A Review of Collaborative Commerce Business based on Enterprise Application Integration in Vietnam

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Abstract

The systems in enterprises are often disjointed together and not interchangeable. Enterprise Application Integration (EAI) is essential to accommodate new business needs in the short- to moderate-term future by providing a right architecture. EAI has helped system to integrate various sources including plug-and-play interoperability. With the pressure in the business environment of information technology field, a demand for financial and security is getting drastically high which enforces the enterprises to learn how to use the existing database and services, reinvent business processes and databases. The objective of this paper is to provide an overview of collaborative commerce business in Vietnam that based on EAI as a solution to the demand. The outcome of this paper reveals that to have an effective integration, applications in enterprises need to be merged in terms of platform, data format, protocol and EAI technologies.

Keywords: Application Integration, Collaborative Commerce Business, Enterprise Application Integration, E-commerce

1. Introduction

Today, the system and application integration for an enterprise infrastructure is frequently concerned with a critical mission. The wide variety of approaches and efforts has been taken to achieve this goal as a proof of this fact[1]. Enterprises all over the world increasingly seek to convert their operations into one smooth stream. Most probably, they have faced the challenge while they try to accomplish an integration of their operations and concurrently keep their systems online[2].

In an enterprise, there are multiple systems and activities such as warehouse management systems, human resources management system, customer management systems, and so on. But, each system has the various components of the infrastructure may use different operating systems, different data formats, and so on. Therefore, they are often used independently and cannot communicate with each other because the data is stored in different places.

Perceived that the use of information technology applications increasingly instigates, enterprises need to find new applications to suit their requirements and needs where they have to expand the system. But due to the difference of the new and old systems, the integration of new applications and the old system was difficult. In order to save the cost of business and effective use of resources, there should be a program that consistent with

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new applications and older applications. Therefore, EAI was introduced to integrate enterprise applications into a consolidated system where organizations should be implemented such as: interoperability, data integrations robustness, stability, and scalability in order to gain benefits of distributed and modular system.

Collaborative commerce (c-commerce) is one form of E-commerce that involves linking a company electronically to its customers, suppliers and business partners. True collaborative commerce requires combining content management, process management, and integration technology to automate and streamline business processes among internal staff, external partners, suppliers, and customers[11].

In 2015, the Vietnamese c-commerce market is expected to carry on its robust development, especially in the business-to-customer segment. The legal system on c-commerce in general and on c-commerce technology standards in particular is yet comprehensive. When Vietnamese enterprises want to establish c-commerce environment successfully, they should redesign operational processes in the way that help them to exchange information, make decisions, response to opportunities and challenges immediately and efficiently. Concurrently, communication tools in operational process should be improved to facilitate the collaborative relationship among staff and increase opportunities or reduce risk cooperatively.

EAI solutions use models of middleware to centralize and standardize integration practices across an entire infrastructure. Standardized method is used to connect to a common system that provides integration, message brokering and reliability functionalities to the entire network. Many complex routine scenarios and other components to show unified integrations solution are adapted by EAI system bundle that can send a message without any knowledge of the consumer's location, data requirements, or use for the message. EAI can be easily added and removed by changing the configuration of the EAI provider, modular development where a single service can be re-used by multiple applications.

The broker model of EAI approaches are able to communicate asynchronously, sending messages and continuing work without waiting for a response from the receivers. It can be integrated all configuration into a central repository. However, a central repository may cause heavy load and bottleneck for messages. Besides, if the repository is belongs to specific vendor's subset of technology, problems might occur when specific scenarios need to be combined among several vendors. Other issues may also happen for internal system or legacy products that receive no more support or maintenance by vendors.

This paper is structured as follows: Section 2 discusses an overview of EAI. Section 3 presents the analysis to identify the characteristics of EAI, the integration levels and methods are being used for EAI taken by firms and developers towards collaborative commerce's goals. In Section 4, we provide current state explanation of electronic commerce in Vietnam. This is followed by an analysis of requirements for Vietnamese enterprises to develop their collaborative commerce business based EAI.

2. Materials and Methods

2.1 Literature Review

With effective system construction to utilize existing applications and generic term to integrate number of applications, EAI was popularly known as a quick way of developing e-business service platform and continue providing the existing service without interrupting current operation. The basic EAI framework is recognized with message infrastructure. It also provides fundamental technology to make application possible.

There are two types of EAI application processes such as hub and spoke; and workflow of EAI. Each application can get data or formatted information from any other applications. In additional, application processes within e-business environment is designed from user point of view rather than an IT management view. As the result, many applications present to end users and consolidated into overall system with EAI. Figure 1 demonstrates the general idea of EAI framework.
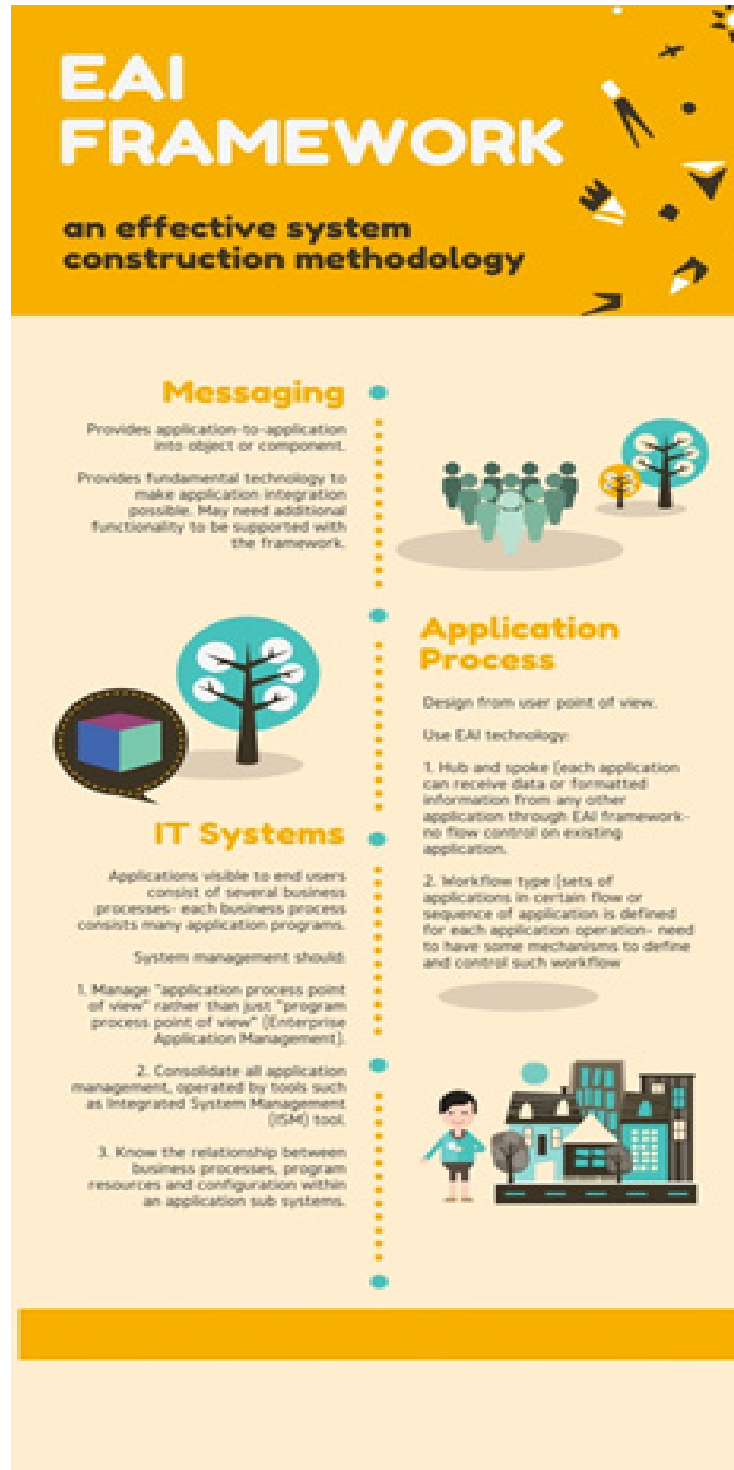
Figure 1. EAI framework.

2.2 Methodology in EAI Selection

In situational method engineering, a method is tailored to the specific situation of a project or scenario and fulfilling their needs. The problem that we have encountered with the existing software-selection and EAI implementation methods that are found during our literature study is that, they are not focusing on the problem of selecting a suitable EAI solution for an organization. Therefore, a method for selecting EAI solutions is created to address this problem.

In assembly-based method engineering a new method is created from existing method fragments, which is based on the needs of the specific project or situation. The roadmap-based method engineering approach uses roadmaps to configure or tailor an existing method to the specific project or situation. Extension-based method engineering is used to extend existing methods to fulfill any missing needs. In paradigm-based method engineering, a meta-model is used to instantiate (a part of) a method. An assembly-based method engineering approach is used in this research. The rationale behind this decision is that no existing selection-methods for EAI solutions are encountered during the literature study. In addition, existing software selection methods are also not found to be suitable for extension or configuration.

It is important that modeling and activating involve in integration problem and should be optimized and improved. The first activity should be done in the problem domain in order to reduce and eliminate unnecessary modeling. While execution of the method there is not semantic problem being found. Hence, execution of the method can be done at the case study organization. Besides that, as a basic principle, the stakeholders should select solutions for their specific application-integration problems from the method report of advisor to avoid adding any additional integration technology.

In addition, enterprises can choose to buy completely new software which has all the necessary functions for overall management. But, it is costly that involve the software cost and implementation cost for its high maintenance of complex data conversion. Recently, a number of large enterprises in Vietnam began to turn onto buying and implementing ERP software has been popularly used in the world such as Oracle, SAP and Sun System.

The investment is huge, especially for special software like hotel systems, insurance, banking and hospital. Besides, not all of these enterprises are already thinking about EAI problem. They just simply chose different software to be deployed. Thus, the integration solution of these systems in the future will be very difficult. Therefore, enterprises should define the Central Integration Hub, link data synchronization of other modules of this integrated system, and then send the data online to update modules or other systems.

2.3 Enterprise Application Integration

With many existing application systems, enterprises were unable to control their data or to solve a duplication data issue. Here, the EAI become too essential to simplify the complex, multiple systems and databases in a single database system.

As shown in Figure 2, the circle represents "fully meshed point-to-point connections N (N-1)/2", that shows the system in the enterprise such as CRM, HR, ERP, SCM are overlap and complex. There is no common system to coordinate data between the systems. Thus, the system is very complex and its complexity is N (N-1)/2. But, the circle represents "Simplified N connections". These systems will only exchange information with each other via the EAI, N, as their complexity.

The EAI is able to connect the internal and external existing systems that have been used in enterprise, consolidate workflow from different systems. It helps to convert either an asynchronous or synchronous data. Furthermore, the EAI improves the exchange and perform data in legacy system in an effective way.

To help organizations in defining requirements for their EAI solution, the following characteristics have been studied and applied to t h e EAI solutions, including: Category EAI taxonomy, integration style layers of integration, form of the software solution, degree of integration and target applications[3].

Some types of EAI are identified such as: Information Portals, Data Replication, shared Business Functions, Service-oriented Architectures, Distributed Business Process and Business-to-Business integration[4]. A combination of these types has been adopted by many EAIs.
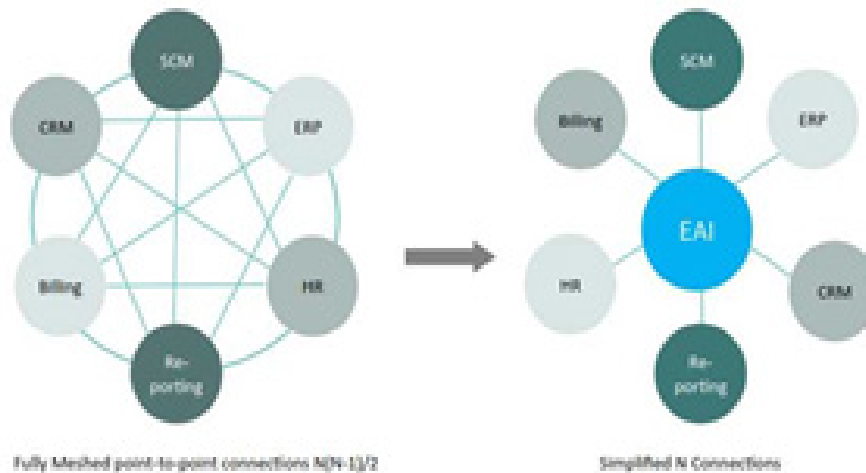
Figure 2. Reduction of integration complexity (SPAN White Paper, 2014).

The EAI applies an internal integration of applications in organizations and among enterprises to achieve information exchange, business collaboration, and formation of virtual enterprises and dynamic alliances[5]. This form of integration is called Business-to-Business integration (B2B). By the wider and deeper integration, the level of difficulty maybe increases significantly in implementation of EAI.

Four common actual integration methods have been applied such as: Data level integration, application level integration, method level integration and User Interface (UI) level integration. Data level integration has its advantage and disadvantage. The data will be consistent but having many potential of risk securities as sometime the data scheme might be broken[6]. Application level of integration is referred as a solution based on the use of a messaging platform in order to enable interaction and data exchange between applications[7]. While, user interface level of integration means combining interface of existing application in a framework[8]. The other level, method integration, is similar to the interface level but it applies at a lower level of granularity. At this level, the enterprise is allowed to be integrated through the sharing of common business logic, or methods.

There are some existing EAI methodologies reviewed. First, the Total Business Integration (TBI) that integrates data, applications and processes within or across multiple business units using heterogeneous systems, throughout the enterprise. A 4-step approach was suggested to the integration, which are Definition, Design, Building and Deployment. Second, 12-Step EAI Program was suggested by Linthicum[9]. And third, the 8-stage methodology for the development of integrated IT infrastructures was out of the acknowledgement that, although the traditional system development methodologies have contributed immensely toward construction of organizations' IT[10].

2.4 Collaborative Commerce Model Based on Enterprise Application Integration

C-commerce is an application that support for business and commerce and combine content management, processes management, and integration technology. EAI application in electronic commerce (e-commerce) shows a minimum risk and maximum utilization of legacy system. The AEI has improved customer relationship with being easy to have picture of customers (with address, telephone and their requirement). Thus, it enhances the loyalty of customers, reduces cost and time to market new products.

The EAI with broker model have major successful in some company. However, other reports state the failure of this model for large integration projects because of unclear standards for its architecture. It makes EAI

Figure 2. A survey of E-commerce implementation in Vietnam.

products more expensive, heavyweight and bottleneck in network.

A Review of Implementation of Electronic Commerce in Vietnam

E-commerce is an application of electronic media in business or commerce. Besides complying with the provisions directly on Electronic Commerce, active participants in e-commerce also have to perform the relevant legal provisions such as business investment, trade and civil[13].

Until the end of 2005, e-commerce in Vietnam ended the first phase (phase of forming) and it is recognized by law of Vietnam[14]. In 2007, the efficiency of investment for e-commerce was quite high and the trend to continue increased. The survey results in that year showed that, on the 1/3 enterprises had revenue thanks to the orders through electronic which was at 15% or more of the total revenue. Back to the year of 2005, this rate was only 8%. The percentage of construction enterprises and website operators increased steadily and reached 38% in 2007. From there, we can clearly see the enterprises were really interested in e-commerce. In addition, 10% of companies participated in the exchange of e-commerce (E-marketplace), 82% have Local Area Network (LAN) and 97% of enterprises connected to the Internet. The statistics of e-commerce implementation are simplified in Figure 3.

In early 2007, an important document related to electronic payments has been in force, it is Decision No 291/2006/QD-TTg in December 29, 2006 of the Prime Minister approving the scheme of payment non-cash 2006-2010 and orientations to 2020. In addition, a series of legal documents guiding the Law on Electronic Transactions and Information Technology Law was enacted in 2007.

In 2014, regarding the legal framework of business, November 26, 2014, Congress passed two new laws: the Investment Law No. 67/2014 /QH13 and Enterprise Law No. 68/2014/QH13, two laws have entered into force on 01 May 2015. About the law of e-commerce sector, December 5, 2014, the Ministry of Industry and Trade issued Circular No. 47/2014/TTBCT regulations on management of e-commerce websites. With the advent of two laws and Circular No. 47/2014 / TT-BCT, 2014 was the year marked many changes in the legal framework for e-commerce activities in Vietnam[13].

The situation notification and registration website on the Portal Operations Management E-commerce as follows: Number of registration dossiers websites to provide e-commerce services in 2014 was around 1,112 records. Number of records stated that about 9,075 records e-commerce websites sales were handled in 2014.

The 2014 survey of Vietnam C-commerce and Information Technology Agency (VECITA) online purchasing of each person was about 145 USD/persons, and B2C sales revenues reached 2.97 billion USD, accounting for 2, 12% of total retail sales. Furniture and electronic technology account for 60%; fashion and cosmetics- 60%; appliances - 34%, books, and stationery - 31% and some other items. Payment by cash (64%) was the most selected after ordering, followed by the form of payment via electronic wallet accounts for 37%, and the form of payment via bank accounts for 14%[13].

From the survey, the limited company accounted for 48% as the highest, followed by the joint stock company with 34%. The remaining numbers belong to the private companies, foreign capital and other types of enterprises, which were accounted for 19%[13].

The high number of enterprises that participated in the survey were wholesale and retail (23%), construction (21%) and industry (18%). In 2013, the industry sector accounted for the highest figure (23%), the wholesale and retail took the second place (21%), followed by construction (17%), as illustrated in the Figure 3.

Similar to the previous years, the scale of enterprises participating in the survey classified into the number of employees. The large enterprises had more than 300 employees, in contrast with the Small and Medium Enterprises (SMEs). According to the scale of enterprises, 9% of respondents in the survey were large enterprises; the rest of respondents were SMEs (91%)[13].

In 2015, the Vietnamese c-commerce market is expected to continue its robust development, especially in the business-to-customer segment. The country's economic development will also have an impact on the growth of c-commerce, adding that more and more people, including retailers, branding partners and delivery companies, are attracted by online trade. The increasing

trend was revealed in newly released research conducted by the VECITA. The agency found that 97% of consumers said they would continue to shop online in the future[10].

In 2016, trends application integration of e-commerce web websites in enterprises care more on sales channels (multi-channel sales)[7]. Enterprises increasingly interested in the goal of transforming their website into a multi-channel sales system, where a common system could operate the entire business process on social networks, e-commerce floor and its affiliate.

3. Discussion of Result

EAI meet more requirements in business issues with their complex, expectation and stronger relationship with supplier and customers. Some of EAI archive high satisfaction from enterprises. Nevertheless, enterprise should be carefully considered their business processes to run EAI across different departments in company and their level of application systems.

EAI integrates many source of technology such as: APIs, Programming language and other technology. So the EAI strategy needs to deeply pay attention on the EAI selection. Additional, because of integration of legacy system, EAI needs to also double-check with current status of system[12].

Based on our observation, "best-practice" tips, tricks, practitioner experience and common pitfalls are the most effective method. We believe that revealing these uncharted research areas can provide better insight to organizations with their EAI efforts. If every enterprise aware on the importance of EAI integration into the system, it will help the enterprise to manage its operations and to cut cost and to produce better profit for the business.

For an effective business in e-commerce, each enterprise needs the investment and technology links. They must have organization behaviors, the revolution of collaborative processes and standards. Besides that, the enterprise has to redesign operational processes of system to satisfy development requirements.

Concurrently, communication tools in operational process should be improved facilitating to the collaborative relationship among staff and increase opportunities or reduce risk cooperatively. Internet technology is applied to connect the partners in a supply chain, ensuring more direct, quicker and safer data transportation between systems. To reach an agreement to database encoding system, communication protocol, or collaborative process templates, the same standard is required. By this way, participants will make a benefit because of less time and saving cost for interaction with trading partners.

Websites are the basic online tools and most commonly used by enterprises in the transmission of information, communication with customers, and a basic tool to promote online commerce. According to a survey results from VECITA, there were about 3,538 Vietnamese businesses (of which 91% are small and medium enterprises) in 2014, and 45% of them owned their websites. Therefore, it seems that Vietnam is now standing at the second stage of c-commerce and transaction commerce[15].

The third stage of c-commerce: commercial collaboration (c-commerce) is the highest stage of c-commerce today. It requires the collaboration, high distribution in enterprises' internal parts, between enterprises and their suppliers, customers and supporting banks. Their websites now should be reached the highest level when they integrate applications of Customer Relationship Management (CRM), Supply Chain Management (SCM) and Enterprise Resource Planning (ERP). Thus to develop in this stage, enterprises' websites should be quite completed the implementation of trade promotion functions not only as supply and transmission of information from the market but also providing certain links with customers, or partners and being easy to make promotion activities for agents in the supply chain.

In addition of investing in e-commerce systems, investment in human resources is also important. Employees are required to have both IT and commerce knowledge. Therefore, Vietnam enterprises need to quickly reinforce human resources in this sector to promote investment effects and e-commerce applications. Enterprises can send employees to participate in short- time c-commerce program or looking for talented students and train them. In order of e-commerce to be truly business solutions that can bring high efficiency, the exporter should contact reputable banks. The purpose is to get them certified for financial guarantees, as well as contact with the network security organization for security certificates and for safety in electronic transactions.

4. Conclusion

C-commerce has reaffirmed its role in bringing to the enterprises in Vietnam the rich information about markets and partners, reduce costs, shorten production cycle, easy to build and strengthen customer relationships. Vietnam has been identified as being entered a period of strong development.

Making EAI visible in organization is a process of significant change of the business. The question often posed before it begin is, "Where to start?" It must be from the business problems of enterprises. EAI is no longer a single IT system which was comprised of business value inside. Therefore, when an enterprise develops EAI, professional staff must be put out request, to participate in building the future process and acceptance to takeover system.

The EAI should be considered in good long-term of enterprise and making decision situation. Otherwise, right architecture must be checked carefully before the implementation. Technologies also need to be seriously considered consider for the long life of EAI. The "trend" technology and right architecture help new application to be easily integrated at the desired level. The AEI is not only integrated operational processes and date but also given the bright outlook for the future. It should be developed as new businesses need and demand in all kinds of term (short, medium and long term) and the "Zero latency enterprise" is the goal that requires the EAI.

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