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受賞報告講演要旨

SCG Logistics Management Company Limited

TQM Practices of SCG Logistics Management Co., Ltd.

1. Introduction

1.1 Company Profile

Introduction to SCG Logistics Management (SCG-L)

SCG-L is a Third Party Logistics provider (3PL), offering total logistics solution both locally and internationally. Under the Siam Cement Group (SCG), one of the largest conglomerates in Thailand, SCG-L is a subsidiary of SCG Cement – Building Materials (CBM) under Domestic Market unit as shown in Figure 1-1.

Figure 1 - 1 SCG organization

Business Philosophy

SCG-L abides by SCG's four core values which are Adherence to Fairness, Dedication to Excellence, Belief in the Value of the Individual, and Concern for Social Responsibility. SCG-L also believes that business success could be sustained when all related stakeholders receive fair benefits. Hence, the Win-Win-Win-Win (Win4) concept has been SCG-L's key principle in order to balancing benefits to 1) customer, 2) end customer, 3) carrier, and 4) SCG Logistics which includes its employees and shareholders. The benefits of the stakeholders will be explained in Figure 1-4.

Business Model

SCG-L strives to create value for its customers and carriers. As shown in Figure 1-2, most of logistics asset are outsourced, the company selectively invests in and owns strategic assets that enhance its competitiveness and growth. For instance, the company handles over million shipments so Information Communication Technology (ICT) should be adopt to solve this complication and to enhance its efficiency and safety management.

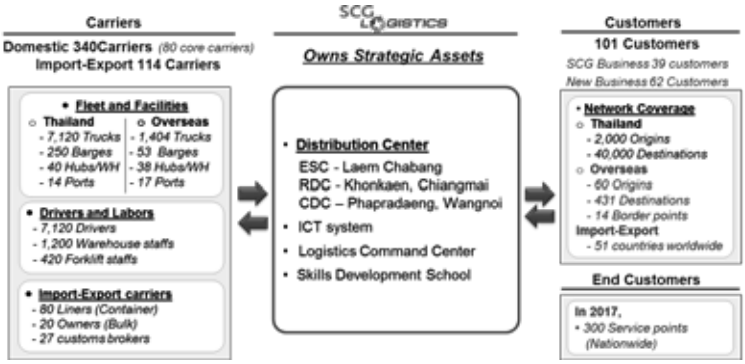


Figure 1 - 2 Business model of SCG-L

In recent years, SCG-L focuses more on external growth by joint venture with various partners to shorten time for market penetration into new business and territories.

1.2 Market and Customers

SCG-L's revenue was around 15,000 million baht in 2016, which 76% of it comes from SCG customers while 12% comes from overseas business. The market share value while accounted 31% if including new focused businesses.

In 2017, SCG-L expands its service scope from inland logistics and customs clearance services to freight procurement by merging with Import-Export division from SCG Trading and set a new function which is called International Logistics Service Division (ILSD) to enhance SCG-L's control in the supply chain. In addition, it expands its service to end-consumers (2C) by setting a joint venture company with the expert in home express delivery from Japan to capture the growth opportunity of e-commerce and omni-channel business.

1.3 Service Scope

In this highly competitive logistics market, impressively fulfill diversified and complicated needs throughout the customer supply chain is crucial for the company's success. In such situation, SCG-L stems its strategy, especially with next-day delivery service nationwide as well as expanding cross border service in AEC (ASEAN Economic Community) countries including international service. Hence, SCG-L's service category is reclassified into six platforms to better serve customers' requirements as shown in Figure 1-3.

Customers' Characteristics	Customers' Industry / Business Unit									
	SCG							Outside SCG		
	CBM (Export & Cross Border)	CBM (Bulk)	CBM (Bag & building mats)	Energy & Mineral	Packaging	Chemicals & Im-Ex	Retails & Ceramic	Food & Beverage	Automotive	Argiculture
Domestic Destination		Plant, Project site, Wholesaler, Retailer	Project site, Wholesaler, Retailer	Plant	Plant, Retailer	Plant	Plant, Wholesaler, Retailer	Plant, Wholesaler, Retailer	Plant, Wholesaler, Retailer	Plant
SKUs	Bulk, Bag- few BM - many	few	Bag - few BM - many	few	many	many	many	many	many	few
International market	Border trade				Border trade			Border trade	Border trade	Border trade
	Export			Import Export	Import Export	Import Export	Import			Export
Specific needs								Temperature control		

SERVICE PLATFORM: Bulk + Full truck load; Consolidate; Warehouse; Cross border; Import-Export; Cold chain

Figure 1 - 3 Customers' characteristics by industry, in relation to service platforms

1.4 Total Supply Chain Process

Figure 1-4 shows the conceptual diagram of the total supply chain process flow and Win4 for all stakeholders. The information flow begins with an order received from a customer being converted to shipments, planned and tendered to carriers before assigning them to trucks. The physical flow starts when a driver picks up shipments from the origin and delivers them through efficient transportation means.

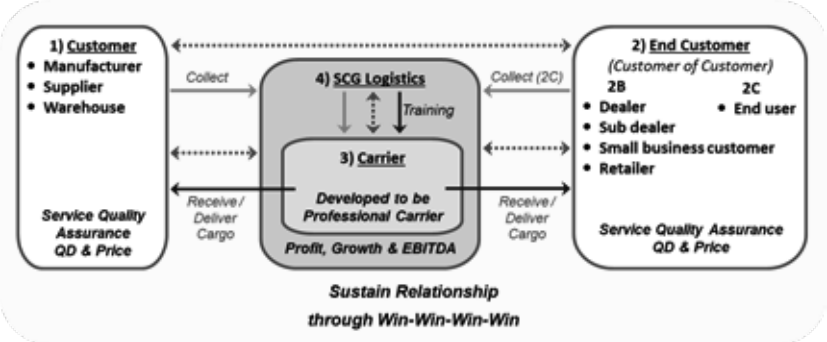


Figure 1 - 4 Conceptual total supply chain process flow for Win–Win-Win-Win (Win4)

Not only providing services for customer, recently SCG-L has focused more on services to end customer, including managing various origin points outside Thailand.

As our principle based on **Win4 concept**, SCG-L creates more "VALUE" by providing well-designed total supply chain services with whole chain visibility to fulfill customer needs and manage uncertainties including further improve service quality and efficiency for its customers. Together with doing a business with "TRANSPARENCY", SCG-L could succeed in building "TRUST" from the customers.

1.5 Salient Features of Our Business

There are many stakeholders involved in the total supply chain solution (order to cash) with each representing unique sets of requirements in terms of delivery, cost, speed, customer satisfaction, environment and safety.

Difficulty lies upon how to manage and balance all requirements and provide to serve all stakeholders. Figure 1-5 shows the detail of how SCG-L creates value to both customers and carriers.

Figure 1 - 5 Salient features of SCG-L

1.6 The Organization

The organization of SCG-L has been redesigned to accommodate customer's needs and ensure efficient operation and sustainable achievement of business goals. Cold Chain business was set up as SCG Nichirei Logistics company in 2013. In year 2016, International Logistics Service division was set up to extend its service to international freight management. In addition, in late 2016, SCG Express was set up for the small parcel home delivery service. The organization structure is as shown in Figure 1-6.

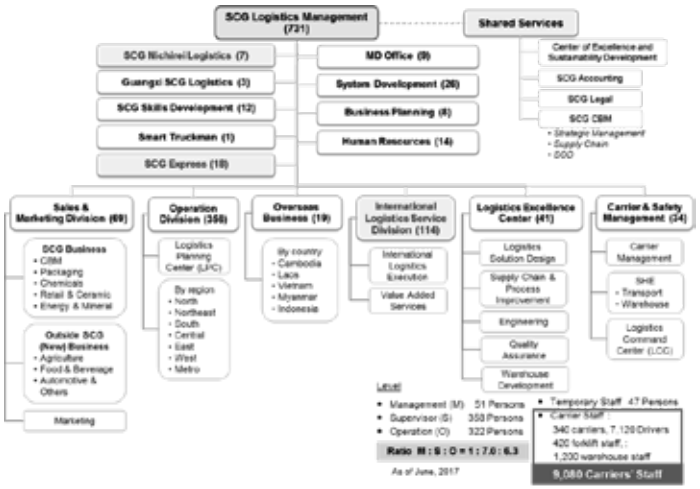


Figure 1 - 6 SCG-L's organization, as of June 2017

2. Business environment, business objective, business strategy and relationship among overall outcome.

2.1 Background: 2008 - 2013: Pursue Sustainable Growth

Situation and Business Environment

SCG-L had expanded its business to capture growth opportunities especially outside SCG customers, pushing SCG-L to face more diverse and sophisticated customers' demands. Aggressive business expansion of global 3PL players intensified the competition, especially in service quality aspect. These required SCG-L to pursue its business expansion and enhance its competitiveness by improving service level to global standard and increasing operational efficiency. Challenging the Deming Prize helped SCG-L to expedite its standard improvement.

The growth opportunity outside Thailand was convincing, especially for ASEAN Economic Community (AEC) which would start at the beginning of 2016. Business enterprises around the world were heading to ASEAN, including SCG. Hence, SCG-L had prepared its business in selected AEC countries so as to support SCG expansion plan.

Business Objectives: To become the dominant Third Party Logistics Provider (3PL) in focused businesses by growing more in its existing businesses and penetrating into new businesses including AEC countries. SCG-L expected to grow its revenue from 10,400 MB in 2008 to 15,000 MB in 2013.

Business Challenging Strategies:

(1) Domestic Market Expansion

Expanded services to new businesses (Agriculture, Food & Beverage, and Automotive segments) with value added services (Cold Chain). In the same time, managed operation for excellence to maintain existing customers.

(2) Overseas Market Development: Coping with ASEAN Economic Community (AEC) Challenges and Prospects

Infrastructure Strengthening Strategies:

The Win-Win-Win concept has been applied for balancing among 3 areas: Revenue growth and profit for SCG-L and carriers, Service quality for customers, and Safety & environment for community. The infrastructure strategies have been developed to increase "TRANSPARENCY" and ensure "TRUST" among different related parties within SCG-L's supply chain. The five major infrastructure strategies are Proactive Quality Assurance System, Carrier Management, Safety Management and Green logistics, Strategic ICT Management, and Human Resources Management.

In this period, SCG-L could achieve its business objective, 'to be dominant 3PL in focused businesses'. SCG-L could increase its share in existing industries and satisfy its strategic customers. Also, SCG-L successfully expanded to new businesses, especially in Overseas and expanded its network coverage throughout Thailand.

By the way, SCG-L increased its visibility for claim & complaint and accident, but still had to improve in terms of reducing recurrence claim cases and number of accidents to zero. Further, thanks to Deming Examination in 2013, SCG-L found rooms to improve in policy management. Firstly, the business objective and KPIs should be more specific to the situation in each period, such as the objective in this period should be 'to grow' and market share should be based on focused, not overall, market. Secondly, the policy deployment should be improved to ensure the alignment from the company level to the functional level and to each strategy.

2.2 2014 - 2015: Manage Uncertainties for Sustainable Growth

Situation and Business Environment

SCG-L had enjoyed its expansion till 2014 when the situation unexpected dramatically changed for demand, supply, and price viewpoints. The political turmoil continued with the coup in May 2014, caused economic slowdown. On the demand side, the GDP growth dropped from 7.7% to 0.9% in 2012 to 2014. However, the economic slowdown positively affected some industries; the automotive spare parts have grown since consumers delayed their new car purchase. In addition, demands outside Thailand stilled have a fortune. The import-export had grown 10% CAGR from 2011 to 2014. In preparation for the AEC timeline, many infrastructure improvement projects in these countries have planned and started. Private sectors eager to capture this new opportunity, including SCG, stimulus border trade to grow 11% cumulatively. SCG has done pre-marketing in the countries, required logistics support from SCG-L to distribute in these countries. Hence, SCG-L had focused more on building cross-border logistics network in preparation to the borderless AEC. On the supply side, the trucking and warehouse situation was shifted back to oversupply situation, pushed to more competition.

Not only demand decreased, the price declined as well. Diesel price reduced from 29.79 in January 2013 to 20.59 Baht per liter in December 2015. This fuel price change effected SCG-L's revenue around 10%. In addition, the fuel price structure has changed according to government policy: reduce the NGV price subsidy in late 2014. NGV price increased from 10.50 to 13.50 THB per kilogram at the end of 2015, and reached the level that the benefit comparing to using diesel was wiped out, from 8% saving to 42% more expensive. The customers urged for logistics cost reduction in relation to the change of diesel price, ignoring the increase in NGV price. In 2008, diesel price raised up to 31 Baht per liter, higher than NGV price around 73%. Since be promoted by the government, SCG-L invested in almost 1,000 NGV trucks which are 23% of total Fleet, mostly in bulk cement fleet. As a result, efficiency improvement became priority for SCG-L in order to maintain cost competitiveness for the customers and, at the same time, fair returns for the carriers. Flexibility had been considered so as to improve the efficiency such as multi-purpose trucks and cross-region fleet sharing.

The cement market was stagnant; its sales volume growth dropped from 10% in 2013 to minus 0.4% and minus 0.8% in 2014 and 2015 while expected 4% GDP growth in these period. In the first quarter of 2015, SCG Cement-Building Materials, accounting for more than 40% of SCG-L revenue, revised its annual business plan which is unusual practice for SCG as shown in Figure 2-1.

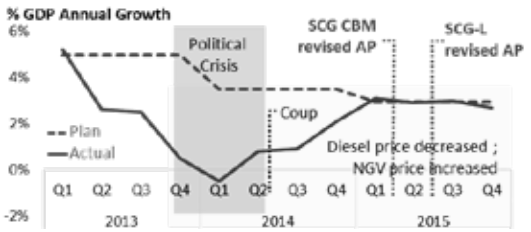


Figure 2 - 1 Situation Timeline in 2013 – 2015

Hence, in the second quarter of 2015, SCG-L had revised its strategy. In this DTQMP will show performance in this period based on the new strategies.

Business Objectives: 'To become the dominant 3PL provider' becomes vision of SCG-L. With the unexpected situations, SCG-L had to shift its focus from 'to grow' to 'business survival', starting in the third quarter of 2015. SCG-L aimed at growing its margin from 1,500 MB to 1,570 MB and its revenue to 17,000 MB, approximately, in 2015:

- To secure logistics share and profitability during unfavorable situations by managing operation excellence, and
- To capture growth opportunity by leveraging competency to develop platforms for new value added services and/or businesses as well as speeding up operations in CLMV (Cambodia, Laos, Myanmar, Vietnam) and Indonesia.

Business Challenging Strategies:

Expanding its share in stagnant market could lead to fierce price competition. Hence, in order to realize the 'to be dominant' objective, market protection strategy has been applied for its already-dominant markets. To maintain its competitiveness in the challenging logistics market situation and to overcome the challenge of the change in fuel price structure, causing 10% price reduction while 16% increase in costs of using NGV, the efficiency improvement became more important.

The growth engine, the business expansion, focused more on new territories, both business segments and geography. Therefore, SCG-L had developed new services and logistics solutions to create more values and attract new customers. The Overseas business had to handle and operate in many countries during the same time in response to SCG's Go Regional plan and the AEC timeline. (Figure 2-2)

(1) Leverage competencies from Thailand to serve strategic customers growth in CLMV and Indonesia

To serve SCG Go Regional strategy, SCG-L has expanded its network and services into these countries. Other strategic customers also expanded their bases. To ensure the success of the strategic customers' expansion, SCG-L would have to prepare logistics infrastructure and fleets and speed up the set up process by leveraging its competencies from Thailand into the targeted countries. In addition, SCG-L has created more logistics connectivity among these land-linked countries.

Though SCG has an aggressive expansion to CLMV and Indonesia, Thailand stills its home market. Not only operation efficiency but also service flexibility are emphasized to maintain its own and its strategic customers' competitiveness. For example, truck modification, from specific to general purpose, and fleet sharing across regions are applied.

Figure 2 - 2 Challenging strategies of SCG-L

(2) Develop high value-added services to capture high potential sectors

Develop new solutions, such as consolidation and import-export platform, to improve service quality and flexibility for existing customers to and attract new customers by utilizing and leveraging from the existing platform. Also, accelerate market penetration in Cold Chain business by providing high service quality.

Infrastructure Strengthening Strategies:

SCG-L insists the Win-Win-Win concept for business sustainability. Five major infrastructure strategies are applied to strengthen our business foundation for sustainable growth: Proactive Quality Assurance System, Holistic Fleet Management for Safety (Safety and Carrier Management), Strategic ICT Management, Proactive Human Resources Management, and Smart Driver Development.

In this period, profitability became key KPI instead of the revenue. SCG-L stilled be able to realize its business objective, 'to secure profitability': the revenue could not meet the target, but SCG-L still be able to manage the costs well resulted in net contribution. Also, SCG-L could partially realize its objective, 'to capture growth opportunity': it had successfully expanded its business in new territories: CLMV countries and Cold Chain business.

However, to realize the vision, SCG-L needed to speed up its expansion, especially when the environment became more uncertain. The higher portion of Student C, and most of them came from the domestics expansion strategy, reflected that we could not respond to the unexpected situation. Also, we need to shorten the PDCA cycle together with improvement in the use of Four Student Model (FSM) for better respond to the unexpected situation as commented in The Deming Examination report in 2013.

2.3 2016 onwards: Speed Up to Capture Growth Opportunity

Situation and Business Environment

2016 was another tough year for our customers, the lowest growth, 2%, in past 4 years, for construction materials industry and food and beverage industry. The forecast for 2017 is that Thai economy would still be stagnant while energy price would be in upward trend. Contradictory with sluggish demand, the supply has already increased, causing fierce competition in the cement and construction material industry. SCG-L adopts holistic management so as to avoid cost competition. Logistics cost efficiency, service quality, and total chain visibility, no matter domestic or international transactions, are crucial to SCG-L in order to enhance the existing customers' competitiveness and attract new customers. The end-to-end international logistics service has been developed.

New logistics demands are more vivid. High Internet and mobile penetration, 56% and more-than 100% consecutively, stimulates high e-commerce growth in Thailand; e-commerce has grown at least 15% in 2016 and would continue in 2017. Almost everything, ranging from fashions, cosmetics, electronics, name-branded products, or even foods, is traded on e-commerce and m-commerce (mobile commerce). The borderless e-commerce requires end-to-end domestic delivery and import/export service for smaller order lot size. Speed and traceability becomes more common to e- and m- commerce users. Altogether open a room for SCG-L to deliver value-added logistics services in last mile delivery. Many e-commerce companies and 3PL players, ranging from a big international company to a local player to a new startup, such as Alibaba and Lazada as marketplaces, and ThailandPost, Kerry, and Lalamove as providers jump into and compete for this new opportunity. Though, the services provided are still not satisfied the users. SCG-L is

speeding up the service development to penetrate the market. Different logistics capabilities, technologies, and skills of people are required to answer needs of the e-commerce.

2016 is the start of the formal establishment of the AEC, trades among AEC countries become more borderless. Many private companies have already established their bases in these countries. For example, Thailand's SET 100 companies have more than 130 business bases in surrounding Mekong countries; SCG Cement has officially started its cement production in Lao at the beginning of 2017. International 3PLs such as DHL also have their operations in these countries. Although the AEC is announced to be single market, law and regulations for setting up a logistics company in some AEC countries remain not open for foreign companies. These require SCG-L to expedite its expansion in CLMV and Indonesia in order to be able to serve SCG in-time and to be not missed the new growth opportunity. Further, SCG-L needs to redesign its logistics model so as to ensure its competitiveness in the borderless AEC logistics market.

According to The TQM Diagnosis report in 2016, the quick PDCA is crucial in order to be able to respond with the hard-to-predict, quickly changed market situation. Starting in 2017, SCG-L improves the Check and Act process by scheduling the gap monitoring and the action-to-fill-gap follow up and the strategy revision if needed in the management meeting.

Business Objectives: While securing the logistics share and profitability during unfavorable domestic situation, the objective is 'to accelerate the growth' to roughly 30,000 MB of revenue and 4,200 MB of contribution in 2021 by

- Expanding into new high value-added services and CLMV and Indonesia, and
- Securing existing businesses by operation excellence

Business Challenging Strategies:

SCG-L continues in its strategies with more focus on the overseas expansion and introduction of high value added and new services covering more activities in supply chain. Flexibility, in addition to efficiency, is required in order to increase its competitiveness and to raise ability to handle uncertainty in the future. To be able to do so, SCG-L would enhance collaboration with its stakeholders from management to operator level and seamless management system from SCG-L to its carriers to its drivers, equipped with ICT and QA system, aiming to higher customer satisfaction. In 2017, SCG-L has reviewed its strategies to be emphasized more on cost efficiency.

(1) Develop high value-added services to capture high potential sectors

Develop new value-created solutions, based on extracted customers' latent and attractive needs, to improve service quality and flexibility through value chain in both B (business) and C (end-consumer) customers, by leveraging from the existing service platform.

(2) Leverage competencies to serve SCG and strategic customers' growth

Emphasize on more operation efficiency and service flexibility to create competitiveness in Thailand during dynamic, uncertain situation. Further, expedite existing competencies to proactively develop logistics network and partnership in CLMV and Indonesia to strengthen customers trust. In addition, provide end-to-end international logistics services to create total supply chain competitiveness for our strategic customers.

(3) Proactive Human Resource for new business

Prepare manpower needed different skills and management scheme from the existing for new business and high value-added service within limited time frame.

Infrastructure Strengthening Strategies:

SCG-L insists the Win-Win-Win concept for business sustainability. Since SCG-L would extend its services to C customers, the concept becomes Win-Win-Win-Win. There are five infrastructure strategies as follows;

(1) Proactive Quality Assurance System

Integrate various ISO standards and apply QC Tools to create in-process control, aiming at reducing recurrent claim and building customers' satisfaction.

(2) Holistic Fleet Management for Safety

Integrate operation's daily management, fleet monitoring and management, and carrier development, together with ICT, so as to increase visibility for safety management.

(3) Strategic ICT Management

Develop data visualization, at the same time with more common, user-friendly ICT system, to enhance further operation and service improvement.

(4) Workforce Readiness for Overseas Business Expansion

Develop recruitment and employee development scheme that fit with jobs and culture of each country to ensure enough workforce for business expansion.

(5) Smart Driver Development

Initiate trainings and promotions to make drivers, its important assets, proud in this job, not only reduce its costs of training and recruitment but also increase quality of service and safety.

In order to realize the achievement of its business objectives, three major areas are emphasized as followed:

- Market share: in focused industries
- Coverage of logistics network: in Thailand and focused countries
- Level of customer satisfaction: of strategic customers in Thailand and focused countries.

3. How does TQM utilized when practicing business strategy

3.1 Development of TQM Framework at SCG-L

SCG-L has been striving for achieving its business objective "To become the Dominant Third Party Logistics Provider in focused Businesses and in CLMV and Indonesia" by aiming to offer service excellence through continually improve the quality of service while increasing customer and stakeholder satisfaction. Since 2016, the Win4 concept has been SCG-L's key principle in order to balancing benefit to customers, end customers, suppliers/carriers, and SCG-L which includes its employees and shareholders. To realize the business objective, since 2008, SCG-L has adopted "Dr.Kano's House of TQM", to frame and develop TQM implementation by aligning with the company's operations and business direction. SCG-L's House of TQM has been shown in Figure 3-1.

**Remark: CoPs is the same concept as QCC*

Figure 3 - 1 SCG-L's House of TQM

Under strong commitment of top management, TQM has played an important role as a solid foundation not only to strengthen **business effectiveness and efficiency** but also to foster **customer responsiveness** by building consistent Working processes to capture and fulfill "customer needs" with differentiated and/or attractive quality. Consequently, although under many uncertainties, SCG-L had achieved in business objectives. Both Domestic and oversea sales volume were successfully increased in accordance with the strategic plans.

3.2 TQM Promotional Activities

TQM Promotional activities have been set to align with SCG-L's business directions and strategies to promote working TQMly culture at company-wide level. WAOT have been deployed from top-down policy, organized on monthly basis to execute and review PM performance especially on Collaboration project in each BU. CoPs are the bottom-up activities, organized on monthly basis for shop-floor employees to systematically solve problem in daily work. Suggestions, started in March 2016, are the new bottom-up activities for employees to share idea of work improvements in terms of QCDSME. TQM concepts and tools and statistical training courses including rewards and recognitions are also provided.

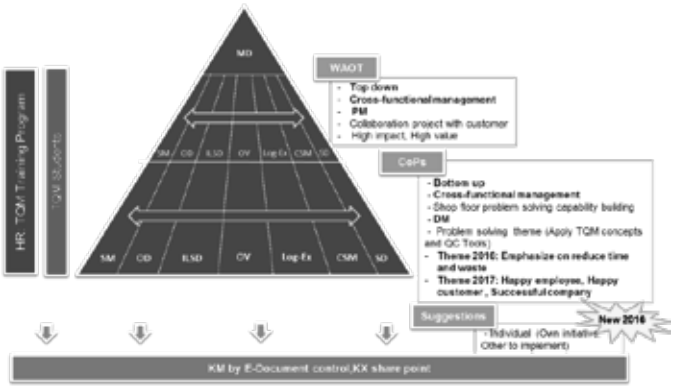


Figure 3 - 2 SCG-L's TQM Promotional Activities

The progress of TQM promotional activities have been periodically updated and reported to SCG-L's top managements to track TQM implementation status and progression. All knowledge and practices of TQM implementation will be systematically managed and categorized in KM system.

(1) Cross-Functional Policy Management: WAOT

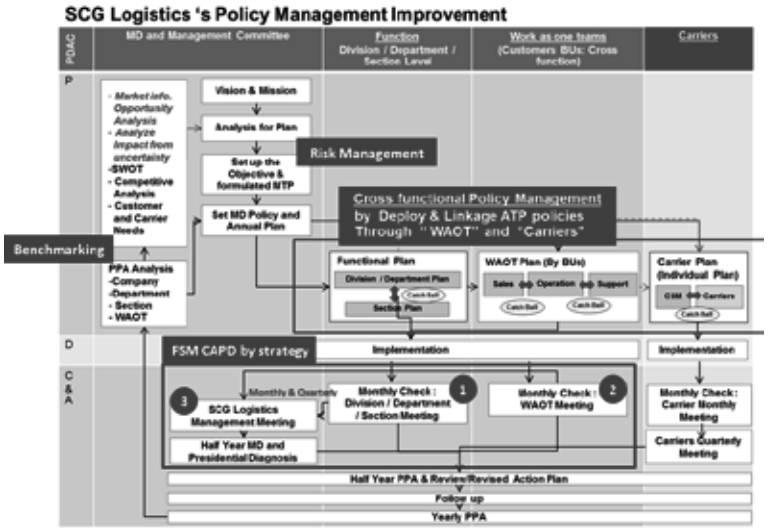


Figure 3 - 3 SCG-L's Policy Management Mechanism

To serve business objectives and strategies as shown in Figure 3-3, SCG-L has utilized strategic formulation process which is one of TQM approach. Moreover, the TQM Diagnosis report in 2016 suggested SCG-L to strengthen Check function and visualization of the PDCA cycle in each management system. Therefore, SCG-L has rearranged KPIs for policy management from "Functional KPI" to "Strategic KPI". Furthermore, quick Four Student Model (FSM) CAPD process and recovery plan were included in agenda of management meeting so as to quickly fulfill business gap by monthly and revise some strategies in case of changing situation by quarterly. In addition, each WAOT will play an important role as a preparation meeting in order to summarize key issues before the date of management meeting.

A key success factor of cross-functional management is the matrix organization called Work As One Team (WAOT) since various opportunities could be generated from this meeting. In 2016, thus, SCG-L has strengthened cross-functional WAOT by developing a new team for new service platform such as Cross border service and Consolidation service. These new teams are strategic WAOT which the objectives are to capture new opportunities from new markets and to strengthen service platform. This activity will ensure that WAOT can enhance the achievement of Business target as the comment from The TQM Diagnosis report in 2016.

① Strategic WAOT: Consolidate Platform (Co-develop new HVA of consolidation service: Super Store)

SCG-L formulated WAOT Consolidation to improve operation performance and to speed up the responsiveness on customer needs. Super Store Delivery is one of high potential sector in consolidate segment (Figure 3-4). This service has been developed by WAOT members from various functions including Sales & Marketing, Operation, System Development, and other support functions.

Figure 3-4 Delivery process of Super Store Service

First of all, WAOT studied difficulties and constraints in this unfamiliar segment and they found that there were three special characteristics including several drops per shipment, fixed unloading time at super store, and far distance between unloading dock and unloading area. After sharing these constraints, WAOT member collaborated to find the appropriate practices for Super Store Delivery Service as follows;

- Logistics Solution Design and Sales applied QFD for translating customers' needs to service specification.
- Operation team applied Genba concept to observe the real location at operating site.
- Engineering developed innovation MHE to protect product damage and reduce handling time by applied Genbutsu concept
- Quality Assurance created manual for drivers to visualize and assure the quality following as FMEA which came from discussion in WAOT meeting.

In conclusion, we were able to create Super Store Delivery Service which complies with customers' requirements because of the effort of collaboration in WAOT. Furthermore, the most critical factor is leader's mindset which creates on common goal and motivates all members to realize the objective of team.

(2) Daily Management: Proactive Daily Management

The challenge of SCGL's Daily Management is to properly manage all interrelated factors both on demand and supply sides to ensure service quality as well as drivers' safety. On the demand side, our customers have differences in business nature, requirements and SLAs. On the supply side, SCG-L has many functions in different geographical locations all over the country with 380 carriers and 8,000 drivers. Moreover, by utilizing ICT System, In-Process KPIs, E-document control, operation visibility and driver safety can be real time managed.

(3) Employee Initiative Activities: CoPs and Suggestion

① **CoPs** are the key activities created by group of employees, in same or cross-functional departments, to actively solve problems in daily work by following Problem Solving or Task Achieving theme. The vital objective of CoPs is to build problem solving capability and to embed automatically self-maintenance mindset to shop-floor employees.

Since 2008, SCG-L has had 457 CoPs projects. Moreover, SCG-L has expanded the scope of participants from SCG-L employees to carriers and smart driver groups since 2016. CoPs of carriers and smart drivers group are also related to safety policy and 5S. According to the comment from The TQM diagnosis report in 2016, CoPs activities have no mechanism for measuring the standard of QC Perspectives and Thinking, or the level of understanding of QC techniques and the ability to apply them. It would be desirable to conduct a multidimensional evaluation that encompasses these perspectives. Therefore, SCG-L has introduced "QC Level Assessment Tool", originated from QC Circle level for leader by Toyota Group, which is shown in Figure 3-5 to evaluate both QC capability and Workplace atmosphere of CoPs members.

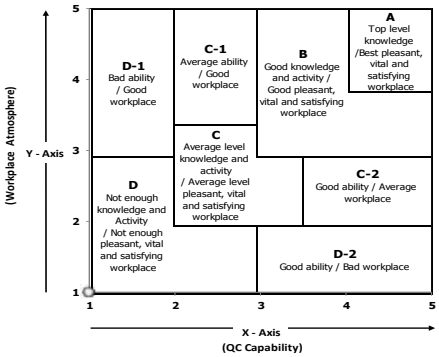


Figure 3 - 5 The QC level assessment tool

CoPs Delivery Management System (DMS)

CoPs DMS is a winner from SCG-L CoPs contest. Members of this CoPs found that KPIs in consolidate delivery process did not achieve the target due to error in delivery process including missed place and missed product. Thus, related parties decided to improve service quality by developing Delivery Management System (DMS) to increase visibility in delivery process, in order to improve on-time and delivery error performance. Development process of DMS has been started from needs and pains which were translated to program features. Moreover, they applied TQM concepts and tools in each step of project development such as Poka-Yoke, Evaluation Table, and FMEA, in order to ensure that this program can be executed smoothly.

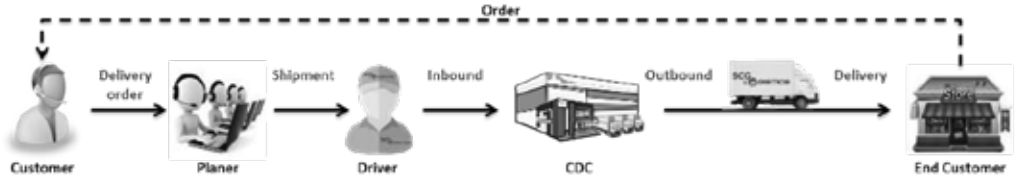


Figure 3-6 Delivery process of consolidate service

Most problems in delivery process (Figure 3-6) can be solved by DMS. Firstly, drivers can receive Job Alert and Information of shipment via smart phone. Secondly, drivers can use GPS data replaced of paper map to confirm location. Thirdly, validity of product can be checked via picture and barcode. Lastly, we use DMS system to track delivery status replace of phone call in order to reduce the accident. After developing DMS system by CoPs, the results in terms of missed place and missed product have been improved. This project can be completed because of collaboration and technical skills integration together with same goal mindset.

② **Suggestion** is also the key bottom-up activities initiated by employees. The main objective of suggestion is to improve work efficiency and work environment in terms of QCDSME and to enhance employee creativity. In 2016, the suggestion system has been officially developed and promoted company-wide. There are 768 incoming suggestions in 2016. Suggestion system has been considered CAPD cycle to encourage the implementation of suggestion by revising the mechanism to follow the implementation stage and result as shown in Figure 3-7.

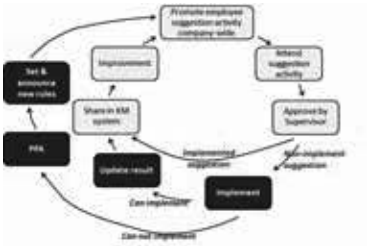


Figure 3 - 7 The mechanism of Suggestion

(4) TQM Capability Building

SCG-L's employees are systematically enrolled through various levels of TQM knowledge and training from fundamental to advanced TQM programs with cooperation with SCG TQM Promotion Office; CQD, along their job levels and job functions such as TQM Concept for new staffs, TQM Tools for Operational and Supervisor staffs, TQM advanced courses (QFD, FMEA and Statistical tools) are also provided to TQM Student program designed to embed specific TQM knowledge with selecting business projects which are related to Action Plan through 70:20:10 learning method. Moreover, since 2007, SCG-L has been sending Top Management staffs to attend TQM Executives course organized by JUSE while SCG-L staffs have been encouraged to attend well-known regional quality seminars organized by HIDA (former AOTS) and international conference such as IAQ, ICQ to present and share success stories.

Table 3 - 1 Training SQC by Project approach each Division/Department

Module		Operation	S&M	LogEx	CSM	ICT	HR	ILSD	OV	Skill	Nichirei
Define Problem	Project Selection	/	/	/	/	/	/	/	/	/	/
Observation	Basic Statistical	/	/	/	/	/	/	/	/	/	/
	Process flow analysis	/	/	/	/	/	/	/	/	/	/
	Process Capability	/		/	/	/	/	/	/		/
	MSA	/		/					/		/
	New 7Tools	/	/	/	/	/	/	/	/	/	/
Analysis	Graphical Chart	/	/	/	/	/	/	/	/	/	/
	Why-why Analysis	/	/	/	/	/	/	/	/	/	/
	C&E Diagram	/	/	/	/	/	/	/	/	/	/
	QFD		/	/		/					
	FMEA	/		/	/	/			/		/
	Hypothesis	/	/	/	/	/	/		/	/	/
	ANOVA	/	/	/	/	/	/		/		/
	Regression	/		/					/		
	DOE		/	/							
	AQC		/	/					/		/
	FTA		/	/	/	/	/				
Standardize	Control chart	/	/	/	/	/	/	/			
	Management System work flow	/	/	/	/	/	/	/			

Referring to the comment in The TQM Diagnosis report in 2016, SCG-L should consider the variation-based analysis by means of data stratification and further use of SQC techniques. As a result, the SCG-L's MD and Top management encouraged employee to analyze the hidden needs of customers, to create attractive qualities that make service differentiation and also to focus on the service quality improvement by using statistical tools. Consequently, TQM training course is added essential tools such as SQC, AQC, QFD, FMEA to the curriculum. During Jan-Feb, 2017, 110 employees attended the special 7-Day SQC Project approach classes which were organized by CQD as shown in Table 3-1. From TQM capability building, SCG-L can create 27 projects applied TQM tools which lead to huge cost saving. Furthermore, SCG-L can develop TQM experts for each subject such as AQC, SQC, QFD, etc.

4. Characteristics (appealing point) of the TQM that is being practiced

4.1 Develop High Value-added Services to Capture High Potential Sectors

(1) Background

Before 2013, SCG-L initially provided to SCG customer with only two types of consolidation services; Window delivery (fixed schedule delivery) and Transport Ok (low-cost lead time delivery) but SCG-L successfully expanded its network coverage throughout Thailand.

Figure 4.1 - 1 Full Truck Load Model (Until 2013)

Figure 4.1 - 2 Consolidation Model

Unfortunately; among non-SCG customers; the severe competition in Full Truck Load (Figure 4.1-1) market led to the aggressive price competition, hence, SCG-L had to find new opportunities in other business areas.

Consequently, SCG-L had developed new logistics solution; especially in consolidation (Figure 4.1-2) segment as its low utilization; to create more values to attract new customers.

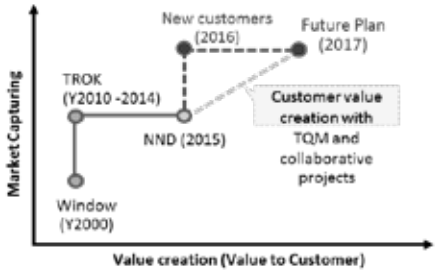


Figure 4.1 - 3 Consolidation Development

Consolidation Development :-

a.) Beginning stage of consolidation (Figure 4.1-3)

- The consolidate model was set up in 2000; fixed schedule delivery called 'Window service'; SCG-L tried to acquire new customers for incremental revenues, then developed existing model for competitive cost service called 'Transport OK'; through shorter lead time; but they did not cover nationwide.
- The captive market encouraged SCG-L to develop high value-added service to compete in the market.

b.) Explore new consolidation: Nationwide Next Day Delivery (NDD)

- According to situation changes, there are high opportunities in consolidation market
- Proceed synergy value creation and market capturing

To do so, key challenges for SCG-L stated as follow:-

1. How do we extract latent needs of strategic customers and create attractive value for logistics solutions.
2. How do we capture market through managing logistics operation in complexity and services/ product variety.

(2) Focused Activities

Finally, the strategic objective was set as "Value creation in Consolidation Segment"

Table 4.1 - 1 Consolidation Development

Problems / Concerns	Focused Activity
1. How to delight strategic customers by creating high value-added service for consolidation chain 2. How to enhance SCG-L capability in high value-added services development (HVA)	1. Enhance market-in approach by customer value creation and market capturing 2. Strengthen new service development system to create high value-added services.

(3) Application Case: Apply Task Achieving to develop Next Day Delivery Platform for "Customer A" Chain

Background

During year 2014 to 2015, SCG-L had applied Quality Function Deployment (QFD) to translate the voice of customer to create new service platform called Nationwide Next Day Delivery (NND). This platform covered entirely "Customer A" destinations in Thailand. SCG-L and Customer A had achieved the project objective; SCG-L succeeded in the new consolidation platform, "Customer A" responded authorized dealer requirements and fulfilled farmer needs. As a result, total logistics cost was decreased from 8.21% to 7.54%, which was affected from inventory cost and admin cost reduction.

① Step 1: Understanding the MD's policies

To create more high value-added services, SCG-L not only offers the NND service, but also focuses on improvement of asset utilization resulting in ***reduction of customers' total supply chain cost***. Regarding the aforementioned target group in automotive industry, SCG-L realized an opportunity in "Customer A" including expansion in lubricant segment and also extension to other segments for which the NND platform can be utilized. The reasons for such successive acquisitions came mainly from an ability to overcome customer's difficulties in their existing operations and can be summarized as follows:

- Effective solution for wrong product and wrong location delivery
- Shorten customer acquisition process using the AIDA steps
- Support to customer's logistics reliability

② Step 2: Set up task - Develop Next Day Delivery Platform for "Customer A" Chain

The first potential segment targeted by SCG-L was lubricant to which applied the direct distribution model. This target setup was certainly ***aligned to Customer A's strategy*** of relocating its chemical and hazardous products to a new storage location. SCG-L identified key challenges and difficulties needed to be addressed as below:

a. Capability of NND service with ***nationwide network coverage*** – to serve Customer A's dealers all over country with Just-In-Time (JIT).

b. ***High standard logistics requirement*** in terms of On-Time-In-Full (OTIF) - Answering by *on-time delivery*, zero accident and nearly perfect service level with accurate shipping (*via ICT solution*), minimal damage, and ***above average customer satisfaction rating*** *(both overall logistics and*

Table 4.1 - 2 Task & target for Customer A

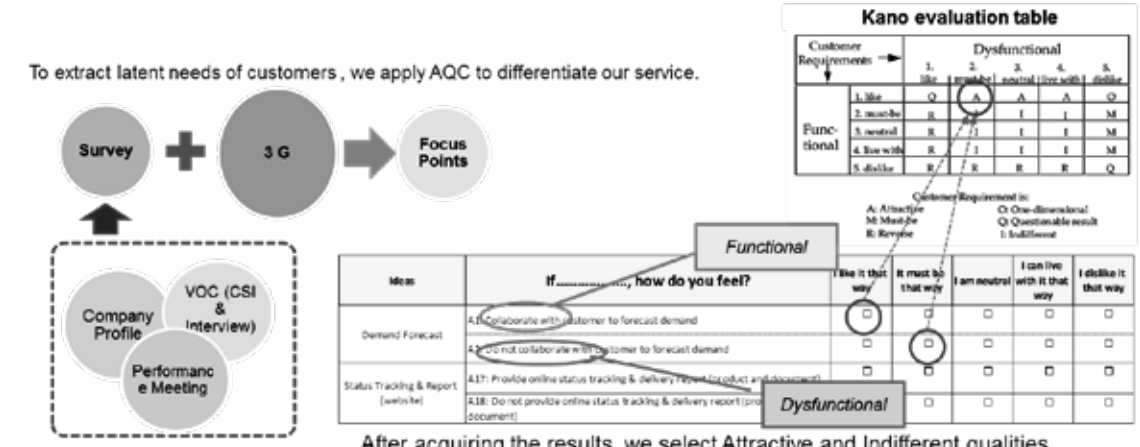
Task	Actual Year 2016	Plan Year 2017
High Value Added (HVA-NND service)		
1. Coverage Area	98%	90%
2. On-time delivery	99%	100%
Customer Satisfaction Index (CSI)		
3. Overall Logistics performance	81%	90%
4. Driver performance	76%	85%
Revenue		
5. Revenue	19 MB	35 MB

driver performance). As a result, two primary tasks and their targets had been setup in order to approach Customer A's chain in terms of ***HVA and CSI*** as shown in table 4.1-2.

c. Lastly, efficient facility for consolidated shipment could be latent need for "Customer A".

③ Step 3: Develop alternatives to perform the task

To penetrate into "Customer A" chain, SCG-L concentrates on developing HVA services and achieving superior customer satisfaction rate. Thus, the Attractive Quality Creation (AQC) methodology has been utilized in order to extract latent needs of customers.



Ideas	A	O	M	I	R	Q	Max score	Category from max score	Extent of satisfaction	Extent of dissatisfaction
Warehouse Management (stock keeping & safety awareness)	4	0	0	0	0	0	4	A	1.00	-
Status Tracking & Report (website)	4	0	0	0	0	0	4	A	1.00	-
Specific Delivery Time	2	2	0	0	0	0	2	A	1.00	- 0.50
Demand Forecast	1	1	0	2	0	0	2	I	0.50	- 0.25
Electronic Scan and Sign Document	1	0	0	3	0	0	3	I	0.25	-

Attractive Quality	Solution
1.Order to cash visibility and tracking	1. New ICT consolidation platform
2.On request time to delivery & safety prevention	2.1 Re-design Next Day to specific delivery time 2.2 New CS system & Smart Driver Program

Figure 4.1-4 How to apply AQC for creating customer value

The results consisted of two (M), four (A), and eight (I) qualities. First, SCG-L concentrated on answering the two must-be qualities (M), namely Material handling & safety equipment, and Confirmation after delivery, since they might cause customers dissatisfaction. Secondly, the first attractive quality (A) that SCG-L focused was Proposal responsiveness because SCG-L usually has standard model and pricing for proposing customer within a week. Thirdly, SCG-L concentrated on the other three attractive, Warehouse management (stock keeping & safety awareness), Specific delivery time (morning/afternoon), and Website for status tracking and delivery report which be answered by operation and ICT development.

SCG-L did not consider only the outcome of questionnaire but also the observation and the executive meeting. SCG-L perceived that "Customer A" seriously concerned over safety so the Proactive safety was included in a solution. SCG-L has also initiated the CoPs smart driver hosted by Carrier Management Team. The CoPs objective is to develop drivers to be smart driver in order to serve customers' needs and increase customer satisfaction index.

As aforementioned, some requirements were responded quickly by improving operation process while some required ICT development separated into three stages. Only the 1st stage and Status tracking & report (Partial of 2nd stage) are mentioned in this chapter. In stage 1, SCG-L achieved quick win of Warehouse management particularly in safety awareness, Electronic scan and signed document, Missed shipping and Customer satisfaction index. POD was developed to prevent missed-shipping. These can answer the indifferent quality (I), Electronic Scan and signed document, by adding some functions into POD Handheld.

④ Step 4: Explore a successful scenario for the focused alternative & ⑤ Step 5: Implementation of the Scenario

Electronic scan & signed document and Missed-shipping: SCG-L had developed ICT system with multifunction, POD Handheld, to increase the delivery accuracy. The key difficulties of preventing missed-shipping were the resembled branch name, product name, and font color. These might cause drivers' confusion in distinguishing the location and product. To select system, SCG-L compared three technologies namely GPS, RFID, and mobile technology (Figure 4.1-5).

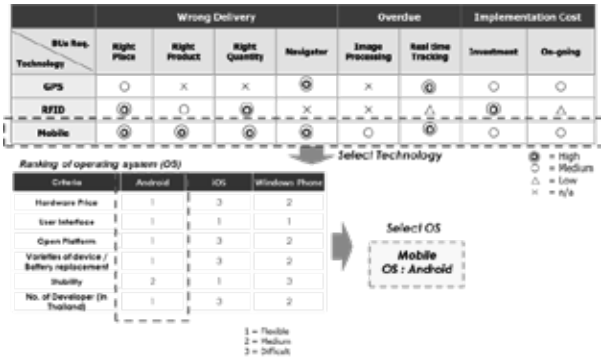


Figure 4.1 - 5 Alternatives of selecting ICT equipment

The criteria were Missed shipping, Overdue, and Implementation cost. As a result, the mobile technology was the best option. Then, SCG-L chose Android OS from comparing among other OS. Consequently, POD Handheld was launched in primary areas i.e. Bangkok and vicinity. Moreover, before implementing POD, FMEA was assessed to prevent the failure that may occur (Figure 4.1-6).

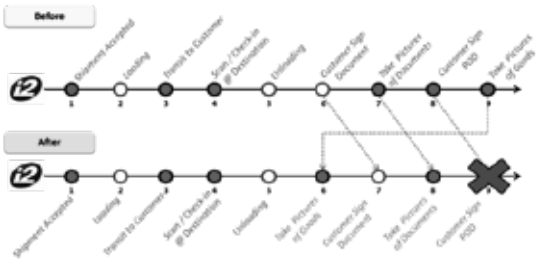
Failure Mode	Severity	Occurrence	Detectability	RPN	Effect	Action
Input data not updated by user	6	4	2	48	Reduce system usability	Communicate with user to input data
Network infrastructure failure	6	1	6	36	Failed to serve customer	Utilized more than 99.8 SLA services, offline data
Security vulnarability	6	5	3	90	Disturb SCG operation	Implement secure connection
Temporary disconnection	5	3	1	15	No data for a period	Offline data update

Figure 4.1 - 6 Failure Mode Effect Analysis(FMEA) for POD

After POD Handheld had been implemented for "Customer A" in Bangkok and vicinity, SCG-L realized that there were three difficulties, and the solutions to answer those difficulties are listed below:

Table 4.1 - 3 Difficulties and Solutions

Difficulties	Solutions
1. Internet instability	1. Changed both network and provider from 3G to 4G and from AIS to Truemove
2. Program error	2. Fixed bug program
3. Unpractical Process	3. Rearranged taking pictures process and eliminated signing document on handheld



POD Handheld (Phase I)	Delivery Management System (DMS Phase II)
Android Phone	Android Phone
- Navigation	- Navigation
- Check in using scan barcode	- Check in using GPS or bar code
- Take and store Product/product Photo	- Take and store Product/product Photo
- Electronic Signature	- Electronic Signature
- Online mode	- Offline mode Enable
	Web based control
	- Job Managemnt
	- Shipment and Truck Monitoring

Figure 4.1 - 7 POD Handheld Implementation and Function of POD Handheld and DMS

After problems were solved through CAPD cycle, SCG-L could perform flawlessly (zero missed-shipping). Therefore, SCG-L aimed to expand POD Handheld in eastern and western region. However, SCG-L found that some drivers still did not use POD Handheld because of the Internet instability which might cause missed shipping. ICT and Operation decided to enhance the functions into Phase II which eventually named "Delivery management system (DMS)" (Figure 4.1-7).

Warehouse management (stock keeping & safety awareness) & Customer satisfaction index (CSI): Customer B had no sufficient storage area which SCG-L could offer its warehouse for stocking popular SKUs at Central Distribution Center (CDC Wangnoi). With the serious concern of Customer A, SCG-L also vigorously provided proactive safety in warehouse to prevent an emergency accident and invested in system named "CSI" to monitor satisfaction on a monthly basis.

Status tracking & report: SCG-L consecutively develops ICT systems (i.e. data visibility as shown in Figure 4.1-8) to ensure the service quality and create value added from which the daily performance could be demonstrated on the website. The performance could be shown per shipment and indicate the KPIs at each node of transportation.

Figure 4.1 - 8 Data visibility

⑥ Step 6: Confirm the effects

In respect of creating ***HVA***, SCG-L currently offers NND service (100% nationwide network coverage), POD Handheld (55% coverage with ***zero missed-shipping***), inventory management, and further attractive solution, for customers in "Customer A" chain. Consequently, NND price per box in "Customer A chain" is higher. Moreover, SCG-L can reach 100% on-time delivery.

Moreover, as logistics provider (LSP), SCG-L has a chance to attend the Customer A's supplier monthly meeting. This is an opportunity to confirm the effects and also the feedback of the service satisfaction benchmark against the other logistics providers in terms of CSI: overall logistics service performance better than competitor as shown in figure 4.1-9. Moreover, all KPIs especially revenue have been achieved as target.

Figure 4.1 - 9 CSI effect in terms of Overall logistics service performance

⑦ Step 7: Transfer to daily operation

Transfer the implementation to the operation standards and rotate SDCA cycle as Daily management. SCG-L takes AQC into account to create value for customers. After acquired latent needs, VOCs, Customer A's feedback, and CSI survey result, SCG-L has set up a work instruction along with Customer A's practice and standardization including driver uniform and working steps.

Together with the standardization, SCG-L also continually monitors daily operation following the standardized work instruction and ensures the service quality, SCG-L delivery to customers in "Customer A" chain.

⑧ Step 8: Future Plan

Currently, the NND platform offered to "Customer A" has been standardized and routinely practiced by SCG-L. The next steps for SCG-L can be illustrated as follows:

- Develop "Safety Smart Logistics Solution" regarding the AQC outcomes
- Apply AQC system in new solution to penetrate into Customer A's cross-border and to be a single logistics provider in segments of lubricant, chemical, and hazardous products.

4.2 Leverage competencies to serve SCG and strategic customers' growth

(1) Background

To serve SCG's rapid business expansion in ASEAN, ***SCG-L has expanded logistics business not only in Thailand but also in AEC market,*** focusing on CLMV countries (Cambodia, Laos, Myanmar, Vietnam), and Indonesia, which are the high growth markets for SCG business and strategic customers.

Besides SCG, our strategic customers in Thailand also have expanded their business into CLMV countries in terms of set up localize factory or export products from Thailand to capture new opportunity from AEC market.

Referring to comments in The Deming Examination Report in 2013, SCG-L has formulating strategy not only SCG customers but also including the expected revenue from expanding logistics services to strategic customers in Thailand and new outside-SCG customers by offering total logistics solution and enhancing value proposition into customer's supply chain to ensure sustainable continuity towards our stakeholders with win-win-win-win concept.

(2) Situation and Development of SCG-L business expansion

① 2014-2015: To leverage SCG-L competencies from Thailand to serve strategic customers growth in CLMV and Indonesia

Table 4.2 - 1 Situations in Thailand, Overseas and SCG-L direction (2014-2015)

	Situations	SCG-L Direction
Thailand	Political instability has totally turned the domestic market into severe unfavorable situation. As a result, SCG and strategic customers required SCG-L to gain more cost competitive and flexibility to serve uncertainties in Thailand.	***Improve cost efficiency and service flexibility*** to serve diversity customer's need and gain competitiveness under uncertainty in highly dynamic environment.
Myanmar Cambodia Indonesia	**- SCG CBM set up new cement plant**: • *Indonesia: Semen Jawa (SJW) (2015)* • *Cambodia: KCC 2nd line (2015)* • *Myanmar: Mawlamyine Cement Plant (MCL) (2016)* **- Strategic customer in Thailand expanded their business in CLMV and Indonesia** • *Sri Trang, Betagro,Kubota,etc.*	***Build up local logistics network in CLMV and Indonesia countries*** to ensure the smooth start-up of the strategic customers' expansion and as commented in The Deming Examination Report in 2013, *SCG-L applied **"Proactive Strategy" by leveraging SCG-L competencies from Thailand to speed up competitive advantage** in focused businesses in CLMV and Indonesia to serve SCG and strategic customers.*

To ensure the success of the strategic customers' expansion, SCG-L would have to **speed up the set up process of competencies development roadmap during Year 2014-2016** through leveraging SCG-L competencies from Thailand as illustrated in Figure 4.2-1.

Thailand	Cambodia			Vietnam			Myanmar			Indonesia			Laos		
	before 2013	2014 -2015	2016	before 2013	2014 -2015	2016	before 2013	2014 -2015	2016	before 2013	2014 -2015	2016	before 2013	2014 -2015	2016
Operational	✓			✓			✓				✓		✓		
Carrier & Safety Management	✓				✓				✓		✓				✓
Quality control		✓				✓			✓			✓			✓
Sales and Marketing		✓			✓				✓			✓		✓	
Management Philosophy		✓			✓				✓			✓			✓
Finance & Accounting		✓			✓				✓			✓			✓
HR & OD		✓			✓				✓			✓			✓
Legal	✓				✓			✓				✓		✓	

Period: Before 2013 | 2014-2015 | 2016 Onwards

Competency elements:
- **Operational**: Demand & Supply planning, Cost analysis, Inbound & Outbound, Multi-modal, BH matching, C-move, Cross-docking, Cross border, Fleet optimization, Warehouse operation
- **Carrier & Safety Management**: Carrier development, SDC training, ICT tools (LCC room)
- **Quality Control:** Claim & Complaint, SQC tools application
- **Sales and Marketing:** Relationship management, Product knowledge
- **Management Philosophy:** TQM, DM/ PM
- **Finance & Accounting:** Financial statement, Credit management
- **HR & OD:** In-house training, Engagement
- **Legal:** Environment control, Weight regulation, Customs process

Figure 4.2 - 1 Development of leverage "SCG-L Competencies from Thailand" to CLMV and Indonesia

② 2016 Onwards: Speed up market expansion by developing end to end service platform

Table 4.2 - 2 Situations in Thailand, Overseas and SCG-L Direction (2016 onwards)

	Situations	SCG-L Direction
Thailand	Due to steady demand in domestic market, SCG customers more considered with the operating cost. As a result, they required the efficiency improvement in order to gain cost competitiveness.	As commented in The TQM Diagnosis report in 2016, SCG-L focuses more on cost efficiency through enhancing competencies as follow; ***- Cost and efficiency improvement:*** Such as reduce waiting time, improve backhaul matching and increase truck utilization ***- Service quality improvement:*** service flexibility, service reliability
Laos Myanmar Cambodia Vietnam Indonesia	- SCG CBM set up ***new cement plant in Laos*** → *Khammouane Cement Co., Ltd (KCL) (2017)* - ***Strategic customers expanded businesses by exporting products from Thailand*** and ***set up their operations into CLMV countries***	***Strengthen local carrier and intra-regional network*** *through creating synergy from total chain efficiency management* *As commented in The TQM Diagnosis report in 2016, SCG-L acquires new technology to expand market (utilizing import/export platform)*
ILSD	- ***SCG-L reorganized****, leading to high opportunity to expand international logistics services*	*- To create total supply chain competitiveness for our strategic customers through **developing End to End service platform***

(3) Focused Activities

Table 4.2 - 3 Focused activities

Problem/Concern	Focused Activity
1. Domestic market has totally turned into severe unfavorable situation. *Customers become more cost-conscious and need flexible service to sustain their businesses.* SCG-L needs to enhance competitiveness to maintain growth	*1. Pursuit of greater efficiency and service flexibility to serve customer's needs and gain competitiveness under uncertainty in highly dynamic environment*
2. Strategic customers need to speed up in overseas business while has difficulties to manage efficient logistics operation (manage risk-external risks : regulation , logistics cost, challenge & difficulties)	*2. Accelerate SCG-L competencies to proactively develop network, as well as partner/carrier development to build up customer trust* ***Application case :****Enhance KCL competitiveness through debottleneck massive volume cross border constraints*
3. *Enhance network allocation commitment and optimization* to benchmark with *world class Logistics Service Provider*	*3. Develop End-to-End service platform through fulfilling international logistics capabilities as total solution to satisfy customer*

(4) Application Case: Enhance KCL competitiveness through debottleneck massive volume cross border constraints

① Step 1 Understanding the MD's policies:

SCG CBM, SCG-L's strategic customer, aims to increase market share in Northeastern region to cover the growth demand. Moreover, there is steady growth in Lao PDR approximately 16% per year. Therefore, Khammouane Cement Plant (KCL) was established in Lao PDR to capture such growth opportunities by exporting cement from Laos PDR to Northeastern Thailand and distributing domestically in Lao PDR. In addition, from one of SCG-L strategies which is "Growth with strategic customers", SCG-L will offer total logistics solutions with high service level and competitive logistics cost.

Figure 4.2 - 2 Distribution area between SKK and KCL

② Step 2 Set up task: From current logistics model in Northeastern area, cement is distributed from Saraburi province to all provinces in Northeast region with backhaul model. SCG-L also continually improves service both in time to market and cost to market. For lead time to market, SCG-L can reduce service level from 1 day (<400 KM) and 2 days (> 400 KM) to 1 day for all province in Northeastern "Next day service delivery". Additionally, SCG-L maintains cost competitiveness through utilizing backhaul model. For to-be logistics model and network, there is obviously advantage in aspect of shorter distance from KCL to upper Northeastern area as shown in Figure 4.2-2. Therefore, *our task is to set up logistics solution for exported cement from KCL to Thailand*. Although difficulties in this project is to debottleneck cross border service constraints that affect time and cost to market; logistics model and long cross border process, we challenge these constraints by setting target to deliver next day service, same as existing model, with comparable logistics cost with feasibility study.

③ Step 3 Develop the Alternatives to perform the task: Generally, cross border transportation, Figure 4.2-3, has been confronted many challenges including long-distance routes, obscure and unstable customs clearance procedures, and long delays at customs clearance offices. SCG-L develops transportation model which utilized operation management competency that could be used for KCL cement cross border delivery, by considering the difficulties as per below:

- Limitation of Thai truck in the Bilateral agreement
- Incremental cost (including customs, investments)
- Time consumed
- Readiness of trucks and asset utilization
- Flexibility of switching fleet
- Road safety of each model
- Requirement and obscure register process in Laos of Thai truck carrier

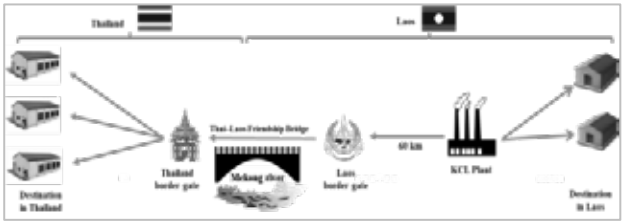


Figure 4.2 - 3 Cross border Logistics Model

We also gave weighted average score to select the most optimized solution, as shown in Table 4.2-4. There are various issues to be solved to start logistics operation smoothly and competitively: 6 issues impact to cost, 8 issues impact to time.

The most concerned issues in macro level were regulation limitations which are constraints from bilateral agreement between Laos and Thailand. It is stated that not allow emptied Thai truck to pick up cargo in Laos territory. Hence, our target is to get permission for Thai truck to pick up cargo in KCL to maintain truck utilization.

Table 4.2 - 4 List of alternatives and decision matrix

Alternative model	Regulations	Cost	Time Consumed	Readiness & Asset Util	Complexity	Flexibility	Safety	SCORE
Direct: Thai Trucks	1	4	4	5	5	1	4	1,600
Direct: Lao Trucks	1	2	4	2	5	1	1	80
Direct: Shared Fleet (TH + LA)	3	3	4	4	4	3	3	5,184
Trailer change (Tail switching)	5	2	3	3	2	5	5	4,500
Cross docking (Lift off/Lift on)	5	1	2	3	3	5	5	2,250
Thai Trucks + Trailer change	4	3	3	3	2	5	4	4,320

④ ⑤ **Step 4-5 Explore a successful scenario for the focused alternative and its implementation:** The management roadmap that SCG-L connected with Laos and Thai government take 16 months to achieve. Normally, the approaching government process takes about 2 years to settlement. We approached to the right key decision makers of stakeholders and accelerated the process by connecting and facilitating every level along supply chain both Thailand and Laos. As a result, we executed many activities to mitigate the concerned issues, thereby completing approaching process in 16 months. After we got the permission, we set mission to improve customs process that was long process time, release in batch size, and unable to control standardization in order to improve and execute truck turnaround with the same rate as in Thailand.

As a macro level in preparation stage, SCG-L collaborated through top-down and bottom-up approach as business to government among policy maker, executor, and private sector. As a result, from the relationship management and collaboration workshop, we could change from batch size release to one-by-one release and was given express lane pass for SCG at Laos border gate. This effort contributed to the cost and time saving in supply chain.

As preparation phase, we designed process flow according to current common cross border basis and international trading competency. There are 8 entities from internal and external SCG in process flow and lead-time takes 2-3 days from receiving order to delivery to customer. Additionally, for proceeding customs clearances in general of Laos and Thailand border, the trucks are released in batch size depended on no. of truck in customs entry. On the other hand, the more no. of customs entry, the more the customs expenses. So the challenge is to using 1 custom entry per day while releasing truck in 1 by 1 for minimizing cost. Therefore, we selected the best alternative which considered costs, no. of truck supply required, and truck utilization aiming to minimize cost and time to market. As a result, we could generate cost saving to supply chain.

After starting operation of transporting exported cement from Laos to Thailand, we faced to some challenges about the lead-time delivery, during first 15 days (1-15 Jan 2017), was more than 3 days for 4% of total shipment in Jan as illustrated in Figure 4.2-4.

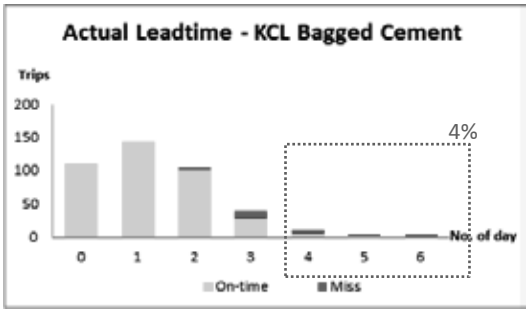


Figure 4.2 - 4 KCL Bagged cement: Leadtime to customers

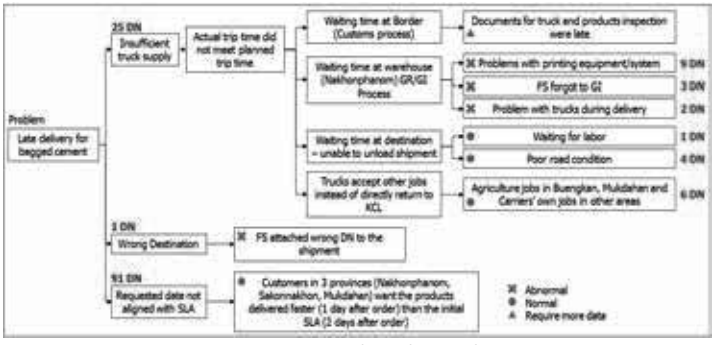


Figure 4.2 - 5 Why-why analysis

Therefore, SCG-L put effort in debottleneck non value added activities in process flow through why-why analysis as shown in Figure 4.2-5 and adjusting model by applying STO model and adjust cutting time.

⑥ Step 6 Confirm effects:

From new process we can reduce lead-time from 2-3 days to 1-2 day which depends on distance from border to destination. By applying control chart to confirm the effect of the improvements, reduction not only occurs in decreasing in time used but also in variation in customs and loading process as showed in Figure 4.2-6.

From all the efforts and collaboration throughout supply chain not only internal SCG but also external SCG, SCG-L can provide logistics solution with lower cost from KCL (Laos) than from SKK(Thailand) as planned, generating cost saving in supply chain.

Even with cross border constraints and increasing orders, SCG-L can serve customer with next day delivery to customer in Thailand as committed KPI (% On-time).

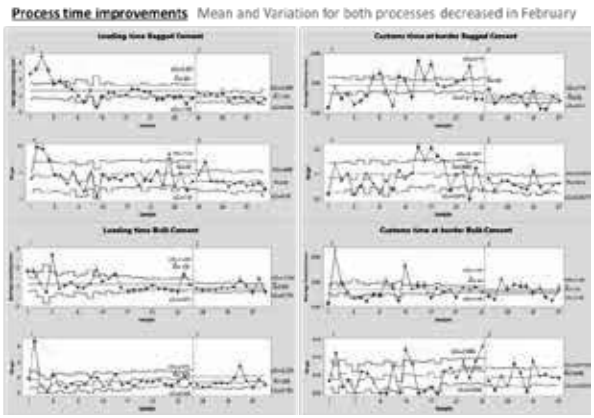


Figure 4.2 - 6 Control chart of loading and customs clearance process time

⑦ Step 7 Transfer to daily operation:

After improvements are made, SCG-L set up a standardized procedure with the improvements and adjustments to cutting times and transferred to daily operations.

4.3 Holistic Fleet Management for Safety

(1) Background

Refer to 2016 record from www.worldatlas.com, road traffic death rate of Thailand was 38.1 death per 100,000 population which was the second rank of the world. For real-time visualize control, SCG-L has established LCC Room to monitor unsafe driving behavior and develop training course by SCG Skills development school such as SMITH System course which are also positive comments stated in The Deming Examination report in 2013.

In addition, SCG-L has managed safety by Holistic Fleet Management (Figure 4.3-1) by integrating ISO39001 into its system to promote seamless collaboration management and started to implement in Saraburi bulk cement fleet.

Figure 4.3 - 1 Holistic fleet management for safety concept

As a result, incident cases in this fleet have dramatically decreased as shown in figure 4.3-2. By enthusiastic utilizing these effective tools and system, total accident rate favorable reduced from 0.90 PPM (Number of case/million kilometers) in 2013 to 0.40 PPM in 2016. However, major accident cases have not tended to decrease during past 3 years as shown in figure 4.3-3.

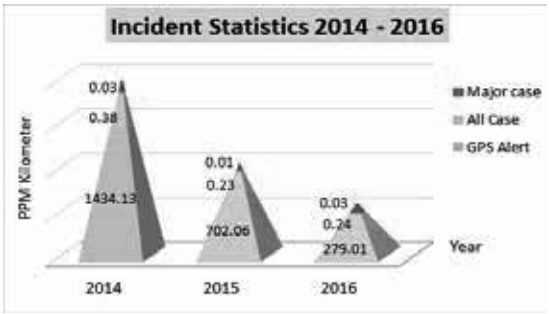


Figure 4.3 - 2 Saraburi Bulk Cement fleet incident statistics 2014-2016

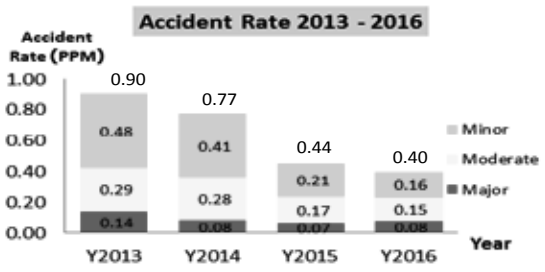


Figure 4.3 - 3 Accident rate 2013-2016

Referring to suggestions from The TQM Diagnosis report in 2016:

- Horizontal deployment of measures to achieve zero traffic accident in delivery processes.
- Investigation of factors contributing to serious accidents and measures to prevent recurrence.

SCG-L has conducted in-depth investigation by utilizing ICT data and application of statistical tool to focus more on solving major accident. As a result, the accident from driving behavior has been improved while the remaining major cause of fatality cases is unsafe parking and main cause of major accident is drowsy

(2) Focused Activities

Table 4.3 - 1 Problems/Concerns and Focused Activities.

Concerns/Problems	Focused Activities
- Strengthen road traffic safety management to reduce major accident	1. Enhance collaboration through road safety management system for all strategic fleets 2. Utilize ICT and improve its function to achieve the prevention of incident

(3) Application Case: Reduce drowsy accident by collaborating to control driving hours per day

① Step 1: Identify Problem

In 2016, all types of accident occurred 223 cases (0.40 PPM) which reduced by 9% from 2015. On the other hand, major accident occurred 45 cases (0.08 PPM) which did not decrease from the previous period. Main cause of major accident occurred from drowsy 17 cases, 38% of major accidents as shown in figure 4.3-4.

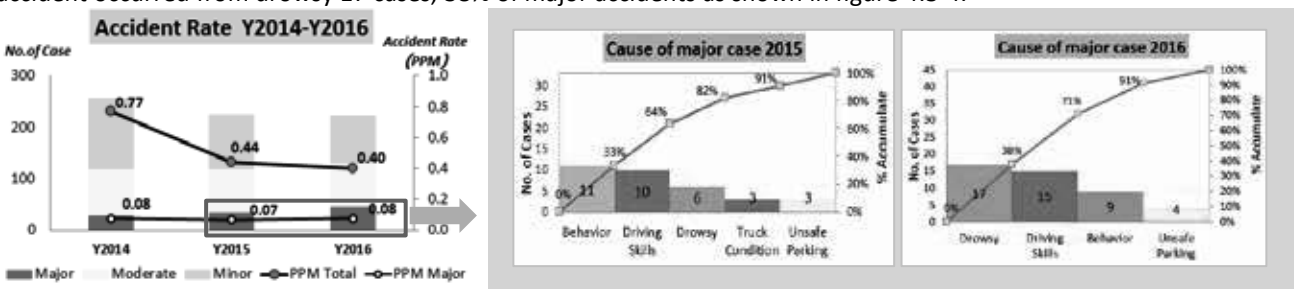


Figure 4.3 - 4 Accident rate 2014-2016 & Cause of major accident 2015-2016

Drowsy accident caused from driving over 10 hours driving were 11 cases as shown in Figure 4.3-5. From GPS data in Figure 4.3-6, the example of drowsy accident case shows that accumulate driving time of driver was more than 10 hours per day.

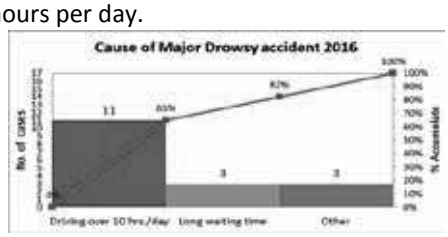


Figure 4.3 - 5 Cause of drowsy accident 2016

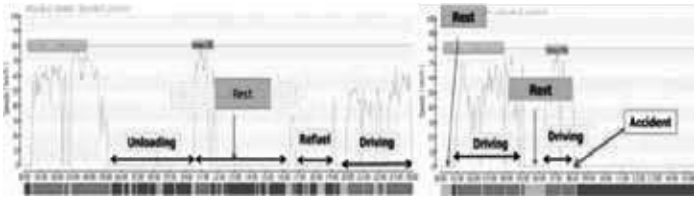


Figure 4.3 - 6 GPS Accumulate driving over 10 hrs. per day

② Step 2: Observation

As we have GPS for all trucks monitoring, so we utilized its function to find out the correlation between the number of alerts and number of drowsy accident cases. From scatterplot shows in figure 4.3-7, Quadrant 2 is a group of carriers who had accidents caused by insufficient resting due to loading waiting time at factory. SCG-L therefore collaborated with customers to reduce loading waiting time. Moreover, Quadrant 1 is a group of carriers who had high level of drowsy accidents caused by excessive driving hours per day. SCG-L selected these 2 carriers; AA and BB for in-depth investigation to find out the effective countermeasures.

After analyzing the relationship between alert 10 hours and drowsy accident by Chi-square test, we found that alert 10 hours per day caused drowsy accident with statistical significant level at 95% as shown in figure 4.3-8.

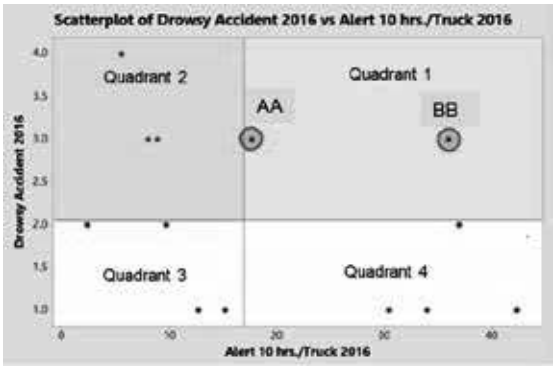


Figure 4.3 - 7 Scatterplot of drowsy accident & alert per truck

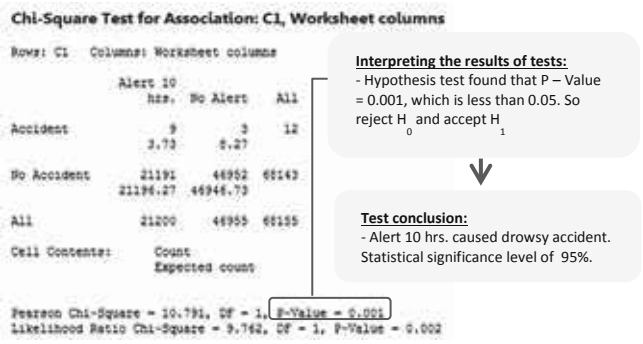


Figure 4.3 - 8 Chi-square test analysis

③ Step 3: Analysis

By using Why-Why analysis and in-depth investigation from the 2 carries, we found that causes of driving 10 hours per day came from driver behavior and long distance (more than 500 Kilometers) due to lacking of effective tools to control. So, SCG-L set up new criteria for GPS alert by controlling driving over 10 hours.

④ Step 4: Action

SCG-L managed alert of driving over 10 hours per day through collaboration between SCG-L and Carriers. As a result, no. of GPS alert has gradually decreased.

Furthermore, long distance may possibly affect to over 10 hours driving. Thus, we set up standard time in delivery plan for high risk route in long distance. Khangkhoi-Lampang route is an example route which has 2-day lead time and driver must manage driving hour following as standard time (10 hours per day).

⑤ Step 5: Check

After communicating alert management system for over 10 hours driving to carriers since January 2017, the results in terms of Alert and Drowsy Accident, have significantly improved from previous period as shown in Figure 4.3-9 and 4.3-10.

Figure 4.3-9 Alert Driving over 10 hrs per day

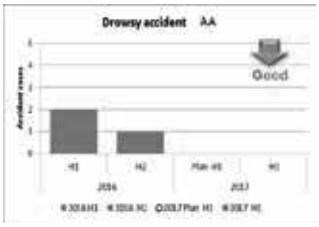


Figure 4.3-10 Drowsy accident

⑥ Step 6: Standardization

SCG-L implemented alert of driving over 10 hours per day in management system flow and deployed to all related functions with seamless collaboration

⑦ Step 7: Future Plan

- Set SCG-L warehouse to be rest areas for long distance > 500 kilometers.
- Set up 2 drivers' model for long distance delivery.
- Study the statistical correlation of accidents and alert 4 hours, alert over 10 hours and drivers checking process before dispatching.
- Expand process for control driving over 10 hours per day to all carriers.
- Set alert driving over 10 hours per day to auto alarm system.

This case is one of example activity which SCG-L attempted to improve its stakeholders in term of service quality. Moreover, there were various activities related with carrier. As Win4 concept, SCG-L also formulated "Carrier Development" program for strategic partner in order to provide additional knowledge and training courses. Furthermore, SCG-L has owned training school, SCG Skills Development, to improve driving skills for all drivers though various training courses by professional trainers.

4.4 Strategic ICT Management

(1) Background

Nowadays, logistics network turns to be more sophisticated and complicated. Moreover, visibility becomes a vital element to ensure SCG-L's service reliability as well as customer responsiveness. Therefore, ICT needed to provide the system that visualizes the order-to-cash process in order to support SCG-L's business.

ICT strategies in each period can be explained as follows;
1) 2013: Utilize ICT system for Service Operation and Safety Management
2) 2014-2015: Support New Service and New Customer of the Next Day Delivery, and overseas operation
3) 2016 Onwards: Speed up market expansion by developing end to end service platform

(2) Focused Activities

Table 4.4 - 1 Focused activities

Problem/Concern	Focused Activity
1. A challenge of Consolidated Services integration to increase customer responsiveness.	1. Explore and develop a data visualization to track and trace transportation status by collaborating with Solution Design, Marketing, and Operation
2. Inefficient of ICT system management due to different purposes of ICT system duplication	2. Develop common ICT Service Platform in both domestic (NND) and overseas business.

(3) Application Case: ICT Visibility Solution for Customer A chain

① Step 1: Understand the MD's policies

From strategy, "Develop high value-added services to capture high potential sectors", we aim to create value through supply chain management, operation and service excellence, and highly integrated IT system to fully support our customers' business and Customer A's Policy and Direction. Together with System Development policy extending visibility to SCG-L partners such as carrier, customer and end customer, consolidated service (Complex mixed Cargo), and expand International Cross border service and solution. We set up business plan on support the consolidated service to create value for customer and enhance SCG-L competitive advantage.

② Step 2: Set up the task

In late 2016, from Attractive Quality Creation (AQC) of collaboration between System development (SD), Sales & Marketing (S&M), and Logistics Solution Design (LSD), visibility will be a vital key to gain customer satisfactions. Therefore we plan to develop ICT value added service system.

Target: Achieve percent of visibility process $\geq$ 90% by March 2017

③ Step 3: Develop alternatives to perform the task

With task set for acquiring customer attractive quality, QFD is used to transform attractive quality into ICT element that need to be improved. We also evaluate ICT required quality to support each attractive quality (Figure 4.4-1).

After utilizing QFD table, we found that six required qualities need to be developed for Customer A chain visualization. To archive 90% chain visualization, we need to integrate all data that support attractive quality from three IT systems; SAP, TMS, and POD , together by collaborating with CISCO® data virtualization system.

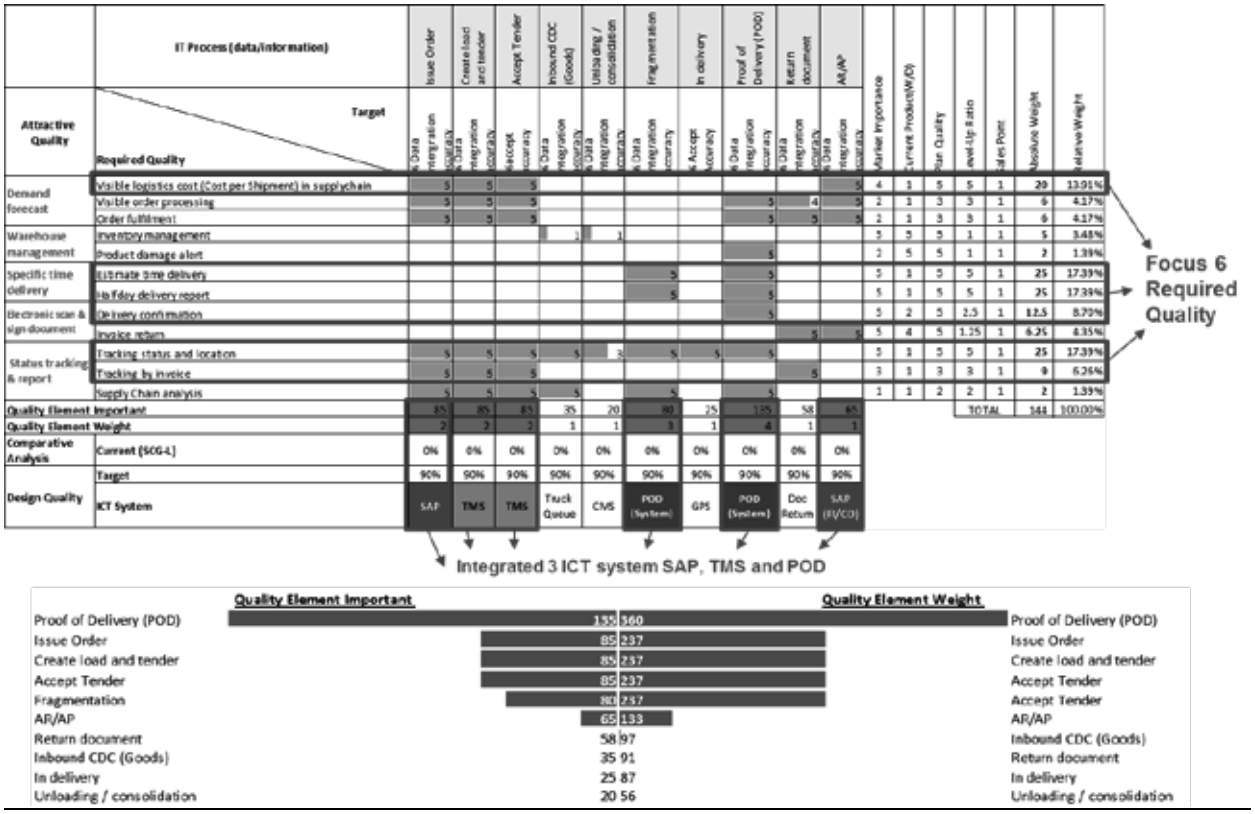


Figure 4.4 - 1 QFD Table

④ Step 4: Explore successful scenario for the focused alternative

To prevent the future problem, we applied FMEA for risk mitigation from our implementation process. Finally we found that two items should be focused more which are input process and data connection process (Figure 4.4-2).

Process	Failure Mode	Effect	Severity	Occurrence	Detectability	RPN	Action
Source data input	Manual input data is not formatted	No result	9	5	7	315	Verify data alignment and screening on input
Data update	Input data not updated by user	Reduce system usability	6	4	3	72	Communicate with user to input data
Data screening	Garbage data	Reduce system usability	5	3	6	90	Verify data consistency by system
Data connection	Network infrastructure failure	Failed to serve customer	6	4	6	144	Utilized more than 99.8 SLA services, offline data
Data connection	Security vulnurability	Disturb SCG operation	9	5	6	270	Firewall configuration, enhance password policy, data encryption.
Data connection	Temporary disconnection	No data for a period	5	4	2	40	Offline data update
Data retrieval	Data is not update in sequence	Failed to serve customer	5	4	2	40	Asynchronous data update function
Data retrieval	Disturb CDC Wangnoi bandwidth	Disturb Wangnoi operation	6	4	5	120	Separated bandwidth from normal operation

Figure 4.4 - 2 FMEA

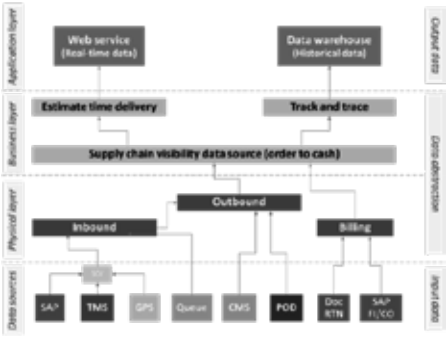


Figure 4.4 - 3 Data abstraction practice layers

⑤ Step 5: Implement the scenario

The implementation focused on integrating data to achieve single platform. The 4 layers of data abstraction example on tracking and tracing web (Figure 4.4-3). Firstly, System Development (SD) needed to collaborate with Sales & Marketing to meet the customer needs. Secondly, data sources are located in separated locations resulting in concerns on network performance, security, and disturbance to normal operation. Therefore, SD mitigate these risks (Figure 4.4-4). Lastly, the data virtualization system helps to reduce implementation time to combine data from different systems but it is still new for SCG-L.

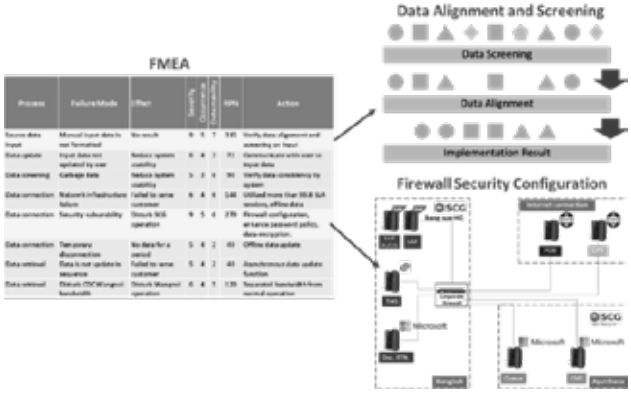


Figure 4.4 - 4 Shown our actions of Data Alignment and Screening and Firewall Security Configuration

However, we have to configure each connection and data combination task.

⑥ Step 6: Confirm the effects

After the repeat CAPD (Check, Action, Plan, Do) until February 2017, as a result from implementation, SCG-L now has increased data visibility and standard information chain which can be roll-out for future next day delivery customers. However, some data are not achieved as planned (Figure 4.4-5), we continue to use CAPD to improve visibility quality for target quality.

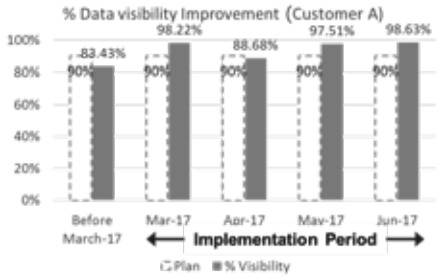


Figure 4.4 - 5 Percent increased visibility

⑦ Step 7: Transfer to daily operation

Data Visualizations have been transferred to daily operation such as tracking status and on time delivery report (Figure 4.4-6) and utilized this tracking report to monitor and response to customers.

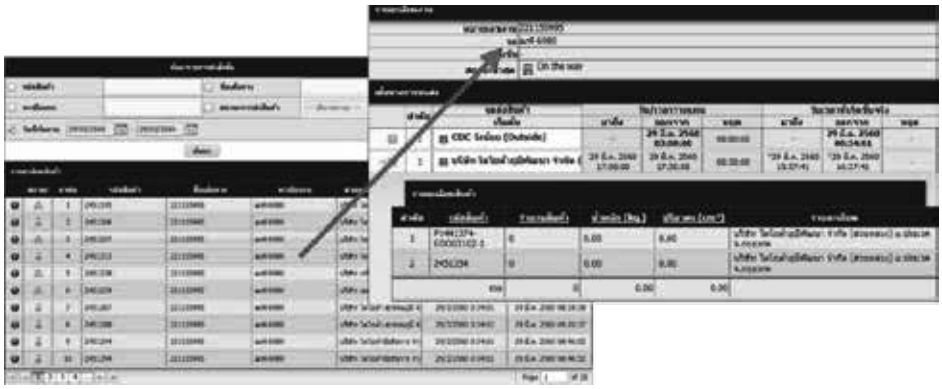


Figure 4.4 - 6 Status tracking Report

⑧ Step 8: Future Plan

To truly meet the needs of the customers, SD considers building collaboration among stakeholders throughout the supply chain by improving the remaining IT systems. Mastered this level of collaboration consistently will outperform most competitors on several key financial metrics, including lower costs, and improve service levels.

4.5 Workforce readiness for overseas business expansion

(1) Background

According to SCG-L's strategies, overseas business expansion is one of the key strategies for the company. SCG-L has continually expanded to AEC (ASEAN Economic Community) countries focusing on CLMV and Indonesia. We started to support SCG customers at the beginning stage and tried to expand scope of service to non-SCG customers. HR needed to develop SCG employees in terms of knowledge and skills to support business expansion following as SCG culture.

Nevertheless, most countries in ASEAN confronted with labor shortage in 2015-2016 due to high demand in skilled labor market. As a result, we further studied the context in each country such as workforce, labor law, education system, salary, and culture, in order to ensure that we developed HR system complying with the business circumstance.

Furthermore, SCG also considered 4-core value concept especially in social responsibility. Thus, CSR was the key framework that was embedded in all HR strategies to create job opportunity and prosperity in that overseas community.

(2) Focused Activities

Table 4.5 - 1 Focused Activities

Problems / Concerns	Focused Activities
1. HR encountered with labor shortage problem due to high demand in skilled labor market, so HR needed to prepare workforce to ensure that our business can compete with others.	1. Develop employee recruitment method to fulfill requirement ensure that employees are job fit and culture fit.
2. HR needed to develop employees under difficult contexts such as cross-culture, technology, language, experience, and know-how of SCG employees to improve service level.	2. Develop employees to ensure that they can work following as work instruction.

(3) Application Case: "Prepare workforce readiness for overseas business expansion in Cambodia"

① Step 1: Understanding the MD's policies

Regarding SCG-L strategy "Leverage competencies to serve SCG and strategic customers' growth". **SCG-L Cambodia was established in 2014 to serve SCG customers' growth and to capture opportunities from other customers outside SCG.** SCG-L Cambodia focused on three key strategies including operation excellence, growing business, and connectivity.

When we expanded to other countries, a framework that could not be neglected is **CSR framework**. This framework was composed of four dimensions as shown in the figure 4.5-1.

Figure 4.5 - 1 CSR Framework

② Step 2: Set up task

To serve SCG-L Cambodia, there were various challenges in terms of HR. For instance, the educational attainment rate was very low comparing that of other countries and Thailand. Educational level and participant level can be illustrated as the table 4.5-2. The upper secondary Cambodia participants have only 31% less than the participants of developed country which have 43%. Moreover, the government of Cambodia did not allocate the expenditure to education system. They spent approximately 7.5% of all expenditures to the education, while other countries spent around 15-20% of all expenditures. In addition, labor shortage was the critical problem at that time.

Table 4.5 - 2 Educational level and level participant

Age	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Grade				1	2	3	4	5	6	7	8	9	10	11	12
level	Kindergarten			Primary						Lower Secondary			Upper Secondary		
Access	Voluntary			Compulsory									Voluntary		
Cost	Fees (small)			Free									Fees		
Participant				96%						66%			31%		
Underdeveloped country participant				90%						72%			43%		

Hence, the challenging task for HR is **Task: To prepare workforce readiness for Cambodia operation.**
Target: Fulfillment capability to work within 3 months.

③ Step 3: Develop alternatives to perform the task

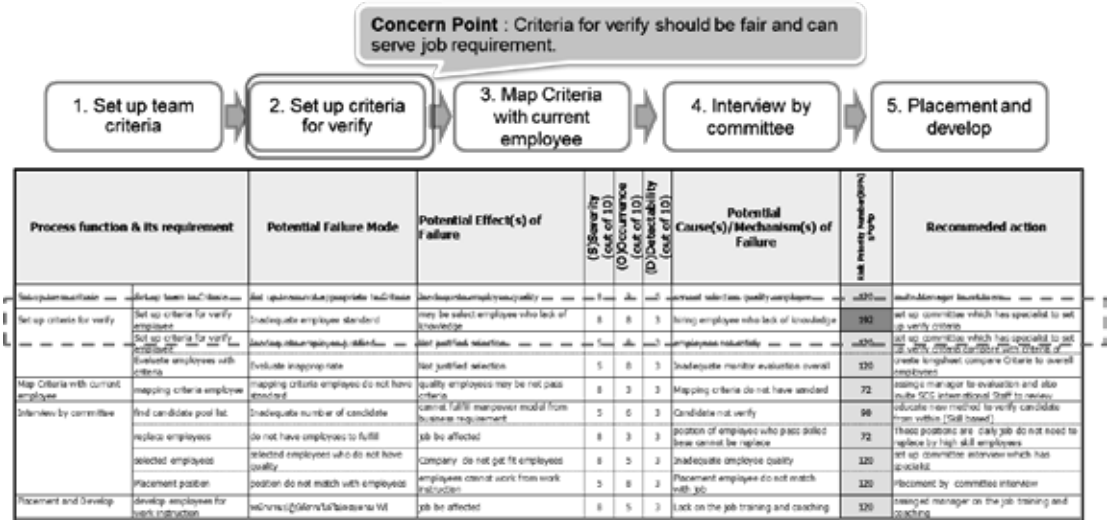
Recruitment Methods	Effectiveness	Feasibility	Efficiency (Time saving)	Community Viewpoint
1.Fresh Graduate and develop training roadmap	L	M	M	M
2.Mid Career Recruitment and develop training roadmap	M	M	L	L
3.Recruit and develop from SCG-L (verify employee / temporary who has potential Skill based)	H	M	H	H

Figure 4.5 - 2 Alternative methods for recruitment

We listed the possible methods for recruitment and evaluated them by four criteria including effectiveness, efficiency, feasibility, and community viewpoint. We also considered the community viewpoint criterion because CSR framework was quite important for SCG and SCG-L Cambodia in the context of HR. In conclusion, we selected recuitment methods No.3 to **recruit and develop employees from internal by verifying temporary employees** who have basic skills and have the potential for development.

④ Step 4: Explore a successful scenario for the focused alternatives

There were 5 processes for Method 3 as shown in the figure 4.5-3. After analyzing the potential risks by FMEA, we found that **the second process ("Set up criteria for verify") was identified as a critical process**.



Process function & its requirement		Potential Failure Mode	Potential Effect(s) of Failure	(S)Severity (out of 10)	(O)Occurrence (out of 10)	(D)Detectability (out of 10)	Potential Cause(s)/Mechanism(s) of Failure	risk priority number(RPN)	Recommeded action
Set up criteria for verify	Set up criteria for verify employee	Inadequate employee standard	may be select employee who lack of knowledge	8	8	3	bring employee who lack of knowledge	192	set up committee which has specialist to set up verify criteria
	Set up criteria for verify candidate								
	Evaluate employees with criteria	Evaluate inappropriate	Not justified selection	5	8	3	Inadequate monitor evaluation overall	120	create longsheet compare Criteria to overall employees
Map Criteria with current employee	mapping criteria employee	mapping criteria employee do not have standard	quality employees may be not pass criteria	8	3	3	Mapping criteria do not have standard	72	trainng manager to evaluation and also invite SCG international Staff to review
Interview by committee	find candidate pool list	Inadequate number of candidate	cannot fulfill manpower model from business requirement	5	6	3	Candidate not verify	90	educate new method to verify candidate from within (Skill based)
	replace employees	do not have employees to fulfill	job be affected	8	3	3	position of employee who pass police leve cannot be replace	72	These positions are daily job do not need to replace by high skill employees
	selected employees	selected employees who do not have quality	Company do not get fit employees	8	5	3	Inadequate employee quality	120	set up committee interview which has specialist
	Placement position	position do not match with employees	employees cannot work from work instruction	5	8	3	Placement employee do not match with job	120	Recomment by committee interview
Placement and Develop	develop employees for work instruction	พนักงานไม่ได้ทำงานตามใบสั่งงาน WI	job be affected	8	5	3	Lack on the job training and coaching	120	assigned manager on the job training and coaching

Figure 4.5 - 3 The process of Method 3 and FMEA

⑤ Step 5: Implementation of the scenario

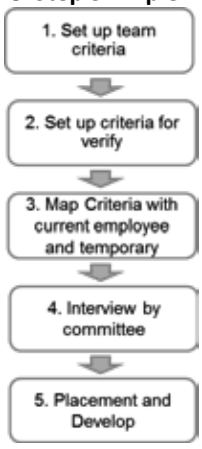


Figure 4.5 - 4 Implement method

- In step 1 and 2, **we developed team from various positions to ensure that our criteria are fair and align with job requirements.** Criteria and expected competency were defined as shown in the figure.
- In step 3, **we evaluated current employees by these criteria** and found that 82.5% of all employees passed the evaluation.
- In step 4**, interview committee was set up to re-confirm the qualification of employees.** This team comprised of Managing Director – SCG-L Cambodia, HR Country Manager-CBM, Sales and Marketing Manager, Operation Manager, and HR Manager –SCG-L Cambodia.
- In step 5, **we can shorten learning journey by training only business overview and Work TQMly** because our existing employees already had basic knowledge and working experience.

Skills and Knowledge Evaluation for Temp -> S0

Sales & Marketing	Expected	Operation	Expected
1. Sales & Marketing Knowledge	2	1. Transport Knowledge	2
2. Basic Transport and WH Knowledge	1	2. WH Knowledge	2
3. Product Knowledge	1	3. Product Knowledge	2
4. TQM Knowledge	2	4. TQM Knowledge	2
5. Presentation Skill	Pass	5. Presentation Skill	Pass
6. Safety awareness	Pass	6. Safety awareness	Pass

Skills and Knowledge Evaluation for S0 -> S1

Sales & Marketing	Expected	Operation	Expected
1. Sales & Marketing Knowledge	3	1. Transport Knowledge	3
2. Basic Transport and WH Knowledge	2	2. WH Knowledge	2
3. Product Knowledge	2	3. Product Knowledge	2
4. TQM Knowledge	2	4. TQM Knowledge	2
5. Presentation Skill	Pass	5. Presentation Skill	Pass
6. Safety awareness	Pass	6. Safety awareness	Pass

Figure 4.5 - 5 Criteria for evaluation

⑥ Step 6: Confirm the effects

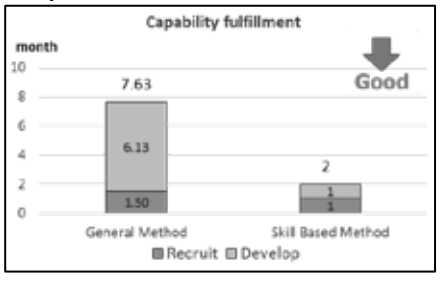


Figure 4.5 - 6 Workforce readiness

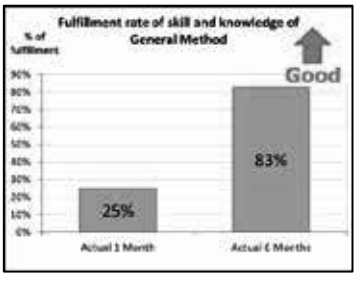


Figure 4.5 - 7 Fulfillment rate of General Method

Figure 4.5 - 8 Fulfillment rate of Skill based Method

We can prepare workforce readiness for SCG-L Cambodia within 2 months (Recruit 1 month and develop 1 month). Moreover, employees recruited by general method take average 6 months to develop to ensure that they can work following as Work Instruction. On the other hand, employees recruited by skill based method take only 1 month to work following as Work Instruction.

⑦ Step 7: Transfer to daily operation

HR SCG-L set up standard of criteria for verifying and mapped these criteria with current employees.

⑧ Step 8: Future Plan

Fulfill competency gap of employees and add SCG Ways of working to all employees of SCG-L Cambodia.

5. Overall Effects

From 2014 to 2016, SCG-L has gone through several challenges such as Thailand political instability since late 2013, declining diesel price in contrast with increasing NGV price since 2014, and stagnant demand growth of its strategic customers. SCG-L also has entered into new territories in aspects of both geography (South China, CLMV, and Indonesia) and business scope (international and 2C logistics). By applying TQM framework, SCG-L has been able to cope with most of the challenges arising from these events and competed in a volatile market. The effects from applying the TQM framework can be recognized in both tangible and intangible senses.

5.1 Overall Tangible Effects

SCG-L is able to realize its business objective, 'to secure profitability', though, the revenue could not grow as planned. The operation excellence and new high value-added services developed from continual improvement help SCG-L to increase its net contribution margin during the tough situations. Moreover, the effective TQM implementation helps SCG-L to be able to leverage its competency to new businesses and expand into other countries: the business in Overseas has grown 19% CAGR. The result is shown in Figure 5-1.

Figure 5 - 1 Total revenue of SCG-L , 2013-2017(Q1)

(1) Tangible Effects to Realize the Dominant Logistics Provider Business Objective

In order to realize the achievement of business objective, "to be the dominant Third Party Logistics Provider in focused businesses and CLMV and Indonesia", three major areas are emphasized as follows:

① Market Share in Focused Businesses

As a result of all the efforts put on improving the operations together with improving customer satisfaction, SCG-L has dominated the cement and building materials, and packaging market as can be seen from the market share consistently more than 50% (Figure 5-2). The share in the cement and building materials slightly declined because of the stagnant of construction market together with the economic slowdown situation. SCG-L also succeeded in penetrating into the new focused businesses, automotive and cold chain business, as shown in Figure 5-3.

Figure 5 - 2 Market share in focused businesses

Figure 5 - 3 Market share in new focused businesses

② Network Coverage Expansion

To dominate the logistics market, network coverage, in Thailand and the focused countries, is one of key indicators. Logistics network of SCG-L in Thailand has risen by 56% from 2013 to 2016 and 91% in the focused AEC countries (CLMV and Indonesia) as shown in Figure 5-4. In response to the cross border network expansion, SCG-L has increased its border network by 67% during the same period (Figure 5-5).

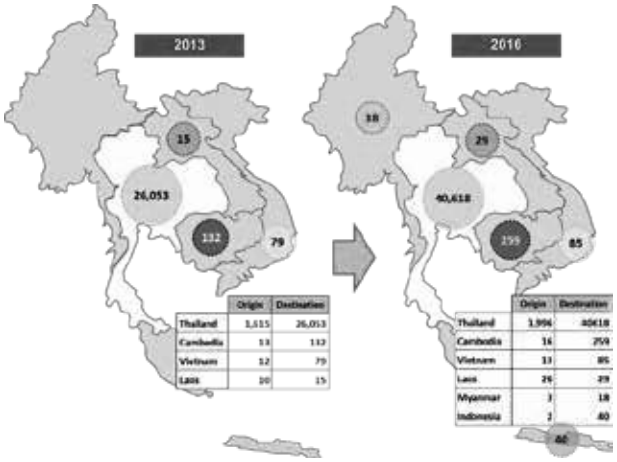


Figure 5 - 4 Logistics network expansion in CLMV & Indonesia

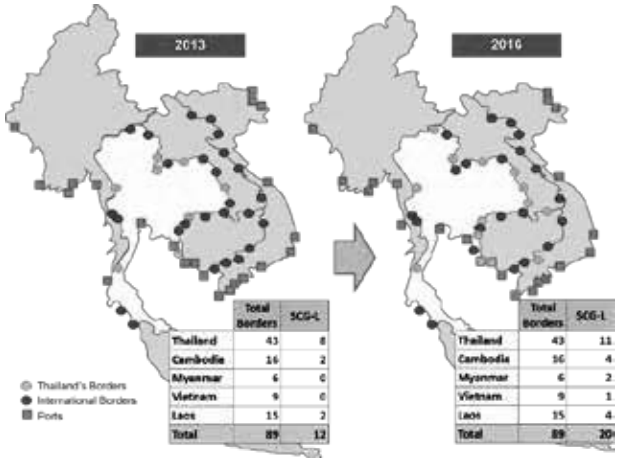


Figure 5 - 5 Cross border network expansion

③ Customer Satisfaction

Applying TQM concept enables SCG-L to be able to effectively solve problems and have more understanding in the customers, resulted in the gradually improve in customer satisfaction both in Thailand (Figure 5-6) and Overseas countries (Figure 5-7).

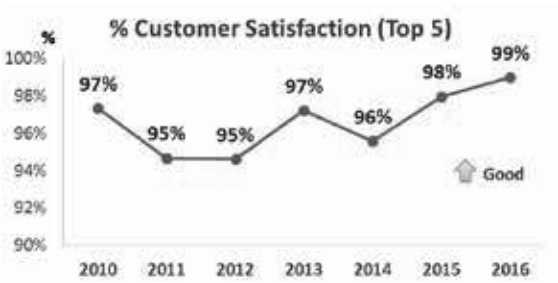


Figure 5 - 6 % Customer satisfaction, 2010-2016
(% of customers gave a score above 5 out of 10-scale rating)

Figure 5 - 7 %Customer satisfaction of strategic customers by Overseas country, 2015-2016

(2) Tangible Effects from Business Objective and Challenging Strategies

① Develop High Value-added Services to Capture High Potential Sectors

SCG-L could expand market in high value-added service of consolidation segment by acquiring more customers using NND. Consequently, the revenue and ratio of high value-added service has increased from 2015 to 2016 from 44 MB to 72 MB as well as 5% to 8% respectively as shown in Figure 5-8.

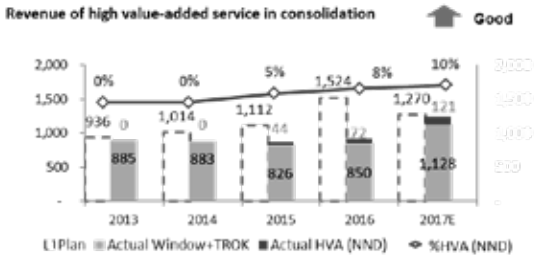


Figure 5 - 8 Data visibility

② Leverage competencies to serve SCG and strategic customers' growth

- **Pursuit of greater efficiency and service flexibility to serve customer's need and gain competitiveness**
  SCG-L increases efficiency nationwide through backhaul matching and fleet management in response with highly uncertain situation as resulted in truck utilization improvement. Consequently, SCG-L could gain competitiveness (Figure 5-9).

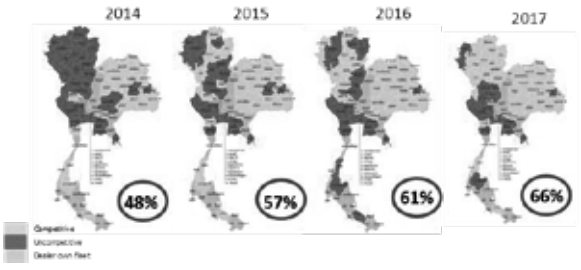


Figure 5 - 9 %Network with cost competitiveness

- **Accelerate SCG-L competencies to proactively develop network, as well as partner/carrier development to build up customer trust**
  SCG-L accelerates its logistics business creation in CLMV and Indonesia. By leveraging competencies from Thailand, SCG-L could grow its business within a short period as well as provide quality services as illustrated by revenue from Thai customers in overseas business.

- **Develop end-to-end international logistics service platform**
  SCG-L is becoming a total solution provider to fulfill and satisfy customers' need in international logistics. As a result, the company could increase revenue from freight procurement service from its existing customers and acquire new customers (Figure 5-10).

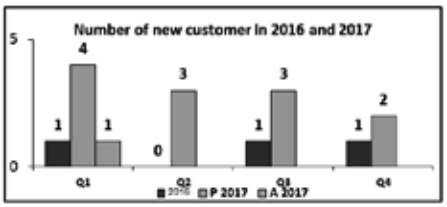


Figure 5 - 10 Number of new customers using international logistics service

(3) Tangible Effects from Infrastructure Strengthening Strategy

To ensure SCG-L's sustainable business, strategy related logistics infrastructure has been emphasized.

① Proactive Quality Assurance System

After launching Proactive Quality Assurance system in 2011, claims and complaints have been unhidden. In order to ensure service quality and reliability, SCG-L does data stratification and in-depth analysis in order to reduce recurrence claims and complaints by embedding self-management into process. As a result, the total claims and complaints have been decreased (Figure 5-11).

Figure 5 - 11 Claim & Complaint Rate, 2013-2017

② Holistic Fleet Management for Safety

Collaboration with carriers and SCG Skills, together with more ICT utilization, has implemented in order to sustainably reduce road accident. Consequently, the accident rate has been reduced (Figure 5-12).

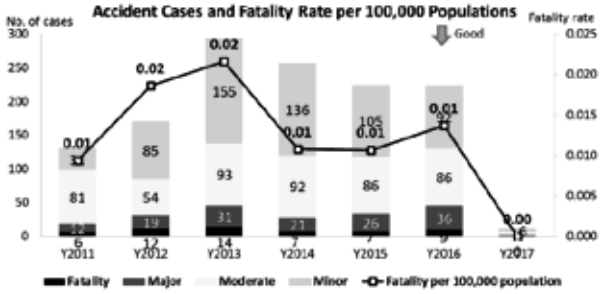


Figure 5 - 12 Number of accidents, by severity, and fatality rate per 100,000 population, 2008-2017(Jan-Feb)

③ Strategic ICT Management

SCG-L has learning curve in develop ICT solutions resulted in better achievement in ICT project implementation (Figure 5-13).

Figure 5 - 13 %ICT Project Achievement

④ Workforce Readiness for Overseas Business Expansion

Proactive human resource management plays important role in the success of SCG-L's business expansion. SCG-L could recruit staffs and train them to build required competencies for logistics business. Consequently, the competent staff could generate more returns to the company reflected by EBITDA per head.

5) Smart Driver Management

Smart Driver community has been created and expanded from 1,239 to 1,950 drivers in 2016 and estimated to be 2,830 drivers in Q1/2017. The Smart Driver performs better than the overall drivers such as lower accident rate (Figure 5-14).

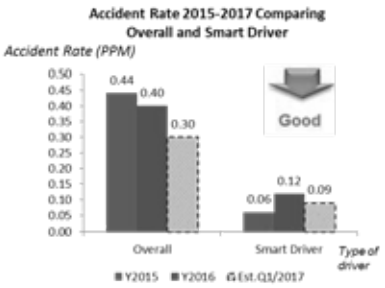


Figure 5 - 14 Accident rate compared between overall driver and Smart driver, 2015-2016

5.2 Overall Intangible Effects

- By developing intimate collaboration and sharing information with its strategic customers, SCG-L is able to create strategies that align with customers' strategies so as to improve the whole supply chain
- By being 'fact and data' based, SCG-L could gain trust from stakeholders
- Employees get more insights into TQM concepts and are able to work systematically

6. Future Plans

SCG-L aims to be the dominant 3PL provider in focused businesses and in CLMVT and Indonesia. Though, the competitive landscape has been changing in faster pace comparing to the past. Industry 4.0 would digitally disrupt the supply chain / logistics industry: the total chain must be transparent and be able to adjust the chain in real time as condition changes with the most efficient logistics model. Not just gathering technologies and use them, SCG-L needs to transform the entire organization: build new capabilities, find people with the right skills, and manage culture change towards being more agile and resilient. In the Industry 4.0 world, the advantage would belong to the one that can analyze the big data generated from the interaction among machines in the system. Task Achieving, quick PDCA cycle, and statistical / analytical tools would be the base for SCG-L to tackle this disruption.