FACTORS CONTRIBUTING TO CUSTOMER COMPLAINTS IN PCR (PROFESSIONAL COMMERCIAL RADIO) SOFTWARE R&D: A CASE OF MOTOROLA SOLUTIONS PENANG

SHOBANA MENON N.KASAVAN

KHEW YING YE

HAMID KAREEM BIN K.A. AHAMED MEERAN

Dissertation in partial fulfillment of the requirements for the degree of MBA (SSME)

UNIVERSITI SAINS MALAYSIA

2014

GRADUATE SCHOOL OF BUSINESS (GSB)
UNIVERSITI SAINS MALAYSIA

DECLARATION

I hereby declare that the project is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

_____

(Signature):

Name: SHOBANA MENON A/P N.KASAVAN

DATE:

GRADUATE SCHOOL OF BUSINESS (GSB)
UNIVERSITI SAINS MALAYSIA

DECLARATION

I hereby declare that the project is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

_____

(Signature):

Name: KHEW YING YE

DATE:

GRADUATE SCHOOL OF BUSINESS (GSB)
UNIVERSITI SAINS MALAYSIA

DECLARATION

I hereby declare that the project is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

_____

(Signature):

Name: HAMID KAREEM BIN K.A. AHAMED MEERAN

DATE:

ACKNOWLEDGEMENT

"A single hand cannot tie a bundle" says an old adage. Many individuals have made it possible for us to complete this project successfully. Without the unconditional guidance, we would never have been able to make it achievable.

We would like to take this opportunity to express our sincerest appreciation to our supervisor, Tuan Haji Noor Nasir Kader Ali for his invaluable assistance, support and supervision that encouraged us to stay focused throughout this project.

Our appreciation is also extended to the stakeholders of Motorola Solutions Penang (Business Team, Engineering Team, Test Engineering Team, MOL Team, Quality Team & Human Resources) for making time for the many interviews and supporting us by providing valuable information required for the completion of the project.

Special thanks to our class representative Ms. Anisha Banu and fellow course mates for sharing helpful information as well as providing moral support which encouraged us to give our best over the last couple of months.

Last but not least, our deepest gratitude to our family and The Almighty, whom have walked with us throughout the challenging journey to make this a successful yet a memorable one.

ABSTRAK

Aduan pelanggan mencerminkan rasa tidak puas hati pelanggan terhadap produk dan servis yang digunakan. Dari segi operasi perniagaan, aduan pelanggan menyedarkan syarikat perniagaan atas masalah penting yang perlu diselesaikan secepat mungkin. Memahami punca yang menyebabkan aduan pelanggan memberikan peluang kepada syarikat untuk meningkatkan aspek pengurusan dalam perniagaan.

Motorola Solutions Bahagian Perisian Penyelidikan dan Pembangunan (R&D) menerima tiga jenis aduan daripada pelanggan: [1] Ciri-ciri fungsi (feature) tidak memenuhi jangkaan pelanggan, [2] kepincangan ciri-ciri fungsi (feature) dan [3] masa kitaran panjang untuk menangani isu pelanggan. Untuk mengetahui punca-punca yang menyebabkan aduan pelanggan, Rangka SVP telah digunakan sebagai kaedah penyelidikan. Dengan terus menguraikan sebab kejadian yang wujud, punca yang menyebabkan aduan pelanggan dapat dikenalpasti. Maklumat yang terperinci telah dikumpul melalui temubual dan ulasan kesusasteraan untuk menyokong pengajian ini. Punca-punca masalah tersebut telah dikenalpasti melalui analisis terperinci dan boleh dibahagikan kepada tiga kumpulan: [1] Isu Pembangunan Modal Intelektual/Kompetensi, [2] Isu Proses termasuk ketiadaan prosedur operasi standard (SOP), dan [3] Kekurangan penggunaan alat teknologi untuk mencapai kepuasan pelanggan yang lebih baik.

Pelbagai penyelesaian telah dicadangkan untuk menangani punca-punca masalah tersebut. Dengan meningkatkan PMI/kompetensi pekerja, proses perniagaan

dan menggunakan alat teknologi yang sesuai, maka ciri-ciri fungsi boleh direkabentuk dengan keperluan yang betul, kecelaan tidak lagi terlepas tanpa dikesan oleh ujian dan isu pelanggan boleh diselesaikan menurut tempoh yang dijanjikan. Jika ditinjau dari sudut pandangan yang lebih luas, perbaikan tersebut akan mengurangkan aduan pelanggan dan mengembalikan keyakinan pelanggan serta meningkatkan pendapatan Motorola Solutions.

ABSTRACT

Customer complaints naturally reflect customer dissatisfaction. From a business perspective, customer complaints are a sign indicating the presence of problems that needs to be resolved at the soonest possible time. Uncovering what is causing the customer complaints presents an opportunity to improve a firm's business growth.

Motorola Solutions primarily receive three types of complaints from customers: [1] **feature functioning but not fulfilling customer's expectation,** [2] **feature malfunction** and [3] **long cycle time to fix issues**. In order to root-cause the underlying factors that causes customer complaints, the SVP Framework was adopted as the research methodology. By continuously questioning why a symptom appears, the root-cause that is causing the customer complaints could be identified. The data collected to support the case analysis was primarily attained through structured interviews and extensive literature reviews. The complaints mentioned above were known to be related to the operations issues constituting to New Feature Development, Testing and Customer Issue Handling and Resolution. This typically results in wrong feature being designed based on the wrong requirement, defects escaped from the test and customer issues not able to be duplicated and fixed within committed date respectively.

The underlying problems were identified through detailed analysis which is categorized into three groups: [1] **Intellectual Capital Development/Competency,** [2] **Business Process issues**, [3] **Lack of Technology Adoption**. By improving the

competency, business process and adopting proper technology, the product features can be designed with correct requirements, defect escapee will no longer happen and customer issues can be fixed within the committed date efficiently. In a broader view, it helps in reducing the customer complaints and regains customers' confidence, which eventually helps Motorola Solutions to increase its revenue in the long run.

EXECUTIVE SUMMARY

Of late, the number of customer complaints in Motorola Solutions related to the software is seen to be on an increasing trend; 16.7% increase from the year 2012 to 2013. The trend is seemingly having a co-relation to the decreasing trend in revenue over the years. This triggered the management of Motorola Solutions to further dwell into the operations of the existing engineering team and the supporting teams to understand the factors contributing to customer complaints. A detailed study was carried out through interviews in the attempt to uncover the root-cause of customer dissatisfaction with the products and services offered. The interview was primarily focused on the internal operations, zooming down into daily routines as well as collaborative activities with the support teams. The Symptom Versus Problem (SVP) Framework was adopted as the research methodology for this case study whereby it identifies, sorts and displays possible causes of a specific problem through continuous questioning.

The Motorola Software R&D team primarily receives three types of complaints from customers: [1] feature functioning but not fulfilling customer's expectation, [2] feature malfunction and [3] long cycle time to fix the issue. Problem [1] relates to the New Feature Development deficiency. Problem [2] is related to Feature Testing deficiency while Problem [3] is related to Customer Issue Handling and Resolution deficiency. These problems can be characterized into three categories: [1] **Intellectual Capital Development/Competency,** [2] **Business Process issue** and [3] **Lack of Technology Adoption**. The result of the analysis has enabled the formulation of various strategies to **improve the competency, business process and proper technology adoption**. These strategies can be classified into

three categories; quick-win strategies, short-term strategies and long term strategies. The quick-win strategies recommends **revising Standard Operating Procedures (SOP)** to reflect new processes, **creating awareness** for process compliance as well as **building test steering committee** within Test Engineering Team to govern test processes so that the test quality is not sacrificed due to schedule pressure. The quick-wins strategies were aimed to provide instant resolution to address issues that can be resolved without much effort to minimize customer dissatisfaction and at the same time boosting internal customers (employees) morale. The short term strategies typically recommends **conducting regular audits** to ensure compliance to mandatory processes, **introducing mentorship programs** to encourage knowledge sharing amongst engineers, **improve assessment** during interview and task assignment and **setting up Technical Review steering committee**. This typically takes a little longer to achieve compared to quick wins. As for the long term strategies, it proposes **development of software (technology)** to automate Test Framework, establish traceability between marketing and engineering requirement and marks effective requirement completion phase. As for the Business Team, **demonstration with video illustration should be adopted** to increase customer feature understanding. Managers should also develop **Strategic Training Plans** for talent development, **implement output performance review** for quarterly assessment to ensure the engineers delivers their tasks effectively and efficiently.

The improvement on **engineers' competency and business process**, together with the **adoption of technology** bring positive impact and repercussion effects to Motorola Solutions. In terms of new feature development, the customer requirement can be captured correctly, good market analysis can be performed, marketing

requirement can be translated into engineering requirement without error and feature can be designed with correct requirement. In terms of Test Engineering, test cases will no longer be overlooked by reviewers; engineers will be able to comprehend design and architecture of features flawlessly, and high quality test development and execution can be delivered. In this context, product malfunctions will be significantly reduced. From the perspective of customer issue handling and resolution, there will be no missing of information on the customer complaint reports and all the customer issues can be fixed within committed date. In a high level business view, as illustrated in **Figure 7.13**, the "House of Pillars", the implementation of the solutions significantly reduces the customer complaints, which deliberately increases the customer satisfaction by regaining customers' confidence. It also helps in reducing the appraisal cost of Motorola Solutions R&D software department, which constitutes to revenue increase in the long run apart from sustaining its reputation as the world's market leader in the two-way radio communications industry.

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

In today's highly complex yet competitive business environment where businesses compete with each other for customers, customer satisfaction acts as one of the key differentiator that is deemed critical for survival and sustainability of an organization in the long run (Jamal & Naser, 2002).

> *"A person's feeling of pleasure or disappointment resulting from comparing a product are perceived performance (or outcome) in relation to his or her expectations (Kotler & Keller, 2006). In a simpler form, customer satisfaction is also perceived as the contentment with a product or service experience" (Oliver, 1997).*

Typically, customer satisfaction is measured by organizations in order to distinguish how well it is at offering products or services to the market place. Organizations tend to measure customer satisfaction to identify the gaps that exist between customer expectations and the product or service performance. Customers are inclined to feel dissatisfied if the perceived product or service performance failed to meet customer expectations. In contrary, if customer expectations are met or exceeded, customers are likely to feel satisfied and may potentially spawn a pool of loyal customers (Kotler & Keller, 2006). Measuring customer satisfaction also paves a way for a product or service improvements whereby it helps organizations to achieve sustainable competitive advantage (Poon & Low, 2005). As a matter fact, customer satisfaction becomes an integral performance indicator for organizations. It is deemed crucial for organizations to embrace customer satisfaction as a

performance indicator to continuously evolve and improve their product development and service quality (McDougall & Levesque, 2000).

Customer satisfaction is not only linked with faulty products or services, but how organizations react when complaints are raised. It is not an uncommon fact, in today's business world to have customers complaining about a product or service which fails to fulfill their expectations. Organizations are well aware that customers expect products and services of superior quality. In addition, customers also expect organizations to respond promptly and appropriately to their complaints in the case of product or service failures. It is highly challenging to identify what exactly customers are expecting. Therefore, customer complaints can be regarded as an important communication channel an organization has with its customers to understand or predict the needs and to continually improve on its product and service offerings to meet or exceed the customers' expectations.

1.1 Background of Case Issues

In the era of today's mature and highly intense, competitive business pressure, Penang Software R&D of Motorola Solutions is directing its effort towards improving customer satisfaction in order to retain the loyal customers as well as to attract new market segments. The ultimate challenge for the Software R&D team is how they can discover the business operations flaw and strategize effective resolution plan that would result in meeting or exceeding customer expectations.

"Increased customer satisfaction can lead to customer loyalty (Bowen & Chen, 2001), positive word of mouth communication, and higher retention rate" (Athanassopoulos, Gounaris & Stathakopoulos, 2001).

Customer satisfaction is achievable through a variety of business actions such as improved product features, service quality and effective customer complaints handling mechanism. There are two significant causes of customer complaints in Penang R&D, categorized as product and process view. Product related factor is constituted to customers not satisfied with the customized product features developed. Oftentimes, this is related to the poor management of customer requirements in the initial stage of the product development life-cycle.

Another element to this issue is associated with feature malfunctions that results in dissatisfaction amongst customers. The root-cause to feature failure is a result of poor competency of the software engineers, whereby the engineers lack in the required skill set to perform their task efficiently and effectively. In view of the process related factor, cycle-time plays an important role. Typically, the software engineers in Penang R&D take longer time to resolve a customer reported issue. This is due to the fact that the organization is lacking in standardized operating process of performing a task, which causes much delay to the activities planned to resolve customer issues. Such types of issues generally result in customer complaints which are deemed a clear sign of dissatisfaction with the products and after-sales services being rendered.

Thorough in-depth analysis through interviews with the stakeholders of Motorola Solutions on symptoms of problem and the contributing factors, strategic business solutions are formalized and recommended to overcome the hurdles currently faced by Penang R&D. Focusing on improving Customer Relationship Management (CRM) in the context of Technology, Intellectual Capital Development (Competency) and Business Process helps Motorola Solutions to increase customer satisfaction whereby it promises revenue growth and reputation, deliberately strengthening the market position for long term sustainability.

1.2 Research Objective

Customer complaints seem to be one of the pressing issues to-date that is faced by Motorola Solutions. Due to the need for a comprehensive solution that can help the Software R&D team to resolve the customer complaints effectively with the intentions of increasing complainant's satisfaction, loyalty and trust, this research aims to provide a better understanding on how to turn a dissatisfied customer into a satisfied one by exploring the influences of Customer Relationship Management in the context of Technology, Business Process Improvement as well as Intellectual Capital Development (Competency) on customer satisfaction.

This research's primary aims:

- Identify the factors contributing to customer complaints
- Identify causes of the gaps – Business Process, Intellectual Capital Development (Competency) & Customer Relationship Management (Technology)

- Examine the relationship between the complaints and the gaps identified
- Determine the factors related to actual levels of customer satisfaction
- Recommend strategies and solutions to improve the business performance

1.3 Research Questions

Following questions were posed in this study to achieve to above stated research objectives:

1. What are the contributing factors to customer complaints?
2. What causes the gaps; Business Process, Intellectual Capital Development (Competency) & Customer Relationship Management (Technology) to occur?
3. How the factors identified in (1) & (2) impact customer satisfaction?
4. What are the solutions to reduce the gaps identified in (2)?
5. How customer complaints impact business/revenue?

1.4 Research Limitations

The limitation of this research is that the study focuses only on customer complaints that related to software, hardware related issues are not within the scope of research. The research is limited to only Motorola Penang R&D, not including other R&D sites around the globe. The future researchers can perform similar research by focusing on hardware, and analyze the differences of customer complaints across Motorola R&D sites or extend their scope by including other

companies in the same discipline for a wholesome view of two-way radio communication industry.

Also, there were no available data on actual end customers of Motorola Solutions to further enrich the case study. Research is conducted based on limited primary data (journals, articles, Internet, unpublished company information) via interviews and secondary data via literature reviews to support the arguments.

2.0 LITERATURE REVIEW

This chapter explores the relevant existing literatures that provide the basis of this research. There have been extensive researches conducted on customer satisfaction and customer loyalty. These research studies have looked at the subject matter from various angles to better comprehend and explain the determinants of customer satisfaction. For the purpose of this case study, the co-relation between **Customer Dissatisfaction** and the contributing factors; **Customer Relationship Management (Technology), Intellectual Capital Development (Competency)** and **Business Process Improvement** has been examined.

2.1 Customer Dissatisfaction

> *"The Cambridge Dictionary defines a complaint as when **someone says that something is wrong or not satisfactory' or 'an illness**'. The current research focuses on the first part of the definition**. A complaint is an unsatisfied expectation"** (Barlow & Møller, 1996). "Customer complaints are an **indication that the service or product does not meet the customer's expectations"** (National Performance Review, 1996). Mintzberg & Lampel (2003) define "different stages **a product can be customized in and argues that this is a good way to meet the customer's needs".***

Customer dissatisfaction in the context of Motorola Solution's Software R&D Team lies in customers not satisfied with the customized product features developed. Typically, customers are not satisfied because the expectations of the products are not met. Customers tend to have higher expectations on customized products because the products are developed based on their specific needs to perform their daily task.

When these expectations are not met, the dissatisfaction is emitted in the form of complaints raised against the products.

> *Boshoff (1997, p. 112) argues that "there are three* ***different ways of showing customer's dissatisfaction****: exit, voice and loyalty.* ***Voice is the only possible complaint that reaches the reseller or manufacturer****; it is also possible the complainant spreads his thought by word of mouth or to third parties". Den Ouden et al. (2006) argue that "****consumers not only complain when they encounter a product or service failure, but also at the moment when their expectations are unsatisfied"*** *(Davidow & Dacin, 1997).*

The medium that the customers of Motorola Solutions adopt to show their dissatisfaction is through voice. The dissatisfied customers reach Motorola Solution's Call Centre to lodge a complaint against the products, believing that the company will act on the complaints immediately to get the issue resolved.

> *"A fault (or a bug) is* ***an accidental condition that causes a functional unit to fail to perform its required function****. A fault may cause a failure. Failures occur during the execution of a software program. According to IEEE standard 729-1983 a failure is* ***an event in which a system or system component does not perform a required function within specified limits****. Failures are caused by faults. A very common term in software engineering is a defect. A framework for counting problems and defects defines a software defect as* ***any flaw or imperfection in a software work product or software process"*** *(IEEE Standard, 1983).*

Based on the definition of IEEE Standard above, the customer complaints in the Software R&D team are typically the example of software defects whereby the product being used by the customers does not operate as intended. The defects raised by the customers mainly fall under three categories, namely **features not fulfilling customer expectations**, **product malfunction** and **long cycle-time to receive the fixed software**. A feature not fulfilling customer expectations ties closely with customer requirements unmet. When a set of customer requirements is wrongly implemented in the radio products, customers raise dissatisfaction. In terms of product malfunction, the feature that resides in the product fails to function, which ultimately results in customer dissatisfaction.

As for the long cycle-time, customers are dissatisfied with the after sales service in the form of fixed software. "***Cycle time clock starts when work begins with the request and ends when the item is ready for delivery.*** *Cycle time is a more mechanical measure of process capability" (Stefan, 2010).* Since the Software R&D team is taking too much time to get the software fixed and delivered to the customers, this result in long cycle time and eventually causes customer complaints.

2.2 Customer Relationship Management (CRM)

> *"Managing a successful* ***CRM implementation requires an integrated and balanced approach to technology, process, and people"*** *(Chen, J. Injazz, Popovich, K., 2003). "CRM is an enterprise wide initiative that belongs to all areas of an organization" (Singh D. & Agrawal, D.P. 2003). "It reflects the comprehensive strategy and process of acquiring, retaining and partnering*

with selective customers to create superior value for the company and the customer. ***Customer Relationship Management is a term for the methodologies and technological capabilities used by the firms to manage customer relationships"****. (Lancaster & Jobber, D.P. 2006).*

Four main CRM strategic capabilities (Gordon, I., 2002), include:

- ***Technology*** *- This will enable the desired functionality for the CRM practice.*
- ***People*** *- Skills, abilities and attitudes of the people responsible for the CRM initiative.*
- ***Process*** *- The processes that the company has identified to enable or to ensure that the CRM objectives are fulfilled-these include the transactional interactions with the customers.*
- ***Knowledge and insight*** *- To ensure stronger and deeper relationships with the right set of customers, companies need to identify the right approaches that will enable them to gain knowledge to gain insight for enhancing the customer value significantly.*

Based on the previous researches stated above, CRM plays an integral part in improving customer satisfaction. The quotes above denote that CRM revolves around four major contexts, namely Technology, People, Process and Knowledge. How can CRM be co-related to customer complaints?

In the context of Motorola Solution's Software R&D, managing customer relationship can be broken down into two aspects – internal customers and external customers. External customers are known as the customers whom the products and

services are sold to increase value to the customers. When handling customer complaints, the existence of customer relationship is deemed crucial. It is utmost important for an organization to place the right individual to the right job to keep the customers happy. Handling customer complaints with care and empathy denotes that the organization care for the customers well being. It is deemed crucial for the employees of the organization in the field of Call Centre and Business Team whom have direct contact with customers to have a positive attitude, fostering customer-satisfying behavior and be groomed to have excellent customer relationship skills and ability in handling customer complaints. It is well known that unhappy customers tend to be aggressive when it comes to faulty or poor quality products. However, the response to the customers has to be subtle, keeping in mind the Customer Leadership values that to-date's organizations have as their core business performance value.

In terms of internal customers, as the business increases exponentially, it calls for integration of different business departments to collaborate the customer information to provide a unified view of customer interaction to serve the customers better. This shows that the communication between the teams in the organization is important as far as business is concerned. Working in silo, to be specific by having different work procedures, standards and so forth will not help the employees to achieve its goal of keeping the customers happy. CRM's role as bridging the communication gap amongst the teams and between customers is highly vital in ensuring products or service rendering is not impacting customer satisfaction. It helps in breaking down the barriers between departments, something which can

prove quite difficult, as in some firms there are even deep rivalries between departments.

In the context of technology that will be focused in this case study, CRM is the strategic process of shaping the interactions between an organization and its customers with the goal of maximizing current and lifetime value of customers for the organization as well as maximizing satisfaction for customers. CRM is typically an IT enabled comprehensive business strategy, whereby the deployment of tools is crucial to establish successful communication systems with both internal and external customers. Any organization without a tool/web based solution lags behind in reaching customers. The internal teams, namely Business Team, Test Engineering Team and MOL need to have the proper tools in place in order to provide a wholesome operations efficiency. With effective data generation and important data analysis, backed with appropriate data mining, the teams can reap huge benefits. Without a tool, customer complaints and the associated details will not be able to be captured and planned for efficient resolution with reduced cycle-time. A complaint may take longer to resolve if the crucial details are not captured, which tend to result in establishing a frequent inquiry to customers which may cause frustration amongst them. These circumstances could be avoided with the deployment of automated tools and interactive solutions to ease the process of understanding customer complaints and resolution. In the context of internal customers, with the use of ever changing technology, this process seeks to integrate various functions of an organization, such that it becomes effective and efficient in the long run. This enables the organization to have a high customer share and market share to gain a long term competitive advantage. This is viable through the deployment of automated tools in an

organization to perform a task which requires collaborations among various teams to produce a single product that fulfills all customer requirements. With the help of tools, there are higher chances of getting a task done faster and error-free compared to manual methods.

As far as process concerned, it plays a vital role in CRM whereby every activity within the organization should have a standardized procedure for effective operations. In the event Standard Operating Procedures (SOP) of the organization is not established, employees tend to carry out similar task differently, resulting in various types of problems, including miscommunications or misinterpretation between employees and customers. The organization would have to pay a heavier price if such issues arise whereby it is much cheaper to deploy standardized work procedure in the organization compared to losing customers due to the poor procedure which causes poor product development or service quality.

As the knowledge aspect, it ties very closely with a competency that will be discussed next in the literature review. Employees of the organization need to be highly competent in their area of expertise. *"In order to handle complaints effectively the business* ***organization should have well-trained workers*** *and an effective recovery and amends program" (Dru 2000).* With the right skill set, employees from the various departments are able to address customers' concerns in a short period of time, gaining trust from the customers from the after-sales service experience. On the other note, highly knowledgeable employees are able to perform their tasks effectively whereby there will be a potentially minimal case of customer complaints pertaining to product malfunctions and overall quality. This could be achieved if the

employees design and develop the product right the first time by complying with all customer requirements and expectations. This could be achieved by providing required trainings to the employees to develop technical and analytical skills to perform their tasks effectively. As for the employers, development of proper training plans needs to be established to ensure new skills are updates timely for best performance for the benefit of the organization as well as the customers.

2.3 Intellectual Capital Development (Competency)

> *"The growing interest in intellectual capital coincides with the dawn of the knowledge society and the newly seen importance of its knowledge workers" (Porter 1993). "It is within this context that many authors discuss* ***the importance for firm survival and performance of human and social capital at the organizational level"*** *(Kogut & Zander 1996; Pfeffer 1994; Uzzi 1996). Furthermore, "concepts such as* ***intangible assets, embedded tacit routines, core competence, knowledge creation and innovation take center stage in the explanation of the firm's assets that continually create value over and above physical and financial resources"*** *(Barney 1991; Bowman & Ambriosini 2000; Swart & Bowman 2003; Davenport 1999; Polanyi 1966; Ulrich 1998). "The combination and integration of these concepts in explaining phenomena such as* ***firm survival performance, innovation and competitive advantage has led to a set of concepts that have often been grouped under the umbrella of intellectual capital, but*** *on close inspection is found to been defined and applied in rather different ways." (Barney 1991;*

Bowman & Ambriosini 2000; Swart & Bowman 2003; Davenport 1999; Polanyi 1966; Ulrich 1998).

"A ***competency is the capability of applying or using knowledge, skills, abilities, behaviors, and personal characteristics to successfully perform critical work tasks, specific functions, or operate in a given role or position****. Personal characteristics may be mental/intellectual/cognitive, social/emotional/attitudinal, and physical/psychomotor attributes necessary to perform the job" (Dubois, 1993; and Lucia & Lepsinger, 1999)*

Intellectual Capital Development (ICD) is indicated as the skills that lie with skilled employees who are committed to business goals. These are the organization's employees who have the potential to create value at present and future, whereby knowledge and skills are regarded as valuable, rare, inimitable and non-substitutable; in another word, tacit knowledge. There is also another dimension to ICD whereby it is depicted as an input into the value creation process a value creation process in itself or tangible output from the organization's value creation process. It is under these definitions that ICD is seen as knowledge, skills and abilities of an individual.

In the context of employee competency in resolving customer complaints, the ICD can be regarded as the tangible output in the form of products and services within the organization's marketplace that fulfills every single customer requirement. The unique and valuable knowledge and skills are embedded with the products and services being rendered. To-date, organizations face many challenges in this changeable world through the knowledge-based economy via globalization. This

hyper competition creates a need to innovate that help organizations have the competitive advantage of the products they provide to the mass market.

Knowledge or competency is highly required in today's knowledge economy clusters to provide competitive products and services to the customers. This is required by each and every organization worldwide in order to sustain in any industry. Often times, lack of knowledge or competency in employees' results in customer dissatisfaction with the products or services provided. Lack of experience & skills of the R&D employees possesses a threat in meeting the organization's goal to keep the customer happy.

There is a relationship between customer dissatisfaction and poor competency. Typically customer dissatisfaction is a result of customer complaints. If an organization carefully analyzes the complaints, a fair number of complaints are root-caused by poor product design that is a symptom of poor understanding of customer requirements on the products the employees are developed. This clearly indicates that skills and capabilities are crucial in performing a task effectively. Failing to place the right individual to perform the right task will pose risk of losing customers if these knowledge gaps are left unaddressed. Organizations need to invest in training and development of employees to prevent spending money on non-value added expenditure. Rather the organization should invest funding to increase the tacit knowledge of the highly skillful employees and to establish a process to document them to be used as training materials to boost up the skills of junior employees for the betterment of the organization.

2.4 Business Process Improvement

> *Six sigma is a BPI (Business Process Improvement) methodology that "seeks to* ***identify and eliminate causes of errors, defects or failures in business processes to achieve breakthrough improvements in quality, process performance, productivity and customer satisfaction"*** *(Richardo & Jiju 2002).*

In today's highly competitive business arena, an organization's primary focus appears to be deploying leaner business operations. To allow this to materialize, the need to reduce costs, develop efficient processes and respond to policy is essential, promising increased customer satisfaction and value as the outcome. Failing to focus on these factors results in customer complaints. The concept of value is important and is mainly defined by the customer. However, other forms of value may well exist which need to be included within the processes and system, including adherence to policy.

Apart from leaner business operations, elimination of defects or failures through improved processes is deemed important to ensure customer satisfaction is attained. This clearly indicates that through process improvement, it reduces the probability of defect escapes to customers. The organization is able to screen through the defects internally prior product or service delivery, which eventually helps in reduced appraisal cost. With improved processes, employees are also able to achieve high productivity whereby inefficiency of an activity can be effectively identified and removed through Six Sigma methodologies. Quality is assured if process

improvement initiatives are deployed strategically to the benefit of the organization and increase customer satisfaction.

Many of the barriers to process improvement were the reverse of the success factors, e.g. lack of leadership, poor communication strategy, no sense of urgency, lack of methodology, little monitoring and evaluation of outcome, little consultation with stakeholders, poor engagement with employees and under resourced implementation teams. Poor communication strategy between internal and external customers often results in customer complaints. As discussed in CRM topic, improving the process of communication will definitely help to bring down the ill perception of customers towards an organization and its products and services.

Another important aspect of process improvement is in the context of Software R&D is an ineffective monitoring process. Failing to deploy proper monitoring and audit processes often results in uncovering flaws towards the end of a cycle. This will pose impact of the products and process delivery whereby the flaws are reported as customer complaints after the goods are shipped. The organization will not be able to detect errors during the production process due to lack of a monitoring system. There will be no avenue to ensure the operations are adhering to the process if there is no monitoring process established to check if the activities executed are in the right track. With the existence of monitoring processes, errors would be detected earlier allowing damage control of the organization to take effect before it causes damage to the intangible qualities of an operation. Recovery from damage done on tangibles are less impactful than the damage caused intangibles whereby the recovery period may take a very long time or worse still, none. Thus, it

is important for organizations to have appropriate process improvement actions to be integrated as part of its business operations to ensure the entire flow of operations are smooth and leaner, contributing to exceptional product quality and deliberately increasing customer satisfaction.

3.0 INDUSTRY ANALYSIS

The case study prominently reviewed Motorola Solutions' current position through external and internal analysis. The common method to be used for external analysis is the Porter's Five Forces model. For internal analysis, the case study will look into the strength and weakness of the two-way radio communications and assessing the critical element of Motorola Solution's value chain. The case study will also include Competitor Analysis to further strengthen the industry analysis.

3.1 Industry Profile

Motorola Solutions, Inc., founded in January 4, 2011 is an American public listed multinational company that succeeded Motorola Inc., following the spinoff of the mobile phones division into Motorola Mobility in 2011 (Motorola, n.d.). The company is headquartered in Schaumburg, Illinois, a suburb of Chicago (Motorola, n.d.). With over 22,000 employees worldwide, it takes pride to be one of the largest data communications and telecommunications equipment provider, a global player in Electrical & Electronics (E&E) industry in North America. Revenues at Motorola Solutions totaled $8.7 billion USD, with operating income of $878 million USD and net profit of $881 million USD, while annual earnings equaled $4.73 per share for the fiscal year 2013 (Motorola, n.d.). It is one of the largest American companies by market capitalization, approximately $15 billion USD, annual sales over $8 billion USD as of 31 December 2013. Motorola Solutions has a strong global presence in over 65 countries across all regions, employing 22,000 employees who reach millions of extensive customer base from small businesses to Fortune 500 companies globally (Motorola, n.d.). Motorola Solutions was listed in the Fortune 500 companies with total assets of more than $12.68 billion USD (Motorola, n.d.).

Motorola Solutions are structured into two divisions, namely the Government & Public Safety (G&PS) and Enterprise Mobility Solutions (EMS) (Motorola Solutions, n.d.). EMS, lead by Girish Rishi:

> *"Comprises communications offered to government, enterprise mobility businesses. The division is responsible to develop advanced data capture, wireless infrastructure, barcode scanning, business pagers, wireless broadband networks and Radio-Frequency Identification (RFID) solutions to customers worldwide" (Motorola Solutions, n.d.).*

Alternatively, G&PS is spearheaded by Bob Schassler:

> *"Produces public safety and government products. This division is chartered to develop analog and digital two-way radio, voice and data communications products and systems, Wireless LAN Securities and mobile computing, among others" (Motorola Solutions, n.d.).*

Motorola Solutions serves both enterprise and government customers with core markets in public safety government agencies and commercial enterprises. It is asserted as the world's market leader in two-way radio communication industry to-date.

Having over a proud 80 years of experience and an early presence in the global telecommunications market, Motorola Solutions offers businesses and investors the ability to tap into its resources and network to meet their financial needs (Motorola, n.d.). Over the years, Motorola Solutions have consistently leveraged on

technology for innovation in its products and services, as well as to enhance efficiency and build a competitive edge in the world (Motorola, n.d.). A host of awards from various regional and international organizations bear testimony to the company's commitment to excellence (Motorola, n.d.). Today, Fortune magazine has named Motorola Solutions to its prestigious list of "World's Most Admired Companies." (Motorola, n.d.). Motorola Solutions is ranked No. 3 in the industry category of Network and Other Communications Equipment (Motorola, n.d.). Motorola Solutions was also named to the Global 100 index of the world's most sustainable corporations, one of only 18 U.S. companies to earn a spot on the list earlier this year (Motorola, n.d.).

Working with global channel partner community, Motorola Solutions reaches an extensive customer base, from small businesses to Fortune 500 companies (Motorola, n.d.). Motorola Solutions has facilities and distribution channels worldwide: Canada, United States, Mexico, Brazil, United Kingdom, France, Spain, Germany, Italy, Poland, Israel, China, India, Russia, Japan, Taiwan, Malaysia, Singapore and Australia (Motorola, n.d.). **Motorola Solutions Malaysia (Penang) is the focus of the case study.**

3.2 Motorola Solutions Global Radio Product Market Position and Market Segment

Motorola Solutions offers a wide range of radio products to customers globally. Public Safety Radio System and Professional Commercial Radio are the critical product segments that generate revenue to the company. There are two product lines within Public Safety Radio System, which are meant to cater to the

high-tier market segment and one product line under Professional Commercial Radio that are targeted low-tier (low cost) market segment. With the intelligent mix of products, Motorola Solutions were able to penetrate into both high-tier and low-tier market segments for wider sales coverage.

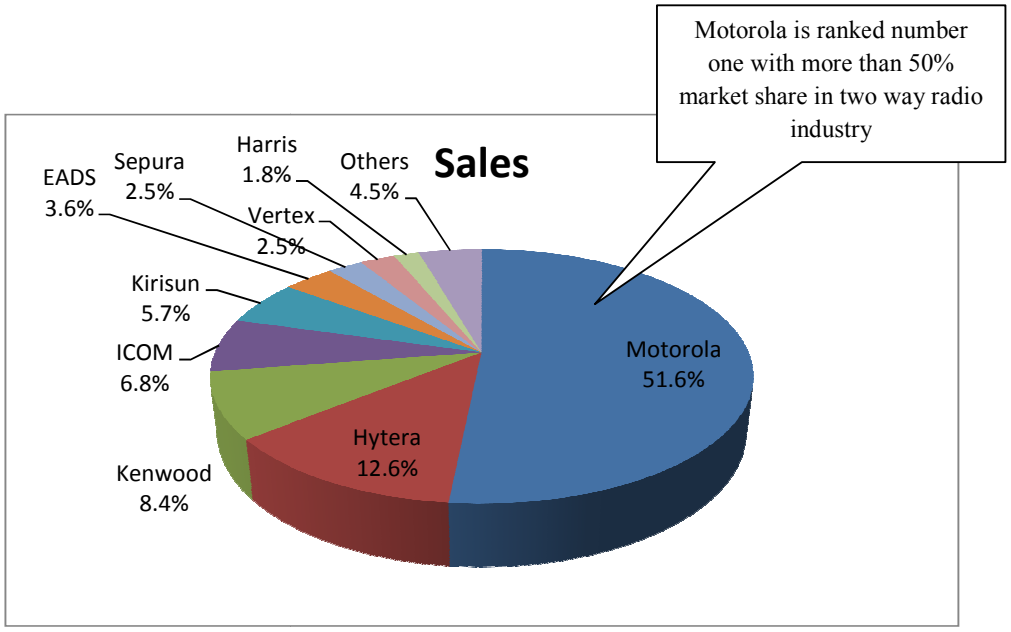
Public Safety Radio System product line:

1. **ASTRO Radios** that complies with the Association of Public-Safety Communications Officials Project 25 (APCO P25) standard
2. **TETRA Radio** that complies to the European Telecommunications Standards Institute (ETSI) Terrestrial Trunked Radio (TETRA) standard

Professional Commercial Radio product line:

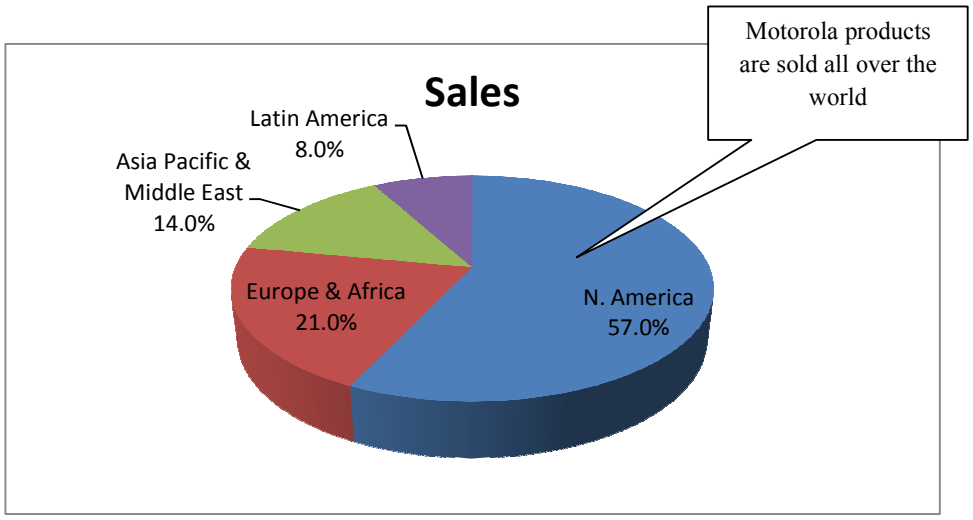
1**. Professional & Commercial (PCR) Radio** that complies with the Digital Mobile Radio (DMR) standard (the focus of this case study)

These radio products are primarily used in the Hospitality, Mining, Classified Communications, Military/Armed Force, Manufacturing and Transportation, Education and Utilities market segment, which cater for each niche market (Motorola, n.d.). For PCR radios in specific, they are mainly used in Hospitality, Education, Manufacturing, Transportation, Utilities and Retail Industries, especially to cater the low-tier market segment that are looking for high quality products with lower cost. **Figure 3.1** below illustrates that Motorola Solutions is the market leader in the two-way radio communications industry whereby it takes up 51.6% of the market share. The three product types from two major product lines stated above are the major contributor to the market share and are all in **Number One** position in their own market segment till to-date.



Source: Hoovers Web Site

Figure 3.1: Motorola Global Market Status



Source: Motorola Web Site-2013 Motorola Solutions Financial Analyst Meeting

Figure 3.2: Motorola Sales Breakdown by Region

Figure 3.2 indicates the product penetration by market segment around the world, which contributes to the high sales volume that contributes to Motorola Solution's revenue globally.