



A Point-of-Sale System for Measuring Sales Performance

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ABSTRACT

Sales performance is the measurement of sales activities to guide business owners to improve their ability to sell a product. It can educate and motivate them to set their own goals and strive to achieve them. In order to measure sales performance, a good system for tracking business progress is required, thus the motivation to build the Warung Dong Sales Performance System (WDSPPS), a prototype of point-of-sale, tracking and reporting system. The prototype has the capability to track daily sales transactions and generate reports in table and chart forms to help the manager of the company in decision making. The prototype has two main modules for regular staffs for data entry and the manager to view reports. Sales target and benchmark have been used as metrics to measure the critical success factors in order to determine business success. This prototype was developed by using an agile development method known as scrum. Upon completion it was tested by its target users, where in general they said that the system is easy to use for both novice and expert users. It is hoped that the system can help the manager to track and measure the performance of the organization and help the manager in decision making.

Keywords: Sales Performance system, point-of-sale, Key Performance Indicator, Management Information System, Scrum

1. INTRODUCTION

Warung Dong Enterprise is a company that operates a restaurant located in Raub, Pahang. It has been operating since 2008. The business currently has a point-of-sale system which functions solely for calculation of customer bills and production of receipts. The system does not have any facility to record any data for later use, thus the manager resorts to jotting down the daily sales records in a book which is not properly organized. Due to this, it is hard for the manager to track the business performance of the restaurant. Moreover, there is also the possibility of losing all the sales records if the book goes missing.

In accounting a sales journal is usually used to record all company sales [1]. These records are important since a

company must look at them to identify whether their strategies to maximize profit are working or not. As a success strategy, it is also important for a company to provide a goal for their sales and analyze the trend of sales to help the company increase its sales as well as profit [2]. Furthermore, a company should not make any assumption about customer demands without any proper data, since it is said that the key sales metric that most affect sales performance is “it is important not to make assumptions about customer demands” [3]. This means that to improve the performance of a company, keeping proper sales record is paramount.

Warung Dong Sales Performance System (WDSPPS) is developed for the company with the aim of keeping track of sales, measure performance and provide proper bookkeeping. The system provides a point-of-sales payment process to gather data and thus create a better payment system. Besides recording sales data, it also measures the sales performance of the company. It has the ability to analyze which menu items of the restaurant generate maximum profit. The prototype implements a transaction processing system to process the data and the information processed will hopefully help the company to improve employee motivation, improve their sales performance and maximize their profit.

2. RELATED WORKS

2.1 Business Performance Measurement

Research on measurement of business performance has been done from a variety of angles. One perspective is to measure performance from an accounting and finance viewpoints and explore the different roles of measurement [1]. The accounting community recognizes that there are three fundamentally different roles of measurement systems [4]. First, they can be used as a tool for financial management. Second, they can also provide an objective for overall business performance. Finally, they can also be a means of motivation and control.

Some researchers recommended using market growth, sales target, sales opportunities, sales to date, benchmark and product performance as metrics to measure performance [4]. While others advocated the use of forecast revenue, sales target, sales opportunities, sales to date, benchmark and average purchase value [5].

In this research, the performance metrics used in the WDSP prototype are benchmark and sales target.

2.2 Sales Benchmark and Sales Target

A benchmark is a performance metric that compares actual values to some benchmark or baseline value. The most used benchmark is the result of the item to be measured within the same period of the previous year [4]. It also could be an arbitrary number, such as a budgeted and forecasted number. A metric could have multiple benchmarks which are often the case with financial numbers. Benchmarks can also be external measures, such as the performance of an industry leader. In the WDSP prototype, the benchmark used is based on the company’s previous year’s performance.

Target metrics is a target that is defined by executives in a planning or budgeting session. Sales target is something that is value-adding in utilizing performance measurement [6] since it can motivate a business to learn from the current situation and identify how to achieve the target. There are end targets, which are typically measured annually, and interim targets. In this research, the sales targets will be measured in daily intervals. The target will be set by the manager and the prototype will visually show the progress of the company.

2.3 Theory of Performance

One of the objectives of research on performance is to determine the measurement systems that lead to high performance [7]. Organizations are required to perform and to communicate their achievements to their stakeholders [8]. This results in many organizations setting various Key Performance Indicators (KPI) to demonstrate their performance.

KPIs are basically quantifiable and strategic metrics that measure an organization’s critical success factors (CSF). Critical Success Factors (CSF) are elements in an organization that determine the current and future success of an organization’s operation. If an organization fails to act upon unwanted changes in its CSFs, it is likely to fail in meeting its goals.

One of the ways to evaluate a CSF is by quantifying and measuring it using Key Performance Indicators. Figure 1 shows the relation between Metrics, KPIs, CSFs, and Business Success. The figure shows that metrics can be used to measure key performance indicators, while Key performance indicators can measure critical success factors and critical success factors can determine the success of a business.

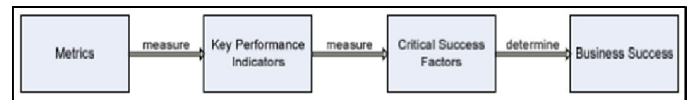


Figure 1: Relationship of metrics, KPIs, CSFs, and Business Success

In this research five KPI’s that determine the Critical Success Factors of the company are selected to be measured, namely revenue, gross profit net profit, return on sales and percentage of sales fluctuation. Each of this is implemented in the system prototype. Table 1 shows the formulae of each chosen KPI.

Table 1: Key Performance Indicator

| KPI Name | Formula |
|--|---|
| Revenue | price*sales(Units) |
| Gross Profit | Revenue - costs(COGS) |
| Net Profit | sales(Units) * Margin - costs(Total) |
| Return on Sales | Net Profit / sales |
| Sale Percentage Fluctuation (YoY variance) | (This year's sales - last year's sales) / last year's sales Percent fluctuation = YoY variance*100 |

3. RESEARCH METHODOLOGY

The Agile software development lifecycle is dominated by an iterative process known as a sprint. Each sprint consists of plan, design, build, test and preview with the customer. During a sprint iteration, it is important that the customers and business stakeholders provide feedback to ensure that the features of the system being built meet their needs. There are many Agile models that are used in software development such as Spiral, Scrum. Extreme Programming (XP) and Lean Development [9]. The methodology chosen for this project is Scrum.

Scrum is a framework for developing and sustaining, continuously improving, complex products. It is a lightweight method optimized for the development of software. It can adapt to changing requirements of the client and releases the software in small release cycles called sprints [10].

Figure 2 illustrates the Scrum methodology. The Product Backlog is the overall plan for the system to be built while the Sprint Backlog consists of a storyboard or the design for the part of the system to be built in the current Sprint cycle.

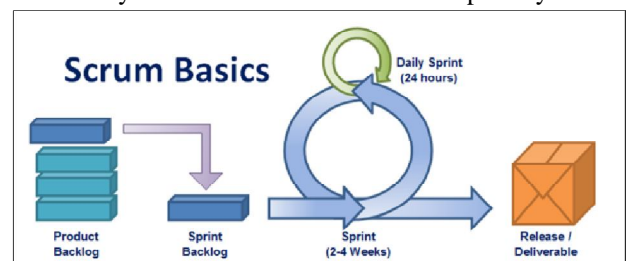


Figure 2: Scrum Methodology

4. RESULTS AND DISCUSSION

4.1 Development

The WDSP prototype was developed in 4 sprint cycles. During the first sprint planning meeting, The Scrum Product Backlog were presented to the company. The storyboard to be implemented is as shown in Table 2. Another meeting upon the completion of the first sprint iteration had been conducted with the client on 1 April 2019 to update the progress of the research. It can be concluded stories 1, 2, 3, 4, 5, 6 and 7 were completed as expected.

Table 2: Result of the First Sprint

| No | Story | Do | Done |
|----|--|--|-----------|
| 1 | As a user, I want to log in. | Manager Log In | 10/2/2019 |
| | | Staff Log In | 10/2/2019 |
| 2 | As a user, I want to be able to edit staff information. | Add Staff | 17/2/2019 |
| | | Update Staff | 17/2/2019 |
| | | Delete Staff | 17/2/2019 |
| 3 | As a user, I want to edit the menu item. | Add Item | 17/2/2019 |
| | | Update Item | 17/2/2019 |
| | | Delete Item | 17/2/2019 |
| 4 | As a user I want to view sales report by daily, weekly and monthly. | Point-of-Sales system that generates daily sales and quantity of each menu item. | 8/3/2019 |
| 5 | As a user, I want to calculate my daily profit. | Calculate profit for each menu item based on date. | 16/3/2019 |
| | | Calculate daily profit. | 16/3/2019 |
| 6 | As a user, I want to define KPI's for my sales. | Set sales KPI's for every day. | 23/3/2019 |
| | | Update reminder the status of KPI's. | 23/3/2019 |
| 7 | As a user, I want to view monthly sales performance in a graph. Visually show the line graph of monthly sales. | Visually show the line graph of monthly sales. | 30/3/2019 |
| | | Visually show the bar graph of top profitable item from last week. | 5/4/2019 |

Further meetings were conducted with the client and discussions were done on what went well during the first sprint and what could be improved. One of the feedbacks received was on the need to improve the visual presentation of the weekly top-selling item. The system needs additional information such as percentage of fluctuation in order for the information to be more meaningful. The features agreed on had been developed. Table 3 shows the improvement of the system in the second sprint.

Table 3: Result of the Second Sprint

| No | Story | Do | Done |
|----|---|--|-----------|
| 7 | As a user, I want to view monthly sales performance in a graph. | Calculate the percent fluctuation for each top item. | 19/4/2019 |
| | | Calculate the percent fluctuation from last year. | 23/4/2019 |

At the start of the third sprint, another meeting was conducted with the client. It was proposed that some features in the manager module needed to be improved. Suggestions for the format of customer receipts, daily reports and the rounding of numeric figures in the display were also given. All the suggestions proposed were incorporated into the system (see Table 4).

Table 4: Result of the Third Sprint

| No | Story | Do | Done |
|----|---|--|-----------|
| | - | Put some notes on the report. | 16/5/2019 |
| 4 | As a user I want to view sales report by daily, weekly and monthly. | Generate a report based on categories. | 19/5/2019 |
| | - | Fixed the entire problem in language and round off values into 2 decimal points. | 23/5/2019 |

After the third Sprint, the WDSP system prototype could be deemed to be almost completed.

Prior to the fourth sprint, testing on the prototype was conducted with 30 people. They were asked to test the system and answer a questionnaire to evaluate the prototype. The questions developed were based on past research [11], where the respondents evaluated the prototype based on several factors, namely screen design, terminology and system feedback, learning factors, system capabilities, and general impression.

Overall user evaluation shows that the respondents were satisfied with all the factors surveyed in the questionnaire. Some respondents suggested that the learnability of the system could be further improved and this was incorporated into the prototype during the fourth sprint. To improve the learnability of a system, it was recommended that the visibility of operations of the system be improved [12]. In order to improve the visibility, more attractive input and output messages were added to the prototype. Table 5 shows the improvement made during the fourth sprint.

Table 5: Result of the Fourth Sprint

| No | Story | Do | Done |
|----|-------|---|-----------|
| | - | Improve the input and output message of the system. | 16/6/2019 |

4.2 The Prototype

The WDSP prototype was completed after the fourth sprint cycle. Figure 3 depicts the main operations of the WDSP prototype as an Activity diagram consisting of a series of actions. The control flow is drawn from one operation to another operation.

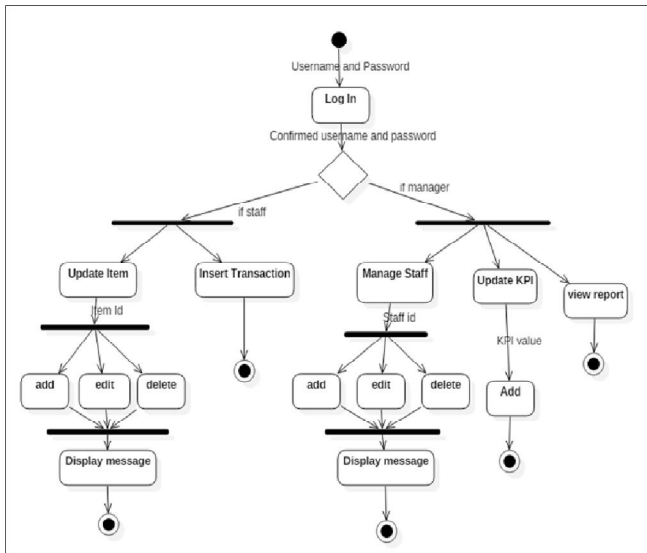


Figure 3: Activity Diagram of WDSP

The system consists of two main modules for regular staffs and for the manager. The staffs' module has two main sections, one for updating the menu items sold at the restaurant and the other the point-of-sale system to insert the sales records each time a customer makes a payment (see Figure 4)

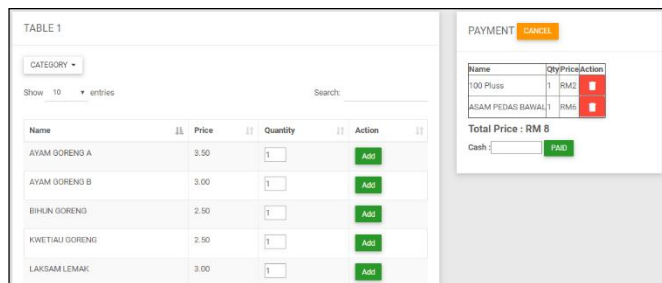


Figure 4: Point of Sale Interface

The manager's module has three main sections, for managing the staffs, viewing reports (see Figure 5) and updating the KPIs and targets of the company.

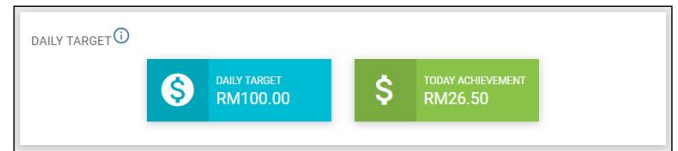


Figure 5: Daily Sales Report vs Target

5. CONCLUSION

The WDSP prototype was successfully completed by following the Scrum Methodology. During the development process, feedback from the client was obtained and incorporated into the prototype. Upon completion, feedbacks were obtained from 30 respondents regarding the look and feel of the prototype. Overall the client and respondents were satisfied with the prototype.

In future, the prototype could be further extended by adding in features, such as the calculation of utilities and labour costs, as well as the calculation of zakat and tax. These figures would give a more accurate data when calculating the profit and loss of the company.

Besides extending the prototype, the next step would be to do an investigation or case study to see how successful is the prototype in helping the company track and measure its sales performance, and whether the information given by the prototype has led them to better decision making

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