Money Mover – Electronic Payment System

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ABSTRACT

The main idea behind the development of a customer-to-customer (C2C) payment system is to allow the user to send money to another person on-line exclusively by electronic means. What aspects of a system appeal to the users, make it usable and induce a perception of being trust worthy by the users – especially European users? This was the main issue which we attempted to solve in the designing Money Mover (MoMo) C2C payment system (http://usisql.ipo.tue.nl/momo). This report contains a short introduction to the project domain, the design process and the prototype description and, finally, the results of user testing of the prototype and some recommendations for the future development.

Keywords

Costumer-to-Customer (C2C), electronic payment system (EPS), e-commerce, Internet, trust, trustworthiness, web site.

INTRODUCTION

Context and Scope of the Project

The objective of this project is to design a web-based high-fidelity prototype of a (third-party) system that would allow people to send and receive money on-line. The focus in this project is on the user interface, namely: conceptual design of functionality to support, information design & architecture, interface design with the stress on professionalism and trustworthiness of the system and usability aspect.

Design Process Description

The project team consists of six USI students. We spent 42 days (spread over one year) developing Customer-to-Customer payment system. During the design process user center design principles were followed, involving the end-users right from the early stages of design process, user evaluation and clearly defined project phases: literature study (gathering background information), analysis of current situation, gathering requirements, conceptual design, evaluation of conceptual design, prototype development, testing and evaluation of the prototype (see Appendix 1).

BACKGROUND INFORMATION

Nowadays usage of plastic money (credit & debit cards) and electronic banking systems is increasingly becoming popular among people to conduct their financial transactions. Going by this trend usage of Internet based payment system to send and receive money online seems to be the next logical step in money transactions.

E-commerce

E-commerce is a general concept covering any business transaction executed electronically between parties such as companies (business-to-business – B2B), companies and consumers (business-to-consumer – B2C), consumers and consumers (C2C), business and the public sector, and between consumers and the public sector.

Electronic Payment Systems

Customer-to-Customer payment systems allow Internet users to transfer money to each other from their checking, credit card or other accounts. The systems are popular among auction sellers because they allow the sellers to accept credit cards without taking the trouble of setting up a more costly merchant account.

The first C2C payment systems were developed in 1999 in USA. The biggest and the most popular e-payment system is Pay Pal. In autumn 2000 Pay Pal broadened its scope of business activity to some European countries. Currently it offers services worldwide. In June 2001 Pay Hound Limited launched the first European C2C payments system, developed specifically for the customers in UK.

Trust Definition

For e-commerce trust means a person's willingness to invest time, money and personal data in an e-commerce site in return for goods and services that meet certain expectations. The more a person trusts a website, the larger the risk he or she is willing to take when dealing with the website.

The users of e-payment system are mostly afraid of two types of risks: financial risks (the transaction can be fraudulent) and identity risks (the possibility of misuse or fraudulent use of personal information).

From the technical point of view implementing sophisticated authentication and security mechanisms can solve both these problems. Unfortunately, this solution does not automatically make the web site trustworthy. The implemented security techniques should be visible and clearly explained to the user.

There are also other factors which influence trust in e-payment systems, namely: privacy, information credibility and ease-of-use.

People are sensitive about privacy of their personal information. Therefore the company should only ask for necessary information, explain, why the requested data is needed and assure about security of personal information given by the user.

Company (address, contacts, history products) information and information about the offered services should be clear, easy to find and up-to-date.

Good presentation, navigation and correct, professional design make the web site easy-to-use and enjoyable.

EXISTING E-PAYMENT SYSTEMS

In order to have a good overview of the current situation we decided to analyze some of existing C2C payment systems taking into account different aspects: desired functionality, information structure, available technology and business opportunities for such a system.

Functionality, Presentation and Navigation Structure

The purpose of this analysis was to find out what services were offered by existing systems, how easy the user can achieve the main goals (registering to the system and executing transactions) and what the web pages look like (layout, colors, technology, used metaphors). The most important and interesting findings of this analysis were investigated later, during the focus groups and interviews conducted in the requirements engineering phase.

Information Structure

During the information structure analysis of existing sites we have found out that there was a great diversity among these. Starting from very short description, through answering frequently asked questions only, to very long and detailed explanation of every aspect connected to the site. However some common features were identified in all the existing systems and it was decided to develop our information structure basing on these and filling lacking parts according to our estimation of their necessity.

Technological aspects

During analyses of technology we discovered high importance of security issue. The customer wants assurance that his transactions are private and the vendor does not want his competitors to figure out how good (or bad) business is, or who his customers are. Also we have to make sure that used technologies are fast, reliable and unfailing.

System's protocols and transactions have to be based on universal standards for transaction business, including negotiating in real- time for different methods of electronic payments, similar to every day transactions. E-payment systems work in the realm of Internet and have to deal with data transfer speed limitations and differences in displaying information by different browsers. Such problems could be solved by fast and easy adaptive technologies residing on the server side.

Business and Competition Analysis

The electronic payment systems are fast emerging to replace the conventional payment systems, which involve the paper bills and invoices. It is expected that the value of transactions in electronic form, in the near future, will be around USD one trillion and that the dominance of USA will diminish to some extent with Europe taking over the lead in the near future with the User-led pull in contrast to the US's technology push.

The Electronic Payment Systems (EPS) come in two categories namely cash-like or debit payment systems and check-like or credit payment systems. Major players in the field will be bankers, the third parties and mobile communication network operators, ISP providers. In practice PayPal and Yahoo turn out to be the best existing systems according to studies conducted to compare services offered by different companies.

END USER CHARACTERISTICS

The target group will be adults from every stratum of the society. The only perquisite being that the target audience should have access to Internet and own either a bank account or credit card account.

Furthermore we especially focused on European users since a service tailored for the European market would have most chance of successfully competing with existing American e-services which only focused on the US and European on-line Bank services which where still in a preliminary phase of offering mature systems.

In a later stage of the project after this decision it was found that also US dedicated e-services where showing interest in European customers by allowing for transfers in European currencies.

Gathering Requirements Methodology

In order to understand the requirements of the users, focus groups were organized along with interviews. The respondents were from different educational and economic backgrounds including students, professionals, housewives etc.

We organized two, six-persons focus groups. This exercise elicited information from the respondents their perceptions about Internet, its use, the possibilities the Internet offers in terms of banking and related services. This afforded the

design team to assess the general level of awareness of the respondents.

The interview sessions went more in depth where the respondents were asked to try out various e-payment services in terms to look & feel, Information Architecture. Finally the trust perceptions about each system tried were collected. We interviewed twelve persons in total.

Requirements

For a suitable list of requirements, we started of with brainstorming about our future product, which resulted in a wish list. This list served as a framework for the system to come and guides us in setting up a mental model. From here on we analyzed the system from several different points of view to get a more detailed list. With the results from the focus groups and interviews we were able to end up with a list of concrete requirements focusing on trust inducing factors. In most cases, the results of this research confirmed the general requirements for the trustworthy systems and usability design principles. Since currently existing systems were designed mainly for the USA, the most important thing for us was to find out, what requirements the system should meet in order to satisfy European users' needs. The main findings are described below.

The users liked the idea of a "virtual account", where they can store some money for Internet transactions. This service makes them feel more confident than using the credit card or the personal bank accounts for each transaction. The main advantage of the "virtual account" is, in the users' opinion, lower financial risk – they can loose only this money, which they have stored on this account.

European users do not feel comfortable with using the credit cards over Internet, therefore they should have possibility to use the Internet based payment system without necessity of using credit cards.

The system should work all over the world. It should be possible, for example, to send money or to pay for something in the USA.

The European users are quite conservative about the web page design. Especially the web pages of the system, which deals with money, should have decent, professional, a bit boring, bank-like look.

The headquarters of the company launched C2C payment system for Europe (or at least its division) should be located in Europe. The street address and the phone number should be easy to find on the web site.

CONCEPTUAL DESIGN

As soon as we formulated the list of requirements for our system, we started working on the conceptual design. After a few brainstorming sessions we decided, what functionality the system will support, what additional features we would like to implement and we agreed upon the basic navigation structure for the system. Then we decided to split up and work individually on the presentation concept for the web site, focusing on the home page for the future payment system. This exercise resulted in six different designs (see Appendix 2). After discussing the strong and the weak points of each design, we decided to combine all of them in the final design rather than to develop one of them. Since in the later stages of the design process we decided to implement some new ideas, the final design looks different than any of the drafts (see Attachment 3).

PROTOTYPE DESCRIPTION

The main focus of this project is on the user interface design. Since we decided to build a working prototype of the payment system, our final product consists of two parts: the user interface – MoMo website and a working database, where all information about the users and the transactions are stored.

The prototype is available on-line:
http://usis.ql.ipo.tue.nl/momo

Look and feel

MoMo system has been designed based on the observations from our preliminary investigation in focus groups and interviews. Later, the design was improved by adding a unique concept based on a checkbook metaphor. MoMo makes navigation enjoyable from different sides. The way MoMo serves user with extra information about current depth and place in the system (titles and path length) makes surfing easier. Colors are a combination of the properties we wanted to convey, such as: trustworthy, decent, vivid, light and reliable.

Functionality

Every user has to register with the MoMo system before he or she can start using the service. In order to make the registration process clear and simple, all necessary information the user has to give are divided into three logical parts: personal information, bank account data and optional credit card data. While the registration process is complete, the system creates a "virtual" account for the user. Since then, after logging in, the customer can use all features offered by MoMo payment system:

- check the account balance and transactions history,
- add money to his/her MoMo account (from the bank account or using credit card),
- withdraw money from MoMo account to the personal bank account,
- send money to another person (for this the user needs to know the recipient's e-mail address)
- request money from a debtor (when the request money form is submitted, the system sends e-mail with the request and link to the MoMo website, so the requested person can make the payment through the system).

To assure the user that money he/she has sent will not go to the wrong person, every payment has to be accepted by

the recipient. For every transaction the system generates two numbers: transaction ID (serial number) and security key (unique 10-digit number). The recipient receives these numbers together with information about the sender via e-mail. In order to accept the payment the recipient has to visit MoMo website, log in to the system, open the "Accept money" form and fill it in with these two unique numbers.

EVALUATION OF THE PROTOTYPE

Testing

After implementing the prototype we have tested 5 subjects on it. The main points stressed in the questionnaire were about: first impression, trustworthiness and ease of use. The general impression was very positive, subjects liked the look and feel of the site, they did not feel lost at any point and they were very satisfied in the presentation and the structure of information. They said that the presentation and clarity of the information increases the perception of trustworthiness towards the system, although there were some other points to be improved in future.

Future Recommendations

To increase trustworthiness in the working system the seals of approval (like partners' logos) should be linked to the existing websites and the information of the association between that site and MoMo system. The major financial institutions have trusted brands and can integrate online payments with broader financial packages. There should be an option of adding credit card information to the already existing account. The way to accept the transaction must be modified, because the current feature was found to be annoying. The option of withdrawing from the transaction should be developed as well. These are the main points to improve in the future.

CONCLUSIONS

The objective of the project was to come up with the prototype of the Internet based C2C electronic payment system. Since the existing systems were designed mainly for customers in USA, it was challenging to design the system, which meets the needs of the European users who are perceived to be more conservative and circumspect than Americans. The final result – MoMo system, however still in the prototype stage, proves that we succeeded in this task. Our test users and people, who were using MoMo system during the demonstration, were very positive about the system's look & feel and enthusiastic about the services the system would offer if it were to be launched. This leads us to a conclusion that there is a good opportunity in the European e-commerce market for such a system if only the predicted problems arising out of legal issues in different European countries could be resolved.

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