RE-DESIGN OF MARKETING DASHBOARD FOR SUPPORTING MARKETING MANAGER IN DATA ANALYSIS – THAI RETAILER PERSPECTIVES

BY

MR. JATUPHOL CHAWAPATNAKUL

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE PROGRAM IN MARKETING
(INTERNATIONAL PROGRAM)
FACULTY OF COMMERCE AND ACCOUNTANCY
THAMMASAT UNIVERSITY
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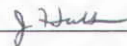
MR. JATUPHOL CHAWAPATNAKUL

ENTITLED

RE-DESIGN OF MARKETING DASHBOARD FOR SUPPORTING MARKETING
MANAGER IN DATA ANALYSIS-THAI RETAILER PERSPECTIVES

was approved as partial fulfillment of the requirements for
the degree of Master of Science Program in Marketing (International Program)

on.............6 JUN 2016...............

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ABSTRACT

Marketing Dashboard design has been an area under spotlight since the introduction of business data analysis. For retail business, where the competition is tough and rapid needs good supporting information for creating strategies and taking actions to cope with different situations in the competitive landscape. Due to the lack of business data analysis in the Thai market and the transforming of consumer behavior over the explosion of social media and online marketing, study of marketing dashboard design nowadays is still quite limited and its paradigm is still shifting.

This study is a contemporary topic in academic marketing, which focuses on application in technology (data collection and analysis) in order to improve the efficiency of marketing. The total research duration is 90 days starting from 9th January to 7 April 2015. The objectives of this research are to understand the data usage behavior of retailers in business analysis (eg. Day to day operation, trend and customer feedbacks, campaign responses) and to identify characteristics of data presented to make it easy to use for setting marketing strategy.

This study gathered data from secondary sources such as literature, articles and online contents to create guidelines for the findings and analysis. Besides, primary sources were collected through the in-depth interview of personnel that relate to marketing and data analysis from 15 managers from different retail companies in Thailand to scope down the data collected and findings from the secondary sources. The qualitative approach was used to analyze the research findings.

Typically, they perform data analysis activities in 3 stages which are the planning stage, the execution stage and the reporting stage. In this study, 4 out of 15 marketing managers from Thai retailers are using a marketing dashboard, and the remaining 11 are using scheduled reports and they have to request for additional ad-hoc reports from business intelligence department in their data analysis processes. To design a marketing dashboard, the designer should focus on the key design factors as the core of the design starting by marketing objectives, KPIs, limitations, key issue patterns and the evaluation of marketing performances. After that, the designer should consider the key design criteria that create direction of the design process, and design features that are the scope that focuses on the functions of the dashboard to validate the design and deliver the most efficiency to the managers.

Keywords: Marketing Dashboard, Marketing Strategy, Business Analytics, Customer Relationship Management, Campaign Management, Key Performance Indicator, Big Data, Management Information System, User Experience Design, Information Technology, Data Visualization

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Jatuphol Chawapatnakul

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CHAPTER 1

INTRODUCTION

In retail business, a large amount of data related to each individual retail company (eg. sales transaction, customer data, review) is generated every second from various sources of information. These data are valuable resources for business analysis for creating suitable strategies for companies to improve performances in different functions such as business operations, resource planning, sales and marketing. These benefits have driven data analysis to become a crucial function that create competitive advantage for all companies. However, data analysis in most companies in the market is not making good use of the collected data, since it requires a lot of factors such as personnel's knowledge in different fields and high capability of computer software and hardware. Therefore, there are many data analysis platform providers offer software solutions to manage and analyze data for each specific business functions.

Marketing is another business function that make uses a lot of retail data. It could be one of the factors that create competitive advantages for a company, which makes the studies of marketing data analysis to be more significant. Hence, the concept of information dashboard is introduced to gather and display significant information necessary for management decision making and strategy setting. Somehow, the design of dashboard requires a lot of knowledge, not only from the system designers, but also the marketers, management and data analyst roles in the companies to drive the best performance from the data analysis. Thailand, as one of the most competitive emerging markets in the world has also paid much attention to the application of marketing data analysis over a decade. This study's findings will give guidelines for designing marketing dashboard for readers who are marketing personnel, data system designer and managers who are responsible for companies' data and information systems in Thailand.

1.1. Field of Research

This study is a contemporary topic in academic marketing, which focuses on application in technology (data collection and analysis) in order to improve the efficiency of marketing.

1.2. Research Objectives

This research was conducted to achieve the following objectives:

1. To understand the data usage behavior of retailers in business analysis (eg. Day to day operation, trend and customer feedbacks, campaign responses).
2. To identify process in designing a dashboard to create the good characteristics of data presentation for marketing data analysis.

From reading this study, the reader will be able to answer the following research question:

"How to design marketing dashboard for data analysis platform in the most effective way for supporting Thai retailers' business application?"

CHAPTER 2

REVIEW OF LITERATURE

Literature used in this study includes textbooks, articles, blogs discussions and online contents related to big data management, retail business marketing and business analysis.

2.1. Retail Business and Its General Objectives

"Retail" is defined by Oxford Dictionary as "The sale of goods to the public in relatively small quantities for use or consumption rather than for resale". Depending on each individual firm's business strategies, retail objectives were defined differently. Lewis & Dart (2014) suggested that, in general, the major objective of the retail business is to create revenue by leading traffic into the store. To achieve the objective, retailers create the "touch points" that attract the customers to buy the goods, which that is when marketing takes places. However, there are different objectives are created into the company's key performance indicators (KPI) such as increasing of sales transaction, increasing ticket size, increasing gross profit, increasing store traffic, increasing buying frequency, improving customers' satisfaction level and reducing losses. For marketing, the measurement of KPI achievement can also be considered toward the activities' success rate comparing to the investment such as return on investment, conversion rate, target achievement, etc.

2.2. Retail Marketing Managers' Roles and Responsibilities

Marketing Managers' roles and responsibilities are usually defined differently in different industries and companies. In general, they are diverse and varied, which majorly focus to the same objective, to support the company sales performances. However, Merchant & Demand (n.d.) have summarized that the roles and functions of marketing managers and officers include:

1. **Conducting Market Research:** Marketing managers need to understand about market situation including customers' need and also the competitors' movements to verify the business opportunities.

2. **Developing the Marketing Strategy:** Marketing managers are responsible for creating strategies to create the outline for the company's direction and make sure the company's product or service would be delivered to the target customers properly, effectively and efficiently.

3. **Managing Customer Relationship:** Marketing managers are accountable for maintaining the customers' relationship with the company to make sure the customers are loyal to the company, spend more on the company's products/services and not switch to the other competitors.

4. **Managing Employee:** Marketing managers are in charge of managing the staffs within the marketing department for the marketing activations to be executed according to the plan and also collaborate with the other departments to deliver the related tasks smoothly.

5. **Identifying New Business Opportunities:** With understanding of the market situation, customers' need, market trends and also activities within the company, marketing managers are answerable for verifying business opportunities for setting up the direction for the company.

2.3. Retail Business Situation in Thailand in 2015

In 2015, the Thai economy has improved from the year before when there were big changes in Thai political situation due to the military coup in May 2014. Thai government issued regulations to support the economic situation throughout the supply chain in most industries ranged from manufacturing, production, logistics to the reduction of retail tax

campaigns for supporting spending within the country (Focus-economics.com, 2016). The improvement of the economic situation caused retail sales value to gain 8% growth from 2014 up to US$163 billion in 2015 (Statista.com, 2016), which has stimulated the big retailers including department stores, specialty stores, convenience stores, supermarkets and hypermarkets to start expanding their new branches in the major cities throughout the country (EuromonitorInternational, 2016). Besides, digital technologies became the significant advertising channel in the retail businesses. The leading retailers have applied different online advertising to promote their products and services by digital campaigns in social media, online advertising and also e-commerce, which has significant growth for 15.29% in 2015 to the value of US$13 billion (Boonnoon, 2015). Due to the high competition in the retailing landscape, the advertising budget in the Thai retail market grew 2.8% up to US$3.75 billion in 2015.

2.4. Retail Business and the Evolution of Big Data

Revolution of technologies have created massive amount of data. Schmarzo (2013) suggested that, for retail business, data is created every second from customers' behavior in the store such as time of purchase, amount of purchase, frequency of purchase, traffic in the store and the products purchased altogether. These type of data are considered internal data that is collected from the customers' activities within the store. However, there are another type of data that is collected from the customers outside the store, which are collected from market researchers, social media and online media tracking, which collect the information regarding the customers' perception toward goods, market trend, customers' intention to buy, etc. These data are valuable resources that retailers collect to analyze the customers' behavior, perception and the company's performance in order to improve their product and service.

2.5. Big Data Analysis; Tools and Objectives for Retail Marketing

According to LaValle, et. Al (2011), collection of retail data over decades cause competitive benefits to the retail tremendously if the collected data is properly analyzed. However, due to the massive amount of data collected, challenges that cause difficulties for the analysis are the business creativity and knowledge in data synchronization and finding relationships between data. Therefore, there are numbers of marketing solution software that provides ease of analysis for the marketing manager to analyze and create strategy from different kinds of data. Example of the data that most retailers analyze are Sales data, Market data, Promotional and marketing data, Customer-centric data, Supply chain and operations data and Merchandising data (James, 2010). These analysis of data from these tools can be used to understand more about the customers, market and the retailers' performance. Measurement can be evaluated by the success of marketing campaigns, evaluate and determine buying patterns, finding optimal mix of product types and quantities by time and location, etc.

2.6. Information Dashboard: Critical Information at a Glance

The dashboard concept was initially developed from control system in industrial process for measuring the operation performance and monitor production status. The first dashboard was introduced in the 1980s as the "Executive Information Systems" (EIS) to present the necessary information for the executives for making decisions and create business strategies. The main functional objective of dashboard design is to select and display the critical information for managerial purposes into the limited space "clearly and immediately" (Few, 2013). For the marketing objective, the dashboard should allow the users to see the bigger picture of the marketing situations, manage the marketing activities more efficiently, monitor and compare KPIs, choose effective channels, evaluate the funnels and the conversions, and reach the target

customers more effectively (Webseoanalytics.com, 2015). For the better understanding in the marketing situation, the information in the dashboard can be presented in the form of graphical information, illustration pictures, map and geographical images, texts, colors, etc.

2.6.1. Advantages of Implementing Marketing Dashboard

The reasons in implementing marketing dashboard is suggested by Webseoanalytics.com (2015) into 6 topics that, it allows the company to:

- See the bigger picture of the marketing performances and situations

- Plan and makes the marketing activities to be executed more effectively

- Monitor, evaluate and compare the company's Key Performance Indicators (KPIs) toward different period of time, location, and campaigns

- Measure the efficiency of different marketing channels and optimize the advertising budget effectively

- Verify the conversion rate of different activities performed in different stages of marketing funnels

- Understand more about the company's target market in terms of insights and behaviors

In addition to the advantages mentioned above, Geckoboard.com (2016) has suggested that the efficient marketing dashboard also allows the marketing managers to have the better picture to "spot trends, seize possibilities and prevent looming problems" (geckoboard.com, n.d.).

2.6.2. Key Consideration in Dashboard Design

Salesforce.com, one of the leading CRM platform has suggested in its blog that, in order to design an effective dashboard that can be used to demonstrate progresses and impact on the

business, it is significant that these "key consideration in the dashboard design" (Thornton, 2013) are considered:

- What is the purpose of the dashboard?
- Who needs to see the dashboard?
- How often will the dashboard be seen?
- What will the dashboard look like?
- How much data is included and presented into the dashboard?
- What is the time period to cover in the dashboard?

The design concept should be aligned to the users' expectations, not the designers', to make sure they can make the best use out of the designed dashboard. These questions suggested by salesforce.com will lead the direction of the marketing dashboard design to create the best practice and present all the necessary information for monitoring the performance of marketing activities in different situations.

2.6.3. Methodology in Designing an Information Dashboard

With the key considerations are considered in the design process, Few (2013) has suggested the preliminary methodology to design an effective information dashboard as follows:

- Begin with a definition
- Focus on goal, not the means
- Get into people's heads
- Ask the right questions
- Identify information that really matters
- Identify useful context for measure

2.6.4. Information Dashboard Characteristics

There are various articles discussed about the good characteristics of marketing dashboard in general. Sweetspotintelligence.com (2013) has suggested that the characteristics of marketing dashboard should be:

- Clearly display the important matrices and key trends, KPIs, comparisons and graphical or small tables of data and leads to actionable insights if needed

- Rapidly responses with notifications, whether it is good news, bad news or normal situation to make sure that the marketing managers can evaluate and plan to take actions to the situations in time

- Up to date with the quick-enough information as well as its accessibility to the necessary information

- Flexibly allow the users to interact with easy-to-use features such as filtering data and switching views

As summary of the literature review, data analysis has played significant roles in retail business in achieving its business objectives. To serve the different business purposes, many tools and systems are developed to analyze the collected marketing data. Moreover, the explosion of social media and online marketing creates digital economy which shift the customers' behavior to change meaningfully which also result the paradigm of marketing data analysis to be changed all the time. If the retail data is analyzed efficiently, it can be a key success in driving the companies' competitiveness. Therefore, it is significant for the systems to present clear and prompt information to the user effectively, which is key principles of the marketing dashboard design.

CHAPTER 3

RESEARCH METHODOLOGY

So as to collect the necessary information for the research purpose, the data was collected from secondary and primary sources as follows.

3.1. Secondary Data

Collection of secondary data was conducted from the following aspects:

- Case studies of 3 retail dashboards (Klipfolio, Qlickview and Tableau)

- Success and failure cases of data analysis in retail business

- Literature in the related fields (Business analysis, Information dashboard design, etc.)

3.2. Primary Data

Primary data was collected by the qualitative approach based on interviews with marketing manager, business analysts, MIS system manager or related roles and responsibilities from 15 retailers in Thailand (excluding e-commerce channels) with topic coverage of issues regarding marketing data analysis:

- Objective of data analysis in marketing (Measure sales performance, Measure success of campaigns, Management report, etc.)

- Situations in marketing decision making (Routine activities, Ad-hoc activities, Research for campaign setting, etc.)

- Management report characteristics

- Problems with data analysis in retail business application

3.3. Literature and Analysis Frameworks

Since the design of a system should be based on users' objectives, the analysis of the collected data made use of the primary data as the critical factors in scoping down the secondary data. The following diagram illustrates the literature framework used as the guideline for analyzing the collected data from this research.
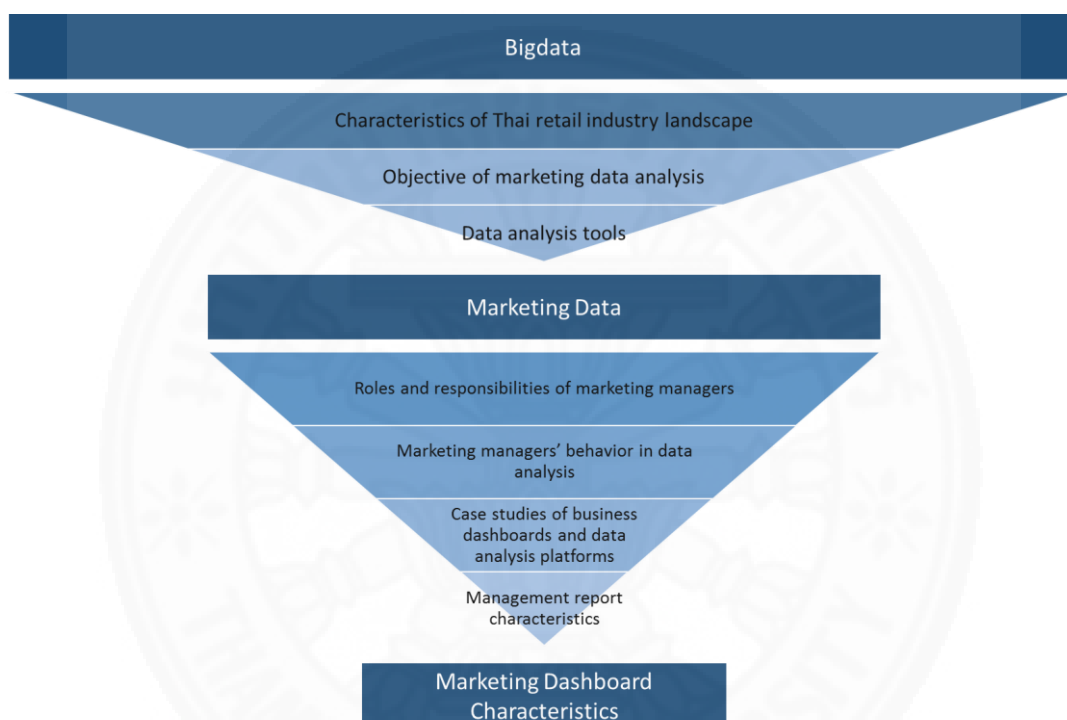
Figure 1: Literature Framework (Developed from literature review)

First, the overall "big data" collected through different activities in retail business are extracted down to become "marketing data" through the analysis of the retail landscape and retail business objectives, which are the primary data collected from the in-depth interview, and the functions and features of the marketing data analysis tools. Later on, the marketing data will be seized and summarized from the roles and responsibilities of marketing managers to scope and specify the features used to support the marketing mangers' behavior in data analysis. After that, observations to the case studies from current business dashboard solutions available in the market will be used as the benchmarks to the interview result for summarizing the dashboard

characteristics, as well as the customers' responses on their usage including problems, success and failures and analysis purposes and situations. At last, the management report characteristics will be used as the guideline that scope down the necessary information to be presented onto the "marketing dashboard". The analysis framework is illustrated as the diagram below:

Figure 2: Analysis Framework (Developed from research methodology)

In order to validate the research analysis as well as its results, the key independent variables in this research including, retail type, currently used data management system, management supports, personnel knowledge background. After controlling the Independent variables, the dependent variables in this research should cover the following aspects:

- Efficiency of the analytic platform. (to be measured by satisfaction level (ease of use) of the user, increment of productivity in business in terms of sales, cost reduction)

- Characteristics and function of the dashboard

CHAPTER 4

RESULTS AND DISCUSSION

4.1. Interview Results

4.1.1. Marketing Objectives of Retailers in Relation to Data Analysis

From the interview to 15 marketing managers in different retail industries in Thailand including 4 banks, 3 supermarkets, 5 fashion retailers and 3 department stores (the name of the companies and respondents are requested to be kept confidentially), 10 out of the 15 respondents suggested that their companies share similar marketing objectives, which are to *increase sales revenue by acquiring new customers, increase sales from the existing customers, and prevent customers from switching brand*. The goal of these marketing objectives can be measured differently in each industry and each company's KPIs such as return on investment, target sales revenue, buying frequency, product holdings, gross profit margin and ticket size. In order to fulfill these business objectives, they have to research, collect, study and monitor sales data to understand the behaviors and needs of their prospect customers, existing customers and also their lost customers. However, these analyses can be performed under 2 specific circumstances:

1. The company have collected their customers' information and an individual customer can be identified (eg. membership, subscription, privileges)
2. The product/service provided by the company have long-term involvement with the customers that allow them to purchase or have after-sales services provided the company's service/product frequently (eg. maintenance, interests fee, premium)

However, all the respondents from the remaining companies that still have not met the above circumstances have also realized the importance of customers' data analysis and have tried to evolve by finding opportunities in promoting activities to collect their customers' data. Therefore, the finding and analysis in this study will be focusing onto the companies that has successfully collected and analyze their marketing data by focusing onto their customers' data.

Apart from customers' data analysis, all respondents also analyze and create marketing strategies from sales data in relation to *location, channel, time and products*, which allows them to understand the customers' needs and segment them by geographical areas.

4.1.2. Marketing Managers' Data Usage Behavior in Business Analysis

From the interview result, task of the marketing managers in their marketing activity life cycle can be summarized as in the diagram below:


Figure 3: Marketing Activity Life Cycle (Developed from the interview)

From above diagram, marketing managers' tasks and responsibilities can be classified by the characteristics of data analysis behavior into 3 stages:

1. **Before the execution:** *Analyze and Verify Marketing Objectives and Create Marketing Plan – The Planning Stage / Campaign Setup*

  The respondents suggested that the planning stage usually takes place at the end of the year to set up the next step for their marketing strategies. Therefore, most of the activities during this stage requires lots of data and information to be analyzed. Their task start from the direction from management which require them to study and analyze the market and company situation. After that, they start from looking into overall status of the company's current performance, which majorly look into the sales performance of the company. After that, they find out about the trends and opportunities for the business expansions and create their marketing objectives or KPIs. Later on, they create marketing plan for proposing to management by finding additional related data to verify the target, set of activities, resources and investments to be executed aligning with the expected timeline required for achieving the KPIs created by the direction from management. When the plan is approved and ready to be executed, they request the scheduled report from business intelligence department or request them to generate the data matrices related to the marketing plan for monitoring the performances. The process of data analysis behavior during this stage can be illustrated as the diagram below:
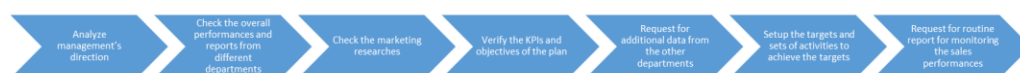
Figure 4: Marketing Managers' Data Analysis Processes in Planning Stage
(Developed from the interview)

2. **During the execution:** *Execute Marketing Activities, Monitor Sales Performances, Adjust Strategies and Activations – The Day-to-Day Operation Stage*

Duration of the execution process is the longest period of the marketing managers' roles and responsibilities (roughly 80% of their working time), which can also be considered as their day-to-day operation. In summary of the interview to the 15 respondents, the daily works for the marketing managers share similar tasks characteristics. Even there are slight difference from the other 6 respondents in detail, 9 respondents suggested that their major tasks can be summarized and illustrated below:
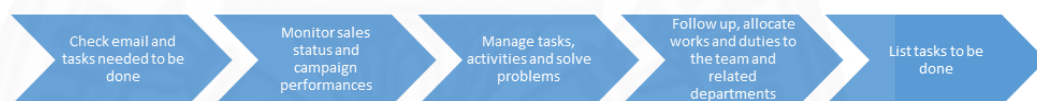
Figure 5: Marketing Manager's Works in General (Developed from the interview)

The tasks within a day of a marketing manager starts with tasks and communications management to make sure the marketing activities continue smoothly and reach their KPIs without any problem. After that, he/she monitor the sales status to evaluate the marketing performances and check if anything went wrong and assure the sales meet their target. If there is any issue with the sales performances that causes better-than-expected or worse-than-expected sales, he/she looks into the cause of the issue and setup short-term plan or on-top promotion to promote sales supporting the issue. Next, they follow up and allocate all the jobs dedicated to the team members and different departments according to the on-going tasks. At the end of the day, he/she list up all the in-completed tasks and tasks needed to be done in the next day.

The data analysis processes take places alongside with the execution and strategy adjustment. They generally start this process from checking their overall sales/promotion performances from the marketing dashboard/performance report, which are created specifically for the certain KPIs and targets binding to the plan. If the overall performances are as expected to the achievement of their target, they generally stop the data analysis activities. However, if the results are not going according to their expectations, they dig deeper into the problems by looking into the sales/promotions performances contribution by channel and by product/service. After that, they look into the causes of the problems with the available data on-hand to find the way to solve the problem. If the data and information on-hand is not enough, they request additional data from the data owners in different departments or the business intelligence department for finding the way to optimize their strategies. The marketing managers' data analysis behavior can be illustrated as the following diagram.
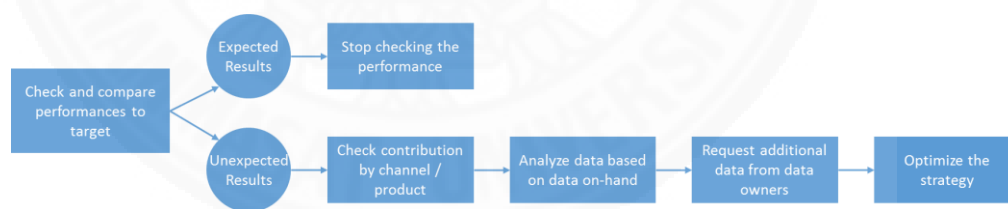
Figure 6: Marketing Managers' General Procedures in Data Analysis (Developed from the interview)

When all the required information is gathered, they use those data to optimize their plan, or create another backup/support plan to get the sales/promotion performances to be on track.

However, the marketing managers suggested that they usually spend a lot of time on finding out the cause of the problem. In addition, they also have

to wait for the data from the other departments in case that the data they already have is not enough for the analysis. Therefore, the dashboard that could notify them when the results are not as expected, and point direct to the cause of the problems would make their execution much more effective.

3. **After the execution:** *Summarize and Report Marketing Results to Management – The Report Generating Stage*

    Finally, when the plan has completely executed, they summarize and report marketing results to management. Basically, they compare the overall actual sales/promotions performances from the marketing plan's execution to the target and find out the KPIs achievements rate. After that, they find out about the causes of the results in terms of reasons in successes or reasons for failures such as top products sold, top sales/promotions channels, best performance activities, etc. Lastly, they find out about the potential for the improvement and other business opportunities for the future strategies. When all the data and information are gathered, they present the information into a presentation and report management for the performances.

    The respondents suggested that the process of reporting is the time-consuming process, since they need a lot of support information for management presentation. In addition, they have to illustrate the marketing performances into graphical form, which generally takes a long time for the preparation. Therefore, if the scheduled report or the marketing dashboard could support them in this process, they will utilize their working time much more effectively.

4.1.3. Obstacles for Marketing Managers' in Their Data Analysis Activities

From the interview, 11 out of 15 respondents stated that, due to the limitation by their information technology departments and difficulties in the synchronization with their current legacy data systems, they are not using a proper "Marketing Dashboard" in their work. They suggested that mostly, the data from different departments are stored in different data platforms for example, customers' data are usually stored in the Customer Relationship Management (CRM) database, sales transaction are usually stored in the finance/accounting or Retail Management System (RMS) database, product data are usually stored in the Product Data Management (PDM) system database and inventory and stock data are usually stored in the Warehouse Management System (WMS) database. In general, these data can be accessed by the Business Intelligence (BI) department, which are generally analyzed and summarized into a scheduled reports based on different requirements from various departments. This issue has caused them difficulties in the data analysis processes due to the limited capability in accessing the necessary information, and hence, they have to request the report owner for the additional data report. These reports are generally created into spreadsheet or data table format, which 4 of them stated that, by only looking into just the data table, they had difficulties in interpreting data and finding opportunities in creating marketing campaigns. Instead, the other 7 respondents stated that they prefer the data to be presented in spreadsheet (mentioned in the interview as Microsoft Excel Spreadsheet) form because they can mine and choose different dimensions to analyze the data and present them in forms of graphical information by themselves. In addition, it takes a long time just to wait for the other departments in completing a report, which many times are too slow in responding to the market situations.

Apart from the previously mentioned 11 respondents, the remaining 4 respondents stated that they are using marketing dashboard in their works. The functions that they like about

the dashboards are the graphical information presentation that makes them understand their current performances and also information coverage that meets their needs in achieving the KPIs. However, in case of needing the deeper or additional data, they will have to request the data from different responsible departments or different legacy systems, which usually takes long time in gathering all the data they need.
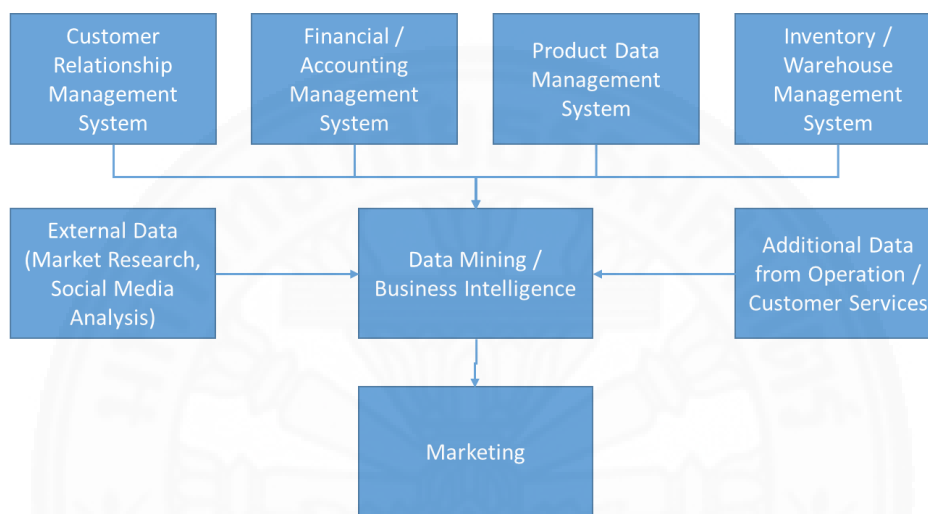

Figure 7: General Data Flow Between Business Functions (Developed from the interview)

They also stated that to make the better use of the marketing dashboard, it should provide them with the actionable insight, notify them when there is an unexpected situation and should be able to present the data just within the time they need. Otherwise, 2 respondents out of the 4 suggested that the existing dashboard technical performance is low that it causes long data processing time and occasionally create errors and hangs when generating report.

In summary of the interview result from the 15 respondents, the design and application of marketing dashboards in an organization should support the marketing managers in solving the following problems:

1. **Lack of authority in data access:** Most manager suggested that they need to request the necessary data for their analysis from different departments or business

intelligence department. In some cases, the data that they require are kept with high confidentiality such as customer information, sales performance or financial performance and need to request for authorities from management to access the data. This problem causes them long time and complex process in requesting data for the analysis especially from different departments. Setting authority for different kind of data will allow them to access the necessary or frequently used data and analyze data more efficient. To be perfect, the dashboard should be able to display the external data related to the current situation and the overall market situation properly.

2. **Lack of flexibility in data template adjustment and exporting data for further analysis:** This problem causes limitation in finding insights and sales opportunities. Most marketing managers are willing to have flexibility in adjusting data criteria and exporting the data for further analysis. For additional preference, marketing managers are expecting the dashboard to assist them in constructing performance report for updating management, which usually is the time-consuming process.

3. **Delay of the data delivery:** One of the biggest problems to the big retailers are that the data system has been long implemented, which are usually developed based on the legacy systems implemented by ERP giants. These systems are extremely complex with less flexibility in the additional implementation from other data platform. More importantly, they are implemented based solely on the local servers in different store outlets around the country and rely on weak network infrastructures from decades ago. This has caused the transmission of the retail data, which are generated every single second causing data package to become enormous. With the low connection performances, these data usually take time in the transmission and frequently cause delays in storing into the major databank. This

problem causes some marketing activation to be insufficient since some of the data-driven activities need up-to-date data for finding insight or to indicate the concerning issues that are needed to be fixed at a time.

4. **Unable to interpret data and identify issues and problems correctly:** This problem might lead to misunderstandings about the marketing situation and may cause the KPIs to be out of reach. Most marketing managers need the perfect dashboard to be able to display the data representing the current situation and point to the cause in case of not-normal performances. In short, the dashboard should be able to suggest the "actionable insight" for the users.

5. **Errors or software performance unable to response with loads of data generated:** There would be no meaning in using and implementing if the dashboard cannot be used within the certain period of time that the user need. The software should be able to handle the access of information from many people in various departments at the same time and can flexible in retrieving information from different legacy systems as well as other external sources.

To sum up from the interview, the author suggested that the key design factors that is needed to be considered for marketing dashboard designing should cover: *Data Synchronization, User Interface Flexibility, Data Delivery, Actionable insights* and *Platform Technical Performances* in order to create the best support for marketing managers in data analysis.

4.2. Observations from Existing Solutions

The research in this study also includes observation of the existing case studies from dashboard solutions available in the market to verify the match between their product design and the marketing managers' expectation. Samples used in this research includes 3 of the

leading Business Intelligence solution providers namely Klipfolio, Qlickview, and Tableau. The observations will be based on the sample of the marketing dashboard design provided on the net and also the product specifications and functions provided on the websites. Analysis of the case study will be based on the key design factors from the interview results.

4.2.1. Klipfolio (Klipfolio, n.d.)

Klipfolio is an online dashboard and business intelligence platform operated under Klipfolio Inc., a Canadian Software company in 2001. It provides the real-time solution that supports companies in data analysis and monitor performances in business sectors.

Data Synchronization: Klipfolio provide the solution that allow user to interface data from various kind of sources to be presented on the dashboard including the static data from a file, dynamic data from different leading databases platforms. In addition, the users can also connect data from other external sources such as cloud applications, share drives, and also feed information from different data sources with the availability of their Application Programming Interfaces (APIs) such as facebook, twitter, news portal, google analytics, salesforce, etc. without any problem in the file format differences. For privacy issue, it also allows the users to setup different level of authorities for each specific groups of users visualized specifically for each different departments.

User Interface Flexibility: The users can choose to upload, connect to different sources of data and choose the way of connecting and visualizing the data by themselves. Besides, Klipfolio also provides data visualization tools that allow the users to edit the formula and logic of the tool such as "transforming, combining, slicing up, filtering, etc. with any data set through easy-to-use command functions before it goes live in a dashboard" (Klipfolio, n.d.). Moreover,

it allows the users to drill down additional data from the report and export them into preferable report formats for further data analysis or assisting in performance reporting.

Data Delivery: The data that is connected to Klipfolio dashboard are automatically refreshed, which the users can setup the frequency of refreshing time by themselves. Besides, it can be accessed by different devices such as desktop, tablet, TV and mobile phone.

Actionable insights: Klipfolio allow the users to manipulate the data, setup conditional thresholds or format (such as the case of the matrices exceed / below the threshold, the exact pattern of matrices occur, etc.) and choose the way to present the data to provide additional insights or notify the user with different visualization tools with ability to customize their formats freely. Moreover, the users can add comments to any visualization and use it to communicate with the other team members for further activations.

Platform technical performances: Klipfolio is the platform that is developed on the cloud which means that it can handle the access of information from many users at the same time. Of one organization, it claimed to be able to handle the access of more than 10,000 access in the same time with scalable pricing based on the amount of data accessed.
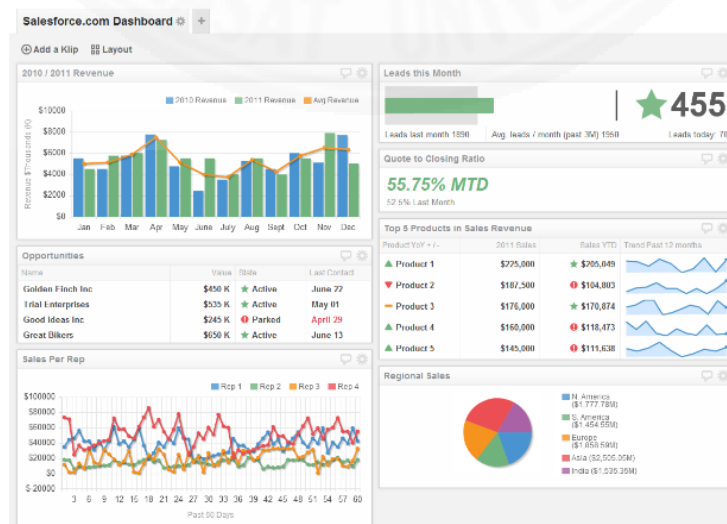

Figure 8: Sample of Klipfolio Dashboard (Klipfolio, n.d.)

4.2.2. Qlickview (Qlick.com, n.d.)

QlikView is a business intelligence & visualization software provided by Qlick, a Swedish software company founded in 1993. The company is also the owner of Qlick Sense, Qlick Data Market, Qlick Analytics, and other products that relate to big data analysis and business insights.

Data Synchronization: QlikView allow its users to consolidate data from multiple sources and combine them into one dashboard. It also provides the search function for words or phrases, which the users can find a specific piece of information directly. In relationship to the selected information, the system will automatically indicate the connections between the selected data to the search result.

User Interface Flexibility: QlickView's user interface is designed to be user-friendly and considered its users to require no coding knowledge. Therefore, the marketing managers can customize the dashboards by themselves. It also provides various ready-to-use analysis tools such as different types of charts and graphs, and allow the users to create relationship between different data set freely. In addition, the expert users who have programming knowledge could also customize their specific types of charts, graphs or even unique business applications by themselves. These tools can also be shared or sold to the other QlickView users through QlickMarket.

Data Delivery: QlikView dashboards can be accessed from different devices especially desktops and mobile devices. It allows the users to setup the report schedules and templates freely.

Actionable insights: With the features that allow its users to see the associations in different datasets, QlikView could help its users to state the issues and find the causes of the issues easily through the prepared visualization in the dashboard.

Platform Technical Performances: QlikView provide the powerful automated functions in maintaining the associations in the data and calculation for the results on-the-go. The success is from its unique techniques in data compressing algorithms, which allow them to pre-load the data to be ready for data processing in the platform prior to the analysis. This concept can shorten the data generating and processing time in supporting to its flexibility into the further analysis.
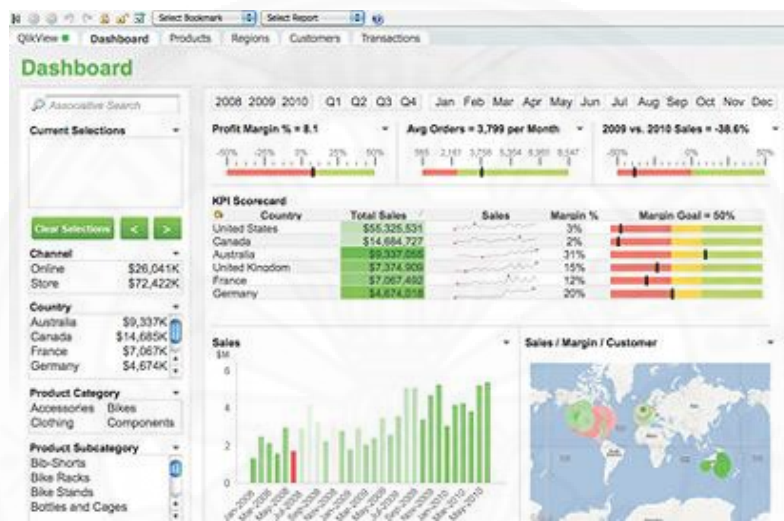

Figure 9: Sample of Qlickview Dasoboard (Qlick.com, n.d.)

Figure 10: Sample of Qlickview Dashboard (singaporebusinessintelligence, n.d.)

4.2.3. Tableau (Tableau, n.d.)

Tableau is a data visualization product focuses on business intelligence from Tableau Software, an American computer software company founded in 2003. It allows the users to create and share data insights from different sources of data across the organization flexibly.

Data Synchronization: Tableau is design to be ready for integrating enormous data from big data platforms, cloud services down to an excel spreadsheet. Through the credentials to different sources of data, which can be customized easily, integration of external data and sources of information such as social media or online portals are also possible.

User Interface Flexibility: Tableau does not require the users to write code to create the connections between those data, therefore, the marketing managers could handle all the operations by themselves. The user can also blend and twist the dimension of the data presented on the dashboard freely without needing any programming knowledge. This includes connecting/joining/cutting tables, creating/editing metadata, and digging/mixing/filtering data deeper with just drag and drop functions.

Data Delivery: Data integrated into Tableau will be updated automatically with the live connection to the data sources. Otherwise, the users can also set automatic update schedules or reports and share the dashboard with the other users freely. It can also be accessed from mobile devices or go live on the web with rapid speed.

Actionable insights: Tableau's allow the users to manage the dashboard and setup the way the data is presented, which means they can choose to create the graphical interfaces that can notify and identify different situations freely.

Platform Technical Performances: Its technical methodology in processing and presenting the dashboard is from the pre-load data into the platform, which allows the data

mining and further analysis to be ready within a short period of time. Besides, its platform is developed on the cloud, meaning the cost of use will be depending on the actual amount of data processed and accessed, which generally much safer than the legacy systems.
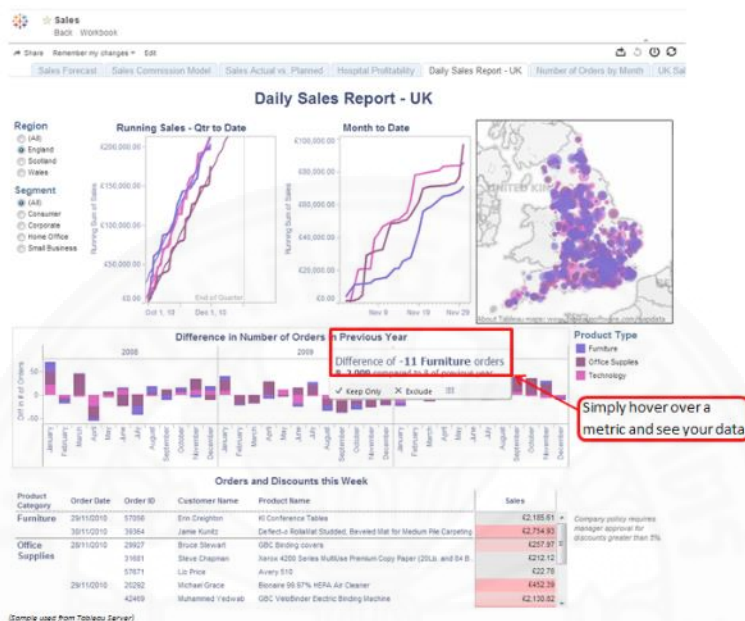

Figure 11: Sample of Tableau Dashboard (Covalentmarketing.com, 2012)

4.2.4. Summary of Key Features from the Case Studies

From the observations, the 3 leading dashboard platforms provided the functions and features that are matched with the major requirements summarized in the key findings from the interview with marketing mangers'. The author would like to summarize that in order to implement a marketing dashboard, the designer should take these features into considerations:

1. Easy-to-use and simple Graphical User Interface (GUI)

2. APIs to connect to different data sources such as big data platform, cloud applications, share drives, social media, news portal, analytics tools and static spreadsheet files

3. Customizable dashboard including graphs and charts depending on business objectives

4. Notification to identify the specific situations based on the specified pattern and interface for pointing to the related data to the cause

5. Flexibility for the interface in combining, mixing, deducting and filtering the data

6. Schedule update to ensure the up-to-date data

7. Reporting system that can be used to share and communicate with other users

These software features should be put into the marketing dashboard, which the design factors and design criteria that associate with each individual features will be the constraints to the detailed designs. The relationships between the design criteria, design factors and design features will be discussed in the next summary session.

CHAPTER 5

SUMMARY AND RECOMMENDATIONS

As the conclusion for answering the first objective, "To understand the data usage behavior of retailers in business analysis", we can conclude that the marketing managers' behaviors in the marketing data analysis can be separated into 3 stages which are **"before the execution"** or **"planning stage"** to find opportunities and objectives in the marketing plan. Another stage is the **"during the execution"** or **"execution stage"** to monitor and make sure the performance goes according to the plan, find the cause that are the problems to the unexpected situations and find the adjustments to the plan. Finally, the **"after the execution"** or **"reporting stage"** to analyze, report the performance and summary the key successes/failures to the managements. In this study, most retailers in Thailand are not using a marketing dashboard, which from the interview, only 4 out of 15 respondents stated that they are using a marketing dashboard. The remaining managers are using scheduled reports generated by the business intelligence department from their organization and they have to additional ah-hoc reports from different departments.

However, all of the respondents suggested that there are difficulties for analyzing data from their perspectives with the current system, which are the lack of authority in data access that cause delay and complex processes in obtaining data. Another problem is the lack of flexibility in data template adjustment and exporting data for further analysis which cause them limitation in perceiving the data in the angle and matrices that they want. In addition, the delay of the data delivery which is caused from limitations of the existing legacy systems cause the analysis to be delayed and many times causes obstacles in executing or adjusting their marketing plan. Moreover, they are unable to interpret data and identify issues and problems

correctly due to the large amount of data are involved in the retail marketing data analysis and there is no indication of the problems and issues at a moment. Lastly, errors or software performance unable to response with loads of data generated causes them problems in the data mining and analysis process in many critical moments.

All the respondents are aware of the importance of a marketing dashboard that it will help them in understanding the marketing situation, support them in the planning process, track and monitor the sales/promotions performances, and also summary and report the plans or campaigns results to management easier. They also suggested that a good marketing dashboard are also needed to act as the management dashboard that can inform the marketing statuses to the management, which can simplify the report making tasks which are their long/complex-processing duties.

Another conclusion to the objective "To identify process in designing a dashboard to create the good characteristics of data presentation for marketing data analysis" is that, the principle in designing marketing dashboard is depending on the *key design factors*, which is the core considerations in the collecting requirements for the design processes of a marketing dashboard. Whilst, the considerations will be created based on different criteria that related to each design factors in each stages. These *key design criteria* will be used as the direction and frame for scoping the capability of the dashboard outputs, which are the *key design features*. These features are the necessary components in terms of supporting user efficiency in the dashboard applications. The relationship between the 3 major matrices can be illustrated and explained as below:
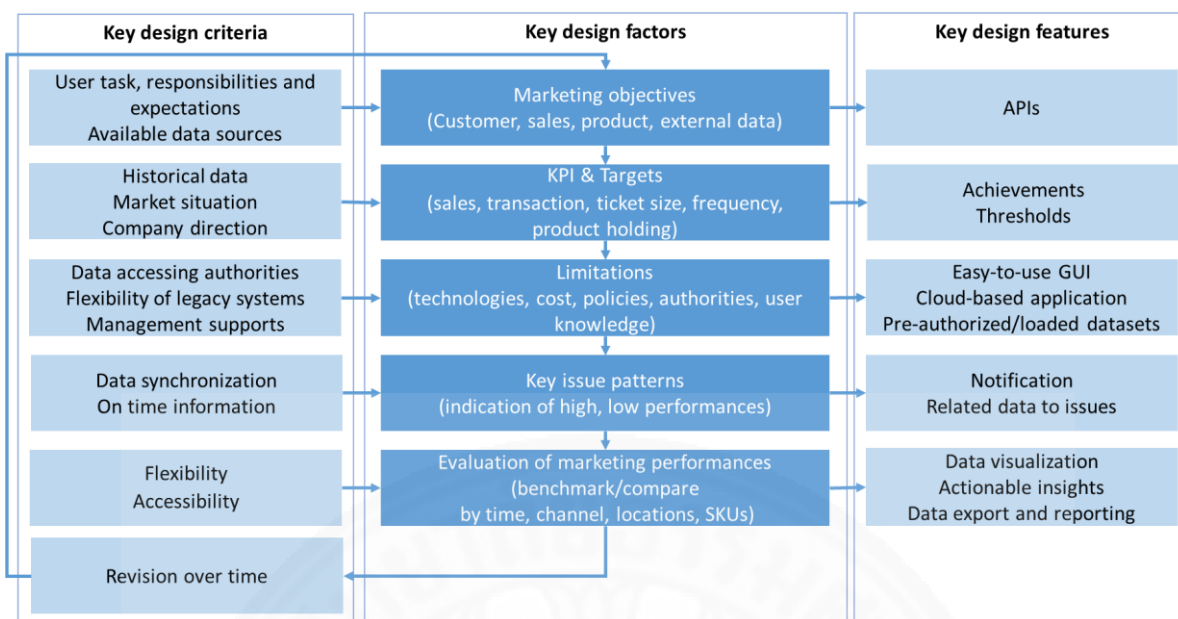
Figure 12: Principle in Designing Marketing Dashboard (Developed from analysis and findings)

First, designing of a marketing dashboard should be started from considering the *marketing objectives* which is the key factor that setup the direction of the remaining design processes. The designer should start by thinking about the types of data that are involved in the business analysis such as customers' data, sales data, product data and/or other external data. The criteria for determining the types of datasets that will be presented onto the dashboard will be the users' *task, responsibilities and expectations* from the dashboard about how the dashboard will help them in their works. Another criterion is the *availability or readiness of the data and their sources* to be included into the dashboard. The outcome from the design factor in this process will be the design requirements for the *dashboard API* lists that associates in synchronizing the data from different sources altogether.

The second step to be considered are the marketing managers' *KPIs* such as sales value, transaction, ticket size, frequency, product holding, etc. and the *targets* of the KPIs, which are the framesets that indicate the key message that the dashboard should tell the user. These factors will be set by the *historical data, market situations and company's direction* for scoping the

matrices to be measured in the dashboard. Outcome of the design factor will be the function that setup the points of ***achievement and thresholds*** in the measurements in the dashboard.

The third step in the consideration will be based on ***limitations*** in the design processes such as technologies, implementation cost, company's policies, management authorities and marketing managers' knowledge and skills in terms of technological and analytics. These factors are scoped down by ***authorities*** in accessing each dataset for the marketing managers, ***flexibility / performances of the legacy systems*** in allowing the dashboard to access and collect the data and also ***management supports*** in terms of budget, training allowances, internal collaborations and authorities in making decisions. The key features of the dashboard that is the outcome of this process are the characteristics of the ***GUI*** in the dashboard that is easy-to-use enough for allowing the users to setup and apply things by themselves. Besides, for reducing the implementation cost of the dashboard, it should be implemented as a ***cloud-based application***, which reduces the limitation of the performances and cost of the system. Also, the data to be presented in the dashboard should be ***pre-loaded and pre-authorized*** to reduce the difficulties in accessing the data that associate with the marketing operations.

The fourth stage will be the consideration of the ***key issue patterns*** of the different performance statuses that the users need to pay attention to such as the indication of high or low performances, abnormality in the data matrices, or even the indication stating that the overall performances go well without any problem. This factor will allow the user to be notified and understand the marketing situation clearer. Therefore, they can find more information and take actions in fixing or boosting the sales performance effectively. The criteria in designing are the level of ***data synchronization*** which allow the related data to be synced and display onto the dashboard and also the requirement that the data should be presented on the dashboard ***on time*** that the activations are needed to be notified.

Last but not lease, at the fifth stage, the designer should consider the way for *evaluating marketing performances* such as the characteristics of charts or graphs used to illustrate the sales performances. The consideration sets are based on the dimension of the matrices bounded to the KPIs such as budget, channel, time, location, product, etc. These matrices will be the key setup points about how the data are visualized on the dashboard. In addition, it also indicates the message, frequency and formats for the insights that the users would like to retrieve. The key design criteria for this process are the *flexibility and accessibility* of the dashboard that allow the users to retrieve more data related to the different scenarios.

At last, all the concept of the dashboard design should be revised over time due to the changes of technologies, business objectives, organization structures, and also the market trends. Following these principles and frameworks, the people who are responsible in designing or using the dashboard will be able to create the marketing dashboard for supporting data analysis and marketing activations more effectively.

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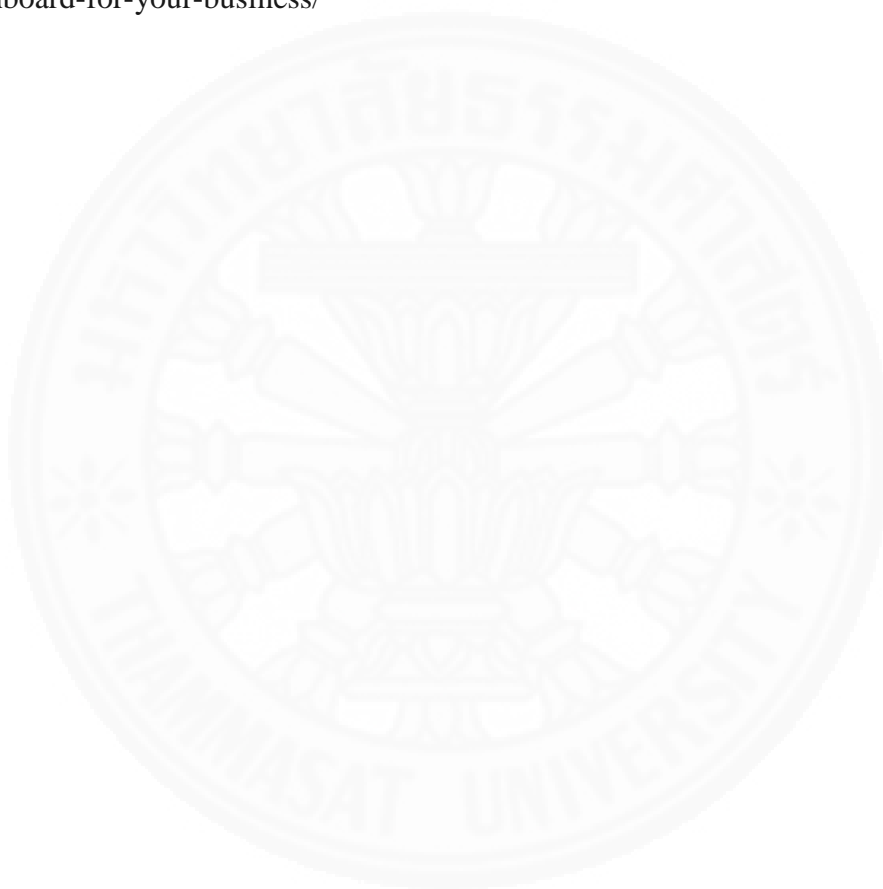
APPENDIX

APPENDIX – INTERVIEW QUESTIONS

1. What is your position? (demographic)

2. Can you describe your routine work? (overall)

3. How can you categorize the data that your company collect? (company, customer, competitor, collaborators, context)

4. How do you use data in your work? (situations)

5. How do you manage and analyze data in your company? (process)

6. What tool are you using for analyzing your data? (technology)

7. What are the major problems in your data analysis? (barrier)

8. What factors would make you analyze the data more effectively? (support)

9. What information is usually asked by management? (objectives)

10. What data and information do you usually show in performance report? (design)

11. What data and information is shown in your data management dashboard? (design)

12. What does your current data dashboard tell you? (design)

13. What function in your dashboard that you use the most frequent? (design)

14. What do you like the most about your dashboard? (design)

15. What do you dislike the most about your dashboard? (design)

16. What do you expect to see in your data dashboard? (design)

17. What information do you usually check after checking the dashboard? (design)

18. Do you usually use external data for your data analysis? (design)

19. What is the most success situation caused by analyzing data effectively? (Case studies)

20. What is the most failure situation caused by analyzing data wrongly? (Case studies)

BIOGRAPHY

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