Computerization in Keda: Best Practices

IS6930 RESIDENTIAL TRIP

FINAL REPORT
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Computerization in Keda: Best Practices
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EXECUTIVE SUMMARY

With just a 20% successful rate of ERP (Enterprise Resource Planning) implementation in China, it signifies the specific challenges to those enterprises which are about to implement such a large-scaled project to the company. Despite the high failure rate of ERP implementation in China, on the contrary, Keda Industrial Co. Ltd. (abbreviated as “Keda” thereafter) has marked a successful record in the history. From planning to implementation, Keda took only a period of eight (8) months to fully deploy ERP successfully to the company in one shot. With respect to the accomplishment performed by Keda, the effort behind the implementation process makes it worthwhile for the team to study on its elements to success.

The report will first conduct a thorough review on the process of ERP implementation in Keda and identify the key factors that gauge the success as a case study. It will then generalize these critical success factors to build a theoretical framework named ‘FACTS’, which serves as a set of best practices for large-scaled information system project implementation in Keda. Components of ‘FACTS’ are illustrated as follows:

‘F’ – Focus
‘A’ – Assessment
‘C’ – Change
‘T’ – Team
‘S’ – Sharing Information to Create Values

In the latter part of the report, as a mean to further advance the proposition of ‘FACTS’, two (2) domestic cases of ERP implementation will be examined. These enterprises possess similar business operation natures as Keda which can be referenced to support the applicability of the framework in a real-life context. As to the support from a literary aspect, a concise literature review will also be conducted to confirm the configuration of ‘FACTS’.
The Keda case and the conceptual framework ‘FACTS’ introduce in this report should be capable to establish as an exemplary for other businesses, ideally to enhance the successful rate of enterprise system implementation in China.
COMPANY OVERVIEW

INTRODUCTION TO KEDA

Found in 1992 by Mr. Lu Qin, with an initial capital of only 90 thousand RMB invested, Keda Industrial Co. Ltd. has now expanded into a listed company on the Shanghai Stock Exchange in 2002. With a blink of 15 years, its net profit has now attained to an amount of more than 100 million RMB in 2007.

Stationed in Shunde of the Guangdong Province in China, Keda mainly manufactures large-scale machinery and integrated systems for the ceramics and stone processing industry. It also offers complete plant design and technical consulting services to both ceramic and stone producers. Currently Keda has more than 2,000 professions and experts working for the company. Competing with over 280 players in the industry, Keda is sustaining a position as the forefront leader in China, and is being ranked as the second in the world. The mission of Keda to ‘Being the champion in the world of building materials and equipment industry’ reflects its determination to pursuit for the paramount with its unremitting endeavor.

ACHIEVEMENTS AND ACCOMPLISHMENTS

Throughout these endeavoring years since 1992, Keda has developed numerous ‘the first’ machines in China, as to the recent D7800 ton pressing machine. All these achievements have led it to the recognition of its outstanding performance which has ranked Keda as the Top 500 China National Machinery Manufactures, Top 10 Building Material Enterprises in China and other acknowledgement of its success.
JOURNEY TO SUCCESS

The expansion of Keda can be delineated as a 3-stages journey. In the mid 90’s, where companies in Europe were still the forerunners in the industry, Keda had undergone an epoch of ‘modeling’ international industry leaders to emerge its business in China, diffused into the domestic market and successfully acquired the championship in China. By the late 90’s, Keda had already ‘revolutionized’ the conventional technologies in the ceramic machinery industry, and brought in product innovation to develop the state-of-the-art (polished brick manufacturing equipment and polishing line) which had fortified its foundation to enter into the battle in the overseas market. From early 2000, Keda had stepped into the stage of leapfrog, which surpassed its global competitors and anchored its position as the second industry leader world-wide. The success of Keda contributes to foster its Chinese manufacturing model (造式) to compete directly with the European manufacturing model in the international market. In 2007, the introduction of a production line ‘Modulo’ (大规格陶瓷薄板) pushed Keda into another climax to a more energy-saving, less resources consumption, and environmental friendly manufacturing approach of which it promotes a recyclable green economy production model as opposed to the traditional practice in the building material machinery industry.

KEY TO SUCCESS

SACMI of Italy is the major opponent of Keda, and also the leader of industry. Globalization is the tactic for Keda to move towards the trophy in the world. To boost itself to become the outperformer in the industry, Keda accentuates the need to ‘innovate’. The establishment of the National Enterprise Post Doctor Working Station and its investment of 45 million to set up the Ceramic Engineering Test Center (陶瓷工程试验中心) with a strong team of professions for research and development should be accounted for its commitment to care about its expertise and technology. However, by the mean of advanced technology and innovation is inadequate. In such, a competitive pricing strategy contributes to its business success also. Similar to most of the industries
in mainland China, Keda can benefit from the verge of low manufacturing cost, which provides it a competitive edge to compete internationally. With the first polished brick manufacturing machine (瓷质砖抛光机) invented, Keda could mark the price as low as 2.5 million RMD per machine, comparing to similar series imported from overseas costing at 1.2 million USD. To facilitate its low cost tactic, apart from building up strategic partnerships with major suppliers through contractual relationship, the contribution from enhancing information transparency and data management in Keda through computerization should be honored.

INTERNAL MANAGEMENT

Formerly Keda was running under a single-plant operation mode. With the on-going expansion of its business, Keda has been transformed into a multi-plant organizational structure, composes of eight (8) business divisions and two (2) subsidiaries – the Keda Stone Machinery Co. Ltd. and the Foshan New Power Clean Energy Technology Co. Ltd. Each division/subsidiary shares the same functional departments under the Office of Managing Director. In other words, Keda is now managing under a matrix operation mode of which each business unit is running independently with a shared pool of supporting resources.

Keda has established five (5) sets of underlying rationales covering the core company values, cultural values, principles of human resources management, codes of conduct and working principles as the corporate culture for the company. Its philosophy of people management is one of the elements which make Keda a success. Through offering a comprehensive recruitment package and introduction of staff retention scheme to its qualified personnel, it shows that Keda recognizes its staff as valuable assets to the company which mainly contribute to the stability and sustainability of the company. In return, the management strongly promotes ‘Value Creation’ and ‘Innovation’ to its staff to enhance the competitive edge of Keda. The culture of ‘Value Creation’ exactly elucidates the motive of Keda to commit the significant amount of investment to
advocate the implementation of computerization, which can facilitate decision making process and internal management of the company.

BACKGROUND OF THE INFORMATION CENTRE

The Information Centre began with an Information System Team under the Office of Managing Director. When Dr. Zhu, now the General Manager of Keda, joined the company in August 2003, with his farsighted vision, he advised to suspend all existing developments and determined to build a roadmap for computerization in Keda in 2004 starting from zero. At that time, the Information System Team was supported by seven personnel, of which only 2 of them were experienced in information systems. In view of the inadequate expertise within the team, Keda had invited a consulting firm to assist on the strategic planning for computerization. By the end of 2004, to cope with the plan for computerization, a specialized ERP Task Force had been setup, having Dr. Zhu as the leader to steer the team. In parallel, the Strategic Planning Division was established. The Information System Team and the ERP Task Force were mobilized to operate under the division. However, as the arrangement was not effective enough to achieve its expected benefits, the two teams were being restructured to formally establish the Information Centre in 2006. The Information Centre is now equipped with 19 professions located on the 5th floor of the main building.

The business focus of Keda lies on its capacity of machinery manufacturing in the ceramic industry to attain an international standard. As such, information technology is just a supplementary tool to support a formal mechanism for the company to accomplish its goals. In Keda, the path to computerization is perceived as one of the tactics to compete in the international market. Information technology is positioned as a service provider which offers a backbone support for doing business, but not a major business line in the company. Therefore, instead of building up a big team for in-house information technology development, Keda has adopted an approach to deploy off-the-shelf packages and outsource to experienced vendor and consulting experts. In this way,
not only the company can enjoy state-of-the-art technology with a best practice solution for a comparable investment, the risk incurred from the implementation can be mitigated from the experienced consultants and maintenance effort can be leveraged from the software vendor in the long run.

Journal of Recent System Implementation in Keda

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<tr>
<th>Year</th>
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<tr>
<td>2002</td>
<td>Deployment of CAPMS (MRP system) developed by Beijing Riamb Software IT Co., Ltd. (利瑪軟體資訊技術有限公司)</td>
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<tr>
<td>Sep. 2003</td>
<td>Initiated a strategic planning for computerization</td>
</tr>
<tr>
<td>Jun. 2004</td>
<td>Strategic planning for computerization completed with Enterprise Resource Planning (ERP) and Office Automation (OA) defined as the core component. A specialized ERP team has been established as well</td>
</tr>
<tr>
<td>Dec. 2004</td>
<td>Activated the 1st phase of computerization comprised of ERP, OA and network construction</td>
</tr>
<tr>
<td>Feb. 2005</td>
<td>Contract signed with Digital China Management Systems Ltd. (神州数码管理系统有限公司) for ERP consultation services</td>
</tr>
<tr>
<td>Mar. 2005</td>
<td>Stimulated the 1st stage of ERP implementation with core modules – Sales and Distribution (SD), Production Planning (PP), Materials Management (MM), Finance Accounting (FI) and Control (CO)</td>
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<tr>
<td>Aug. 2005</td>
<td>Launch of 1st stage of ERP implementation</td>
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<tr>
<td>Sep. 2005</td>
<td>Stimulated the 2nd stage of ERP implementation with modules – Quality Management (QM), Project Systems (PS), Customer Service (CS), Reporting (ES-CS)</td>
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<tr>
<td>Apr. 2006</td>
<td>Launch of 2nd stage of ERP implementation</td>
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<tr>
<td>Aug. 2006</td>
<td>Launch of OA</td>
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<tr>
<td>Apr. 2007</td>
<td>Activated the implementation of Plant Maintenance (PM)</td>
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<tr>
<td>Jul. 2008</td>
<td>Launch of Manufacturing Execution System (MES)</td>
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**THE JOURNEY OF ERP IMPLEMENTATION**

**IMPETUS FOR ERP IMPLEMENTATION**

The MRP system CAPMS developed by Beijing Riamb Software IT Co., Ltd. (利瑪軟體資訊技術有限公司) implemented to Keda in 2002 was only applicable for enterprise under a single-plant operation model. With the rapid growing capacity of the company, which has been transformed into a multi-plant, cross-functional operation mode, the MRP system can no longer support Keda on its business operation mode and processes. In addition, Riamb Software decided to terminate the support of the MRP system due to a restructuring within the software company, which triggered Keda the drive to seek for an alternative.

**JUSTIFICATION FOR KEDA TO CHOOSE SAP**

Unlike CAPMS, SAP is capable to support complex operational processes across the multi-plant platform in Keda. With more than 35 years of history and more than 40,000 customer implementation, SAP should have been enhanced to cater for numerous improvements from past experience. The package is sophisticated enough to have a proven track record of high successful implementation rate. Moreover, with reference to similar case studies, particularly for SACMI, the competitor of Keda, who has already implemented SAP, the risk from implementing SAP is low, thus can minimize any negative impact brought to the company.

**RETROSPECT OF ERP IMPLEMENTATION**

*Planning and Evaluation*
A meticulous plan can increase the chance of a project success. Back in 2004, Keda had already performed a three to five year-planning as a roadmap for its path to computerization. Within a period of six months, resources were devoted to address the strategic needs of the enterprise and identified existing problems in the company. Through the thorough study, Keda corroborated that construction of information systems was an effective mean to pursue computerization for the company. Tactics of ‘How’, ‘What’, ‘When’ to attain the objective were planned. In addition, an assessment of status quo and identification of business requirement was conducted.

Vendor selection process

In August 2004, Keda began the vendor selection process which it had invited local and overseas software vendors with enriched experience in ERP implementation. Keda had contacted twenty (20) software vendors and spent around two (2) months for conference room pilot, software package analysis and prior experience sharing. In the second round, Keda had filtered out eleven (11) vendors with nine (9) left for further study. After paying visits to the clients of the vendors, Keda conducted an analysis on ERP requirement and provided a request for proposal to the vendors. In turn, the vendors prepared their statement of work and performed presentations and demonstrations to Keda. At this stage, management of Keda was heavily involved in the vendor assessment and contract negotiation.

Building an implementation team

To accomplish the ERP project, a project team had setup in March, 2005. The team composition and the roles of the members are illustrated as follows:

1. Provide project direction and make critical decisions – top management of Keda
2. Project management support – project managers from both Keda & Digital China Management Systems Ltd. (神州数码管理系统有限公司)
3. Consultation – consultants from Digital China Management Systems Ltd. (神州数码管理系统有限公司)

4. Make decisions on business process redesign and system design – key persons (best hands) from all departments involved

5. IT support – personnel from Information Centre

Implementation Process

Below describes the five (5) stages which Keda had undergone in the implementation process:

- Assessment on status quo (現狀調研) – to identify the current business practice and operation workflow
- Design of blue-print for business operation (業務藍圖設計) – to identify the gap between existing process and the ‘to-be’ process
- Realization of system technology (系統技術實現) – to execute system development and upgrade hardware and network
- Integrated testing (集成測試) – to validate the system against functional requirement
- System Implementation (系統實施) – to deploy the system into business use

IMPROVEMENT IN KEDA AFTER ERP IMPLEMENTATION

With the implementation of ERP, the following listed the improvement areas which Keda has been benefited from it:

- Increased transparencies on data and information, especially on product cost
- Improvement on internal management
- Increased accuracy of production plan
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- More accurate inventory information which lead to a decreased demand of stock level - Just-In-Time Inventory Control
- Increased responsiveness to market
- Data accuracy increased from 85% to 98.2%
- Increased number of ‘on-time’ production delivery
- Decreased operation and management cost
- Shorter time for monthly financial reconciliation

A roadmap to successful ERP system implementation in Keda
OBJECTIVES OF THE STUDY

With reference to the market share study conducted by Gartner, the annual growth of the demand for ERP software in China has experienced an increase of 29% in 2006, when comparing to 2005; and the momentum is expected to continue in the coming years. This promising figure denotes that more and more enterprises in China will strive for the benefits from ERP implementation. Given the large sum of investment for ERP solution, “How can ERP system be implemented successfully in China?” becomes a meaningful topic that worth an in-depth scrutiny on the relevant critical success factors.

In Keda, despite that statistics is presenting a low successful rate on ERP implementation of less than 20% in China, it has performed a brilliant job on implementing ERP in 2005 successfully within a short period of eight-months time. Despite the hiccups encountered at the beginning after implementation, it is worthwhile to devote the effort to examine the merits of Keda and identify the success factors during the course. To facilitate the reusability of the best practices in Keda, this study will recapitulate the critical components to deduce a conceptual framework for large-scaled enterprise system implementation. The framework targets to provide a model to both Keda and other enterprises as an exemplary for future reference.

To support the conceptual framework, two domestic cases have been analyzed to investigate the relationship on the applicability of the conceptual framework against pragmatic cases. In this way, the foundation of the best practices can be strengthened to be applied to the implementation process of any information technology projects in general.
SCOPE OF THE STUDY

Based on the computerization journey of Keda in the past ten years, especially in the ERP system implementation, the scope of our study is to identify the critical success factors and the best practices of Keda in the implementation process at various stages listed as follows:

Stage 1 – Assessment on status quo (現狀調研)
Stage 2 – Design of blue-print for business operation (業務藍圖設計)
Stage 3 – Realization of system technology (系統技術實現)
Stage 4 – Integrated testing (集成測試)
Stage 5 – System implementation (系統實施)
METHODOLOGY

In this study, all information are collected through the form of company documents, company visits and interviews, questionnaire, benchmarking and literature review.

Company document

Review the detailed process at various stages of ERP implementation in Keda.

Company visit and interview

During the pilot trip on May 17, 2008 and the residential trip held during June 22-28, 2008, interviews were conducted with the following personnel. During the interviews, the team has obtained in-depth information on the business nature of company, computerization planning, and experience sharing on ERP implementation process and the management philosophy as well as the role of IT in Keda.

- Dr. Zhu, the General Manager
- Mr. Zhang Bei-Jun, the Director of Information Centre
- Personnel of the Production Planning module (Mr. Tin) and Material Management module

(Refer to Appendix for the interview protocol).

Questionnaire

Collect the opinion from SAP end-users about the implementation of the ERP system.

(Refer to Appendix for the questionnaire).

Benchmarking
Support the applicability of the conceptual framework from a pragmatic aspect – FACTS with reference to cases of ERP implementation of other companies with similar business nature to Keda.

*Literature review*

Support the conceptual framework of FACTS from a literary aspect.
OVERVIEW OF CONCEPTUAL FRAMEWORK: FACTS

F – FOCUS
Clear Business Goals
Alignment to business strategy
Management Support and Engagement
Management Involvement

A – ASSESSMENT
Identification of business requirements
Compatibility of software package with business requirement
Engagement of Competent Consultant
Close Monitoring on implementation progress

C – CHANGE
Effective Change Management Program (People, Technology, Business Process)
Communication
Implementation Approach
Corporate Culture

T – TEAM
Team Composition
Cooperation and Collaboration
Effective Project Management

S – SHARING INFORMATION TO CREATE VALUES
Turning Data into Information
Data Integration and Data Quality
EMPIRICAL FINDINGS

F - FOCUS

Clear business goals

In view of the company growth from single-plant to multi-plant operation mode, the capacity of the MRP system could no longer support its business development, therefore, in 2004, they had conducted a comprehensive planning on computerization for the need in the coming 3-5 years. Mr. Zhang, Director of Information Centre, said:

“We decided to suspend the existing systems and started from the beginning to plan for it. That’s why we started the computerization planning in 2004. To plan for computerization, we had to know how much we have to invest, what kind of system we will build. We have to define our objectives, identify the problems that hinder the company, clarify on why we need computerization and what kind of problems we are targeting to resolve.”

In view of this, Keda had spent a 6-month time to conduct a roadmap for computerization and concluded that they need to implement ERP, PDM, OM and SCM by phase. As revealed in the project initiation report (科达机电信息系统建设立项报告), Keda had conducted a detailed analysis (as shown in Figure 1 and 2 in the Appendix) covering various aspects such as market analysis, details of computerization project, major functional objectives of implementing ERP and OA system, the estimated investment and expected benefits, a feasibility study in terms of staffing, internal management policy, data management, technology and risk evaluation.

Strategically fit with business strategy
Keda is leading the direction of domestic ceramic industry on technological innovation. Their goal is “To be more professional and international”. In the interview with Dr. Zhu, the General Manager, he clearly stated that:

“Our goal is to be the leading player in the international market. Such quantifiable goal cannot be attained by just increasing labor hours and working overtime, it requires a well-established structure and system to ensure…… including computerization as a mean. Actually, computerization is an auxiliary tool that helps to achieve company goal and business development.”

Dr. Zhu further elaborated that “Enterprise should be aware of what their core competency is…… For Keda, we position ourselves to compete in the machinery manufacturing industry, our target is to be the leader in manufacturing of ceramic machinery, our professionalism is on machinery manufacturing… other than that we acquire everything from outside ……. We can communicate our requirement to the IT professionals (the vendors) and build what we want… if we can rent, we rent; if we can buy, we buy; we do not have to build by ourselves”. In this sense, Keda focuses on its core competency on product innovation, and acquires other resources, such as software package of ERP system which strategically fit with their business strategy, either from outsourcing or direct buy-in instead of maintaining a big team for in-house development.

Management support and involvement

Final decisions on ERP implementation was made by the Chairman, as Mr. Zhang said

“…… He (The Chairman) has a good vision ….. wherever he locates in the world, he wishes to keep updated with the company operation condition from the laptop at his fingertips, no matter it is a profit or loss, the data will tell him the truth instead of a report from the Financial Manager …..”
Top management support to the computerization project at Keda had truly reflected through their direct involvement in the implementation process. For example, in 2005, the Chairman had only joined five (5) board meetings of the company, of which four (4) of them were related to the progress status update of the computerization project, including the project meeting, the blueprint design briefing and the project launch ceremony. Mr. Zhang further addressed that “In the project implementation process …… reactions from the head of business units actually depends on the attitude of their senior executives, they would not express their opposition to the change if top management had shown their determination on the implementation of the project.”

Management support and involvement is not a must, it has to be earned from proactive engagement by top management during the key stages of the process. Mr. Zhang said “In the vendor selection process, we had invited 20 companies to conduct site survey and assessment. The main purpose of the process to bring in a concept to the middle and senior management staff on computerization as everyone can bring up new ideas… we had selected 9 vendor after the tendering process and invited them to present their proposal to us. Actually the target audiences were the senior management in Keda, the main purpose was to provide them a solid grounding about computerization”. He also added that,

“Through the process, you could test how excited they were on the project. If they were not willing to attend the presentation proactively, it showed that their support was only rested on their words and the new system could not be moved forward …… At that time, their responses were quiet positive …. With the solid grounding on the issue, they (the management) had to grade on the tenders based on how the proposal could fulfill the needs of the company. Then, in the business negotiation stage, the senior management was heavily involved in the negotiation directly.”

On March 8, 2005, the Chairman and General Managers were invited to attend the project kick-off ceremony. In the ceremony, the project requested the management to mobilize human resources to work in a collaboratively manner. Regarding the arrangement, the
business unit managers worried that if they worked for the project team for a period, it indicated that they were of no value to their existing functional role when the business unit could still be running well without them. In this respect, Mr. Zhang reflected their viewpoint to senior management and the response from the General Manager showed the full management support to the project that “it is of equal importance for ERP implementation and daily production, any failure or negative impacts brought from either of them to the other is not acceptable”. Mr. Zhang emphasized that “Management support and supporting words from management at critical moment is essential to the successful implementation of ERP system”.

A - ASSESSMENT

Assessment on status quo

“The ERP project was kicked-off by the end of 2004. In the first place, we had conducted a vendor assessment process. At that time, we had invited 20 local and overseas companies to visit our company for detailed evaluation and assessment”, Mr. Zhang said.

In October 2004, Keda had invited twenty (20) vendors to participate in the software assessment. Also, it had requested for site visit to the vendors’ client companies for benchmarking and referencing. Through the site visits, Keda had captured the experience of other companies and came up with ideas on what problems needed to be tackled in the implementation process. Finally, Keda selected nine (9) companies for a comprehensive modeling. Keda then summarized what they need for the ERP system in a requirement specification (ERP 业务需求报告) and invited the vendors to submit tender based on their requirements. As revealed in the report (ERP 业务需求报告), it has clearly stated the main objective of ERP system, the scope of implementation and a concrete requirement assessment in respect of the various modules to the management of the company. For example, for the Purchasing Management (PM) module, the main objective is to support multi-business unit operation and facilitate centralized
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procurement and distribution in order to reduce operation cost and tighten financial control. Moreover, specific requirement assessments on the PM module focusing on supplier management, purchasing planning management, material cost control, purchase order management and capital management on procurement had also been conducted. (Please also refer to Figure 3 of the Appendix for the “Project Plan of computerization projects in Keda”.)

Gap analysis between business need and software package

After vendor assessment, Keda started the preparation work for ERP implementation. In Keda, the documentation on the blue-print design of the ERP system was conducted by key users of each individual module. In other words, all documentation was prepared by business unit managers, who understood the business processes the most and were the ‘best hands’ of the unit. In this stage, a gap analysis between business need and the ERP software package was conducted. When there was a conflict, final decisions would be made by top management. Mr. Tin, the Head of the Manufacturing Management module, said “We tried to discuss among the representatives of key users in order to seek for a compromise, the consultant might provide advices in the process; if no resolution could attain, the issue would be escalated to management for final decision-making.”

Periodic review on project progress

Through the exchange of information among various parties, the project progress of the ERP implementation process was closely monitored by project managers through periodic project meetings, such as project steering committee meetings, phase start meetings, phase close meetings, weekly working meetings and other small group meetings. Reports to executives were also conducted to address any concerns and to update project progress to management.

C - CHANGE
Streamlining workflow and organization structure

As revealed in the blue-print design of the individual modules, the operation workflow and organization structure had to more or less adjusted or streamlined in order to match with the ERP system. According to Mr. Zhang,

“The critical issue is to get balance, sometimes the consultant advised to do it this way but the key user proposed to do it in another way. Consensus could not be reached each time …… if no consensus could be achieved, we would escalate to the project management for decision-making. In some cases, we had to submit a report to analyze the pros and cons of the proposals made by both parties and seek for a decision from senior management …… In fact, as SAP is a well-established system, we normally adopted the advice in full (100%) from consultants at that time… We had a tendency to follow the design of SAP, as SAP involves business process reengineering and change in management.”

As discussed with Mr. Tin, the Head of the Manufacturing Management module, “Basically, the success on ERP implementation was the result from the cooperation between the managers and the consultants. The consultants were the experts on the SAP but they did not understand the business process operation of the company. On the other hand, we were familiar with the business flows of the company. We worked together with the consultant and sought for their advice before formulating the ‘to-be’ workflow which best fit the company and the system. After that, the proposed workflow had to be endorsed by key users.”

Communication and training

“Actually, ERP implementation in Keda is a project with a full commitment of all members …… the implementation process is in fact a knowledge transfer process (from the consultant) to the key users … and all end users had to conduct an exam
after the training… before system deployment, we had a training environment to practice with all access right granted.”, Mr. Tin said.

Staff training on ERP implementation was conducted in parallel with system integration testing. The trainings were conducted at different levels. As discussed with Mr. Zhang, “during the system integration test, on one hand, we were carrying out the testing; on the other hand, the most important was to conduct a training to simulate the ‘to-be’ process…… the first level of training was provided to key users by the consultant; the key users then had to transfer their acquired knowledge to end users… At the same time, key users were also responsible for preparing operating manuals for end users…”

As revealed from the questionnaire survey, all respondents expressed that they clearly understood the objective of the ERP implementation and they had trust on the leadership of senior management in the implementation process. Moreover, most of the respondents were able to master the operation of ERP system within one month due to an effective training process.

**Implementation method**

Having evaluated the expected risk incurred to business operation, Keda had adopted a “big bang” approach for the implementation of ERP system and selected a non-peak season (i.e. from August to October) to deploy the system. With an aggressive implementation schedule in Keda for ERP, this approach can expedite the exigency of the plan which can experience the magic of ERP in the entire organization at one stroke.

**“Value Creation” as core value**

As discussed with Dr. Zhu, Keda has a strong sense of core value that may create favorable environment for computerization of the company. Dr. Zhu said “From my point of view on business operation, what we need is value creation, and that is the ultimate goal of the company …… to generate more value from investment …… based on
this core value, we are willing to provide any platform for my staff to learn... in order to seek for value creation for themselves and for the community as well. In this sense, we provide attractive fringe benefit to our staffs, such as a good living environment and recreation facilities, in order to increase their loyalty to the company, such that our business can be benefited ultimately”. In this respect, management of Keda values its staff as an asset to the organization and how its staff can create values to the company can also contribute to the success.

T - TEAM

Team composition

The team was divided into 5 functional levels: project decision makers; project managers; consultants; key users; supporting staff. For the structure in the project decision-making level, with the group of Project Directors formed by seniors of Keda and Digital China as the center, this level composed of the Project Direction Committee with executives of Keda and Digital China, Business Decision Making Team with management of Keda, and Senior Consultants and managers of Quality Management from Digital China. As to the project management level, both Keda and Digital China had assigned one (1) ERP project manager and a project coordinator to it. In the implementation consultancy level, consultants from Digital China had been arranged into teams by SAP application modules and the infrastructure team. Then, the next level below was the key users’ aspect. Significant representatives for each module from functional units of Keda were identified to participate in the process and contribute to the team, in addition to the data management team and the technical team. At the bottom of the configuration presented the supporting staffs, which were the working level of related business process from a day-to-day routine aspect.

The project team was organized in such a way that both the management and working level could be participated. Resistance to change was minimized and acceptance to
change was maximized as more staff from working level was involved. Also, clear roles and responsibilities of each team member were defined by arranging them into five hierarchies, of which members in each altitude were required to undertake a definite extent of obligations by the group function.

Besides its corresponding structure, the expertise of the project team members should also count for a credit to the success of ERP implementation. First, with the approval from management to mobilize the “cream” of the company, the project team was able to call for the manager of each business unit, to be involved in the implementation process. They were responsible on status quo assessment and blueprint design – at the key user level of the team structure. These people referred to the ‘best people’ who were familiar with hands-on business operations enriched with analytical skills. Only the best hands, but not the available personnel, were being selected to team. As Mr. Zhang mentioned, “In the project kick-off meeting, we requested the management to mobilize of human resources to participate in project on a full-time basis… we required that all the team members should be the best hand of their business unit: the Marketing division should send their Marketing division manager, while Supply division should send their Supply division manager. Each division should send its best hands to be involved in the project, we did not need any one of the business unit who is not capable to take part in it.”

With the professionalism from the consultants of Digital China, the key users (the best hands) could contribute to the success of ERP implementation from assisting on closing the gap between SAP and Keda’s business practice.

Second, the project managers played an important role in the team. Two (2) project managers and two (2) project coordinators were mobilized from both Keda and Digital China to monitor and manage the noteworthy project. As stated in the document “Project Team Structure and Responsibilities”, the project manager should possess the following qualifications, with project coordinator should possess a subset of the skillset:

- Knowledge on business processes and full understanding of the organizational structure
• Enriched working experience on project management
• Problem resolving skills to monitor and facilitate problem management
• Capable to work collaboratively with all levels of management and to provide directions to project team members
• Being responsible to drive project progress to accomplish project goals with outstanding time management skills and leadership skills on a multi-task basis
• Excellent presentation, verbal and written communication skills
• Effective decision making skill
• Excellent organizational skill

Third, the project team constituted of a blend of professions from the IT, business, management and consultants perspective. This arrangement spanned through the latitude of expertise from different areas, from a technical/operational view to an aerial view. The team composition also facilitates the best solution for Keda, with the knowledge and prior experience from Digital China.

With staff arranged in the key user level, they were delegated with ownership of the module assigned to the party. In other sense, they were empowered to make decisions on the operational level about the re-engineering work of the business process, and the redesign of workflow to meet the structure of SAP. In addition, executives were involved in the project decision-making level which significant decision could be escalated to this height for management advice and decision. Important decisions referred to vendor selection and contract negotiation. In case of unresolved conflict and dispute, the project managers would prepare a report analyzing the details of impacts; submit it to this level for a consensus.

*Teamwork and collaboration*

The project had summoned all subject matter experts of different functional units to work collaboratively in the same physical working environment. They were requested to move
their desktop computer, physically stationed in a designated area to work on the project such that they could concentrate on the project without distracting by their daily functional tasks during a designated period of time from 9am to 5pm. Daily functional tasks were allowed to perform from 8am to 9am and after 5pm. The full commitment encouraged a top prioritized job task in the company. As Mr. Tin mentioned in the interview, this setting of mobilization could facilitate the key users from different units to focus on the discussion among themselves. Besides, with respect to the complex network of business processes under the multi-plant platform, the collaborating team could examine thoroughly on the correlation of business processes spanning across various units and attained an agreeable solution on the redesign of workflow. Also, with the prolonged collaboration of team work, it could enhance positive human interaction among members which could strengthen the working relationship and association after returning to normal position.

Effective project management

In the progress of the ERP implementation, it had incurred numerous of conflicts and frustration. Also, resources allocation concerns were reported to the director in project weekly meetings and project steering committee meetings.

Apart from regular weekly meeting, the team would prepare an interim progress status report on every Friday, to report any issues or potential problems for immediate attention. Also they would prepare a detailed schedule planner for next week, with actions to be taken, discussion sessions already planned at a specific time slot next week. In that sense, key users were informed in advance of the schedule and were required to attend the specific communication sessions for a better resource and time management.

The project team had adopted a reward-punishment system to alleviate the anxiety from the arrangement on working collaboratively. For those team members who opposed to work together and impacted the progress of the implementation, with the management’s endorsement, the staff would be arranged to work in the canteen for a week. On the other
hand, a monetary reward had been arranged to most of the team members, to recognize their effort on actively contributing to all project tasks during 9am-5pm, and at the same time, they had to perform their own regular work tasks out of the mentioned hours. As described by Mr. Zhang,

“At that time, there was a system for project management, we had a reward-punishment system on working collaboratively for each team member. First, if you were able to work collaboratively, which had proven spent your effort, we would provide you some rewards. On the other hand, if you did not follow the policy and the working hours closely, a punishment would be imposed, such that we can be sure that you would come on time. As raised out by General Manager, if anyone did not abide the project management system, besides monetary penalty… neither would we yell at you nor fire you, we would ask you to work at the canteen for one week as the food distributor and expose yourself. In this sense, the policy worked well, and could get to the point. The mid-management level were scared by his words and dared not to take any unfavorable actions.”
(Refer to Figure 4 of the Appendix for “Project team structure of ERP Implementation”.)

S - SHARING INFORMATION TO CREATE VALUES

Turning Data into Information

“Without refining and analyzing on the raw data, they are of zero value to the company.”, Mr. Zhang said. The business nature of Keda, which is operating under a disparate manufacturing mode (離散製造業), possesses a characteristic that it utilizes an abundant amount of raw materials and processes through a lot of add-on procedures to finish a product. Therefore, a sea of raw figures will come up. Without a system or control to manage these data, these data is meaningless to the company without any value creation. Information on costing and productivity cannot be refined accurately for business decisions and internal management. As Dr. Zhu mentioned in his conversation,
“After the implementation of ERP, the total productivity hour per month has been increased by 140% which has resolved the problems of waiting time in hand-off …… however, the priority of orders is still a problem. As the workers do not have the knowledge to identify which order is urgent and which is not, thus they always have a tendency to select those orders with simple tasks to process first. In this way, it can screw up the production delivery schedule …… therefore, we are still pending for the implementation of MES. With the concept of work time clocking, the workers will strive for his best to maximize his performance in terms of productivity. We have once sent a staff to record the actual operation hours of a manufacturing machine manually. Surprisingly, the average operational rate of the machine is only 25%, plus, adding an addition of 25% for manual work, it’s only 50%… where does the 50% gone? With computerization, we can be informed of the resource utilization status clearly and accurately. With MES, while the worker swipes his staff card to the system, the system will assign his next task and assign relevant material until he finishes the job.”

As mentioned by Mr. Zhang, Mr. Lu Qin, the director of Keda, wishes to transform the valuable data in Keda into information and this is reason why he fully supported the computerization project. Raw data of disparate systems should be turned into pieces of information such that, he can access the financial status and operation condition of the company at his fingertip, anywhere, anytime.

The implementation of SAP helps workers to transform their past experience and tacit knowledge into the system. While receiving a new order, according to the business rules set by experienced users, SAP will show relevant information on the quantity of materials, the timing schedule and the batch size, etc. for the order automatically. In addition, Keda is now planning to put Business Object in service, a product of the SAP Company. It is a tool to implement business intelligence to manage the data of the company. With business logics built into the system, raw data can be refined into useful information which can provide timely and accurate status of operational and financial conditions to both the working level and the management of the company.
Data Integration and Data Quality

Formerly, the data were stored in islands of systems, the accuracy of the data was in doubt and the data format between different systems was inconsistent. For urgent orders, the worker could bypass the system without updating the data of the order in the system.

Before the implementation of SAP, the key users were required to classify clearly the definition of each item in BOM (Bills of Materials) with meaningful logistic codes assigned such that it serves as a fundamental definition for other systems in Keda. As described by the Material Management Supervisor, to prepare for ERP implementation, they had performed a thorough inventory stock take to make sure that the data in the system reflected the physical inventory. In addition, Keda has integrated MES with SAP. With the interface, it can indicate clearly the status of process in transition across different operational unit. However, with SAP alone, as the process in transition was conducted manually with virtual process defined in the system, confusion and miscommunication would easily occur.

As Mr. Zhang mentioned, they are aware of the improvement areas to improve data quality. The management of Keda is now working to make sure that all workers are utilizing the systems in their daily operation such that all data can be run into the systems. Also, they will promote the users to feed in timely and accurate data to the system with quality, according to the standards and designed required by the system. The resolution of these problems is considered as the next steps in the road ahead.
BEST PRACTICE IN KEDA: FACTS

The review and analysis of prior study on ERP implementation in Keda has led to the development of a conceptual framework ‘FACTS’. The framework not only lists out a comprehensive set of critical success factors, but also the relationship between the variables in the implementation process and its corresponding outcomes.

F - FOCUS

Clear Business Goals

As the steer of the company, the management should provide a clear mission which defines the business strategy to achieve competitive advantages. A clear vision of goals and tasks to be accomplished should be formulated on how to run the business. In this way, all projects should follow the direction to translate company’s vision into concrete priorities. Each enterprise system implementation should have a clear business case with objectives and metrics established with ownership identified.

Alignment to business strategy

With a clear mission of the company, project goals should be tied in to the direction of business goals. Enterprise system implementation should be recognized as an enabler of business strategy, complementing an organization strategy to enable market expansion, increase process efficiency, increase inventory visibility (such as minimize backorder, improve customer satisfaction, reduce unnecessary stock level and inventory cost), reduce cycle time and operating cost. It should support company’s business strategic opportunities and address strategic needs. The business implications of an enterprise system implementation should be evaluated and its alignment to business goals should be tracked.
Management Support and Engagement

As each large-scaled system implementation is a large investment with tracked records of incurring high risk to the company, top management support has been recognized as one of the most important elements in a successful implementation. The engagement from management plays a critical role in pushing the project forward in creating a vision for success, making high-level decisions and motivating the team. Essential company resources, including human capital and financial resources needed to undertake the project can be procured and manipulated efficiently and effectively. With the commitment from the management level, it can keep the project focus as the priority in the company. In addition, management incentive directly links to project success with respect to the degree of user acceptance. A strong presence of top management may also signal the importance given to the project thus increasing users’ sense of the issues at stake. Besides, it could have a motivating impact on users. Therefore, it is easier to get the buy-in from all functional units and key users which will experience less resistance to the new change. Anxiety from project team members can also be alleviated with the consensus and commitment asserted by management.

Management Involvement

Implementing an enterprise system is not only a matter of technical issues; rather it is a matter of reengineering the company and transforming business practices to the industry best practices. Apart from management support on an elevated level, the extent of top management involvement on a hands-on level is also vital to the success of implementation. Management can play as a mediator to settle any disputes in the implementation process. Only authoritative decision making or compensating rearrangements of resources can resolve resulting conflicts of interests. It is recommended that executive-level of champion should be involved in the project team to provide the communication link to top management. Or in another way, a steering committee should be established with executive members committed to participate in project team meetings, to closely monitor the progress of the project, and to provide clear
direction to the project. In additional, throughout the project, the implementation team should keep management informed through reports and regular meetings. Direct participation is recognized from the management to attend steering committee meetings, making critical decisions, understanding the status of the implementation process, the related benefits, required resources, risks and costs relevant to the implementation.

A - ASSESSMENT

Identification of business requirement

A clear visioning provides a clear objective for the project. Directing towards the defined project goal, the company should identify the business requirement to accomplish the task. It should involve evaluating the current ‘as-is’ status and identifying the ‘to-be’ status such that the company can be able to distinguish between ‘where is the current position’ and ‘where will be the destination be’. It is recommended that the business requirement should be documented clearly and precisely, with justifications stated which should be all related to business needs. The assessment of the gap between the current practice and the ideal state is important to identify the needs that drive the direction of the implementation process and as a measurement against the ultimate implementation outcome.

Compatibility of software package with business requirement

Another determinants to implementation success relates to ‘Fit’ analysis – assessment to address the gaps between the ‘to be’ status and the off-the-shelf package. A variety of packages are available in the market. The requirement analysis mentioned in the last section facilitates the selection of packages that most fit the business needs. Conference Room Pilot (CRP) to validate software applications assists the understanding of the package and assess the compatibility of the package with business requirement. As the packages provide generic off-the-shelf business solutions, it is rare that a mutual fit exists.
Due to unique business nature and government standards, the application may have to accommodate industry-specific business practices, and may result in different data, functionality and output requirements. Thus, it is important to select the most suitable package and analyze the cost and benefit from adopting the application since they play a crucial part in shaping the ultimate outcome of the implementation.

Last but not least, not only the company has to understand the functional operation of the application, maturity and stability of the packages, track records with customers, reliability of the software vendor and global readiness (if applicable) are also important consideration areas that must be taken into account.

Engagement of Competent Consultant

An experienced consulting firm can provide an in-depth knowledge to the client on the both the product and the implementation process. Also, it have consolidated the best practices from previous experience. Therefore, a competent consulting service provider is crucial in the implementation path as it can share prior experiences and professional knowledge to the company which do not possess similar expertise in the organization. The consultant’s extensive prior project experience can help to resolve cross-functional implementation conflict and facilitate users to take optimized advantage of the software. Reliability of the consultancy firm is also important to ensure continuous support throughout the implementation. Qualified consultants knowledgeable in both the business processes and software functions with good interpersonal skills and active involvement plays an important role in the process.

Close Monitoring of Implementation Progress

Frequent assessment on the implementation progress is vital to avoid schedule delay, scope creep and over-budget. A comprehensive monitoring system should be adopted to track implementation effort, identify gaps and deficiencies during the course and identify necessary actions to fine tune the situation back to the right track. A ‘Phases and Gates’
approach can be taken into consideration which milestones and interim goals are set along the implementation process as checkpoints while the project executes.

**C - CHANGE**

*Effective Change Management Program*

Existing organizational structures and business processes may not fit with the workflow and design of the new system, which introduces a certain level of change. It is critical to manage all change hurdles involved in the process. An effective change management should be carried out throughout the various stages of implementation. Changes can be interpreted from three aspects: people, technology and business process and details are discussed below.

**People**

Minimizing the resistance to change from people can increase the likelihood of success. Without the users buy-in and an agreeable values by employees will cause serious impediments. Another issue about people is the anxiety about job security. Business process reengineering has all along been misinterpreted as an euphemism for downsizing. Therefore, management should give sufficient credence to manage the distress of its staff. Employees are encouraged to have a better understanding of how their jobs are related to other functional areas within the company. Also, users should be involved in the design and implementation of business processes and held accountable for making the implementation to expectations. Though consultants can help users to understand the operation of the application, the company should provide a customized training and education program that provides them the knowledge to integrate with the new processes, technology, and the new roles and responsibilities to ensure a successful transition.
Technology

At the end, technology should support the people, strategy, structure and processes of the organization. The management has to get an equilibrium point between cost and benefit to determine whether technology should be aligned to business or business re-aligned to the technology.

In the former approach, modification increases the cost of implementation from customized programming and technical support, and in some cases, may devastate project progress. Besides, the more tailored-made the package is, the less flexible it is when building interfaces with other systems within the company and with business partners in the industry (e.g. the supply chain management system). Moreover, in the long-run, each time when a new version has to be implemented, existing modifications must also be upgraded which incur additional deployment effort and cost. In case of over-customization, it may also distort the best practices of the package to fit the company’s habitual “bad practices”.

On the other hand, the later approach implements the ‘vanilla’ of the package while minimizing the extent of customization. It requires streamlining business operation and reengineering business and the organization needs to reengineer its internal processes in order to match the packages. However, it can advocate the adaptation of the ‘best practice’ embodies in the package.

Business Process

As the state-of-the-art packages are based on best practices, adapting the new system to old business practices and perpetuate an outdated way of business process is discouraged. Organizations should reevaluate their existing workflow processes and possibly incorporating the working principles of the package to realign its business process. Reengineering the existing business processes to the best practice calls for a business process redesign but not automation.
Automating inefficient processes without redesigning them may reduce the benefits ensue from the implementation effort.

**Communication**

Management should communicate clearly to employees on what to benefit and achieve from the implementation. An effective communication channel should be established to ensure cascading of change rationales and plan to everyone affected by the effort and assure quality and reliable user feedback. With employees understanding the changes about to take place, it can reduce the resistance and add value to the implementation process. Extensive exposure and communication to the progress and hands-on training can alleviate the anxiety that comes with the transition. Indeed, the more the open and transparent the communication is, the more the users will be familiar with their future working conditions; the more the users will become confident in their abilities, they are more willing to take ownership and become valuable contributors to the success.

**Implementation Approach**

The approach to adopt between a ‘phased’ and ‘big bang’ rollout remains a controversial issue regarding to the best implementation methodology. The ‘big bang’ implementation demolishes all its legacy systems and converts to the new system right out of the gate. This approach can expedite the exigency of an aggressive implementation schedule which can experience the benefits in the entire organization at one stroke. The ‘big bang’ approach also promises to reduce integration cost and compress project timeline under an otherwise ‘incremental’ manner which can address long-term resource shortages and longer timeline commitment. The ‘one-time’ implementation approach condenses the pain and difficulty of implementing a big project into a shorter period of time. On the other hand, a ‘phased’ project will drain continuous effort and unremitting focus from the staff, causing a burn-out from constant change, which may incur a higher risk from the diminishing motivation. However, in terms of risks, a ‘big bang’ implementation
approach incurs higher risks to project failure. A ‘phased’ approach limits the scope of implementation, thus reducing the corresponding business risks. It also allows more time for user to fully master the new environment which facilitates an easy acceptance of change.

Corporate Culture

Company culture is always an essential element in the implementation process. An open culture should be promoted to encourage an open exchange of ideas to gain commitment, support and response from employees. Also, how the company values its staff as an asset to the organization and how the staff can create values to the company can also contribute to the success.

T - TEAM

Team Composition

People are probably the most critical and constrained resource in any implementation process. Before the implementation, the project should summon the ‘cream’ of the company – business experts from affected units with an injection of consultant to formulate the team in a focused team-oriented manner. Roles and responsibilities should be clearly defined for each team. Ownership of effort lies on the hand of the team in making empowered decision which can help to keep implementation on track. The team requires that functional and technical leadership to develop a strong partnership and a shared commitment to the success of the project. The blending of IT and business representatives in the project team endorses that the implementation is not only a technical initiative, but also hinges on involvement of each functional unit from assignment of staff with hands-on experience. Involvement of personnel from different units can drives changes across functional boundaries. However, enterprise system implementation is usually misinterpreted as a threat to users’ perceptions of control over
their work and tolerance with transition. User involvement through participation as the implementation team can gain support and acceptance of the solution which can influence the perception of peer group as well.

**Cooperation and Collaboration**

Subject matter experts of all divisions are marshaled to work collaboratively in a designated location such that active participation of these parties can be ascertained. Co-locating the most capable and experienced personnel which forms a microcosm of the enterprise denotes a full commitment to the project as a primacy to the company. In this working environment, it can enable the group to interact and work together without interrupting from their prior functional job tasks. The perseverance and dedication required over a long period of time can encourage teamwork instead of an ‘individual’ concept.

**Effective Project Management**

Similar to the tactics of leading the troops into a battle, a proficient project management can provide guidance and structure to the implementation process. With a standard methodology, an effective project management can

- delineate clear objectives and goals;
- set realistic implementation schedules;
- limit the project scope;
- control complex and diverse activities;
- manage the implementation progress against planned time and cost;
- assure milestones are met with deliverables completed on time;
- mobilize dedicated resources;
- manage expectations;
- ensure quality assurance;
• perform risk management;
• conduct periodic project status meetings;
• act as a coordinator among business, vendor and consultant to capture the value of the implementation.

S - SHARING INFORMATION TO CREATE VALUES

Turning Data into Information

Data management can enhance the long-term development of an organization. To achieve competitive advantage, processes and tools should be developed to transform raw data into relevant information, which can create business values to the company. Without a system or control to manage these data, these raw data is meaningless to the company without any value. Information on costing and productivity cannot be reflected accurately for business decisions and internal management. Raw data should be refined into useful information which can provide timely and accurate status of operational and financial conditions to both the working level and the management of the company.

Data Integration and Data Quality

Information quality is a major determinant of implementation success. As there always exists a gap between current business practices and the design of software package, incompatibilities in terms of data format is inevitable. Also, with the choice of adopting best-of-breed from different vendors, with business data intricately links to each other, inaccurate data input will adversely affect the quality of data as a whole in the company from disparate data sources. Therefore, it is important that the company should plan for a comprehensive solution with regards to data quality and data integration. In other words, to leverage the advantage of having an integrated data source with quality in terms of data accuracy, data timeliness, data consistency, data validation and data completeness.
SUPPORT FOR FACTS

LITERATURE REVIEW

Ngai et. al. (2008) undertook a comprehensive review of academic reviews which investigated the critical success factors (CSFs) leading to the successful implementation of ERP across 10 different countries/regions. This review identified 18 CSFs, with more than 80 sub-factors, for the successful implementation of ERP:

1. Appropriate business and IT legacy systems
2. Business plan/vision/goals/justification
3. Business process reengineering
4. Change management culture and programme
5. Communication
6. Data management
7. ERP strategy and implementation methodology
8. ERP teamwork and composition
9. ERP vendor
10. Monitoring and evaluation of performance
11. Organizational characteristics
12. Project champion
13. Project management
14. Software development, testing, and troubleshooting
15. Top management support
16. Fit between ERP and business/process
17. National culture
18. Country-related functional requirements

Not only did this study identify the CSFs common in the studies across all nations/regions, but it also looked at the influence of national culture on the effectiveness
of ERP implementation. The study dismisses the possible influence of China’s socio-political background as a state-planned economy, and the stresses and strains associated with transitioning to a capitalistic system, as a reason for any significant differences in the implementation ERP systems. Instead, Ngai et. al. propose to look deeper in Chinese culture and society in order to understand how management in Eastern countries reacts to change:

*Chinese managers and executives lean more towards collectivism, personalism and personal relationships in contrast to their Western counterparts. Impacts of these cultural characteristics may in many ways manifest themselves in the management styles and behaviours of Chinese business executives and manager (p.558).*

Therefore, Ngai et. al. find that in any ERP implementation, there are at least sixteen CSFs that can be universally applied to improve a projects chance of success. However, country and culture specific considerations need to be taken into account on top of these sixteen CSFs.

Xue et. al. (2005) says that only 10% of ERP projects in China actually succeed, and that because of cultural issues, an important CSF is whether the ERP vendor is a domestic (i.e. Chinese) company or not. However, it estimates that as of 2002, 52% of ERP projects were completed by domestic vendors (refer to Table 1).

Table 1: Chinese ERP market shares (Source: Xue et. al. (2005))

<table>
<thead>
<tr>
<th>Company name</th>
<th>Market share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP</td>
<td>16.9</td>
</tr>
<tr>
<td>UFSof*</td>
<td>16.2</td>
</tr>
<tr>
<td>Kingdee*</td>
<td>13.2</td>
</tr>
<tr>
<td>GenerSoft*</td>
<td>10.3</td>
</tr>
<tr>
<td>Oracle</td>
<td>7.5</td>
</tr>
<tr>
<td>HJSof*</td>
<td>4.3</td>
</tr>
<tr>
<td>Anyia</td>
<td>3.9</td>
</tr>
<tr>
<td>Riamb*</td>
<td>3.7</td>
</tr>
<tr>
<td>Other</td>
<td>24.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

*Chinese ERP vendors.
It could be expected that in the six years since these survey results were collected that the ERP implementation success rate in China has improved somewhat. Short of a massive improvement in this success rate in the past six years, however, it does highlight the fact that the successful implementation of ERP at Keda is an exception rather than the norm.

Like the Ngai et. al. (2008) study, Xue et. al. places the emphasis of ERP implementation failures in China on cultural differences between eastern and western societies. This study cites the example the CSF of Business Process Reengineering (BPR) for ERP implementation. This CSF requires western vendors implementing ERP in China to make the Chinese companies realise that, in a rapidly changing technological environment, ERP is not simply a new piece of technology, but is in fact that ERP is a totally new business process model.

The study by Zhang et. al. (2005) studies both generic and unique critical factors that affect ERP implementation success in China, and establishes measures to assess the extent to which an ERP system implementation can be defined as a success or a failure. It develops four propositions concerning the associations between the proposed critical factors and ERP implementation success:

- Organizational environment is associated with the ERP implementation success in China.
- User environment is associated with the ERP implementation success in China.
- ERP system environment is associated with the ERP implementation success in China.
- ERP vendor environment is associated with the ERP implementation success in China.

Four ERP user firms were selected and interviewed based on the same size and business industry. This study confirms that CSFs identified in Western countries are applicable to China context, and all four propositions (above) get support from the study.

Zhang et. al. find that the implementation of a foreign ERP system in Chinese firms involves the issues of organizational culture, BPR, and standardization of the enterprise’s
operational processes. The critical success factors identified in Western countries are confirmed applicable in the China context, and culture is an important unique factor when an ERP system is implemented in Chinese firms.

The paper by Shanks et. al (2004) presents a study of CSF in ERP implementation by contrasting the experience of two companies in China and Australia, respectively. The picture that emerges from this study is that some factors may be important independent of national culture, and some other factors may be culturally dependent. The two CSF that were common to both firms through most stages of the implementation projects were top management support and formation of a balanced project team. The differences in CSFs, that may be culturally driven, seem to be that because of the greater power-distance and collectivist nature of the Chinese culture.

The study by Law and Ngai (2007) uses empirical survey data to examine the relationships between the success of ERP implementation, the extent of business process improvement (BPI), and overall organizational performance. It also investigated the associations between the outcomes of these initiatives and such organizational factors as strategic intent, senior management support, and the status of the IT function within a company. A correlation analysis of 96 firms was made to test the hypothesis that the use of ERP was closely related to the success of BPI, ERP, and organizational performance. The empirical evidence reinforced the long-held assumption that organization-level benefits, BPI, and ERP success were closely related; and that these relationships were subject to the influence of the organizational variables. Unlike the previous studies covered in this literature review, Law and Ngai did not examine any relationships between ERP success and cultural factors.
## APPLICABILITY OF FACTS

**Summary of Domestic Case Studies against FACTS**

<table>
<thead>
<tr>
<th>FACTS</th>
<th>Critical Success Factor</th>
<th>KEDA</th>
<th>东方电机</th>
<th>大连重工</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>Clear Business Goals</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Alignment to Business Strategy</td>
<td>Y</td>
<td>Y</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Management Support and Engagement</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Management Involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>Identification of Business Requirements</td>
<td>Y</td>
<td>--</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Compatibility of Software Package with Business Requirement</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Engagement of Competent Consultant</td>
<td>Y</td>
<td>--</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Monitoring on Implementation Progress</td>
<td>Y</td>
<td>--</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Change</strong></td>
<td>Effective Change Management Program</td>
<td>Y</td>
<td>Y</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>Y</td>
<td>Y</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Implementation Approach</td>
<td>Big Bang</td>
<td>Phased</td>
<td>Phased</td>
</tr>
<tr>
<td></td>
<td>Corporate Culture</td>
<td>Y</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Team</strong></td>
<td>Team Composition</td>
<td>Y</td>
<td>Y</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Cooperation and Collaboration</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Effective Project Management</td>
<td>Y</td>
<td>--</td>
<td>--</td>
</tr>
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</table>
## Computerization in Keda: Best Practices

<table>
<thead>
<tr>
<th>FACTS</th>
<th>Critical Success Factor</th>
<th>KEDA</th>
<th>DEC</th>
<th>DHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing Information to Create Values</td>
<td>Knowledge Management</td>
<td>In Progress</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Data Integration and Data Quality</td>
<td>In Progress</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
ANALYSIS ON DOMESTIC CASE STUDIES

DongFang Electrical Machinery Company Limited (东方电机)

Background

Previously named as DongPang Electrical Machinery Plant (东方电机厂), DongPang Electrical Machinery (东方电机) was founded in 1958 which was originally named as the National Level Enterprise. On 1993 December 28, it has been listed to the joint stock system, being the first batch of Hong Kong and China companies to be listed on both stock markets. The enterprise owns a factory area of around 740 thousand square meters. Currently it has around 6,300 staff working for the company with a capital of around 9.6 billion RMB in total.

DongPang Electrical Machinery had been implementing computerization for many years. Computerization is now widely applicable in DongFang Electrical Machinery to each aspect of its business production operation, including CAD, CAE, CAPP, CAM, CAT, MIS, CIMS, etc. As they mentioned, “the experience of computerization construction in DongFang Electrical Machinery is like a textbook, covering each stage of computerization process in Chinese enterprises for 30 years which it has been gone through”.

Analysis on Focus: Clear business goals

Its business goal is defined as resolving existing business problems, enhancing management level, reducing operation cost and gaining a larger market share. Thus, DongFang Electrical Machinery possesses a clear direction from management to follow with.

Analysis on Focus: Alignment to business strategy
Computerization in Keda: Best Practices

The reason behind to implement the ERP system was to strengthen its internal logistics, capital flow, and information flow to attain an international standard. The rationale for computerization was in line with it business goals.

*Analysis on Focus: Management Support and Engagement*

The management considered the implementation of computerization as a top priority. During the EPR implementation, the management had setup three leading groups by levels with respect to main plant, functional unit and sub-plant. Regular weekly meetings were held which were organized by the factory managers in person to coordinate and resolve any problems in the implementation process, to monitor the progress and to push forward the ERP project.

*Analysis on Assessment: Identification of business requirement*

In these years, one of main reason of the successful computerization in DongFang Electrical Machinery was due to its careful implementation in which they had spent a lot of effort on the ERP project planning and preparation. As EPR is served to be the foundation of modernization for the enterprise, for enhancing the core competitive power; therefore, the implementation process had to be treated earnestly, with patience and analyzed carefully.

*Analysis on Assessment: Compatibility of software package with business requirement*

DongFang Electrical Machinery had spent a lot of time on vendor assessment to select SAP. The major reason is that SAP can be said as the ‘trademark’ of ERP solution with quality on the computerization platform in the world. Besides, their assessment result showed that the functionality of SAP could match well against the business requirement of the company.
Analysis on Change: Implementation Approach

Referencing prior experiences with phased implementation approach in other companies and assessing the maturity of SAP development, DongFang Electrical ERP project implemented its six (6) modules with integration to PDM by phase in June 2005.

Analysis on Team: Team Composition

Positioned as the top priority in the company by management, the implementation of computerization, especially for ERP implementation, was not merely related to information centre. Instead, the participation from senior to junior staff should be actively involved. In view of this, a strong team had been setup with management executive as the team leader, and key persons from each department as the team members.

Dalian Heavy Industries Electro Mechanical Power Company Limited (大连重工)

Background

Dalian Heavy Industries is one of the domestic large-scaled equipment manufacturer, mainly manufactures machinery and equipment for metallurgy, electric power, harbor, and urban construction.

Analysis on Assessment: Engagement of Competent Consultant

Dalian Heavy Industries appointed Digital China Management Systems Ltd. (神州数码管理系统有限公司) as their business partner in their ERP project as it possessed successful experience in ERP implementation for other enterprises. The services Digital China provided for Dalian Heavy Industries were: management consultation, advisory plan for computerization implementation, enterprise network restoration, business coordination, ERP implementation and PDM implementation.
Analysis on Change: Implementation Approach

Dalian Heavy Industries adopted a phased approach in implementing ERP. The scopes and stages are described as below:
1\textsuperscript{st} stage – Material Management, Production Planning and Finance Accounting
2\textsuperscript{nd} stage – Supply Chain workflow
3\textsuperscript{rd} stage – Integration of SAP and PDM
CONCLUSION

From an empirical study of the successful case of ERP implementation in Keda, related evidence which contributes to the success in the case study are analyzed and categorized. Those critical success factors are then encapsulated to deduce a conceptual framework named ‘FACTS’:

‘F’ – Focus
‘A’ – Assessment
‘C’ – Change
‘T’ – Team
‘S’ – Sharing Information to Create Values

To further support the proposition of ‘FACTS’, two (2) domestic cases, DongFang Electrical Machinery Co. Ltd. and Dalian Heavy Industries Electro Mechanical Power Co. Ltd. regarding their ERP implementation are examined. It demonstrates that the components of ‘FACTS’ identified in this study can serve as a checklist that covers all the possible success factors associated with an enterprise system implementation. The more elements of ‘FACTS’ the implementation process possesses, the higher chance the implementation will success. Thus, a better understanding of ‘FACTS’ can facilitate an organization to plan for corresponding solution to eliminate or avoid the most common causes of failure in implementation.

To put forward, the conceptual framework ‘FACTS’ introduced in this report should be modeled as an exemplary for other businesses, ideally to assist in enhancing the successful rate of enterprise system implementation in China.
Figure 1: Computerization Planning in Keda

Figure 2: Implementation Stages on Computerization in Keda
Computerization in Keda: Best Practices

<table>
<thead>
<tr>
<th>阶段</th>
<th>主要工作内容</th>
<th>2004年</th>
<th>2005年</th>
<th>2006年</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 基础化 管理模块</td>
<td>需求分析、功能分析、设计方案</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 现状调研与流程优化</td>
<td>系统基础数据采集</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 系统实现与推广</td>
<td>系统基础数据采集</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 系统集成与测试</td>
<td>系统测试与系统集成</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 验收</td>
<td>系统实施</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3 – Project plan of projects to Computerization in Keda

![Figure 3 – Project plan of projects to Computerization in Keda](image)

Figure 4 – Project team structure of ERP implementation

![Figure 4 – Project team structure of ERP implementation](image)
多谢你参与这个问卷调查，请对现在的 KEDA 的 ERP 系统（下称“这个系统”），给予宝贵意见。谢谢！

所属部门：__________________        填表日期：2008 年 ___ 月 ___ 日

1. 你的职责有需要接触这个系统吗？        有  没有（完成）

2. 你现在操作哪个模块？__________________        不知道

3. 你接触这个系统有多久？________月

4. 你最初花了多少时间才能完全掌握这个系统操作？
   3 天内   1 星期内   2 星期内   1 个月内   1 个月以上
   还未完全掌握

5. 你平均每天花多少时间来操作这个系统？_______小时

6. 如果用以下句子，用来形容这个系统，你会打多少分？
   (1 至 5 分，5 分为满分)
   我对系统就业务运作的意见能充分被反映 1 2 3 4 5 不打分
   我对公司的发展方针很清晰 1 2 3 4 5 不打分
   我知道这个系统的真正用途 1 2 3 4 5 不打分
   我完全信任公司的领导 1 2 3 4 5 不打分
   我在实施过程中得到充分的培训 1 2 3 4 5 不打分
7. 在学习操作的过程里，有没有遇到困难？
有               没有
如有，请说明：
________________________________________________________________________
________________________________________________________________________

8. 你觉得这个实施过程中有没有可以改善的地方？
有               没有
如有，请说明：__________________________________________________________________
________________________________________________________________________

9. 你的教育程度是：   小学   中学   大学或以上   其他

10. 你的年龄组别是：   16-25   26-30   31-35   36-40   40 以上
    ---------------------- 完 ----------------------------
Exhibit 2 – Interview Protocol

訪問重點:

<table>
<thead>
<tr>
<th>被訪者資料</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>被訪者</td>
<td>待定</td>
<td></td>
</tr>
<tr>
<td>公司</td>
<td>广东科达机电股份有限公司</td>
<td></td>
</tr>
<tr>
<td>职銜</td>
<td>待定（行政人员）</td>
<td></td>
</tr>
<tr>
<td>公司電話</td>
<td></td>
<td></td>
</tr>
<tr>
<td>訪問的日期及時間</td>
<td>待定</td>
<td></td>
</tr>
<tr>
<td>訪問地點</td>
<td>待定</td>
<td></td>
</tr>
<tr>
<td>訪問員</td>
<td>Alan, Annie, Einar, James and Kelvin</td>
<td></td>
</tr>
</tbody>
</table>

目標及預期結果

| 目標       | 公司的远景，目标及价值观，及 IT 在公司层面所扮演战略角色如何 |

拟定問題

- 可否分享一下贵公司的远景，目标及价值观
- 你认为 IT 在科达所扮演的角色和定位如何？
- 请问贵公司每年在 IT 方面的投资如何，可否跟我们分享一下未来的发展方向？
- 在过去十年里面，你认为 IT 项目投资对公司业务发展的成效如何？
- 管理层怎样将公司核心价值与员工沟通，另外，你们怎样培养学习的文化，去配合公司在信息化方面的发展？
- 请问人力资源管理部门在 ERP 实施方面所扮演的角色如何？
- 管理层在公司信息化的发展旅程上所扮演当角色如何？
- 你对就项目实施在变革管理方面有什么看法？
- 就 ERP 项目实施，你怎样评价当中的成功关键因素？
### 被访者资料

<table>
<thead>
<tr>
<th>被访者</th>
<th>在 ERP 实施过程当中，主管以下模块的管理层：</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- SD（销售管理）</td>
</tr>
<tr>
<td></td>
<td>- PP（生产管理）</td>
</tr>
<tr>
<td></td>
<td>- MM（物料管理）</td>
</tr>
</tbody>
</table>
|        | - FI（财务管理） 
|        | - CO（管理会计）                               |

<table>
<thead>
<tr>
<th>公司</th>
<th>广东科达机电股份有限公司</th>
</tr>
</thead>
<tbody>
<tr>
<td>职衔</td>
<td>SD, PP, MM, FI 及 CO 模块主管</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>公司电话</th>
<th>--</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>访问的日期及时间</th>
<th>待定</th>
</tr>
</thead>
<tbody>
<tr>
<td>访问地点</td>
<td>待定</td>
</tr>
<tr>
<td>访问员</td>
<td>Alan, Annie, Einar, James and Kelvin</td>
</tr>
</tbody>
</table>

### 目标及预期结果

<table>
<thead>
<tr>
<th>目标</th>
<th>个别模块在 ERP 实施过程中所扮演的角色</th>
</tr>
</thead>
</table>

### 拟定问题

- 你在 ERP 实施团队内的岗位是什么？
- 最后是怎样解决而达到成功？在 ERP 系统实施阶段里，你遇到什么困难和挑战？
- 在你负责的范围内，你认为什么是现在 ERP 系统的强项和弱项？
- 贵公司对 ERP 上线后，就业务操作方面有何期望及能否达到？
- 科达在 ERP 上线后，对信息流通上，有什么改变？
- 前线销售员工，在 ERP 上线后的运作，意见如何？
- 贵公司有否进行一些统计，就 ERP 上线后对营业额及市场份额的提升，有何成效？
- 如员工新加入，有否提供 SAP 系统训练，如有，需时多久？
- 如管理层改变他们的方位或战略，SAP 系统怎样配合？
- 可否提供做招投标工作时发给供应商的 ERP 需求分析？
- 可否提供在上信息系统前，针对当时将上线的 SAP 系统，部门撰写的蓝图设计文档？
- 当时如关键用户所希望得到的流程和顾问提出的建议达不成共识，大多都是按顾问（按系统模式）。当时有什么流程是达不成共识？可否提供相关的问题报告？
- 在部分流程于运作上按系统模式实施后，有什么业务流程现时仍有待协调？
- 在 SAP 上线时，在组织结构上有什么调整，在人员调配上有什么变更？可否提供相关资料？
- 在集成测试的时候，有否在流程方面进行过端对端的沟通？流程和流程方面的磨合是怎么协调？
- 数据方面，有否在系统中仍不能支持的业务产品结构？
**REFERENCE**

Alice Hsu, “Manage Your Way to ERP Implementation Success!”


Company document

- 科达机电企业信息化系统立项报告
- 科达机电 ERP 业务需求
- ERP 项目组织与职责
- ERP 项目实施管理办法
- 集团公司生产模块业务流程综述
- 生产系统管理现状调查报告
- 成型事业部生产物控部业务调研报告
- 科达企业信息化战略规划 20040505
- 信息中心 2007 年度工作总结及 2008 年度工作安排 2008