A Model of E-Banking Applications Evolution Issues

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A MODEL OF E-BANKING APPLICATIONS EVOLUTION ISSUES

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Abstract

As a specific case of E-Commerce, E-Banking is a typical service combining a communication and a distribution channel. E-Banking applications have continuously evolved over the time, from their appearance in a context of innovation in the banking sector to the relative standardisation and convergence of current state. Several players in the banking sector were studied in order to learn specifics of client segments and implementation of requirements. This paper presents a simple model for the core issues of the evolution in E-Commerce applications. The research target is to extrapolate a framework from E-Banking case studies to understand the main business drivers over web-based applications evolution and change management.

Keywords: E-Commerce Applications Evolution, E-Banking, IT Alignment

Introduction

E-Banking developed and evolved rapidly during the last ten years. IT innovations like web-commerce and secure information exchanges have been a trigging factor for E-Banking appearance. E-Banking functionality is also evolving continuously, driven by the necessity to cover new clients' needs and to procure more integration between electronically available banking services. The evolution of demand in online services induces a continuous evolution of the underlying E-Banking applications. This pressure to evolve raises a number of interesting questions not only to developers and maintainers but also to executive managers, some of these issues can easily be extrapolated to other web-based e-commerce applications. This paper discusses the organisational and methodological issues in the evolution of E-Banking applications. Several players in the Swiss banking sector were studied using interviews and a questionnaire. After the first set of common issues was identified and examined, the model of these issues was elaborated.

This paper has the following structure. First, we give a definition of E-Banking and identify the close standing domains and discuss the methodology used. Next, we define E-Banking evolution and provide an example of it. Finally, the model of issues associated with the E-Banking applications' evolution is presented.

Scope of Research and Related Work

From the most general point of view, the evolution of E-Banking applications falls within the domain of software evolution. We use two criteria to specify the scope of our research within the common evolution of software: the type of application and its application domain. The choice of E-Banking applications was influenced by the following factors: web applications' evolution is not trivial and less studied, E-Banking applications are evolving continuously.

The close standing domains of E-Banking applications' evolution are: software evolution, web applications' evolution, E-Banking. In this paper, we mention some but not all of the existing publications covering these topics.

Lehman [7], Cook [3] and Ciraci [2] brought meaningful contribution to the domain of software evolution. But being focused on the "traditional" and desktop applications, none of these works consider the E-Commerce applications' evolution. Among other efforts to support the web applications' evolution, we can mention the following publications:Giuseppe and al. [5] try to put forward an approach for supporting web applications' evolution by reverse engineering analyses of the existing web applications with limited documentation. Daniel and al. [4] use active rules for automatic evolution of adaptive web applications. Bebjak and al. [1] in order to reduce costs and increase the speed, are proposing an approach for web applications' evolution using aspect-oriented design patterns.Hong and al. [6] in their publication discuss users' feedback and a requirements management system that must help to support the financial portal evolution. They agree with the fact of the importance and complexity of corporate financial portal evolution, and underline the iterative and contentious character of the evolution. The key incentive of evolution for them is feedback or a change proposal coming from the end user. Wu and al. [15] are talking about core capabilities necessary for E-Banking. While mentioning "planning a new IT infrastructure" and "delivering differentiated services" among eight core capabilities, they don't clearly distinguish a capability to conduct applications' evolution easily. Shah [9] investigates the factors that are critical to the success of E-Banking. Like the previous authors, while talking about "system integration" and "organisational flexibility", researchers don't focus on applications' evolution.

In this paper we focus on the evolution of E-Banking applications as it is perceived by the users through the user interface and as it is driven by the continuous change in offered services.

We based our research partially on the results of related works, but neither of them talks about the phenomenon of evolution in E-Banking application. That is why in the next paragraph we give a definition of E-Banking applications' evolution as we see it.

E-Banking

E-Banking or Electronic Banking is an externalisation of front-office processes and bank services towards clients using information technologies. E-Banking is a virtual front office (counter) with no human actors on the Bank side participating in the interaction. Using a standard web browser, a client can be in contact with his bank from anywhere. This makes access to the E-Banking channel universal, as is the case with any other E-commerce service. E-Banking in contrast to the traditional banking provides a service with a new quality and features. The banker is replaced by a piece of software. There are cases where the bank has no physical counter at all, only virtual ones. All interaction with customers is done through a website, supported by a telephone hot line. This is the case of Swissquote - a Swiss bank that is purely electronic [13].

E-Banking Evolution

We consider E-Banking applications' evolution as a process, progressively changing functionalities of the underlying applications throughout time. Evolution has a continuous character. In contrast to a purely versioning process with difficult migration steps, an evolving application passes smoothly from one state to another. At each new state, the application either offers new functionalities or existing parts of it are enhanced. The complex character of E-Banking applications' architecture, organisational structure and technical infrastructure, makes E-Banking evolution highly complex. That is why multiple issues can be associated with this phenomenon.

In figure 1 below, we give an example of the trade-off between business needs and specific requirements, requirements implementation and requirements' evolution.

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décompresseur TIFF (LZW)
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Figure 1.   Requirements Implementation
Specified by business and realized, a requirement

Req. 1 satisfies only a part of what business may need. To be developed this requirement needs some components c1, c2, c3. Some of these components exist; some of them are to be developed. After some time, a new business requirement Req.2, very close to the previous one, may appear. In other words, Req.1 evolves to Req.2, which uses some common components and covers partially the same business needs. The matrix components/ requirements are highly useful for the management of requirements' evolution and required components. The time needed to align an application to new requirements is typically 6 to 12 months [14].

As a specific example, we present here a sequence of evolution in E-Banking application for private clients of a Geneva private bank for the period from 1999 to 2007 [12].

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décompresseur TIFF (LZW)
sont requis pour visionner cette image.

Figure 2. A Geneva private banking functionality evolution

We mentioned that functionality was evolving continuously in order to support core banking activities. This example shows not only the need for evolution during the last ten years, but what is also highly important, the need for further evolution in the nearest future.

Research Methodology

We used interviews of e-banking experts as a starting point for our research. The main data were collected through series of interviews with different actors coming from various financial institutions. The target group for our research included: traditional private bank, universal bank, insurance company, consulting company and software development company. The last two actors deal as external providers of IT services and products for financial institutions such as banks and investment funds. The specifics of the financial sector – highly reserved character of the IT security policy, due to confidentiality issues - make quantitative research almost impractical: e-banking applications managers consider this subject as too sensible strategically to accept answering general surveys. That is why a first round of interviewed actors was limited to the companies mentioned

above. Then we applied content analyses to interviews results. The way the research was carried out can be depicted by the following figure:
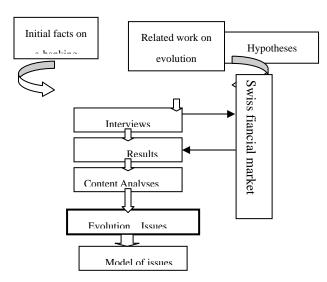

Figure 3. Overall methodology

A number of hypotheses coming from the study of the related work, the knowledge of the E-Banking applications lifecycle and our intuition were formulated:

- H1: E-Banking applications evolve conti-nuously rather than by very different versions,
- H2: this evolution is complex and has a multi-dimensional character,
- H3: applications evolution is directly driven by business evolution.

In order to test these hypotheses a questionnaire was created. It contained about forty questions concerning different evolution issues. Next, this questionnaire was used as a guideline for conducting the interviews with the number of financial sectors' actors. The results of the interviews were systematized and then analysed according to content analyses methodology [8]. We can classify our research methodology as being mostly "interpretation-centric". Various data was gathered including facts, negotiated meanings by subjects/researchers and subjective understanding [10]. The answers to closed questions received during each interview confirmed the existence and importance of an issue. Then, we drew more detailed conclusions from the answers of the opened questions. In order to retrieve and group the issues, we considered the significance and the concerns interviewees given to each of them. Finally, we draw a set of major issues associated with evolution of E-Banking applications from this analysis. In fact, the results of interviews confirm the hypotheses formulated at the beginning. As we mentioned

above, we based partially our hypotheses on the results of the related works, but neither of them talks about phenomenon of E-Banking applications evolution. We made the first attempt to consolidate the issues in a more detailed manner (see the next section). The consolidation of the issues is necessary in order to receive an adequate tool, [16] proceed to obtain their matrix of factors in fairly similar manner.

A simple model of E-Banking evolution issues

The purpose of the next stage of our research was to organize issues into three groups, by main research hypotheses. At the current stage of our research we try to identify the specifics of the influence of each group on E-Banking applications' evolution. In figure 3, we present a simple model structuring issues by their groups. The structuring of issues in this way is a first step towards a fully detailed model of E-Commerce applications' evolution issues.

Figure 4. Influence of different issue groups on application evolution

Issues belonging to different groups influence application evolution in different ways. The issues of the first group H1 stipulate that the evolution phenomenon has a continuous character. The issues of group H2 either facilitate the evolution or complicate it. The issues of the last group serve as a powerful engine of evolution and stimulate it.

Group 1 implies that E-Banking applications must be aligned with bank business strategy. Bank business strategy needs to be updated and rectified in order to respond to a constantly changing business environment. This changing business environment makes E-Banking application' evolution almost never-ending.

Group 2 includes facts such as that E-Banking applications' evolution is complicated and expensive; it is conducted by different actors, it depends on bank organisational structure and IT architecture. We collected evidence that better organisational, methodological approaches and technical tools can facilitate evolution considerably.

Group 3 comprises the main drivers of E-Banking applications' evolution. The satisfaction of clients' needs and the evolution of bank business models are amongst the most important incentives. The entrance of a bank into the new market or change in local regulations may lead to E-Banking applications' evolution as well.

Finally we stipulate that the ability of a bank to support evolution of applications is one of its core capabilities.

Conclusions

First, we identified issues associated with E-Banking applications' evolution. Some of the identified issues are valid for other close standing domains; some of them are specific for E-Banking applications' evolution. We made the first attempt to consolidate the issues in a more detailed manner. The next step will be the elaboration of the model, which can be used for evaluation of: the extent of the exposure of some application to evolution, the easiness/impediment of the evolution process implementation. After this, we plan to test the elaborated model, by applying it to the evolution processes of some real life complex E-Banking example. Finally, the model may be complementary to such existing methodologies and frameworks as ITIL or COBIT.

Acknowledgement

References

[1] Bebjak, M., Vrani, V., Dolog, P. (2007). Evolution of Web Applications with Aspect-Oriented Design Patterns. Proceedings of the 2nd International Workshop on Adaptation and Evolution in Web Systems Engineering, AEWSE'07, Como, Italy, July 19

[2] Ciraci, S., Broek, P.v.d., Aksit, M. (2007). A Taxonomy for a Constructive Approach to Software Evolution. JOURNAL OF SOFTWARE, VOL. 2, NO. 2, AUGUST

[3] Cook, S., Ji, H., Harrison, R. (2000). Software Evolution and Software Evolvability. Working paper, University of Reading, UK

[4] Daniel, F., Matera, M., Pozzi, G. (2006). Combining conceptual modeling and active rules for the design of adaptive web applications. In Workshop Proc. of 6th Int. Conf. on Web Engineering (ICWE 2006), New York, NY, USA, ACM Press

[5] Giuseppe, A.D.L, Massimiliano, D. P., Fasolino, A. R., Tramontana, P. (2005).Supporting Web Application Evolution by Dynamic Analysis. Proceedings of the 2005 Eighth International Workshop on Principles of Software Evolution (IWPSE'05)

[6] Hong T.K.V, Elsner, H. (2007). Management of Portal Evolution Introducing Evolution Management for the Corporate Financial Portal, in eOrganisation. Service-, Prozess-, Market-Engineering, Vol. 2, p.337-352, Wirtschaftinformatik-Tagung

[7] Lehman M.M. (2000). Rules and tools for software evolution planning and management. FEAST 2000 workshop: feedback and evolution in software and business processes, J.F. Ramil, Ed. London: Imperial College of Science, Technology and Medicine, pp. 53-68

[8] Oppenheim, A.N. (2001). Questionnaire Design, Interviewing and Attitude measurement. Publié par Continuum International Publishing Group, ISBN 0826451764, 780826451767, 303 pages

[9] Partnov, N., Estier, Th. (2009). E Com-merce Applications Evolution Issues: the case of E-Banking,, Procs of BUSITAL 09, CAISE 09

[10] Shah, H., M., Branganza, A., Khan, S., Xu, M. (2005). A Survey of Critical Success Factors in e-Banking. in the proceedings of EMCIS 2005

[11] Suprateek Sarker. (2007). Qualitative Research Genres in the IS Literature: Emerging Issues and Potential Implications, Proceedings of the 40th Hawaii International Conference on System Sciences.

[12] Torreblanca I., Arvetica. (2008), http://www.arvetica.com/en/about-us/

[13] Swissquote. (2009), www.swissquote.ch

[14] UBS, www.ubs.com/1/e/ebanking.html

[15] Wu, J.-H., Hsia, T.-L., Heng, M.(2006). Core capabilities for exploiting electronic banking, Journal of Electronic Commerce Research, VOL 7, NO.2.

[16] Terlouw J., Terlouw L. and Jansen S., (2009), An Assessment Method for Selecting an SOA Delivery Strategy: Determining Influencing Factors and Their Value Weights, Procs of BUSITAL 09, CAISE 09, pp. 16-30