

# The Global Headquarters Systems Integrating the Process of Collaborative Commerce: A Case of an Electric Company in Taiwan

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## ABSTRACT

Nowadays, the corporation concerned about the issue of supplier management, whether or not it relates to interregional business or multinational business, which is becoming a discussable issue for researchers and practitioners. Especially, a corporation has several independent business divisions, which run in different systems and own suppliers information, making information integration problem happens in the corporation. It shows not only the systems implementation but also the process integrating issues. In this study, the case company had shown that they faced three problems. The authors had been in-depth investigating this company. Their information system implementation process took twenty-four months, and there are four to five domain experts had been invited to help the investigate. Finally, in accordance with the case finding, there are two arguments could enhance the teaching a case in the classroom or the consulting service execution. First, precise requirement helps for promoting the headquarters mechanism. Second, the headquarters mechanism helps the company obtaining the suppliers' satisfaction.

**Keywords:** headquarters; supplier relationship management; product lifecycle management; headquarters mechanism

## 1. INTRODUCTION

Nowadays, the corporation is concerned about the issue of supplier management, whether or not it relates to interregional business or multinational business, which is becoming a discussable issue for researchers and practitioners. Especially, a corporation has several independent business divisions, which run with own enterprise resources planning (ERP) system and control own suppliers information, making information asymmetry always happens among headquarters and branches, because of integrating information resources or requesting supplier coordination. It shows not only a systems implementation problem but also the process integrating issues.

This study is going to use case study method to in-depth investigate a real case company, which stands in the electric industry in Taiwan, which have set the manufacture bases in three different locations (Taiwan, China and Vietnam), in which every manufacture base geared to Taiwan. The case company had faced the three problems. First, they must to link up to the international major suppliers to survive in the international competitive environment. Especially, when the achievement is growing up, they need to resolve the problems for operation process and decrease the times on business trip, because, it is cost to Taiwanese resources (Operation process problem). Second, three locations have three different ERP systems, which leads the trading information cannot integration on time. The staffs still use the telephone or email to confirm the trading

messages or waste a lot of time for waiting the confirmed messages (Information integration problem).

Finally, those phenomena gradually caused management issue to impact on the development of the corporation, especially, on the resources allocation; the complexity operation process does not reflect on the performance of enterprise instead of the responding time has been influenced causing a loss to information accurately. However, the company cannot rapidly response the correct information, it might make the wrong decisions leading the operating cost getting higher and higher, which becomes a major pressure and management issue for the company. However, the corporation is facing the challenge for not only in information integration and operation process, but also the management problem with every business divisions, especially, connecting to the related supply chain members.

The case we would like to start from the listing of three research questions to explore its impact. First, how the information system has been seen as a tool that could establish the headquarters mechanisms and integrate the process of supply chain in the company? Second, how the established mechanisms to change the headquarters process. Finally, what are the competitive advantages of the company from the information system implementation?

## 2. LITERATURE REVIEW

### Supply chain management

A typical supply chain is a simply network of materials, information and service processing links with the characteristics of supply, transformation and demand [3]. SCM is a systematic, strategic coordination of the traditional business functions and tactics across these business functions within a particular company, and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual company [4].

For achieving supply chain agility, the supply chain needs a well integrated IS internally and externally to realize information visibility and to increase transparency across the supply chain. Some operations researchers have investigated the function of supply chain agility; they have concentrated on fundamental operations, such as purchasing and distribution in centralized concepts, and by changing the transportation method [1], for example, through data exchange, delivery, etc. However, most studies have focused on discussing integration issues from the IS such as ERP systems [5], e-business technologies [7], and e-procurement applications [13]

### Global headquarter

Kono [9] notes that a functionally integral headquarters included three main functions. The first was the formulation of a corporate strategy, which is carried out from top management, the planning department, the research management department and the budget department. In-group meetings, some issues

mentioned include the goals of the company, the product-market strategy and integration of division and production control strategies. Following from this, in order to increase organizational competitiveness, the expert functional staff department, must identify and develop the organization's competitive core. Therefore, departments such as human resources, production, and marketing would have to accumulate knowledge, standardized daily, and help line departments to develop expertise in building a knowledge base by investing in resources such as personnel, fixed assets, and ISs.

**Collaborative commerce**

Russell [8] concluded three major points of view on the logistics supply chain. Firstly, the integrated head office should play the role of a coordinator, through the centralized method, integrating their logistics activities in a commercial context, which should be built on reliability, maintainability, and supportability in their ISs, focusing on customer requirements, and coordinating the supply network [2]. In addition, it should support useful information [10, 12], and all other integrated logistics support elements. The second point of view is that the company merges supply chain thinking and breakthroughs on some of the problems and issues related to the interconnectivity and interactivity of information technology, logistics processes, and customer support. Finally, SCM is not a passing stage in the evolution of management practice, but a major revolution that is already delivering end-to-end visibility, cost reductions, and new levels of performance metrics in meeting customer requirements.

Integration of business resources is still an important in the supply chain issue [11], especially in the complexity of business environments and competition for opportunities. Due to this, the supply chain has not only been used to explain logistics activities, but also the planning and control of materials and information flows internally within a company or externally between supply chain members [6].

**3. RESEARCH METHODOLOGY**

**Research framework**

Our conceptual framework (Figure 1) is based on the company who established the global headquarters using the supported information systems into the headquarters mechanisms. This study concerns about the influence between information process and the company's strategy. Therefore, the research framework shows the relations among each part of systems. The authors aimed to three systems (global supplier relationship management (GSRM), integration product lifecycle management (iPLM) and global headquarter system (GHS)) in their headquarters to discuss how information system impacts on the case company.



Figure 1. Conceptual framework

**Case selection and description**

The case had been in-depth investigating from a Taiwanese electric company, which established a global headquarters to distribute the enterprise resources, separates business divisions into three different locations (Taiwan, China, and Vietnam). The case company is a well-known worldwide key components supplier of the motorcycle. It selected from "Innovative Technology Applications and Services Program", which sponsored by Ministry of Economic Affairs in Taiwan. The investigation process has been separated into two stages. The first stage is proposal presentation, which includes reviewing proposals, process redesign and checking performance. The

second stage is tracing execution performance, which includes times of interview key persons and field observations. The implementation periods took for 24 months, and there are four to five domain experts had been invited to help investigate.

**Case company**

Case company is a manufacturer of electrical and power transformers, switchgear, automation, controls and automotive electrical devices with headquarter in Taiwan. The company was founded in 1955. The company lists fifteen sales subsidiaries and over one hundred distribution partners worldwide. Additionally, the company's operates manufacturing factories in Taiwan (three in Hsinchu), China (ten in Xiamen, Suzhou, Wuxi, Changzhou, Fuzhou, Wuhan, etc), and Vietnam (one in Southern Vietnam). Until now, they owned five business divisions, which includes heavy electric, automobile equipment, breaker and switchgear, automation, and headquarter sales division and others. Their total revenues around 18.5 billion NT dollars in 2010 (Figure 2).

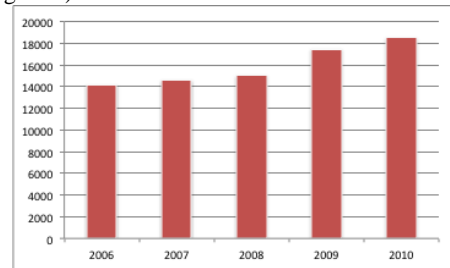


Figure 2. The case company these five years revenues report

The company provides heavy electrical machines, including electric power transformers, high voltage switches, air insulated switches, capacitors, generators, uninterrupt power supply (UPS) products, water resource processing equipment, industrial automation systems and digital integrated electric meters, among others, as well as electrical machines, including automobile electric products, automobile electronic products, direct current (DC) motors, switches and industrial controlling products. The company also involves in the leasing and distribution of office buildings and parking lots. The company distributes its products primarily in Southeast Asia, Taiwan, Australia and the Americas. This study focused on the motorcycle business, which belongs to automobile equipment business group in the company. This group mainly produces the electric products, such as motorcycle parts, DC motor, etc. The electric industry productions are relating to factory automation and national standard of living. Especially, two things have influenced the automobile and motorcycle parts markets. The first, Taiwanese government is expending the urban public transit system, such as Taipei Metro. The second, the population is on the decline making the motorcycle market is gradually stepping into saturation. In addition to the raising crude oil prices and financial tsunami, the sales volume is not well in the automobile and motorcycle market, until recently the markets are slowly recovering. The international automakers already performed global sourcing mechanism into the procurement process. Therefore, the prices competition turned white-hot on the global markets. Case company's motorcycle business is facing the challenge of purchasing prices in the global market. At the same time, the Association of South-East Asian Nations (ASEAN) had signed a free-trade agreement (FTA) with China to connect both side markets. Especially, in January 2010 the FTA linking China and the ASEAN came into force, which threats to Taiwanese export competitiveness. Meanwhile, the electronic components and semi-conductor manufacturers are extending to the automotive electronics industry, which seriously impacts on case company's electric market.

Therefore, case company set the oversea offices in order to cope with global market competitiveness and connect to their clients and suppliers. The figure 3 shows the case company's global arrangement. According to the map, case company announces three regional centers (black nodes) in Taiwan, China and Vietnam. Each center has linked up with different clients, suppliers and owned ERP system, which supports the functions, such as processing the daily work, and coordinating the branch resources. It is essential to solve the problems (separated resources and information integration) in dispersed regional center.

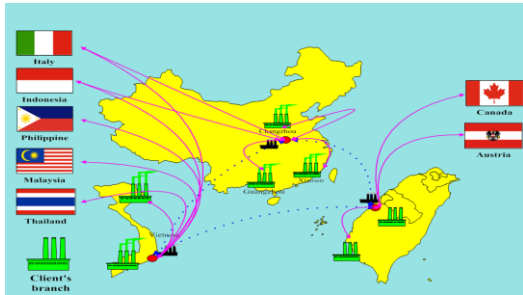


Figure 3. Case company's global logistics layout  
Resources: case company

#### 4. CASE DISCUSSIONS

Case company hopes via to establish a headquarters integrating the resources and information from different ERP systems. On the other hand, the company wants to control the critical resources allocation to enhance supply chain abilities to reduce the operating cost and improve their competitiveness in the market. Therefore, the company sets another two supporting centers (operation center and research center) to facilitate the headquarters to resolve the four problems. The first, case company faces the problem of depressed bargaining power, because, the case company used to adopt the local production and replenishment process (Figure 4).

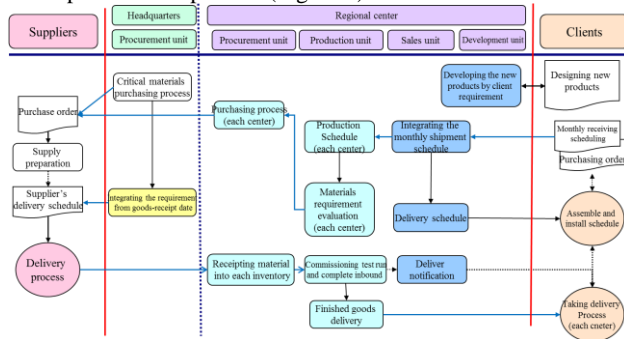


Figure 4. Local production and replenishment process  
Resources: case company

Each branch has authorized to perform requisition and procurement process and owned sourcing strategy, which based on the regional suppliers, except for few critical materials. Taiwanese business managers had evaluated the new clients to decide the production base and quotation requirement (Figure 5) then sending a request for demands to each regional center, which feedbacks the cost evaluation. The Taiwanese business managers will report the quotation to the new clients.

However, it is difficult to obtain the number of economies of scale to depress the company's bargaining power, because they cover the three problems in the decision order process. 1. Hard to get the new market, because Taiwanese business manager, who not only looks for the new clients from the global market, but also manage the new clients quotation. 2. The critical decision is not in time enough, because Taiwanese business

managers take around one hundred and twenty two days of the business trip in one year, and it is hard to respond the strategy of the quotation from new clients and select the useful production base. 3. Losing the global sourcing mechanism, the company does not integration their global supplier information; it is unsuccessful in building the quotation mechanism.

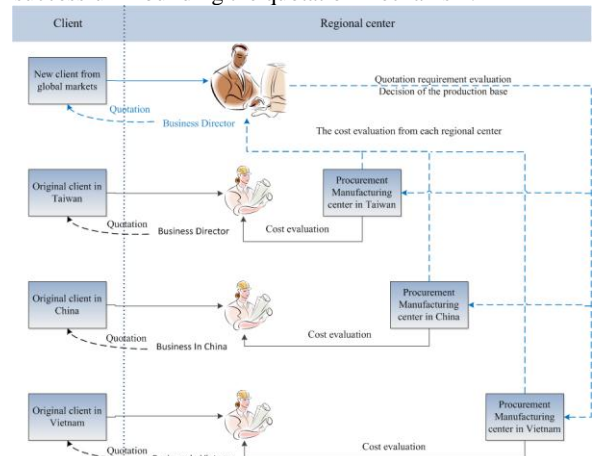


Figure 5. The global quotation process  
Resources: case company

The following is happening in purchasing the critical materials. Each production base does not integrate the critical materials, and they followed owned requirement to complete the purchasing order making the number of critical materials cannot achieve the economist of scales, difficult to use their power to negotiate the prices with the suppliers (Figure 6). Especially, each regional centers use the owned ERP, which result problem in the information transmission and integration. For instance, if case company had received a request from their client to Vietnam, the company would have used their Vietnam regional center to shipment their resources and source the materials to carry it to their client. At the same time, in the supplier management, the Vietnam regional center only can use local sourcing mechanism to obtain the local supplier information, because, the global supplier information must disperse in the different ERP's supplier main file, which saves the payment information in the ERP, provides the statement of delivery, and the price of the goods.

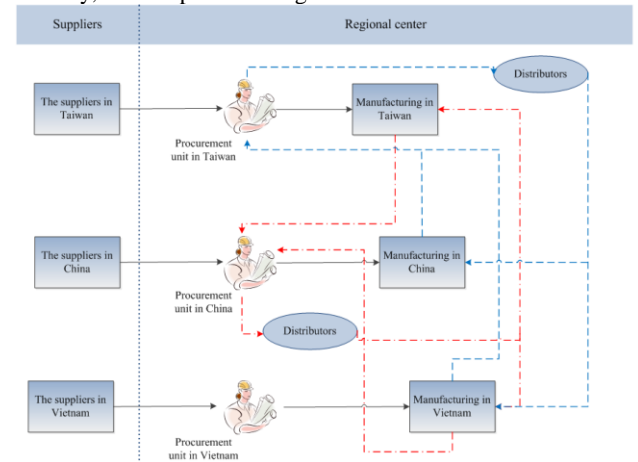


Figure 6. The purchasing process in critical materials  
Resources: case company

Therefore, the company cannot provide the detailed information about the interregional supplier in time, and facilitate regional center to evaluate the supplier's capability. In terms of, the

company cannot minimize the cost in efficient and the inconsistent contact windows are making the company spending time to look for the sourcing mechanism, because of their shipment strategy based on the single regional center. The third, the schedule of new products design moved forward extremely slowly, because, case company spend twelve months in the product design process (Figure 7) to develop a new product for their clients. In this period, the company takes a lot of time to look for resources from different locations. Therefore, the company cannot satisfy their clients' requirement in time, such as reduction the time of development, and speedy released new products.

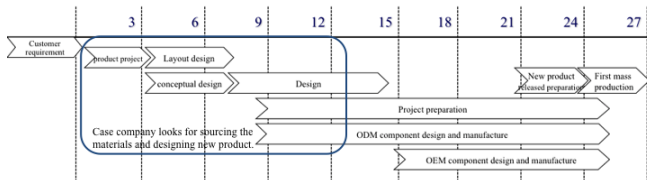


Figure 7. Product design process  
Resources: case company

Furthermore, independent IS made the Taiwanese research center might not be fully considered as the production equipment and research capability in China or Vietnam and even the statement of the regional suppliers (Figure 8). Finally, the problem has been found in the pilot run. The research and development (R&D) engineers need to use E-mail connect to production line workers to fix the components magnitude and adjust the blueprint then pass it to design verification test (DVT). However, inconsistent information results the staffs for waiting the confirmed messages, especially, the information transmit between the different ISs.

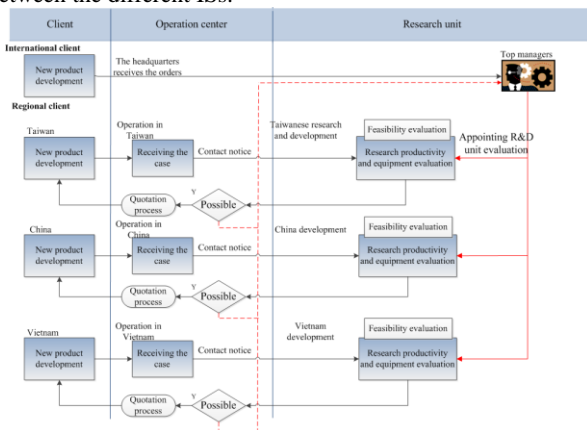


Figure 8. Developing new product decision process  
Resources: case company

Finally, each regional center cannot combine the statement of projects from the dispersed product data management (PDM) system (Figure 9). Therefore, the staffs must follow project schedule to control the project progression by using E-mail, Fax or phone. On the other hand, Taiwanese designers have to communicate the blueprints with the other regional center's design or workers to confirm the size of parts, even bill of materials (BOM).

There are two problems would occur between Taiwan and the other two regional centers. First, the Taiwanese designers also have to spend time in the business trip, because the designers use the telephone or E-mail to discuss the blueprints, which would easy make misunderstanding from the phone or E-mail. Second, the PDM system does not integrate with ERP causing the parts or BOM information cannot transmit immediately making the designers have to spend some time to wait for information from ERP.

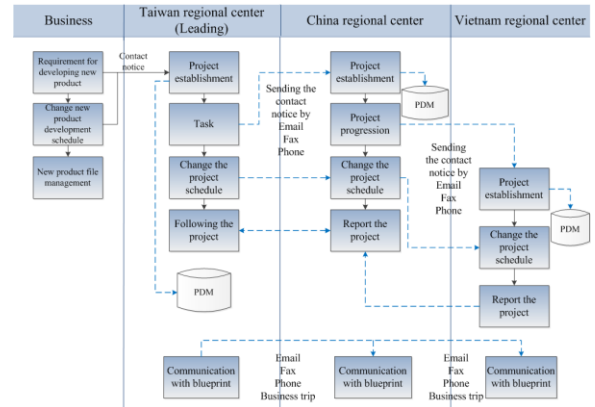


Figure 9. Interregional collaborative design  
Resources: case company

### Global headquarter mechanism

Case company establishes the headquarters, and set the operation center and research center for improve the company's competitiveness in the motorcycle market. On the other hand, the company had implemented business-to-business integration (B2Bi) Web interface and enterprise application integration (EAI) in order to integrate ERP systems from different regional centers (figure 10). They preserve the original regional ERP systems as core operations, and address B2Bi between the headquarters and ERP systems to gather information from the regional centers then through extract, transform and load process to transfer the information into headquarters system.

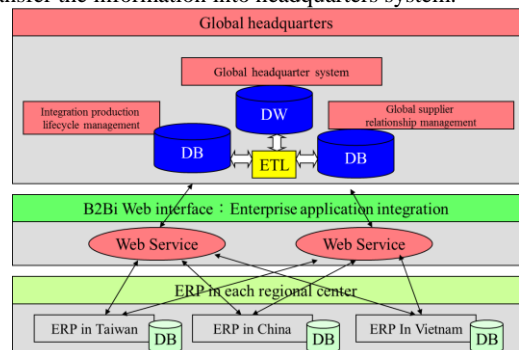


Figure 10. Case company information system architecture  
Resources: case company

Case company established the headquarters developing two main supporting systems, which named GSRM, iPLM and GHS. Finally, the information would be sent to iPLM and GSRM increasing the information transparency and transmitting the useful information into GHS. However, the case company also creates four headquarters mechanisms (Table 1) to support their operation center and research center.

Table 1. The Global headquarters mechanisms

Global headquarters mechanism		
Operation center	<b>Global quotation and order decisions</b>	<b>Critical material centralized procurement</b>
	<ol style="list-style-type: none"> <li>Consolidating on the cost of global supplier's items into GSRM.</li> <li>Using development platform to simulate forecasting BOM.</li> <li>According to the element of cost, the headquarters rolls up for the future cost simulation.</li> </ol>	<ol style="list-style-type: none"> <li>Integrating the forecasting shared and critical materials from ERPs into the headquarters.</li> <li>The headquarters proposes the centralized pricing to the suppliers.</li> <li>The regional center follows the production schedule making orders.</li> </ol>
	<b>New product research decision</b>	<b>Interregional collaborative design</b>
Research center	<ol style="list-style-type: none"> <li>The products extend decisions.</li> <li>Discussing the annual works with cooperation technical partners</li> <li>Implementing the resources planning to new products, and new technology.</li> </ol>	<ol style="list-style-type: none"> <li>The headquarters performs centralized control in every project</li> <li>The headquarters distributes the new product, and division of regional design.</li> <li>Accumulating the knowledge of developing and drawing to reduce the time of development</li> </ol>

Resources: case company

**Global quotation and order decision mechanism**

After the company implementation the GSRM, they, first, set the global quotation and order decision mechanism, which brings some advantages to support the operation center (Figure 11). The headquarters separated their products into two situations. First, when the company received the global general product orders from the new clients, the headquarters decided the production base and products.

Second, when the company received the special product orders from whether new or original clients, the regional center will manage the project to analyze the return on cost and quotations. Therefore, GSRM plays the critical role for not only providing the global supplier information, but also gathering information from each trade. However, whether the headquarters or the regional centers can immediately obtain the new information, which related to the qualified suppliers, production capabilities, delivery date and the cost reports.

On the other hand, GHS provides production areas, products and cost information, which helps the company to simulate and roll up the production cost saving into GSRM to promote the quotation rates of accuracy. In terms of the company must evaluate the customer conditions, such as performance, quality and price, from GSRM then using their advantage of sourcing capability to build the prototypes and create the model BOM from it to determine the forecasting BOM to predict the customer demand. It is functional the company to an inquiry process and increase the bargaining power, especially, in the new market development to increase the strategy quality.

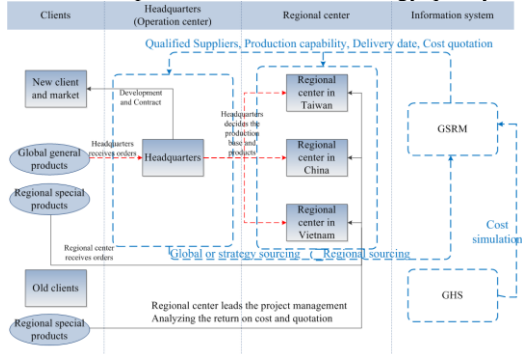


Figure 11. Global quotation and order decision process  
Resources: case company

**Critical materials centralized procurement mechanism**

From the critical materials centralized procurement process (Figure 12), the headquarters must roll the forecasting orders and the clients long term requirement to propose the centralized prices to the suppliers. The suppliers will ship the goods to the appointment distributors, who are going to deliver the materials to the regional centers in time. On the other hand, the regional center can support the production scheduling rolling the forecasting order to the owned suppliers to ask for the critical materials procurement. It is not only increasing the regional center's production capabilities, but also reducing the time for waiting materials.

According to ERPs historical requirement information, GHS provides the information, which related to forecast the critical parts requirement, and share the cost information to help GSRM provides the integrating procurement resumes from the regional center. The staffs can directly query the part number to gather the prices and supplier information and material sourcing to increase the sourcing efficiency and confidence. Therefore, the regional centers' procurement unit updates the suppliers, and material information every month making the part number synchronized to ERPs to avoid the company's sourcing problem.

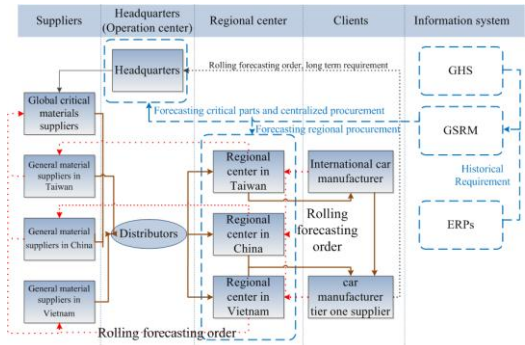


Figure 12. Critical materials centralized procurement process  
Resources: case company

**New product research decision mechanism**

The headquarters controls the new product and technology planning (Figure 13). When the headquarters receives the new product development orders, they have to do feasibility evaluation based on the characteristics and the client's areas. If the regional centers have the ability to develop the new products, they are going to report to the headquarters based on their research productivity and equipment evaluation. By reaching the quotation process, the regional centers extract the valuable information from GSRM, at the same time, reply the possible prices to the regional clients. On the other hand, the headquarters updates the information, such as new products and new technical partners into iPLM. Therefore, case company can use the headquarters to manage the regional markets also via iPLM to predict the clients demand, and decrease time of new products development.

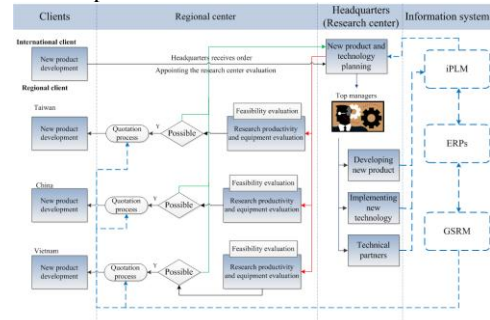


Figure 13. New product design decision process  
Resources: case company

**Interregional collaborative design mechanism**

In the interregional collaborative design process (Figure 14), the headquarters can via the iPLM to create the new projects, and immediately determine the task to send the project notices to the Taiwan regional center, which will lead the project schedule to coordinate the other two regional centers to do the collaborative design. At the same time, iPLM provides the notice and trace function to assist the regional centers controlling the projects states. Therefore, the company can make sure the project finished in time.

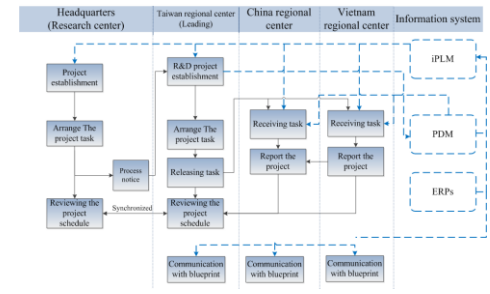


Figure 14. Interregional collaborative design process  
Resources: case company

The company shared PDMs resources, which support the regional centers can easy to integrate research resources, and the designers reduced the time for looking for the blueprint. On the other hand, the company integrates PDMs and ERPs solving the problem in repeatable parts and BOM information. Finally, the designer also can save time for the business trip, because the company implementing online viewer function in iPLM, the designers can use the online meeting to communicate the blueprint information to reduce the error cost.

## 5. CASE FINDINGS

The headquarters is an organizational mechanism which functions starts from call for collecting the inside resources, coordinating the suppliers and communicating with the other headquarters until to distribute the resources to the right positions. The case company established the global headquarters mechanism (GHM) to monitor the interregional supply chain performance. GHM consisted of two information systems; one is GSRM, which used for global resources searching. The other is iPLM, which used for online product development, integrating the interregional resources, and supporting integrated information to help ERP's synchronization. According to the investigation result, there are some critical facts as follows:

1. GHM is matter. GSRM provided accurate information on time. ERP calculates the cost of key materials getting more accurately and that helps the company obtain the key material cost from each \$ 4.1 per/pic, reduce to \$3.465 per/pic US dollars.
2. GSRM also provided an interactive platform that avoiding the error caused by staff. The precise information delivery facilitated the company increases the decision making capabilities, the information correctness from original 88% rises to 95%.
3. Implemented GSRM and iPLM helped the company reducing the time of information delivery, especially, the interregional product development process, which from original ten months reduces to three months.
4. GHM facilitated the integration of the collaborative process not only between the different divisions of the company in one site, but the different site of divisions, such as Vietnam and China as well, the work become more clearly and precisely, the user acceptability raised and the working process redesigned.
5. GHM provided a one-stop-service to the stakeholders. Whether the internal collaboration, (headquarter, and branches) or external coordination (suppliers, and clients), the company established a B2Bi platform unifying the contact window to satisfy the requirement of GSRM and iPLM. It not only reduces ERP impact, but also increases the capability of system integration.
6. The headquarters plays a critical role in the unified contact window, which helps the company increases the bargaining power to suppliers and decreases the waste resources and avoids repeat orders. The headquarter brings two significant benefits, first, rising straight up the communications with customers, and second, integrating procurement resources that directly request for orders in the shortest period to appointment suppliers.
7. The creation of the reciprocal mechanism which not only enhancing the supply chain collaboration, but also obtaining the sponsor in orders from international brand manufacturer. The company becomes a tier one supplier, and indirectly leads the other suppliers into the supply chain to get the win-win situations.

## 6. CONCLUSIONS

In accordance with the case finding, there are two arguments could enhance the teaching a case in the classroom or the consulting service execution. First, the precise requirements (whether product specification or role of systems) and real time interactive functions both are contributing to promoting the headquarters mechanism. Second, information systems facilitated the headquarters integrating the information of resources requirement and allocation which contributed to achieve economies of scale and take suppliers equity into consideration not only increasing the bargaining power to suppliers, but also obtaining the suppliers' satisfaction, as well as company's competitive advantages.

## REFERENCE

1. A. Geoffrion, & R. Powers, "20 years of strategic distribution system design: evolutionary perspective", **Interfaces**, Vol. 25, No. 5, 1995, pp.105-127.
2. E.D. Zhai, Y. Shi, & M.J. Gregory, "The growth and capability development of electronics manufacturing service (EMS) companies", **International Journal of Production Economics**, Vol. 107, No. 1, 2007, pp.1-19.
3. I.J. Chen, & A. Paulraj, "Understanding supply chain management: critical research and a theoretical framework", **International Journal of Production Research**, Vol. 42, No. 1, 2004, pp. 131-163.
4. J.T. Mentzer, W. DeWitt, J.S. Keebler, S. Min, "Defining supply chain management", **Journal of Business Logistics**, Vol. 22 No. 2, 2001, pp. 1-25
5. L.E. Allen, "Where good ERP implementations go bad: a case for continuity", **Business Process Management Journal**, Vol. 14, No. 3, 2008, pp. 327-337.
6. M.C. Cooper, D.M. Lambert, J.D. Pagh, "Supply chain management: more than a new name for logistics", **The International Journal of Logistics Management**, Vol. 8, No. 1, 1997, pp. 1-13.
7. S. Devaraj, L. Krajewski, & J.C. Wei, "Impact of e-business technologies on operational performance: the role of production information integration in the supply chain", **Journal of Operations Management**, Vol. 25, No. 6, 2007, pp. 1199-216.
8. S.H. Russell, "Supply chain management: more than integrated logistics", **Air Force Journal of Logistics**, Vol. 31, No. 2, 2007, pp. 55-63.
9. T. Kono, 1999. "A strong head office makes a strong company", **Long Range Planning**, Vol. 32, No. 2, 1999, pp. 225-236.
10. Y. Shi, & M. Gregory, "Emergence of global manufacturing virtual network and establishment of new manufacturing infrastructure for faster innovation and firm growth", **Production Planning and Control**, Vol. 16, No. 6, 2005, pp. 621-631.
11. Y.C. Lin & P.H. Tsai, "The Impact of Global Logistics Integration System on Localization Service and Business Competitive Advantage", **European Business Review**, Vol. 21, No. 5, 2009, pp. 418-437.
12. Y.C. Lin & P.H. Tsai, "The Impact on Global Logistics Integration System to Concurrent Collaborative Process", **Advanced Concurrent Engineering**, 2009, Part 2, pp. 105-114.
13. Y.C. Lin & P.H. Tsai, "The Influence of the Headquarter Establishes on the Procurement Process to Supply Chain", **The 2010 International Conference on Innovation and Management**, July 7- 10, 2010, Penang, Malaysia.