

T2B Model – Experiencing the Successful Conversion of Traditional Enterprise to e-Business

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Abstract

Successful selling over the Internet involves organizing the entire value chain around the Internet and determines where they can exploit technology to add value. Such conversion in small and medium size enterprises (SMEs) is still at its infant stage; knowing on the large enterprises' experiences, this enlarges the non-empirical qualitative learning and possibilities for empirically testable theories to come up with a well-structured framework for such conversion. Based on theories from technological innovation literature, this paper presents an integrated model for T2E (Traditional to Electronic) business conversion for SME. Our novel T2E model makes use of a 3-layers hybrid approach: which unifies the technique of IDEF [Integrated Computer-Aided Manufacturing (ICAM) DEFinition] to assist in business process design; the concept of Business Process Reengineering (BPR) for business structure re-organization; and Innovation Diffusion (ID) theory for progressive introduction of new e-business functions. Our model is intended to minimize the impact of operational and cultural changes on SMEs while taken the critical successful factors of e-business projects in consideration. The feasibility of our conceptual framework is testified by a case study SME - Valentino World Fashion (VW), Inc.

Keywords: T2E (Tradition to Electronic) Business conversion; Business process reengineering; Innovation Diffusion; Integrated Computer-Aided Manufacturing; Critical successful factors

1. Introduction

Today, SMEs could not afford to fall behind in taking e-Business initiatives to reach customers, to collaborate with

business partners and to keep pace with competitors. Large enterprises had now found difficulties to promote their use of e-Business product and serve the highly segmented market, which on one end of the spectrum are multinationals and top-level domestic corporation while the other end are SMEs that are not yet ready to upgrade and transform their system. Many software vendors claim to provide SMEs extending from front office Customer Relationship Management (CRM) to back office Enterprise Resources Planning (ERP) applications and platform infrastructure. However, the e-Commerce initiative is believed to have more social-managerial issues to resolve than technical issues no matter how small is the company. It is clear that there is much changing drivers in management strategies, working culture and marketing plan between e-business and conventional business [5, 10, 15] besides the dramatic changes in its intra and extra-organizational processes.

When enterprises manage the impact of changes imposed by e-business, they typically proceed with Business Process Reengineering (BPR). T2E conversion in business need a detail but flexible, careful but innovative planning from the start, that integrated re-engineering process for dynamic strategic, managerial and technical consideration which interact and influence among each other constantly within an enterprise. This axiom supports the argument of Fixed Point Theorem [18, 19]. We concluded that speedy conversion from T2E would never catch up with the dynamic market changes. The key issue of e-business is process, process that inter-connect enterprise's individual business processes into a dynamic e-business network that open to authorized suppliers and potential customers. So this network should be flexible. This research proposes a novel dynamic T2E framework, which takes into consideration of changes and proactively adapt to the anticipated changes.

1.1 The e-Business System Life Cycle

Electronic stores need a strategic plan that react and adapt to changes, to survive and sustain profitability, to leverage investment in IT and to capitalize on knowledge through organizational learning. Disruptive technology (technology that replaces process) and creative technology (technology that enhance process) can cause a dichotomy in how organization operate and embrace IT-enabled change [13], we therefore regard that developing e-Business application should not constrain business possibilities under the limitation of computing technologies, but rather puts business sense into IT by developing each e-Business process that is business-focused and customer-centered. We recognize e-Business project should focus on business processes re-organization that adopts IT to enhance their connectivity and functionality for value adding. Hence, set up business vision and requirements are always the critical first step. The e-Business application development system life cycle provides us the foundation to construct our T2E

framework: the initial phase in the cycle involves the BPR for core business functions transformation into a series of conceptually defined web-based processes. This involves requirements acquisition and analysis that yields a corporate requirement document regarding the e-business set up.

1.2 E-Business Adoption Barriers for Traditional Business

The main barriers of their IS adoption and to develop a Web presence are simply the concern of knowledge deficiencies, lack of financial budget or slack resources, unconfident that the Web would not lead to more efficiency or lower costs [26, 27]. We have therefore identified from our literatures and case studies search that the critical success factors to adopt e-business in SMEs are as follows:

- It is important to have innovative and E-Business knowledgeable CEO.
- The SME must possess adequate financial resources and E-business knowledgeable employees.
- The E-Business must offer a better alternative to existing practices in the SME.
- The E-business system must be secure, easy to use and to understand.
- The E-Business system must be scalable, able to react and adaptive to changes.

The first two factors regards to human and organization issues of SME. The last three factors focus on the system design and implementation model. Our model also attempts to resolve the primary barriers of unfamiliarity with web and lack of guidance to start the T2E conversion process, by employing the theory of diffusion in our model.

2. From Traditional Business to e-Business

The T2E business transformation involves both the conversion of necessary legacy processes to web-enable applets and the integration of new enhanced modules to enable a value chains system. We propose to unify the concept of BPR for re-engineering the existing processes via organizational learning; Innovation Diffusion (ID) Theory for enhancing change management in new integration; and IDEF method as the modeling standard for design documentation in our T2E methodology. The hybrid use of these techniques and concepts accordingly should combine the advantages in providing a total solution.

2.1 Architecture of a B2C Web site

The typical architecture of a B2C e-store includes two tiers: the external tier is a web system that manages the customer ordering information; and the internal tier is an enterprise resource planning system.

External Tier Architecture - External tier architecture includes four typical subsystems: (1) a product management system, (2) a customer management system, (3) an ordering management system and (4) a payment management system.

The external tier is typically a web system. It is important to ensure that each of the following four major business processes corresponded to a web-enabled sub-systems.

- (1) **Product management system** - manages its stock with a workflow merchant for the products return and replenishment.
- (2) **Customer Management System** - offer customers the ability to update their profile, review their orders and payment history.
- (3) **Ordering Management System** - manages sales transactions and customer details, which includes capturing the transaction information.
- (4) **Payment Management System** - manages payment data, includes definition of preferences such as billing address, ship-to address and its verification.

Internal Tier Architecture - The Internal tier architecture typically includes an Enterprise Resources Planning (ERP) system in a company of medium scale or above.

2.2 An Introduction to IDEF

IDEF (Integrated Computer-Aided Manufacturing (ICAM) DEFinition) methodology [3, 21] is the successful end-result from the planning work of American Air Force-ICAM. The objective of ICAM is to upgrade manufacturing production by applying systematization of IT. It is a structural method for manufacturing using computer technology, and through this, it enables managers to understand the context of manufacture production more easily. The ICAM plan had developed an IDEF method that stated properties about manufacturing, then inter related the properties of statement and abstract them into graphics, to enhance communication.

2.3 Business Process Reengineering (BPR)

To perform T2E business transformation, we have extended the concept of BPR to our Total BPR that revise the integrated business processes via constant organizational learning for better system adaptability. Three important elements of context in Total BPR with organizational learning efforts: Vision, dialogue, and system thinking. The bottom line of system thinking is leverage seeing where actions and changes in structures can lead to significant, enduring improvement [22]. As much bigger payoffs are expected by revising the basic nature of the work performed rather than by just improving the source code itself that support the business process, we propose to integrate BPR actions with T2E organizational learning efforts as the solid building block of our

methodology. Total BPR procedure is not a one time process for T2E conversion, it is expected to be constant practices that carry out in the physical organization whenever there is new business vision and dialogue are formally identified. New business process could than be abstracted by corresponding conceptual e-business process and plug into the existing e-business system. Therefore, the principle of “High Cohesion and Low Coupling” (HCLC) is applied in the modular design with Total BPR approach for e-business application development. The challenge in our Total BPR is to restructure or structural transform the SME traditional business through e-Business, to determine whether the company should focus on core competencies or seek vertical and forward integration to provide integrated services so as to develop a single web-platform for the SME’s market. Our Total BPR attempts to abstract traditional and visionaries potential e-business changes conceptually by representing the pre-state and post-state of change after BPR in terms of As-Is and To-Be Models.

2.4 Building e-stores progressively

We therefore deploy the Innovation Diffusion (ID) Theory of Rogers [25] in of model to ensure thorough consideration in quality of service requirements in terms of sufficient knowledge on site architecture, network capacity and system software structure are all acquired before system implementation.; we have deployed his theory and relabeled them with our unique T2E activities. Our BPR

model is complement to the innovation diffusion view of implementing Enterprise Resource Planning (ERP) systems of Rajagopal [24] which consists of similar stages of Initiation, Adoption, Adaptation, Acceptance, Routinization and Infusion. The original ID theory of Roger is thus proven to be also feasible in application of e-Business development other than ERP implementation. We have built our T2E conversion activities base on the ID Theory of Rogers, who regards a new product or concept adoption can be classified into five stages: (1) Perception; (2) Interesting; (3) Evaluation; (4) Trial; (5) Adopt.

3. The T2E Business Conversion Methodology

The methodology framework is classified into five stages: (1) introducing management model, (2) choosing management model and channel thinking, (3) process analysis, (4) process simulation and (5) system establishment.

3.1 The Methodology Framework

The complete conceptual framework for successful e-Business transformation is presented in the following Figure 1. Our model is complement to the IS Adoption Model for small business [26] in conceptual term. Our model has also recommended specific tools; approach and techniques to enable these considering factors are taken care of in our model:

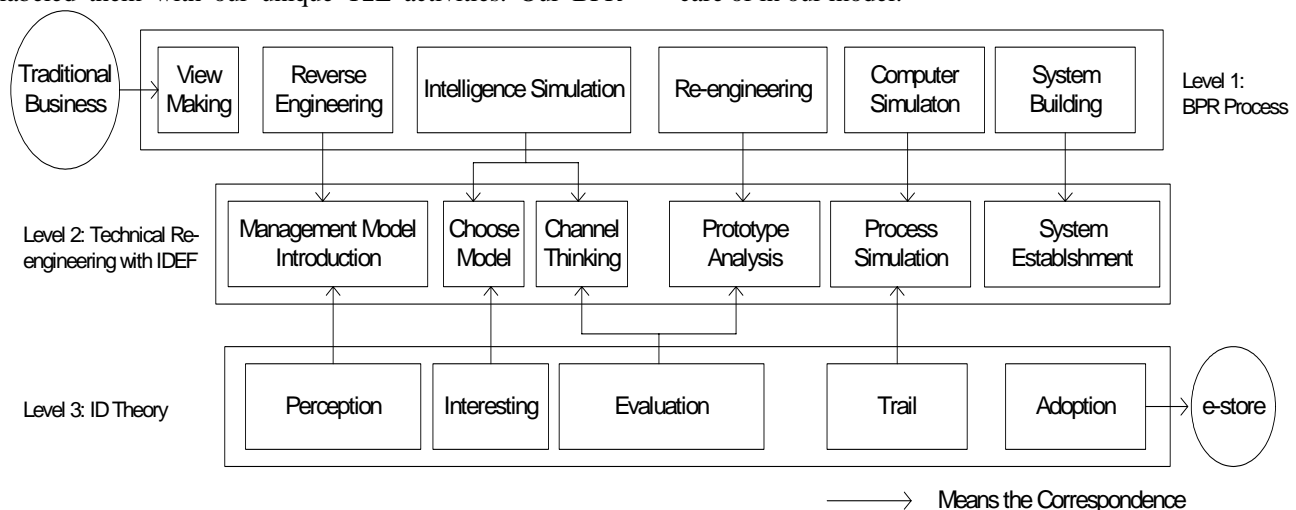


Figure 1: The conceptual framework for T2E process.

Stage1: Management model introduction.

The first stage uniquely declares the difference between the conventional stores and e-stores using an AS-IS (what the enterprise is currently doing) model and a TO-BE (what enterprise will do) model to ensure that the organization recognizes the changes and its impacts to business. Management support is important at this stage.

Stage2: Choosing a management model and Channel thinking.

Upon Stage 1, a management model could be decided for designing the e-Business plan.

Choosing an appropriate management model

The management model of *traditional stores* could be broadly classified into three types: (1) General stores, e.g. an independent shop; (2) Direct / Multiple store, e.g. Chain of retail stores and (3) Department

store. Whereas the management model of *e-stores* can be classified into another three models: (1) Single store; (2) Monopoly store and (3) Mall. Management could select an appropriate management style above by modeling the differences in processes, logistic and cash flow by AS-IS Model for current traditional business and by TO-BE Model for e-Business.

Channel thinking for building e-stores

McNaughton regarded that marketing activity could occur through three types of channels: distribution, transaction, and communication [16].

- **Communication Channel**
 - Organizing and communicating interactively between customer and company [20].
 - Acquire customers' information and comments on new products [7, 11, 12].
- **Transaction Channel**
 - Improve transaction visibility [17].
 - Improve revenues by exploiting cross-selling opportunities [9].
 - Streamline transaction processing, thereby reducing task complexity, paper works and transaction cost [1, 14].
 - Practice customization [12].
- **Distribution Channel**

- Eliminate large inventories and practice on Just In Time (JIT) business [4].
- Shorten supply chain and reduce commission and operating cost [8].
- Reduce delivery cost and ensure instant delivery of e-product/service.

Stage 3: Process Analysis for Building e-stores

e-Business has further caused changes on logistics flow, transitive cash flow and information flow [6]. This stage proposes to design operational process with the principle of HCLC to enable flexibilities in coping with changes. Coupling or association among and between processes as well as cohesion of functions within a process could be more easily identified by examining the AS-IS (traditional business) and built the TO-BE model (e-business) with power users before the confirmation of investment commitment for the new system is sought from management.

3.2 The Logistic Process Analysis

Business logic are analyzed and represented by IDEF chart for better communication among design team. We focused on the three arenas: Logistic Flow, Cash Flow and Information Flow.

3.3 The Cash Flow Process Analysis

Figure 2 below abstracts the differences of these cash flow processes in the AS-IS model and the To-BE model respectively:

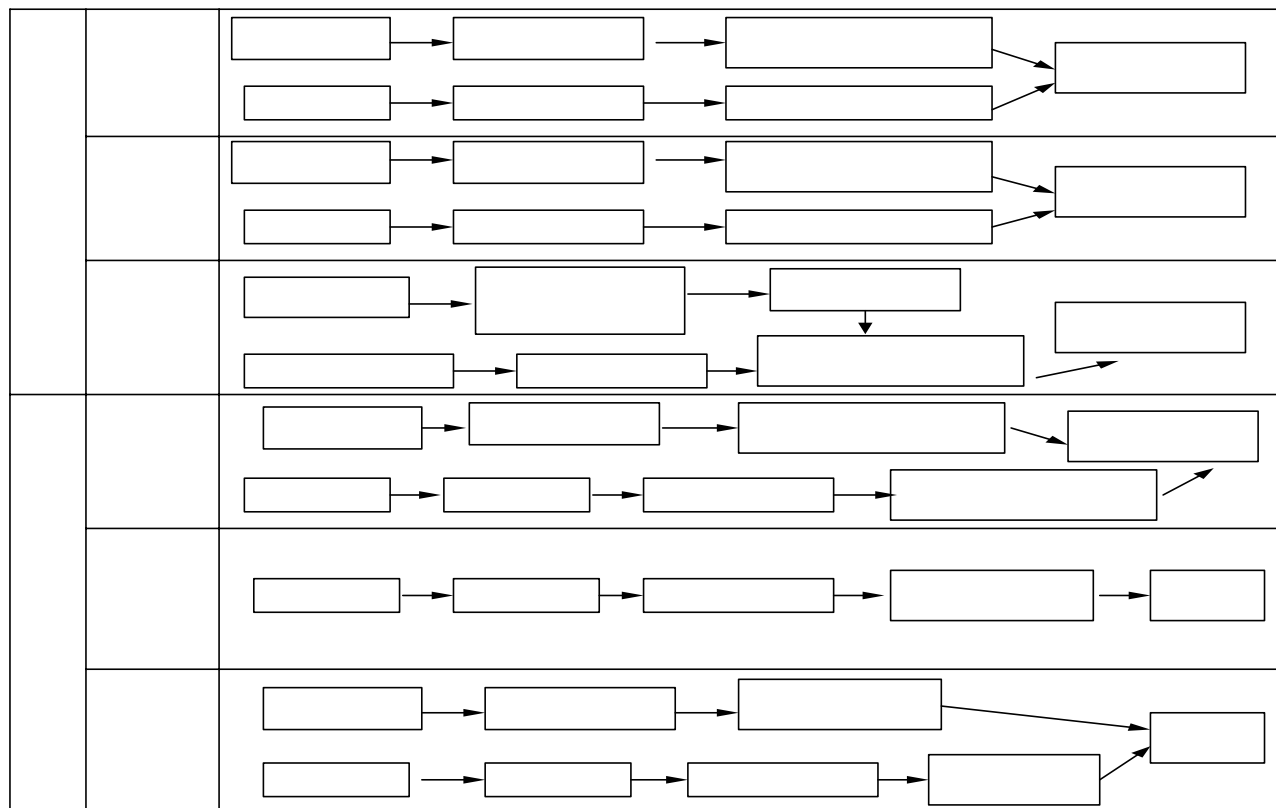


Figure 2: Comparison of cash flow between AS-IS model and TO-BE model.

3.4 Information Flow Process Analysis

This step works on the integration of local information flow among departments within the organization for a complete values chain concept. As such, information flows from upstream to downstream or vice versa is dramatically redeveloped to keep pace with the organizational changes.

By comparing the above As-Is and To-Be models, the SME could then determine on how to use its traditional assets flows and integrate Internet initiatives into its e-Business strategy to create sustainable competitive advantages.

Stage 4: Process simulation.

Simulating models ensure the development team to design a scalable system.

We recommend to deploy the CASE tool ALOWIN [2] to design the IDEF0 model which is the work flow diagrams of an e-store. We then used the Modeling Tool, ProSIM, [23] to convert the IDEF0 model with more design details ready for the simulation software WITNESS [28], to simulate the model. We highlight the five steps of simulation process in our model as follows:

Step1: Building an activity:

The basic concept is to define what is required to control and measure in a model.

Step 2: Building a structure of overall logistics:

Expand and refine the model of step 1 with more detail, in terms of what should be accomplished under its structure and who should be responsible for which activities.

Step 3: A transformation of ALOWIN design to ProSIM for modeling:

When the transformation is completed, the ProSIM system could then transform the input output of ALOWIN into an entity of ProSIM.

Step 4: Build the process arrangement, information flow and status for ProSIM system:

ProSIM establishes the procedural order and inter-relationship of the processes.

Step 5: Transformation from ProSIM system to WITNESS system:

After establishing the process flow, entering the variables in each process in ProSIM system to establish a simulation model (IDEF3), WITNESS [28] is applied in our prototype, to simulate each process of the e-store model by adjusting the variable's value to simulate different scenario. The optimum model (IDEF2) could then be selected.

Stage 5: System establishment.

We have deploy a hybrid approach that unify a combination of knowledge and concepts (BPR, IDEF, ID Theory) as well as techniques and software tools (ALOWIN, ProSIM and WITNESS) to come up with a

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complete and novel T2E business design suite which have taken the consideration of the major e-Business successful factors identified in section 1.2 above.

4. Case study

A case study approach is applied as our empirical study on Valentino World Fashion (VW), Inc., a SME on clothing agent in Taiwan, to evaluate our model for T2E business transformation. While developing an e-store for VW Inc. (i.e. ValentinoWorld.com) based on our T2E methodology framework, we have observed and experienced the successful business conversion.

The VW Company was set up in 1977 with over 20 branches in Taiwan. The company was aiming for business growth and has decided to go for e-Business initiative for more market share.

4.1 Effect of Introducing EC

As the VW targeted for full control of information process built upon a value chain concept, direct transformation of the existing business processes do not map the desired e-operations. We have performed Total BPR on the original business process model of the company. The following e-store processes were identified and implemented:

- On-line stock information: from the stock web database, sales information was made openly available on the net for possible on-line order.
- Pick up/ get / return/ exchange operations: customers could directly handle their necessary information online for order delivery, receiving invoices/receipts for their payments.
- Keep track of customers' information: maintain e-CRM on-line customer information; offer the customers with information of their order status, profile and other information of their individual preferences and interests.

After the T2E business conversion, two additional e-functions and various corresponding information flows were successfully introduced into the system.

4.2 Learning from the T2E Conversion

Our learning from the VW Company experience:

- (1) Traditional stores must identify their strengths and weaknesses before kick off the e-Business initiative. Recognize that additional e-processes are for value adding and not merely for follow the trend in industry is an important start.
- (2) The management may choose from different management models for e-store conversion, but must select a complementary management style with their existing one to minimize impacts of changes in terms of working procedure and culture.

- (3) If cost is a major constraint of the business, the e-business could start by participating in monopoly stores by joining the main portal of the same industry as an affiliation.
- (4) For e-store to grow and be competitive in the e-market, the features of a customer-centered and business-focused e-store to attract Internet traffic are necessary.
- (5) Information: an informative yet simple Graphic User Interface (GUI), a multi-lingual search engine (e.g. both Chinese and English, specific for Taiwan and Mainland China e-Market), rich database, effective store plan, good e-CRM and Internet marketing are important. The bottom line is that the e-customer should be able to come to the web site and complete an e-service process from the beginning to the end in a user-friendly, sensible and intuitively correct manner.
 - Logistics: the e-store itself must have an optimal logistic structure. The bottom line is a complete values chain from order through payment to delivery with a simplest format in fastest time span.
 - Cash flow: secure and safe payment methods that are convincing and reliable. The bottom line is to trade with maximum flexibility and security on Internet.

5. Conclusions

This paper presents a three-layer with five-stage framework as the solution of T2E business model conversion within an SME using a hybrid concept of ID theory, Total BPR and IDEF standard. It is then empirically tested using a case study approach. We have demonstrated the practical feasibility of our model through a case study SME – VW. To the best of our knowledge, the T2E model emphasize the importance of initial management support, organizational learning, and change management as well as simulation before the e-store construction, with the primary objective to minimize the impact of cultural and procedural changes within an organization, is one of the first rigorous studies that examined T2E conversion in SMEs, from a theoretical and empirical perspective.

Future research could build on and extend the proposed T2E model by including potential variables to establish benchmark for measuring the degree of success of e-business conversion in SMEs. Finally, the limitation of this studies is (1) the Asian experience in SME T2E conversion, that might not be general enough to represent a generic model; (2) Quantitative data to empirically measure the effectiveness of our T2E model is not available for publish due to confidentiality. As such, the research method employed in our empirical studies was qualitative. (3) Difficulties to put a commercial web site in a lab setting for evaluation of its quality. Future research could

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examine these possibilities. Notwithstanding these limitations, this paper has proposed and tested aT2E model for T2E business conversion for SMEs, in Asia perspective.

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