

Adapting an Business Model for Marketing of Distributed ERP Components

Evan Asfoura
Dar Al Uloom University,
Department of Business administration
Institute for Management information Systems,
Riyadh, Saudi Arabia
Emails: evan [AT] dau.edu.sa

Mohammad Samir Abdel haq
Dar Al Uloom University,
Department of Business administration
Institute for Management information Systems,
Riyadh, Saudi Arabia

Abstract— The federated ERP System (FERP system) as service oriented architecture (SOA) is a new version of conventional ERP system. It aims to solve many problems by the using information systems of small and middle-sized enterprises (SME) which has to use more than one information system because it can't pay for one integrated ERP system. But on the other side, the realization of this new idea has many requirements and problems which should be discussed; one of these is the adapting of appropriate business model for marketing of FERP components.

In this approach we will present logical determination of the appropriate business model and characterize this model through analyzing of the needed tasks along the FERP value chain. This could be the basis for work in the future for realizing of FERP idea.

Keywords-component; ERP system, FERP system, business model, FERP value chain

I. INTRODUCTION

An ERP system is a standard software system which provides functionality to integrate and automate the business practices associated with the operations or production aspects of a company. The integration is based on a common data model for all system components and extents to more than one enterprise sectors (Abts et al 2002; Rautenstrauch et al 2003; Robey et al 2002; gronau 2004).

Normally, an ERP-Vendor offers a single ERP-System, which is the basis for the integration of various types of business applications. The functionality of this ERP-System covered all of the functions of the enterprise sectors that are implemented and controlled by the respective vendor. The installing, developing and maintenance of this system is very expensive. Only big companies are able to cover this cost while the small and medium businesses are not able to do so. The increasing number of the small and medium companies' employees, extended the need for flexible functionalities in ERP systems. SMEs face different Problems when they buy the ERP systems, like (Abels et al 2006; Brehm et al 2007a).

- Not all downloaded components are required.

- The usage, conditioning, and maintenance of these products are too expensive.

Therefore, in the last few years the idea of the Federated ERP-System in the basis of Web-Services has evolved. A federated ERP system (FERP system) is an ERP system which consists of system components that are distributed within a computer network. The overall functionality is provided by an ensemble of allied network nodes that all together appear as a single ERP system to the user. Different ERP system components can be developed by different vendors. Figure 1 shows a federated ERP system architecture where ERP components are provided as services by external component providers. Through the FERP system, companies pay only for components deemed necessary. Also, the needed End-Hardware is made available by the service provider which in turn, reduces costs (Abels et al 2006; Brehm et al 2007b; Brehm et al 2007c).

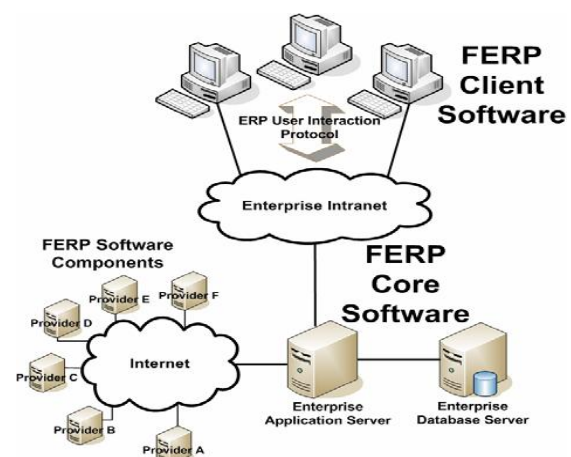


Figure 1. FERP system architecture

Web Service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in manner prescribed by its description using SOAP-

messages, typically conveyed using http with an XML serialization in conjunction with other Web-related standards (W3C 2003).

Exchanging ERP's components as web services need a suitable business model. Therefore, businesses should be adopted to fulfill the new idea's needs (Asfoura et al 2008), therefore, this work aims to characterize appropriate form of business model, which fulfills the requirements for successful exchange of FERP web services.

In this work we will present the possible types of business models and which one is more appropriate to be adopted in the second section and the characterization of this model in the third section. This work will be summarized in the fourth section.

II. APPROPRIATE TYPE OF BUSINESS MODEL FOR MARKETING OF DISTRIBUTED ERP SYSTEMS

At first we should explain the mining of Business Model. A Business model involves (Timmers 1998):

- The architecture for the product, service and information flows.

- The business actors, their roles, their potential benefits from the business model, and the revenue streams.

An Enhanced and customized categorization of the business of the provider and facilitator in relation to the marketing of professional services and functionalities as Web Services in five forms (Nüttgens et al 2008):

- The business model of software-companies, which offer services with obligatory fee for the direct revenue generating.

- The business model of software-companies, which offer in addition to the distribution and licensing of their software products free web services.

- Business models of companies that are not software vendors, but they offer free Web services to support their core business.

- Business models of companies whose core business is not in the production of software, but builds know-how solutions in these areas. These companies offer their Web services with obligatory fee.

- A new and customized business intermediaries for Web Services marketing is the broker (or brokerage), which mediates between Web services providers and the customer (enterprises, individuals,...) and supports the customers to find suitable Web services through online directory of services as a clear database. The Intermediary is an entity which stands between the seller and the customer and he can act towards both, in known or unknown ways. The importance of this element comes from reducing and facilitating the commercial and practical cost and the two most famous examples are the E-mail and E-auction (Bartelt et al 2001).

There more than one customer and provider of the ERP components in case of FERP system. In figure 2 we present an example manufacturing business process which includes three functions and every one of these functions will be provided as service from deferent external provider:

Material requirements planning is provided from provider x.

Purchase order is provided from provider y.

Production scheduling is provided from provider z.

Due to the lack of pre-defined communication channels and areas of responsibility from enterprises and customers point of views, the determination and the direct contact of customers with multiple FERP service providers for adoption, customization and maintenance of such federated systems is very difficult and problematic. Therefore, this business model services as a commercial intermediary between the providers and customers. This intermediary presents the ERP components (ERP web services) of different providers and organizes a cross vendor to satisfy the functionality demanded by the customers (Asfoura et al 2008).

In case of ERP auction, customer (user or company) should sign several contracts, if his/its requirements are covered by different ERP WS providers. That means that each provider is partially responsible to the user and there is no single "one" responsible party which customer could deal with in case of failure or any accident. As a result of this Problem, beside the high prices of ERPs software, we consider this possibility practically inapplicable..

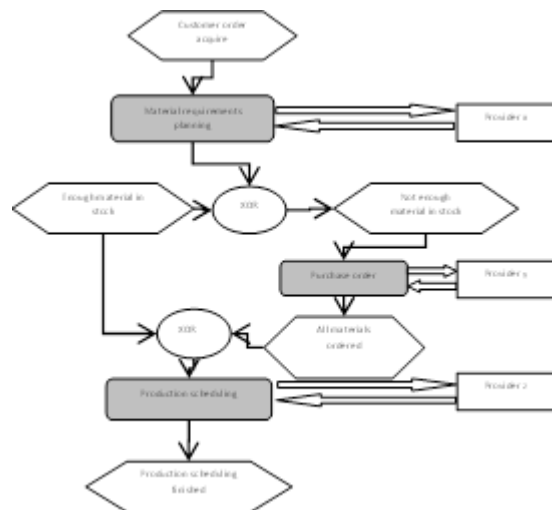


Figure 2. Example manufacturing manufacturing business process and outsourcing of ERP-functions

Then we can say that an ERP-mall (see figure 3 below) as an intermediary business model between the providers and the end-customer (enterprise) is the reasonable and appropriate business model type (Asfoura et al 2009).

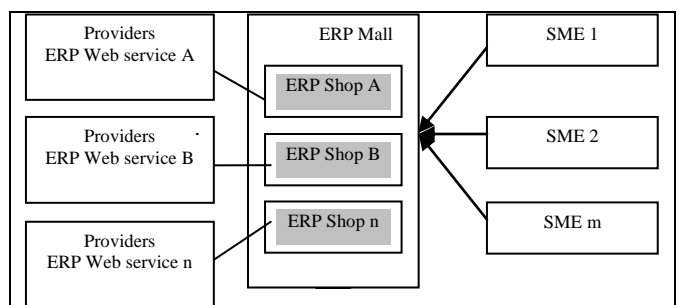


Figure 3. Primary e-mall for exchange of ERP

After this primary determination we will characterize suitable form for this intermediary (mall), which can fulfill the needs of (SMEs) through an appropriate adaptation.

III. CHARACTERIZATION OF FERP MALL

to characterize the FERP Mall, we will define the possible offers in case of FERP system. These offers depend on the requirements of FERP system. Figure 4 represents the requirements of FERP system along the value chain. In this context, we can distinguish between two categories of requirements:

A - Main requirements of FERP system.

B - Supporting requirements of FERP system.

The characteristics of our FERP Mall could be achieved through the determination of the possible offers along the presented FERP value chain. We must determine who can offer which requirements of these?

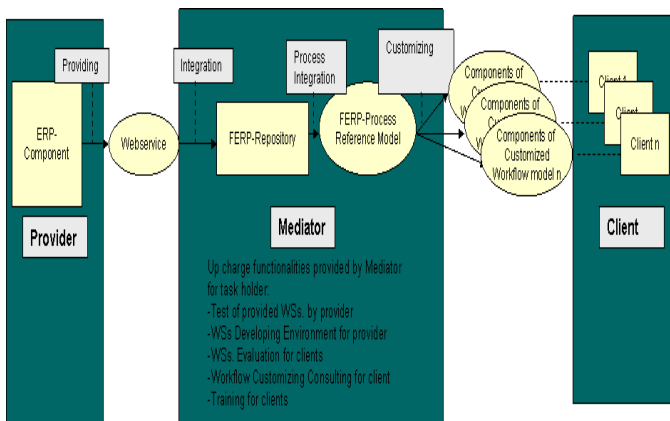


Figure 4. FERP Scenario (or FERP value Chain)

To determine that, we should classify all the requirements among the parties, that act in the market to exchange the ERP component. In Table 1 we present the possible distribution of offers between the three parties (providers (or developers), intermediaries and other parties). For the simplification here, the other parties represent other potential participants in the FERP market, who can offer just as the intermediary can do. In the next section we will logically discuss the content of this table to determine the domains of the FERP mall (or intermediary/mediator).

A. The Main requirements of FERP system

The main requirements are the necessary parts for the realization of FERP systems. This could be derived through the FERP scenario (or FERP value chain) to:

1-FERP Web Services (FERP WSs): This web services are implemented by the suppliers (developers) and their interfaces are described by the WSDL-standard (WSDL = Web Services Description Language). These services are reusable and offer the FERP functionality as operations, which are required by user companies. The development of FERP WSs is open for all; therefore, any player could be as a FERP WSs developer in the market. The providers are responsible for the quality of FERP web services

TABLE I. THE POSSIBLE DISTRIBUTIONS OF OFFERS IN CASE OF FERP SYSTEMS

	Provider	Mediator	Other parties
Main requirements			
FERP WSs	yes	yes or no	Yes or no
FERP Repositories	no	Yes	Yes or no
FERP WF-Definitions	no	yes	Yes or no
Supporting requirements			
WSD-environment	no	yes	Yes or no
Testing service	no	yes	no
WSE-Information	no	yes	Yes or no
Training courses	no	yes	Yes or no
Consulting	no	yes	Yes or no

2-WS-publishing: The WSs developers publish the WSDL interface descriptions in the online directories (repositories), which are structured by the UDDI standard (UDDI = Universal Description, Discovery and Integration). The main role of the FERP malls is as online directories provider, where providers can publish their FERP WSs and the customer enterprises can find the appropriate FERP WSs. FERP WSs in these repositories are classified based on the functional enterprise sectors (Accounting, Logistic... Sector) and every sector represent a different shop in our FERP Mall.

3-ERP Workflow-Definitions (WF-Definitions): Workflow is a plan of sequential or in parallel chained functions as working steps in the mining of activities which lead to the creation or utilization of business,, (Brehm et al 2007a). By standardizing these types of activities in a workflow language (e.g. BPEL: Business Process Execution Language), it is possible to use

workflow definitions in different companies, and to market it separately. FERP workflow combines Web services from different providers FERP for the support of the whole of FERP business process in user companies. Therefore, our FERP Mall appears as a provider of workflow reference model, which represents all possible scenarios (workflow descriptions) of a company. FERP mall can customize, through this reference model, the suitable workflow for each enterprise. FERP workflows can also be described by the user companies themselves, but in this case, FERP Mall is not responsible for the qualitative aspects of these workflows.

B. The Supporting requirements of FERP system

The supporting requirements here mean requirements which can support the FERP WS developers and the customer companies along the FERP value chain. These requirements can be offered either as fee-based services or as a free service to support the core business. In case of FERP systems, we can distinguish the following requirements:

1-Web Services Developing Environment (WSD-Environment): Because of the importance of Standardized Web Services description in case of the FERP systems, we can support the developers with tool which help them by the implementation of Web services. This tool (or development tool) could be used by standardizing the specification to describe functional and non-functional (qualitative) properties of Web services and to manage the development process for the reduction of development time and the potential errors by the WS development (Höß et al 2002; Brehm et al 2008). This tool is offered in FERP as service to be used by the developers, who seem to be costumers in this case.

2-The Testing Services (T-Services): The intermediary (FERP Mall) offers web services test and Integration test for the user to find the error in the cooperation of various FERP Web Services (Marx Gomez et al 2008). This increases the intermediary safety in his relationships with the large number of FERP Web Services providers and increases the costumers' trust in the reliability of the FERP systems. This test service could be offered by partners (third party) too.

3-WS evaluation information (WSE-Information): FERP WSs are reusable products and every one could be provided from different developers with different prices quality levels. In our case the market is open to small and private developers for the development and offering of individual FERP WSs. In this situation the intermediary meets many risks because of the large number of foreign suppliers (developers). Therefore, the reputation of these developers has relevant role in increasing the trust and security between the intermediary and the providers (developers) and for the continuous assessment of the quality of a service. This has been considered in (Brehm et al 2006; Brehm et al 200d) through a secure protocol for exchange of the evaluation information between the provider, the customer, and a trusted third party. This collection and summarizing of historical evaluation information of FERP WSs is offered by intermediary (FERP mall) as trusted party

as a quality - and safety information. The aggregation of this information could be by selecting and adapting an appropriate FERP workflow. This consulting could play also important role for solving of the possible problems in using of FERP system.

4-consulting service: After the decision of the company to be a costumer of our FERP mall, we offer supporting advices to this company by selecting and adapting an appropriate FERP workflow. This consulting could play also important role for solving of the possible problems by the using of FERP system.

5-Training service: the decision of the company to be a costumer by our FERP mall, the employees, who can use the FERP system. FERP Mall offers in FERP training courses to cover the lack of knowledge by using the new offers by external parts either.

As a result of this work is an FERP Mall as appropriate business model. This mall offers FERP Web service through the online directory and work as an integrator of FERP WSs in FERP processes through workflow reference model, which provides all the possible scenario of business in an enterprise. This integrator can fulfill the needed FERP functionality as one hand and he is responsible to the user companies for the quality of ERP processes. The all FERP shops in FERP mall appear as single shop to the costumer companies, which supports all phases of transaction, but only the using of WS functionality execute directly between the FERP WS providers and the end-user.

This mall also offers services (as service providers) which are needed for the marketing of FERP Web Services. These services appear in other shops (see Figure 5). All shops in the FERP Mall have a single shopping and payment system. FERP mall, with this intermediation form, has many advantages for both providers and clients using it.

For providers or suppliers:

- The compatibility with the other FERP WS providers.
- Easier and faster way to reach the market, especially for small providers.
- Every Provider can offer services depending on selected competences.
- Increasing the level of trust where the business relation becomes business-to-business.

For clients or customers:

- Pay only for the used components.
- FERP mall are more flexible to meet any change in the client's business processes.
- No need for high-end computer hardware
- User companies' can select the needed components from different providers directly through the mall as one ERP package.

- Benefit from the support services (exp. training and consulting) offered by the intermediary.

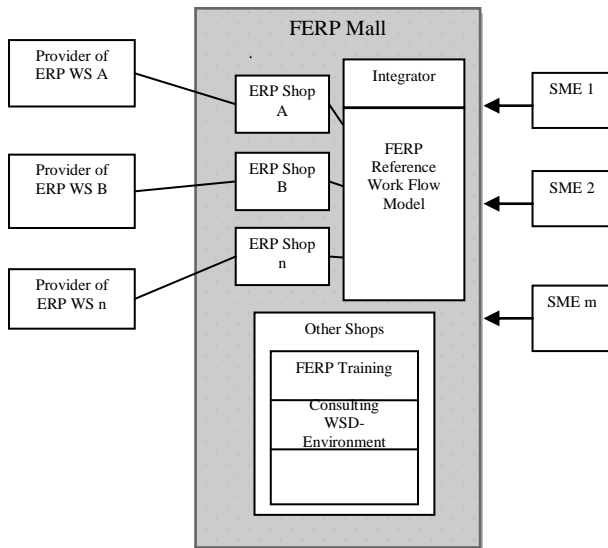


Figure 5. Adapted FERP mall

In the future works we will discuss the methods, which can increase the softy and the trust between the actors (provider, intermediary and client) through increasing the intermediary roles in the FERP market.

IV. CONCLUSION

In this work we have defined the FERP system based on service oriented architecture as new version of Conventional ERP system. After that we have discussed logically the suitable type of business models for marketing of FERP web services through the investigation of the business models in the market of web services. The main aim of this work was characterization of adapted FERP mall through the determination of its work area along the FERP value chain. For supporting our result we have presented the benefits of FERP mall on the FERP WS providers and clients.

V. REFERENCES

1. Abels, S., Brehm, N., Hahn, A.; Marx Gómez, J. "Change management issues in federated ERP-systems – An approach for identifying requirements and possible solutions", in International Journal of Information Systems and Change Management (IJISCM), 1, 2006, pp. 318-335.
2. Abts, D.; Müller, W. "Grundkurs Wirtschaftsinformatik. Eine kompakte und praxisorientierte Einführung", 4. Aufl., Braunschweig et al., 2002.
3. Asfoura, E.; Kassem, G.; Rautenstrauch, C.; Gómez, J.M.; Jamous, N. "The classification of business model for the exchange of distributed components of Federated ERP Systems",

In: Proceedings of the 3rd IEEE International Conference on information and communication technologies (ICTTA'08), Damascus, Syria, April 7 - 11, 2008.

4. Asfoura, E.; Jamous, N.; Kassem, G.; Dumke, R. "E-mail as solution for marketing the federated ERP components on the basis of web services", In: journal of International review of business research papers . - Melbourne, Bd. 5.2009, 4, pp. 478-490.
5. Bartelt, A.; Lamersdorf, W. "Geschäftsmodelle des Electronic Commerce". in: Informatik 2001 - Wirtschaft und Wissenschaft in der Network Economy, 2001, pp. 902-908.
6. Brehm, N.; Marx Gómez, J. "The Web Service-based combination of data and logic integration on Federated ERP systems", in: proceeding of the 18th IRMA International Conference - Managing Modern Organizations with Information Technology, (IRMA2007). Vancouver, Canada, 2007a.
7. Brehm, N.; Marx Gomez, J. "Federated ERP-Systems on the basis of Web Services and P2P networks", in: International Journal of Information Technology and Management (IJITM), 2007b.
8. Brehm, N.; Marx Gómez, J. "Web Service-basierte Referenzarchitektur für Föderierte ERP-Systeme. In: (Pietsch, T.; Lang, C.V. Hrsg.): Ressourcenmanagement. Erich Schmidt Verlag, Berlin, 2007c, pp. 125-142.1875
9. Brehm, N.; Marx Gómez, J. "Sicherheitsprotokoll zur Bewertung von Diensten in SOA-basierten Anwendungssystemen", in: BSOA Workshop - Bewertungsaspekte Serviceorientierter Architekturen, Berlin, 2006.
10. Brehm, N.; Marx Gómez, J.; Ziesenitz, A. "Toolunterstützung bei der vermarktungsorientierten Entwicklung von Web Services als Bausteine komplexer betrieblicher Anwendungssysteme", in: proceeding of Multikonferenz Wirtschaftsinformatik, München/Garching, 2008.
11. Brehm, N.; Marx Gómez, J.; Strack, H. "Request-Response-Evaluation Infrastructure for trusted Web Service-based ERP systems", In: C. Rautenstrauch (Hrsg.), Die Zukunft der Anwendungssoftware - die Anwendungssoftware der Zukunft. Aachen: Shaker Verlag 2007d. pp. 83 - 93.
12. Höß, o.; Weisbeker, A. "konzeption eines Repositories zur unterstützung der wiederverwendung von Softwarekomponenten" in: Turowiski, k. (Hrsg.): 4.Workshop koponentenorientierte betriebliche Anwendungssysteme (WKBA). Augsburg 2002, pp. 75-85.
13. Gronau, N. "Enterprise Resource Planning und Supply Chain Management", in: Architektur und Funktionen, München, 2004.
14. Marx Gomez, J.; Lübke, D. "in Kunzept und Support für das testen von Services", in: Orentierung für die Praxis, 2008. pp. 28-31
15. Nüttgens, M.; Dirk, I. "Geschäftsmodelle für dienstbasierte informationssysteme- ein strategisservicesvon Webcher Ansatz zur Vermarktung", In: journal of Wirtschaftsinformatik 2008 pp. 31-38.
16. Rautenstrauch, C.; Schulze, T. "Informatik für Wirtschaftswissenschaftler und Wirtschaftsinformatiker", Berlin et al., 2003.
17. Robey, D.; Ross, J.; Boudreau, M. "Learning to implement enterprise systems: An exploratory study of the dialectics of change", in: Journal of Management Information Systems, 19, 1, 2002, pp. 17-46.

18. Timmers . P . ‘Business Models for Electronic Market`,
in: Electronic Markets 8(2), 1998.
19. W3C 2003, ‘Web Services Architecture`, Working Grup
Note, im WWW unter: <http://www.w3.org/TR/ws-arch/wsa.pdf>
(15.03.08), 2003, p. 7