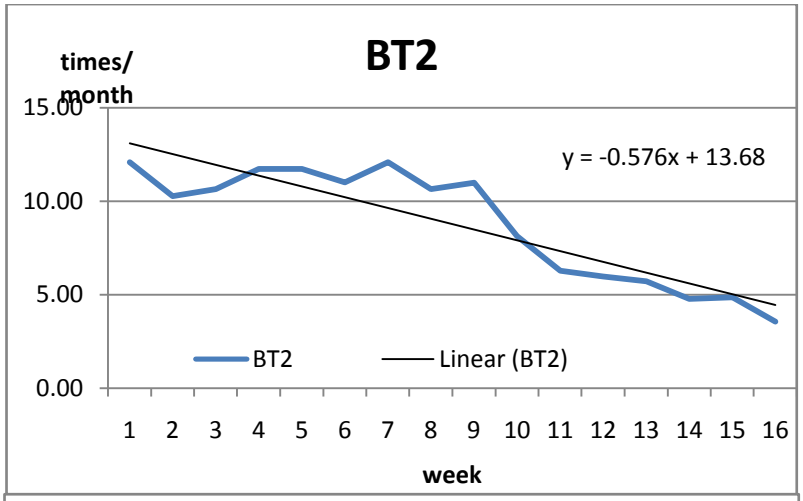
Objective one: To improve retailer"s operation process in term of quality, cost, and delivery when compared with average. The objective one conclusion could be found by proving evidence of quality improvement, cost improvement, and delivery improvement.

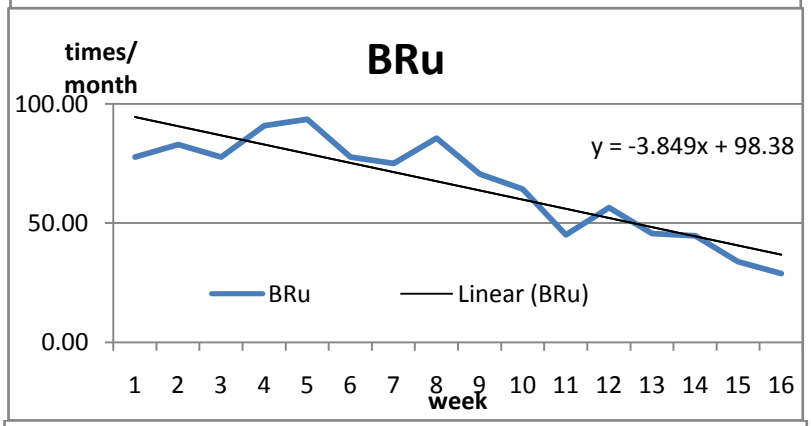
7.1.1 Quality improvement

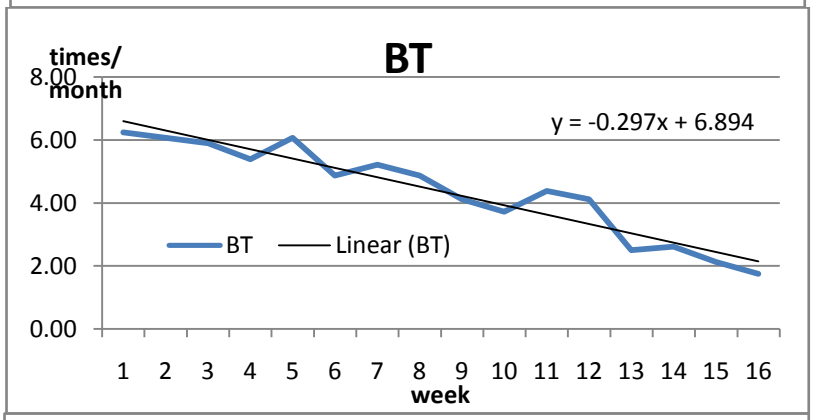
As presented in table 7.1, the evidence of quality improvement is the record of claims for incorrect price (time/month). As a result from the new price label changing process, the average claim for incorrect price after process transition in every branch is reduced more than 40%. By eliminate the activity of price change list printing, with exist labels changing, and keying price change into printing program, the historical trends of every branch are reduced significantly. At the same time, there is no sign of reducing trend in "All Items Record" and "New Price Items Record". The result indicates that new price label changing process could reduce incorrect price defect and improve process quality.

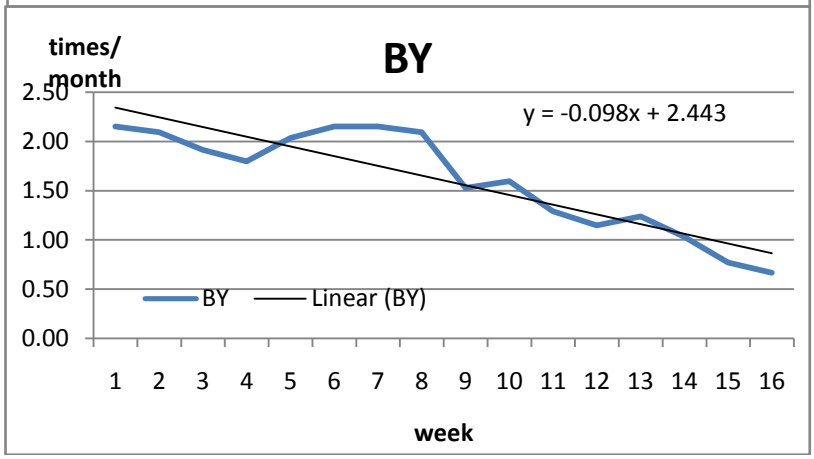
Table7.1: Claim for Incorrect Price (times/month)

Claim for Incorrect Price (times/month)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	16.07	9.29	-42.20
BP	26.58	15.09	-43.24
BR	13.93	7.61	-45.36
BY	2.05	1.16	-43.48
BT	5.58	3.16	-43.23
BT2	11.27	6.28	-44.24
BRu	82.68	48.64	-41.17


BT2
times/ month
15.00
10.00
5.00
0.00
y = -0.576x + 13.68
BT2
Linear (BT2)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week


BRu
times/ month
100.00
50.00
0.00
y = -3.849x + 98.38
BRu
Linear (BRu)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week


BT
times/ month
8.00
6.00
4.00
2.00
0.00
y = -0.297x + 6.894
BT
Linear (BT)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week


BY
times/ month
2.50
2.00
1.50
1.00
0.50
0.00
y = -0.098x + 2.443
BY
Linear (BY)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week

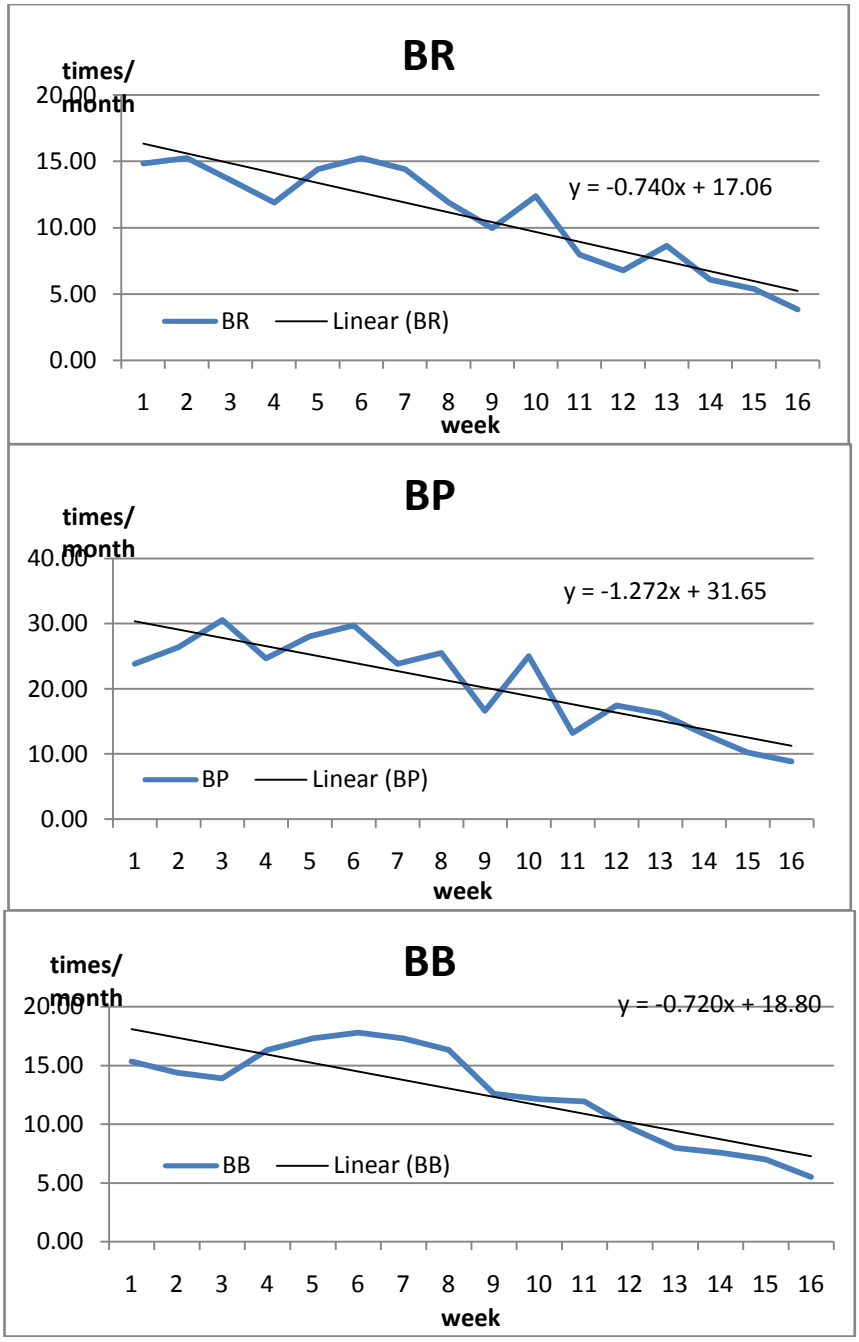


Figure7.1: Claim for Incorrect Price (time/month) in every branch

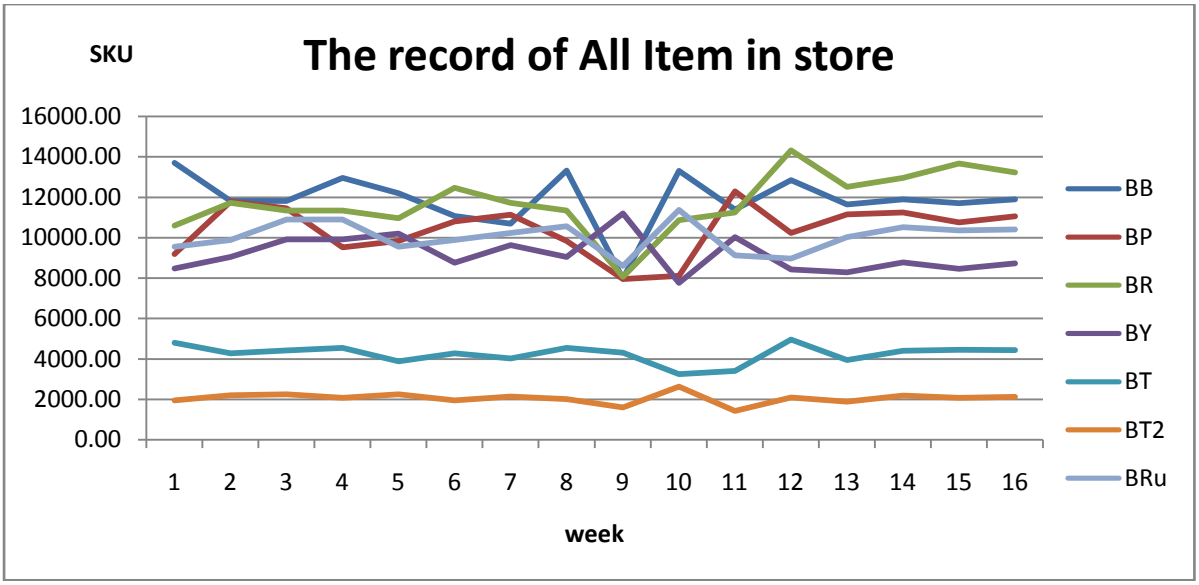


Figure7.2: The record of All Item in store

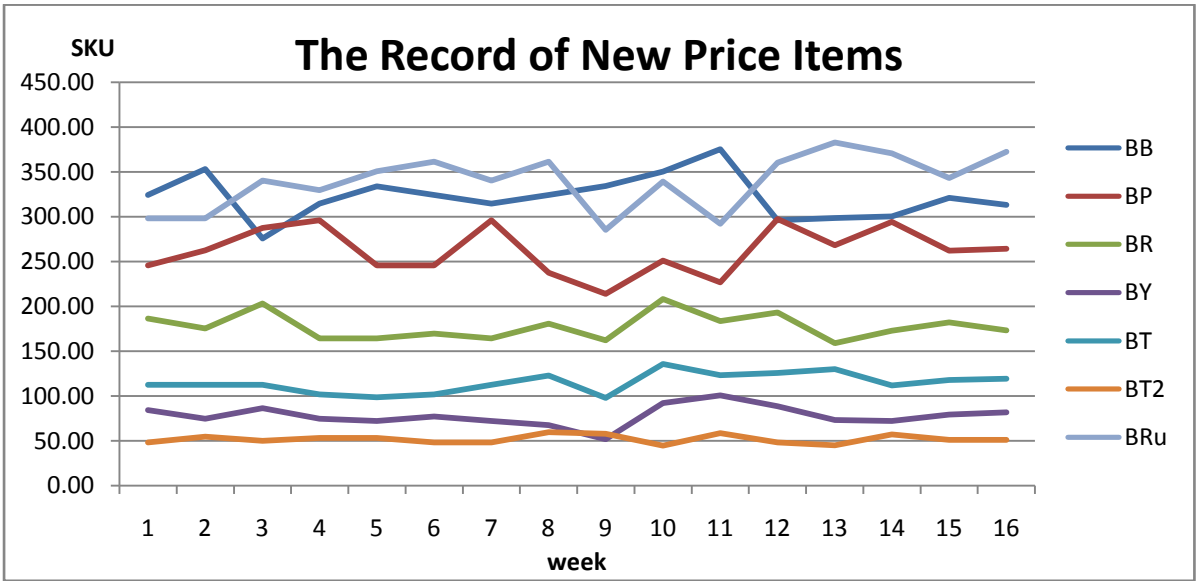


Figure7.3: The Record of New Price Items

7.1.2 Cost improvement

The evidence of cost improvement is the comparing between calculated activity costs before and after process transition. As mentioned in previous section, the activity cost could be calculated from average staff need, man-hour per day, and man-hour cost. The activity cost of Stock Arrangement, Out of Shelf Checking, Price Label Changing, and replenishment are summed up to find the activity cost . As a result from the new process transition, the calculated activity costs based is reduced more than 28.54%. The result indicates that new processes could reduce activity costs based and improve cost of DIY processes, as presented in table 7.2.

Table7.2: Activity Cost Based Summary before Process Transition

Process list	**Average hour spent per day**	**Average staff needed**	**Average Man-Hour per day**	**Activity cost Per month**	
Stock Arrangement	2.81	6	16.86	(16.86 X 30 X 67.63) =	฿34,207.25
Out of Shelf Checking	1.66	6	9.96	(9.96 X 30 X 67.63) =	฿20,207.84
Price Label Changing	1.64	5	8.2	(8.2 X 30 X 67.63) =	฿16,636.98
Goods Receive	0.88	4	3.52	(3.52 X 30 X 67.63) =	฿7,141.73
Replenish from Buffer	1.85	4	7.4	(7.4 X 30 X 67.63) =	฿15,013.86
Sum					฿93,207.67

Table7.3: Activity Cost Based Summary after Process Transition

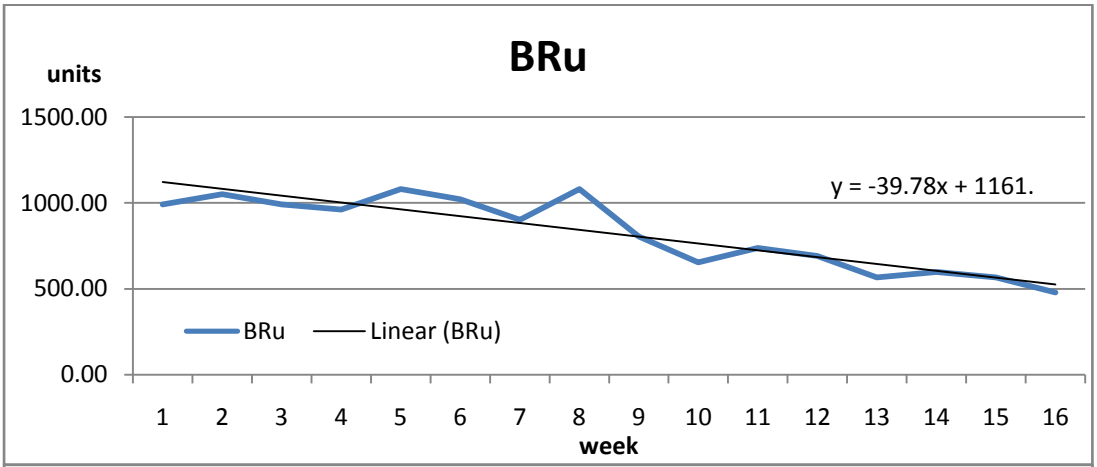
Process list	**Average hour spent per day**	**Average staff needed**	**Average Man-Hour per day**	**Activity cost Per month**	
Stock Arrangement	2.48	6	14.88	(14.88 X 30 X 67.63) =	฿30,190.03
Out of Shelf Checking	1.16	6	6.96	(6.96 X 30 X 67.63) =	฿14,121.14
Price Label Changing	0.99	5	4.95	(4.95 X 30 X 67.63) =	฿10,043.06
Goods Receive	0.51	4	2.04	(2.04 X 30 X 67.63) =	฿4,138.96
Replenish from Buffer	1	4	4	(4 X 30 X 67.63) =	฿8,115.60
Sum					฿66,608.79
Reduced Activity Cost					฿26,598.88

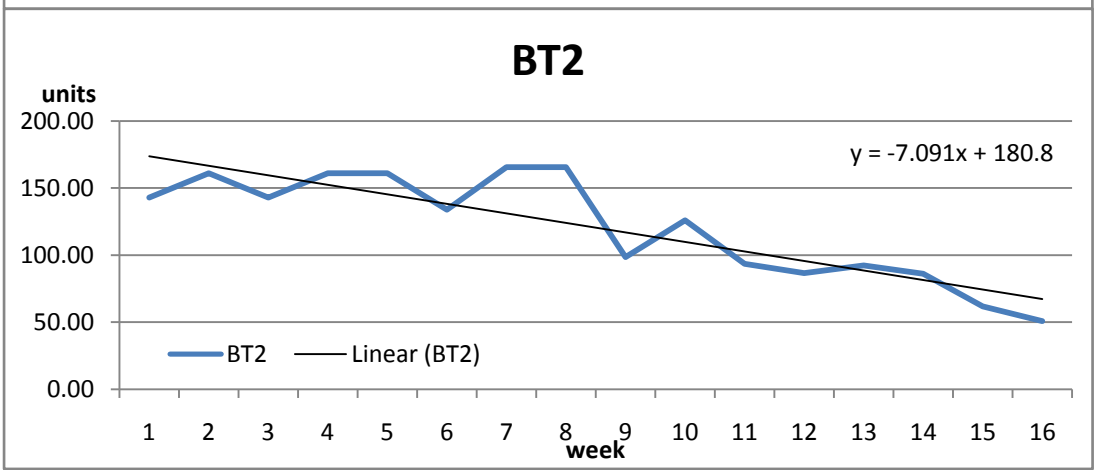
7.1.3 Delivery improvement

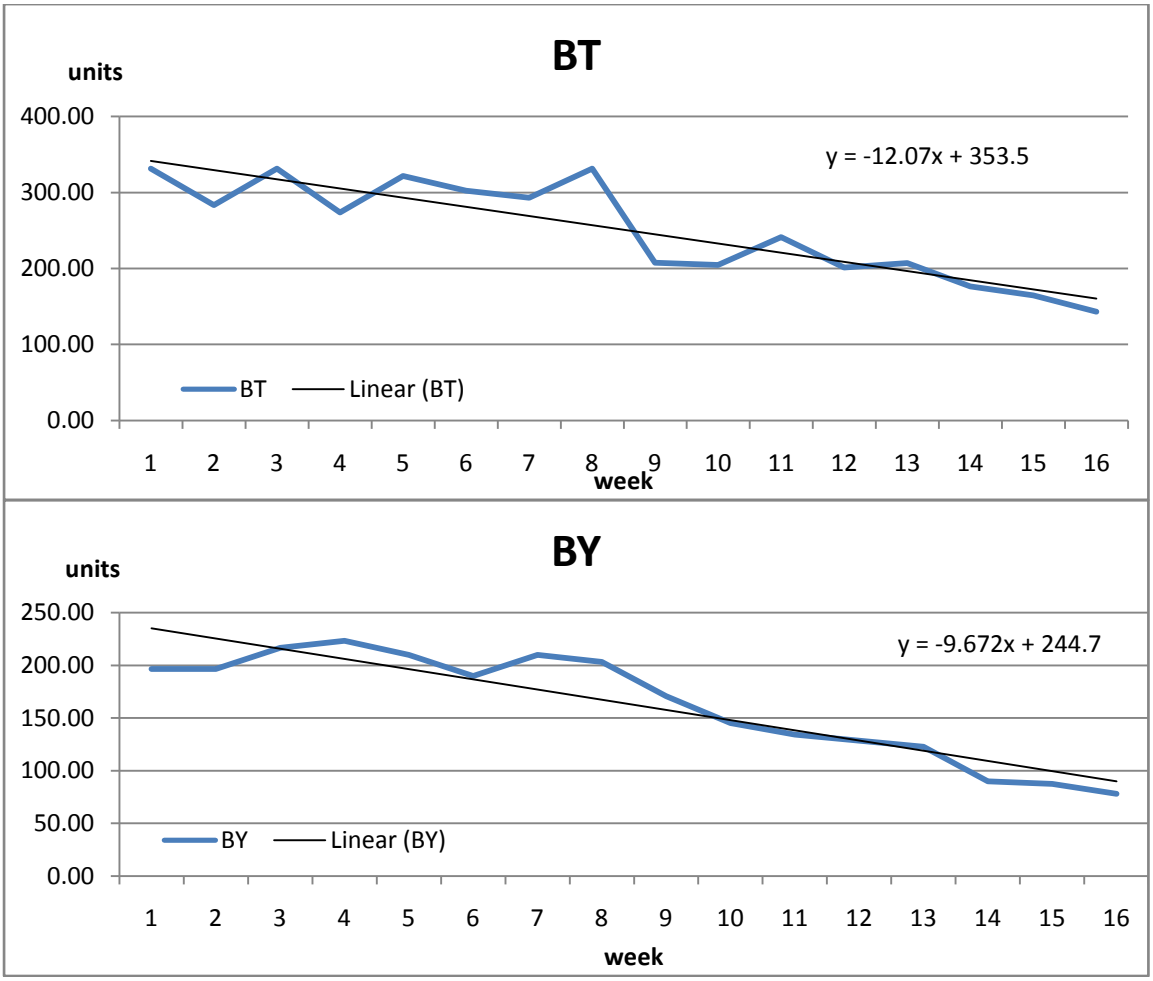
The evidence of delivery improvement is the record of out of shelf rate (items), issuing full form invoice via pos (minutes/bills), and DIY sales order (Minutes/bills). As a result from the new replenishment and out of shelf checking process, the average out of shelf rate after process transition in every branch is reduced more than 36.93%. The historical trends of every branch are reduced significantly. At the same time, there is no sign of reducing trend in “DIY Monthly Sales” and “Stock arrangement items”. The result indicates that redesign process could reduce out of shelf rate, time of create DIY sales order more than 8.29%, time of issuing full form invoice more than 12.55% , and time of selling via sales order more than 12%. The delivery performance is improved as presented in following figure 7.4-7.6 and table 7.4-7.6.

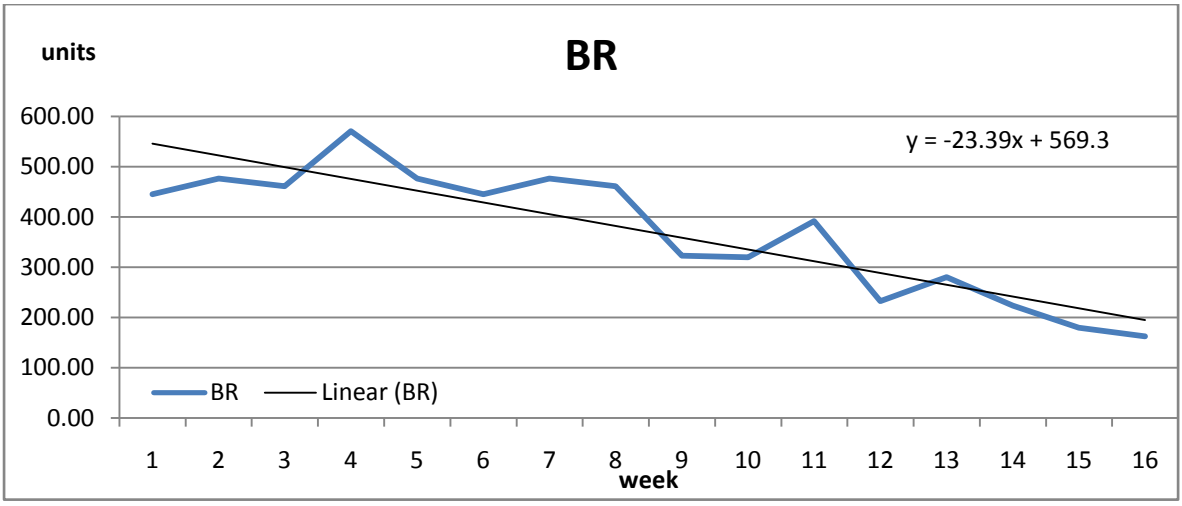
Table7.4: Out of shelf rate (units) in every branch

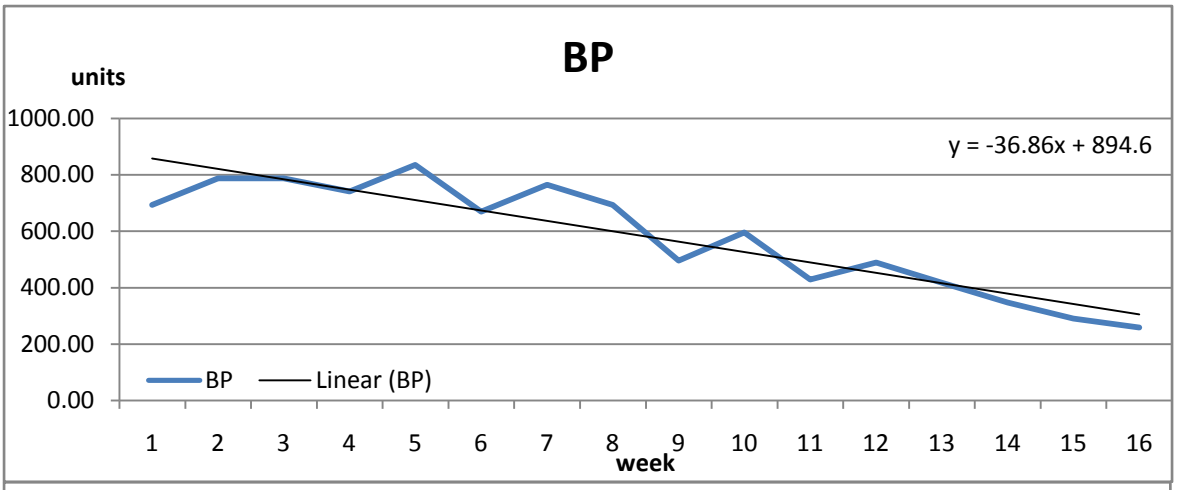
Out of shelf rate (units)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	858.10	520.30	-39.37
BP	746.87	415.70	-44.34
BR	476.67	264.23	-44.57
BY	205.61	119.38	-41.94
BT	308.53	193.21	-37.38
BT2	154.23	86.96	-43.62
BRu	1010.28	637.14	-36.93






BT
units
400.00
300.00
200.00
100.00
0.00
y = -12.07x + 353.5
BT
Linear (BT)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week
BY
units
250.00
200.00
150.00
100.00
50.00
0.00
y = -9.672x + 244.7
BY
Linear (BY)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week





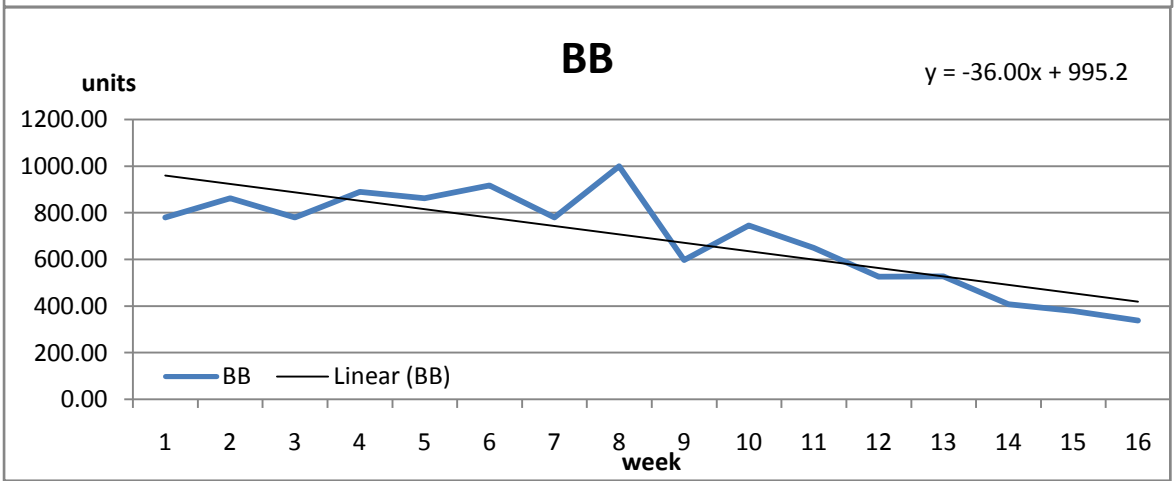
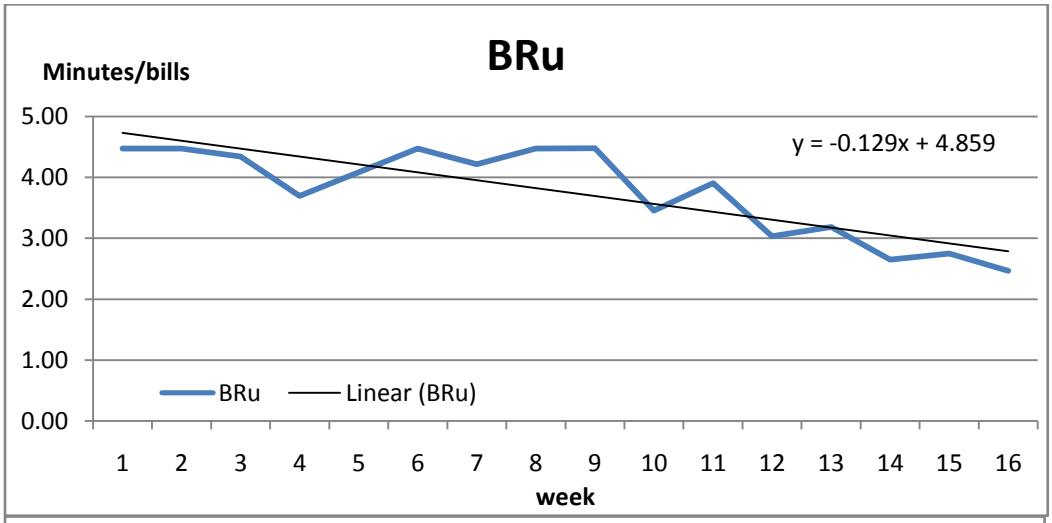


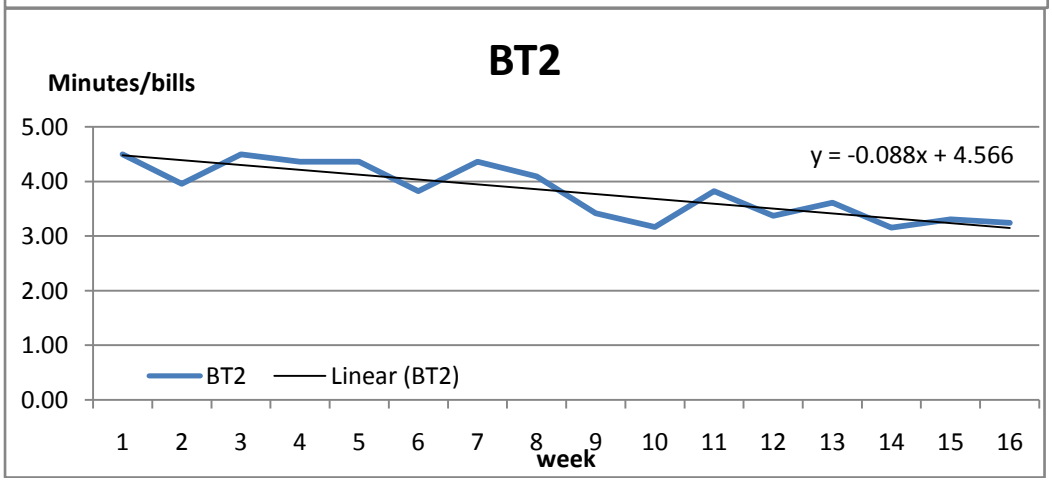
Figure7.4: Out of shelf rate (units) in every branch

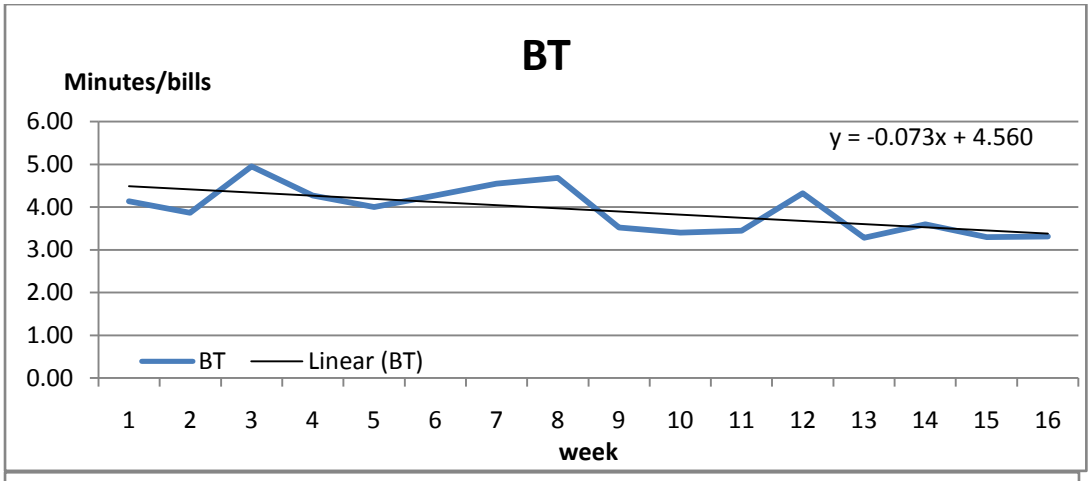
Issuing Full Form Invoice via POS (Minutes/bills)

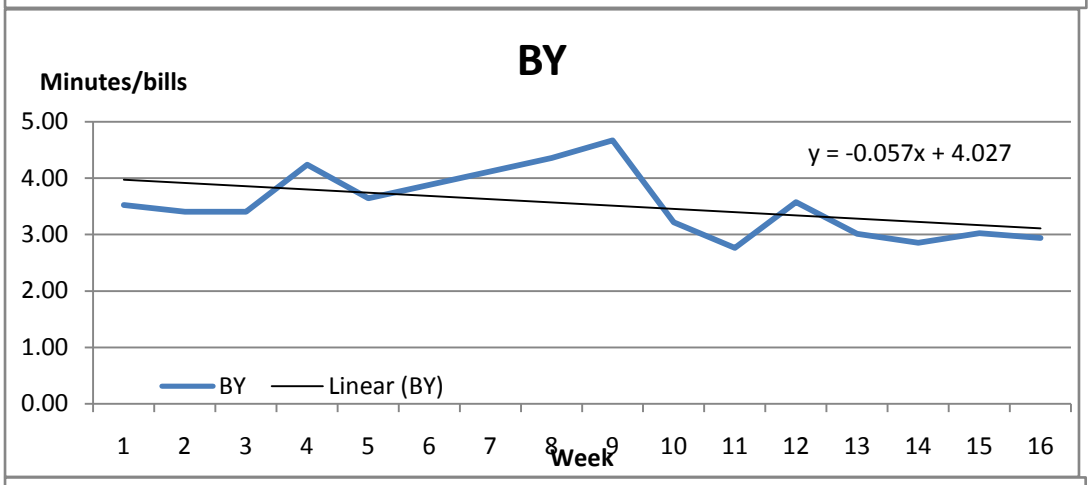
Table7.5: Issuing Full Form Invoice Via POS(Minutes/bill)

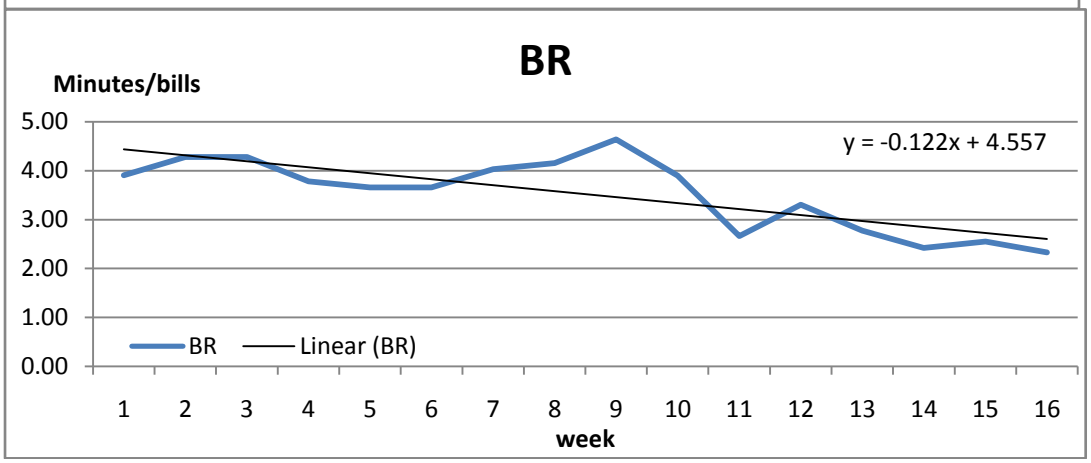
Issuing Full Form Invoice Via POS(Minutes/bill)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	3.84	3.17	-17.59
BP	4.02	3.68	-8.29
BR	3.97	3.07	-22.55
BY	3.82	3.26	-14.76
BT	4.34	3.52	-18.85
BT2	4.24	3.39	-20.24
BRu	4.28	3.24	-24.28






BT
Minutes/bills
6.00
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.073x + 4.560
BT
Linear (BT)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week


BY
Minutes/bills
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.057x + 4.027
BY
Linear (BY)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week


BR
Minutes/bills
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.122x + 4.557
BR
Linear (BR)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week

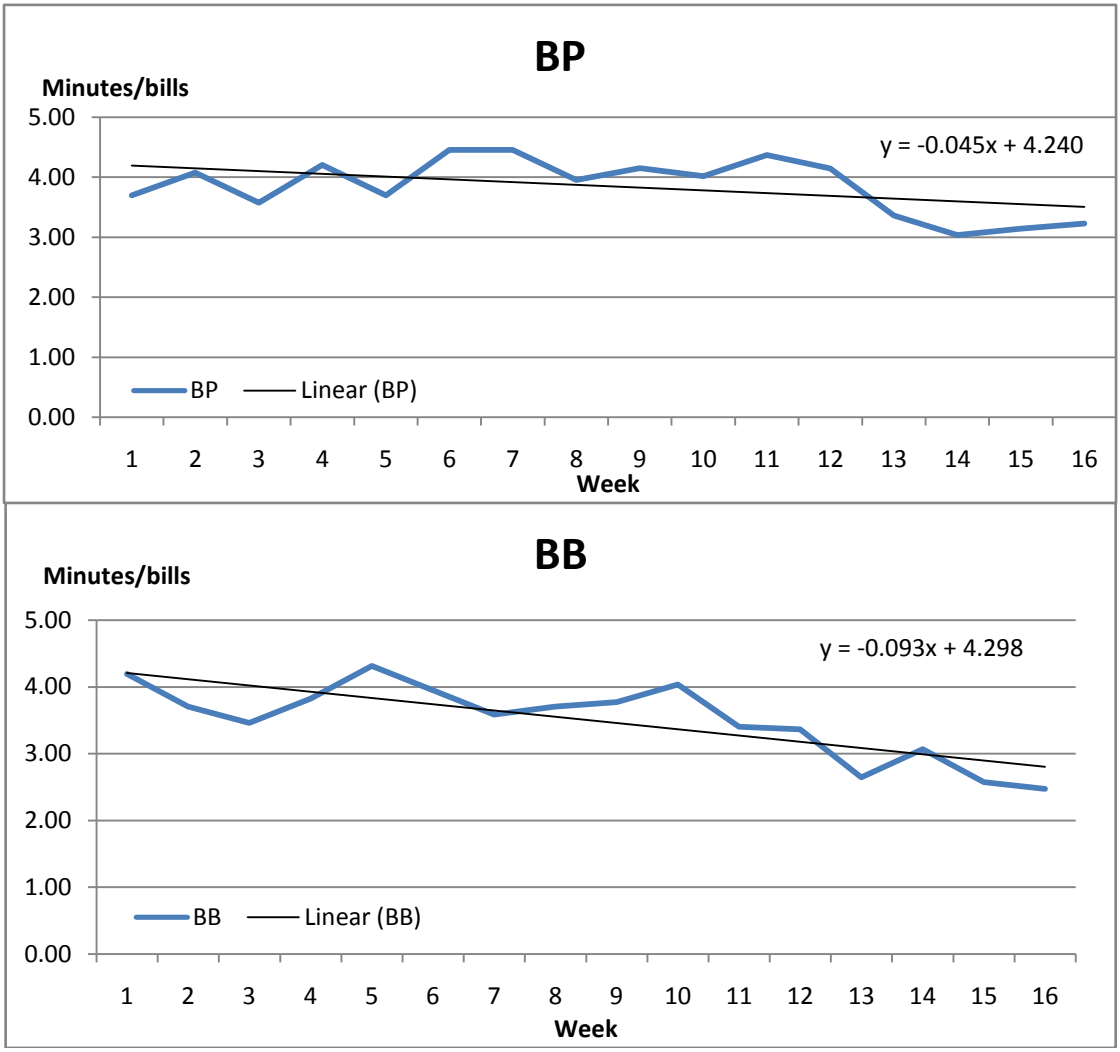
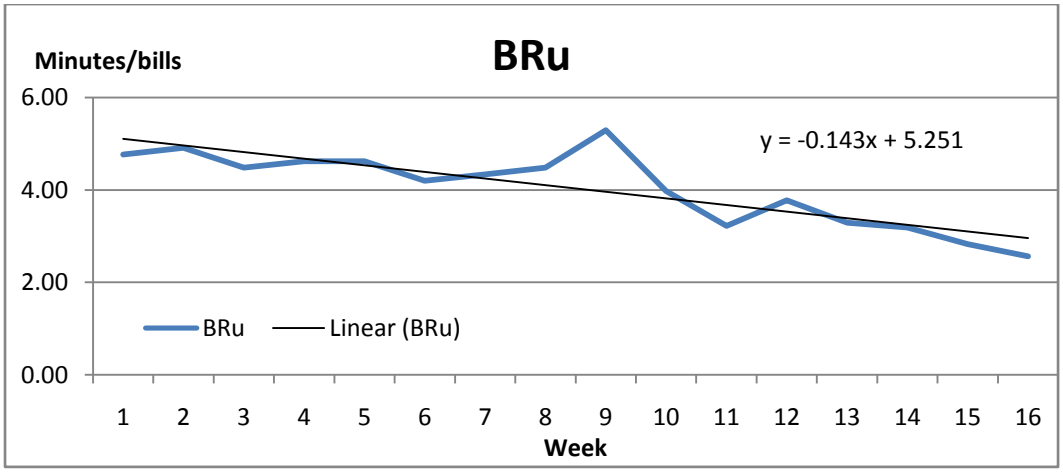
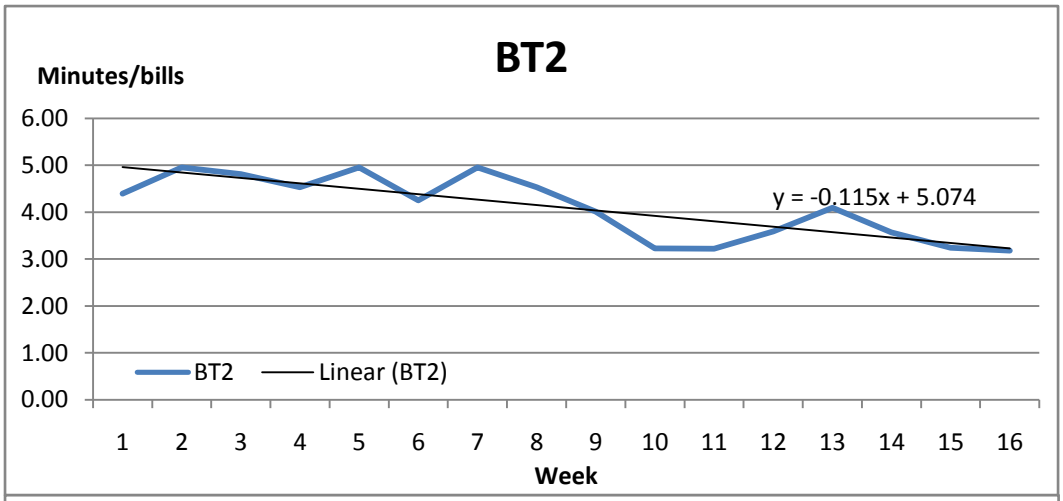


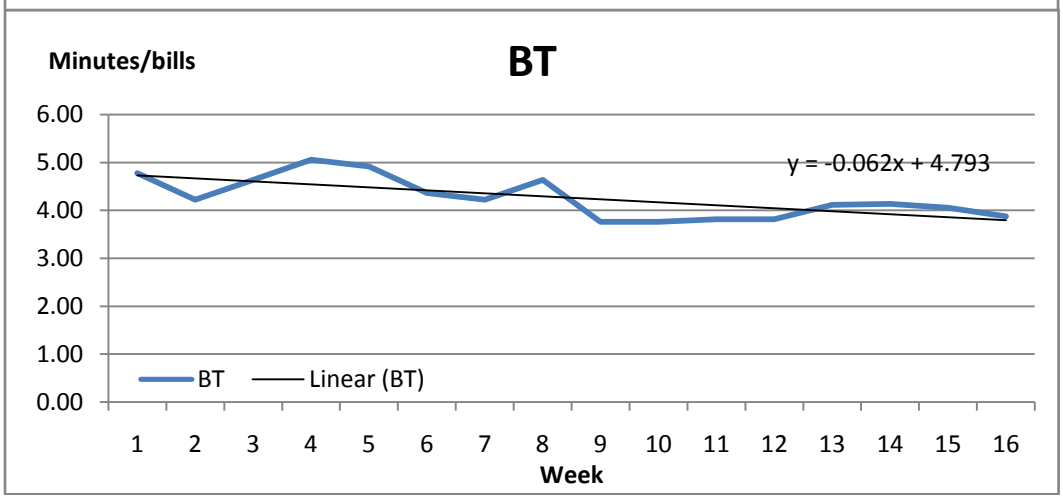
Figure7.5: Issuing Full Form Invoice Via POS(Minutes/bill)

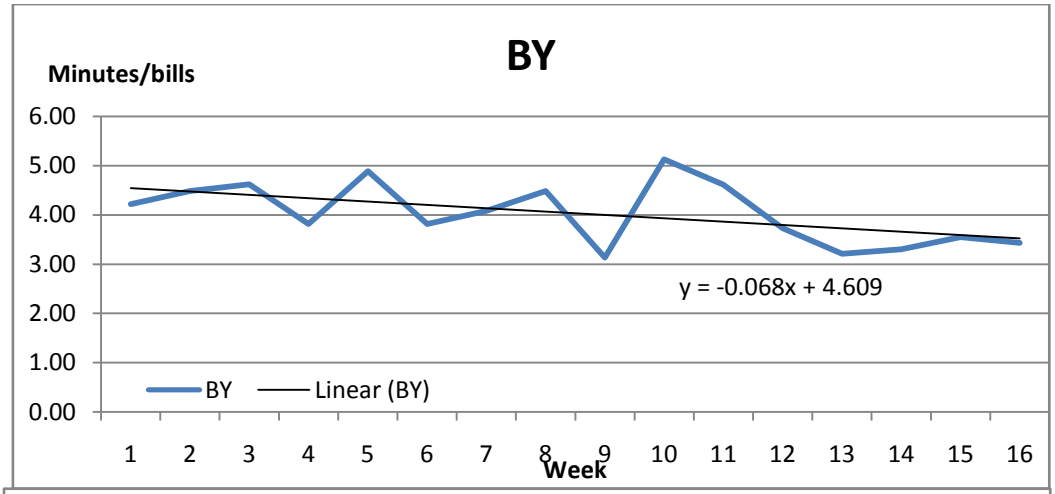
Table7.6: DIY Sales Order (Minutes/bills)

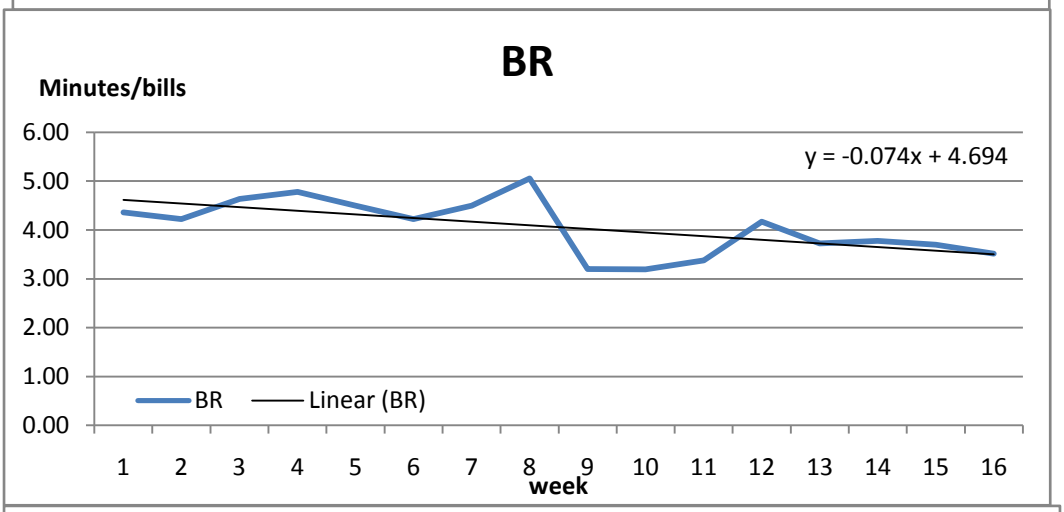
DIY Sales Order (Minutes/bill)			
Branch	AVG. week 1-8	AVG. week 9-16	%change
BB	4.24	3.59	-15.22
BP	4.07	3.53	-13.15
BR	4.54	3.59	-20.97
BY	4.30	3.76	-12.55
BT	4.61	3.92	-14.91
BT2	4.67	3.52	-24.73
BRu	4.55	3.52	-22.76

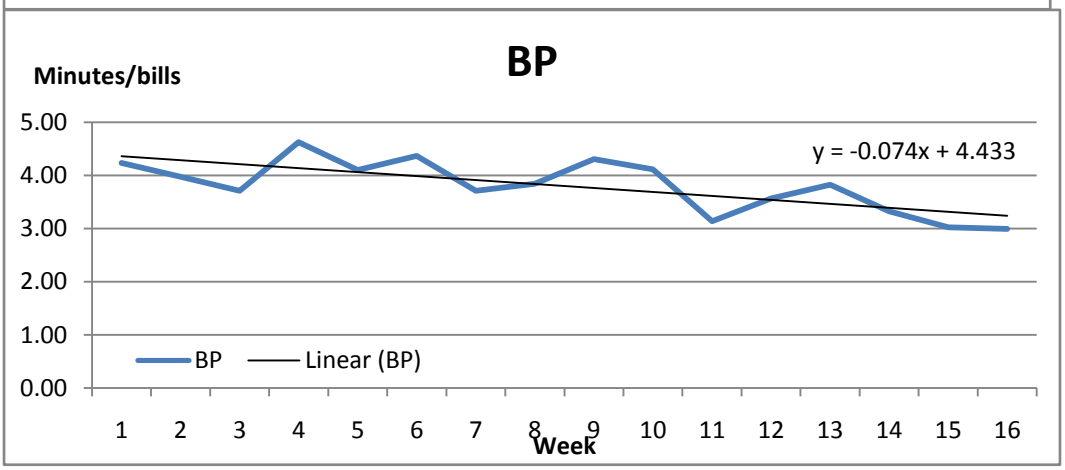

BRu
Minutes/bills
6.00
4.00
2.00
0.00
y = -0.143x + 5.251
BRu
Linear (BRu)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week


BT2
Minutes/bills
6.00
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.115x + 5.074
BT2
Linear (BT2)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week


BT
Minutes/bills
6.00
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.062x + 4.793
BT
Linear (BT)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week


BY
Minutes/bills
6.00
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.068x + 4.609
BY
Linear (BY)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week


BR
Minutes/bills
6.00
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.074x + 4.694
BR
Linear (BR)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
week


BP
Minutes/bills
5.00
4.00
3.00
2.00
1.00
0.00
y = -0.074x + 4.433
BP
Linear (BP)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Week

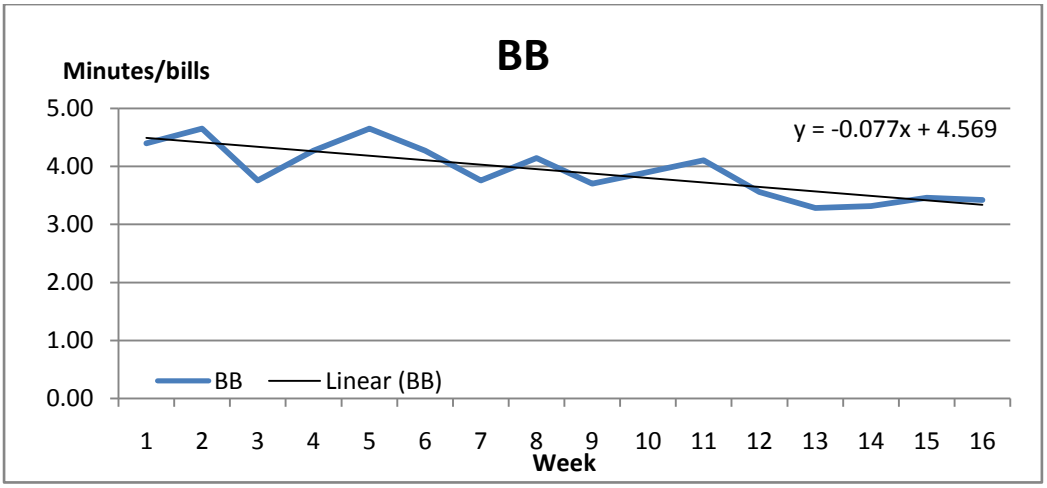


Figure7.6: DIY Sales Order (Minutes/bills)

Objective Two

Objective Two: To demonstrate tools for avoiding OPR pitfalls in retail business. In the order to answer objective two 7 practices are suggested to prevent new process‟s pitfalls as follow.

7.1.4 Communication Failure

Communication failure is the first risk that must be controlled. After problems are occur and detected at the shop floor level. Staffs have to identify them and solve them with proper procedures. If they cannot solve those problems, they have to report them to supervisor or headquarter. Another important communication issue is happened when headquarter staffs are developing solution for problems. Solutions must be reviewed and updated in daily meeting to prevent confusion among headquarter staffs. With ineffective communication, problems can be misunderstood and treated with a wrong procedure.

In the order to control and minimize problems, communication procedure, contact point and tools must be prepared before the day of go-live. DIY staff has to understand the process of problem reporting and solution developing. The must know which parameter and data must be reported for each problem. Redesign team must list potential problems and categorize them. A list of contact person must be prepared. IT technical support team must install remote software as a tool for problem monitoring and solving.

7.1.5 Program bugs

Another critical risk that most likely to occur is program bugs. Although every program is systematic tested and simulated in previous phases, some of unexpected program bugs may still remain.

When problems are detected, it must be check whether that problem is happen because of bug or human error. After the root of bug is identified, is will be listed in bug fixing report to inform every part of an organization. Through intranet website and e-mail service, the report will tell staff about case of occurring, temporally solution, contact person, fixing status and fixing due date. Project manager will review this report and select extreme issues. Those extreme issues will be reported to steering executives and asked for executive decision.

7.1.6 Incomplete Transactions and Human Errors

Human errors cannot be perfectly eliminated, but they can be controlled and reduced. Expected human errors can be controlled with work procedure and work procedure improvement since the starting point of new program implementation. Late discovered human errors can be reduced by using human errors record. Without the detail of who make those mistake, human error record will tell ABC‟s staffs how to avoid errors. The record will contain the detail of case monitor process and solutions.

7.1.7 Hardware failure risk

Hardware performance and availability effect business performance directly. To prevent hardware out of order, spare parts and preventive maintenance will be prepared by technical IT department. Redesign team has to create a set of contingency manual document. Although volume test is done in simulation process, redesign team found that SAP server could be crashed and breakdown because of many unexpected reasons. In two months, SAP server breakdown 3 times because staffs use query program with improper parameters, 1 time because accounting staffs run accounting summary report in the afternoon, 4 times because backup storage is full, and 2 times because headquarter run master data maintenance programs. The frequency of hardware out of order can be reduced with FMEA monitoring and continuous improving preventive main maintenance.

7.1.8 Incorrect Program Parameter and Data

Without good maintenance and monitoring replenishment parameters, pricing parameters and warehouse parameters can cause many big problems. Wrong replenishment parameter can draw unwanted items to stores or send incorrect purchasing orders to vendors. False warehouse parameters can suggest staff to put goods in wrong place and send pick slip to wrong warehouse. Incorrect pricing parameter will cause wrong selling price calculation and buying price calculation.

To prevent these disasters, data and parameters must be monitored, and reviewed every week by process owners. Each department has to make sure that its specific parameters are correct and up to date. If they have to change or fix some bunches of parameters or data, basis IT staff will prioritize those data maintenance requests and run data maintenance in the night.

7.1.9 Inappropriate Authorization

Tool limit Authorization usually interrupts daily process, causes problems of flexibility, and consume a lot of man-day resources. The board of directors decided to set uncritical authorization not much specific. The flexibility allows staff and supervisors to help of support each other at the very beginning of implementation. However not much specific authorization also has disadvantage part that could harm processes. Staff can do something across limitation.

After team meeting the solution seems to be resetting the uncritical authorization after go live. The advantage part of this practice is flexibility at process transition, more available resource for more critical activities before go-live, more available resource after go-live, and reconfiguration with more knowledge and experiences.

7.1.10 Unexpected result from SAP implementation

SAP Implementation is a detailed and complicate project. Implement team has to match fuzzy business requirements with complex program functions in very limit time. Although programs are design and configured with systematic dedicate efforts, new requirements and unexpected program output still could be discovered after go-live. To response with this problem, resources for program improvement should be prepared.

7.2 Problems Facing and Recommendation in Redesign Process

In project review meeting after process transition, redesign team discussed about problems facing and recommendation in redesign process as follow.

7.2.1 Did not Set Aggressive target with attractive incentive

Redesign project is a very tough work. It consumes a lot of time and effort. In the case of ABC Company, project time and resource is very limited. Therefore Executives did not decide to set more pressure on a project by specifying an aggressive target. The disadvantage part of this issue is leaving redesign team to discuss about how much resource should be spent on each redesign project. Redesign team usually has argument about the appropriate of design and configuration that could give different level of performance and ask for decision from executives.

The recommendation for this problem is setting aggressive target performance after benchmarking phase and also set some attractive reward to raise team morale. After acquire enough information of legacy process problems and the standard level of the same process in this industry, the specific target of development should be specified as a guide line for redesign and resource allocation.

7.2.2 Process owners can spend limit time on a project

Although involving DIY chief into the project at early phase is good for creating ownership of the new design process, it also limit the time of redesign team in this project. Those DIY Chiefs have a store to monitor and could not attend the project activities every day. Redesign team often has to contact each other with e-mail and telephone. It is hard to have all team members in the same time. This issue causes a communication problem in the project.

The recommendation for this problem is reviewing project progress and milestone frequently to update project status. Redesign team must be sure that the detail of each progress is communicated to responsible person on-time. Message sender must acquire feedback from receivers.

7.2.3 Data collection

Although process performance data is necessary since the starting point of the project, the task of data collection from shop floor level is a non-value added task to business process. In rush hour, DIY staff usually feels uncomfortable to do both data collection and regular routine at the same time.

The recommendation for this problem is taking advantage form executive‟s strong commitment. Before the project is started, redesign team has to hold a meeting to communicate project value and executive commitment with shop floor staffs. If the shop floor staffs believe in project‟s value, it will be easy to draw cooperation from them.

7.2.4 Data transfer errors

One of the critical problems in this project is the high volume data transfer. As part of system changing from oracle based to oracle based, a high volume data must be transferred and install in the new system. Many simple human errors and technical errors could occur. It staff could transfer some record to the wrong place in new data base. Some record could be missing because of data transferring with excel program.

The recommendation for this problem is always backup every set of data in buffer server of save storage drive and recheck those data after uploaded to the new server. Redesign team must be careful on ever time that that have to transfer data especially after project is go lived.

7.2.5 New discovered requirement

Although the project has a systematic design procedure, the new discovered requirements could be found. Redesign could miss some detailed specification and business requirement. IT consults could fund that the solutions may not support business requirement in every case.

The recommendation for this problem is using problem issues record along the project. When unexpected problems are discover, they must be identified, studied and discussed for contingency solution. It may be impossible to solve every problem before process transition. In critical cases, project manager has to create trade-off analysis and present to executives for trade-off decision.

7.2.6 Project Staff Resign

Because of limited time and human resource, redesign team usually has to stay until midnight or even all the night to complete project activities. At the same they

have to wake up early to do regular jobs. This high pressure situation is irresistible for some team members. This is the reason why the project manage should expect that some staff could resign among the period of process development.

The recommendation for this problem is always indentify every important detail in project document. This information will be useful on project hand over activity and new member training. In also help the company in process maintenance and continuous improvement.

CHAPTER VIII
CONCLUSION AND RECCOMENDATION
FOR FUTURE RESEARCH

This chapter concludes the research in short summary. It describes the process and result to fulfill research objectives. The possible area for future improvement is also suggested for future research.

8.1 Conclusion

This aim of DIY department is to satisfy customer. From the perspective of operation process management, customer could be satisfied by the improvement of better delivery and better quality. This is the reason why, this research is carried out in the order to improve delivery, cost, and quality of retailer‟s operation. The improvement of the operation performance is expected to be achieved by applying The Consolidate Business Process Reengineering technique.

The redesign team is initiated to conduct reengineering project. Steering committee, team member, team leader are appointed. The operation process of the case study company consists of 9 main processes and 1 activity model. As described in chapter 4 those processes are including.

- Replenishment from DC and Vendor
- Goods Receive
- Out of Shelf Checking
- Replenish from warehouse
- Stock Request
- Price Label Changing
- Stock Arrangement
- Selling Via POS
- Selling Via Sales order

In the order to understand business environment, the redesign team study these processes with process mapping technique. They identify major problems of each projection as a set of disconnections. The activity cost based analysis of each process is calculated to find the cost of each process. A set of practical measurement index is selected to prepare data for process performance comparison. The team summarizes disconnections of each process and analyzes them with FMEA technique. They create the criteria of severity, occurrence and detection. Disconnection of each process is quantify and analyzed as the failure mode of each process. Because there is no high severity failure with low occurrence or detection, the RPN score is calculated from the multiplication of severity, occurrence and detection. As the result of FMEA analysis and prioritization the most important failure mode, with more than 100 scores of RPN, is

identified. The redesign team also has a consensus that the stock request process could be cut off from the reengineering project, because the process has no failure with RPN more than 100 scores.

In redesign phase, the team use ECRS technique to find the direction to improve processes. From the ideas and solution of elimination, combination, rearrangement and simplification, 7 redesign projects are initiated to improve operation process including;

- Redesign Business Process Activity
- Redesign Replenishment from DC and Vendor
- Redesign Goods Receive
- Redesign Price Label Changing
- Redesign Selling Via POS
- Redesign Selling Via Sales Order
- Redesign Out of Stock Checking

Those 7 projects are planned, developed, communicated and implement in the case study company. The board of direction approves the budget of 642,400 baths for the project plan. The plan has 3 main activities to finish in 8 weeks including;

- Project communication and program development
- Creating enabling environment for implementing the To-Be design
- Process Implementation and Monitoring

The team records the new process performance of two months after the process transition. The performance of each project is compared in term of before and after process transition. As a result the strong trend of improvement could be found in every project. The team has a consensus that the improvement will be continue when SAP system is fully utilized. The comparisons of process performances after transition are;

- Time of warehouse stock preparing for DIY replenishment (Minutes) is reduced more than 60% in every branch
- Time of warehouse good receive for DIY stock (Minutes) is reduced more than 40% in every branch
- The DIY stock volume in warehouse reduced more than 13% in every branch.
- The goods receive time reduced more than 33% in every branch.
- The average out of shelf items reduced more than 30% in every branch.
- The average number of stock moving by unit reduced more than 40% in every branch.
- The average out of shelf items by unit reduced more than 32% in every branch.
- The average time of DIY stock arrangement reduced more than 8% in every branch.
- The average time of selling via sales order (minutes/bill) reduced more than 12% in every branch.

The team also suggests the way to maintain new design process and avoid 7 pitfalls including Communication Failure, Program bugs, Incomplete Transactions and Human Errors, Hardware failure risk, Incorrect Program Parameter and Data Inappropriate Authorization, and Unexpected result from SAP implementation. Therefore the objectives of this research have been achieved. The issues which could be improved in the future are mentioned in following section.

8.2 Recommendation for Future Research

In competitive world, every retailer has to spend all of efforts on its process improvement. Although the concept and steps of process reengineering are easy to be studied, the implementation of these practices is complex and challenging. The reengineering procedures needs a good understanding and dedicate effort to achieve success.

Trying to support detailed business logic with reengineering solution, the redesign team and the management level staff must have strong commitment, sufficient resource, deep operation logic understanding, project management experience, and change management skills. The reengineering project must be leaded and initiated by executives, but planed, designed and implemented with cooperation from process owner.

Moreover project manager has to communicate systematic redesign procedure and draw consensus from stakeholders. The consensus will help redesign to acquire cooperation and to lead the project across unexpected obstacles. The systematic redesign procedure will provide explicit direction and milestone in each step

Future research should be addressed more in other new technology solutions that could simplify retailer‟s processes. For the example, electronic price labels pick to light and RFID applications. In nearly future electronic price label will be cheaper, more economic, and more stable. With electronic labels, price changing process will be done by automatic system job from head headquarter and eliminate human errors. Pick to light application will suggest pickers to the right position of appropriate storage location. Stock picking process will be faster and much more accurate. RFID Applications will reduce stolen goods problems and simplify cash receive process.

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