A new Concept for Meeting the Demands for Services in Communities

Joerg Schuetze (Corresponding author)
Graz University of Technology
Department of Urban Planning and Environm. Studies
8010 Graz, Austria
0043-316-225319-15 (Fax)
joerg.schuetze@gmail.com
www.schuetze-consult.com

Markus Hill
MH-Consulting
Schäfergasse 42 - 44
60313 Frankfurt
Tel. 069 280 714 (Tel/Fax)
markus.hill.cologne@t-online.de
http://www.competence-site.de/cc/experten.nsf/experte/H3579-Markus-Hill

Abstract
Inspired 2005 by an early version of the trust and reputation framework in e-commerce provided by Jøsang et al. (2007) we are looking into a specific situation: We assume that on a day-to-day basis many people have needs which go unsatisfied even though these needs could be met with a relatively small amount of effort on behalf of other people. Such assistance is frequently given and received in social networks.
A reduction of the gap between supply and demand is provided by services like ebay.com (goods), www.getafreelancer.com (services), ciao.com (information) or mixed age housing projects (family-type exchange of financial power and work/care).
It is difficult to assign a market value to such 'mini jobs' when using the currently accepted economic model. A concept for an exchange service to include both supply and demand covering typical day-to-day needs or mini jobs was designed by the authors. This paper shows the main idea and further details, possible extensions of the concept and possible results of an implementation of such a service, which include making it easier to set up a business, extending the labour market and enabling people with certain disabilities to stay in their homes.
.**Keywords:** Reputation, e-commerce, social networks, family, sanctions.

1 Introduction

Inspired 2005 by an early version of the trust and reputation framework provided by Jøsang et al. (2007) we are looking into a specific situation: We assume that on a day-to-day basis many people have needs which go unsatisfied even though these needs could be met with a relatively small amount of effort on behalf of other people. It is also

assumed that there is a comparatively large number of people who would be willing to meet these needs for a corresponding fee.

These needs include, for example, the need for assistance in the home, the need for transport and collection services, advice, short-term use of premises, etc. Such assistance is frequently given and received among family members, from a person's friends and acquaintances, through organizations and from neighbours. The time required for this assistance is typically between 5 minutes and one hour, although it may often be the case that family members and/or friends help with building a house over several months or even years.

2 State of the Art

The work of Jøsang et al. (2007) represents the state of the art and provides the resarch framework. It is accessable online.

3 Lack of a Comprehensive System

According to Jøsang et al.(2007) research into trust and reputation should refer to the following points:

"a. Find adequate online substitutes for the traditional cues to trust and reputation that we are used to in the physical world, and identify new information elements (specific to a particular online application) which are suitable for deriving measures of trust and reputation.

b. Take advantage of IT and the Internet to create efficient systems for collecting that information, and for deriving measures of trust and reputation, in order to support decision making and to improve the quality of online markets."

The lack of a comprehensive system for bringing together supply and demand is due to the costs of such a platform (fees for advertising for assistance, fees for handling the transaction), the costs incurred for accessing the required information (recommendations, reports, location of the offered/advertised assistance), the limitations placed on exchangeable goods and services and/or the limited access to a suitable system (such as the number of senior citizens with access to the internet).

This paper assumes there is supply and demand for assistance which requires between a few minutes and one hour. It is difficult to assign a market value to such 'mini jobs' when using the currently accepted economic model.

An example of a successful exchange of services within small circles of trusted people is the family unit: The most important properties of this circle are low communication and transaction costs due to regular communication, knowledge of the requirements and behavior of the members, trust arising from their established relationship and the awareness of sanctions, e.g. possible punishment due to group pressure, withdrawal of trust and even exclusion from the group.

4 Concept for a new System

The above-mentioned properties of families are also found in the communities formed by online trading platforms such as ebay (www.ebay.com) or one2sold (www.one2sold.at). Trading is based on „trust in the evaluations of others". Offering and advertising for assistance anonymously, i.e. based on the evaluations of others, would be possible via such a trading platform provided that 1) access to the platform was easy and affordable, e.g. via telephone (service hotline) and/or text message and 2) the total costs of the transactions were kept low.

The platform must also be made available to a wide circle of potential users and provide a system for payment of fees for the given assistance. These concepts are explained in detail in the following sections.

4.1 Identification and Localisation

4.1.1 Overview

Participants need to be identified and identifiable at least by the trading platform provider. This is true whether the participant is looking for assistance, offering assistance; whether transferring or receiving payment. Mobile telephones registered to the participants could be the solution, provided that the person registered as using the mobile telephone is the person who actually uses it. An alternative way of identification is via the internet. Identification systems can be implemented using the eTAN system as currently used by General Electric (GE) Bank.(Heise, 2005) The system requires an individual to use a small device in combination with an internet browser. The user enters a code made available from the internet service provider and creates a corresponding eTAN, which can be used for identification purposes.

When used with the system described in this paper, the technology would be used to assign the existing evaluations from the database to the participants currently offering assistance. As is the case with the online auctioning platforms, this evaluation consists of a description and a rating of the participant's behavior.

As services are the focus of this new concept, the rating of the participants represents an even more important factor for those in search of assistance.

4.1.2 People new to the System and Tourists

People who are new to the system and tourists require a registration which includes a having to identify themselves via credit card or via the Post Office similar to the process used in online trading platforms.

4.1.3 Localisation of Services

The geographical location of participants (and therefore the services on offer) can be determined via mobile phone, registration of the participant's home address or using GPS devices combined with LBS (Location Based Services).

The time and effort required to travel to the location of the requesting participant (for instance, a man who requires assistance moving a wardrobe from his car into his

apartment on the fifth floor) can be accurately estimated and taken into consideration when setting the payment.

4.2 Trust and Reputation Systems

4.2.1 Overview

The main differences between trust and reputation systems can according to Jøsang et al (2007) be described as follows:

"Trust systems produce a score that reflects the relying party's subjective view of an entity's trustworthiness, whereas reputation systems produce an entity's (public) reputation score as seen by the whole community. [...] Finally, trust systems usually take subjective and general measures of (reliability) trust as input, whereas information or ratings about specifc (and objective) events, such as transactions, are used as input in reputation systems."

4.2.2 Evaluations and Recommendations of Trusted People

Besides the negative rating (-1), neutral rating (0) and positive rating (1) it would be especially useful to give additional information: After a transaction, the 'employing' participant has the chance to recommend the 'employed' participant. Users in the system can assign other users to a list of 'trusted users'. The list of participants recommended by assigned trusted users are then accessible. The elevation to 'recommended user' represents an additional positive rating (2, positive/recommended). Should a user decide to place a previously 'employed' participant on his/her list of users whose recommendations are trusted, this gives the 'employed' user a second additional positive rating (3, positive/recommended/recommendations trusted).

These additional positive ratings extend the well-known rating system used in existing systems (number of positive evaluations as a ratio of the total number of evalutions). The additional rating forms an evaluation which is specific to a trusted circle of users. This is given as the ratio of positive evaluations from trusted users to the total evalutions from trusted users. These ratings can be categorised as 'total rating' and 'trust rating'. If the assistance offered is split into categories, users would have the option of calling up the ratings for other users per category or subcategory. When searching for a suitable babysitter, for example, users would have the information on general ratings and also the recommendations (or lack of recommendations) given by those users who make up the 'trusted circle'. In an extension of this system, this could lead to the selection of users via a filter of preferences: In the case of babysitting the following criteria may be of interest: resident in the vicinity, age 30 to 50, similar interests, similar education, only women. The author realises that such a filter for selection purposes also has the consequence of allowing discrimination.

The rating system can therefore be summarised as follows:

negative (-1), neutral (0) and positive (1), additional ratings: positive/recommended (2) and positive/recommended/recommendations trusted (3). The 'employed' participant sees only three values (-1 for -1, 0 for 0, 1 for 1, 2 or 3).

To make this summary as short as possible, e.g. for display via mobile phone text services, use of percentages and symbols are recommended (smilies if technologically possible):

Table 1: Example list of symbols for ratings.

Symbol	Explanation
N	No rating available
-	Majority of evaluations are negative
0	Ratio of negative to postive is 1:1 or less than 70% of evaluations are positive
+	At least 70% of evaluations are positive
*	At least 85% of evaluations are positive
!	At least 99% of evaluations are positive

4.2.3 Common Judgements of Exchange Partners

Establishing a continuous and successful relationship often needs common judgements. Criteria and weights for evaluation models depend on personal viewpoints in situations without given standards.

In the absence of industry-standard defined requirements and procedures the degree to which a job has been achieved is disputable. A typical example for a service is the setting up of a website.

In case of a dispute, referees have to be consulted. The choice of a referee often determines the result. Therefore, the selection is difficult. As a result of this a selection should take place before a contract is made.

In case of a payment per time, there is a trade off between time for work and time for the documentation of the work being done. (Schierz et. al, 2008) Similar problems may arise. Therefore, the selection of a referee should take place before a contract is made.

Any referee has to declare relationships, interests etc. which could influence the judgement

4.2.4 Payment, Annulment and Sanctions

For those requests for assistance which require preparatory work (and corresponding costs) for the 'employed' participant, payment in advance seems the obvious choice. Payment systems such as Paypal, Firstgate, Webcent (offered by Web.de), Quick or via the mobile telephone invoice could be used. If the service is not carried out, the parties can mutually annul the contract; the advance payment is then reclaimed.

Disputes are resolved as currently the case for online trading platforms.

4.2.5 Deleting an Evaluation, Arbitration, Validity of Ratings

If there are problems with the evaluations, a mediation project can be started. This mediation project can only be carried out by three people (mediators) and is based on

majority decisions. Only people who have never been involved in a transaction with the participants can be a mediator in the case.

Any mediator has to declare relationships, interests etc. which could influence the judgement.

The costs or the mediation project must be covered by the applicant unless the mediation leads to the evaluations changing in favor of the applicant. A further option is the decision to annul the evaluation. The mediators evaluate the two contract parties at the end of the mediation. The contract parties can then evaluate the mediators (with neutral or positive). A negative evaluation is not possible.

If there is a need for referees, the mediation process should be organized taking into account good practices, i.e. Riesslegger et.al (2007).

Ratings from a evaluation lose weight over time, i.e. after one quarter they lose 0.25 points. Therefore, a positive rating point is only worth 0.75 after one quarter has elapsed, after two quarters have elapsed it is only worth 0.5, 0.25 after three elapsed quarters. After four quarters have elapsed the point is deleted.

4.2.6 Punishment Outside Contracts

„Trust zones" could be implemented on public transport. People using these areas are aware that they can be punished for misconduct. This would reduce the protective measures for facilities (reduction in costs) and/or make additional facilities available (increase in service).

The entrance to these Trust Zones requires identification, e.g. via mobile phone. This is held up to a scanner to read off the RFID chip4, which is integrated in the mobile phone. Such a system is currently being tested in Hessen, Germany, for public transport.5 If there is misconduct, a sanctioning project can be started. This requires a iniator. This person has to pay 50 cents, independent of the outcome. To determine a breach of the regulations, the iniator must find at least four other supporters. Each supporter has to pay 50 cents so that the sanctioning can start. All those involved must be prepared to go to the entrance of the Trust Zone to start this sanctioning process. At the entrance there is a display with the photos of the last 15 people to enter.6

By selecting a photo and confirming the selection the sanction can be completed. Sanctioned people receive five negative points, e.g. for travel on public transport. Restaurants, play areas, parks, and other public areas with limited access can make use of this system. Those involved in the sanctioning committee all receive a neutral rating point.

It is only possible to be involved in one sanctioning committee per day. Sanctions always require CCTV material to prevent injustices.

4.2.7 User-specific Information Available

There are many ways to obtain information about a person in the digital world. Depending on the level of activity in the internet, ebay and amazon are two examples of an institution with information available about trading partners and their services or products.

While ebay works with a percentage system, amazon uses a 1 to 5 star system

4.3 Supply and Demand

4.3.1 Overview

R stands for 'paying participant' / 'employer'
E stands for 'paid participant' / 'employee'
The categorisation of the offers (see below) is available in short form for sending to a mobile telephone. This shortened form could use a series of up to four characters. If no information is available, this is shown by an „X". Using two category codes prevents the mix-up of offer and request.

4.3.2 Restrictions for Offered Services

A trading license is required when services are regularly offered for which a trading license is normally required according to the regulations in force in the country in question. The authorities should have access to the system for the purpose of anonymous evaluations and information flow, i.e. to inform participants of the requirements and dangers present in strictly regulated areas, such as health examinations required for cooks.

4.3.3 Coding Categories for Supply and Demand

1XXX Cooking / Eating
Italian-style cooking / Assistance (with apparatus) with jam-making / Coffee / Cake / Breakfast.

2XXX Entertainment / Games / Study / Office work
Help using MS Word / Implementation of WLAN / Reading stories to children / City tours / Italian conversation.

3XXX Wellness / Care
Pedicure-manicure / Care in the home – care visits / Hairdressing / Color consultation / Demonstration of the use of a manicure system.

4XXX Vehicle / DIY / Maintenance / Renovation
Painting / Oil change.

5XXX Garden / Garage / Household
Carrying objects upstairs / Shopping / Defrosting a refrigerator / Cleaning / Ironing / Digging / Demonstration and assistance using technical devices (e.g. how to use a particular make of sewing machine).

6XXX Children / Pets
Babysitting / Cat sitting / Walking the dog.

7XXX Transport / Aid on journeys / Collecting parcels / Storage
Collection from station or bus stop / Storage of furniture / Travel from Vienna to Salzburg.

8XXX Garden products / Presents / Home-made objects
Home-made jam / Fresh tomatoes / Knitted goods / Calendars.

4.3.4 Examples for Offers via Text Message

According to table 2 below a request for assistance for a translation via telephone of an internet page from Russian into German is coded as follows:

„R" for 'payer'/'employer' „!" for a total rating of at least 99% positive evaluations, „2XXX" for the categorisation of the service required (2XXX for Entertainment / Games / Study / Office work), „Internet/Telephone" for the location of the service (via telephone and internet), „10 Euro" and „30 Min" as payment and time factor (10 Euros for approx. 30 minutes work) „immediately" as the start time and „Russian-German" as a description of the service required.

Table 2a: Offers and requests, including rating: part 1

Case	Participant	Total rating	Trust rating	Product rating	Category I	Cat II	Location (autom. detected)
1	R	!	!	N	2XXX		Internet/telephone
2	E	!	!	!	6XXX		32 U 0491269 5382537
3	E	!	!	!	6XXX		32 U 0491269 5382537
4	R	*	!	N	2XXX		Vienna
5	E	+	0	0	7XXX		Berlin Zoo
6	R	*	N	!	2XXX		Telephone
7	R	!	N	*	2XXX		Internet

Table 2b: Offers and requests, including rating: part 2

Case	Payment	Duration	Start time	Description
1	10 €	30 min	Immediately	Russian-German
2	7 €	1h	Today until 8 p.m	Babysitting
3	7 €	1h	Today until 8 p.m	Babysitting
4	7 €	1h	2 p.m	City tour
5	20 €	3h	4 p.m	Travel in car to Hamburg
6	4 €	30 min	Immediately	MS-Word help
7	12 €	1.5 h	Immediately	Age of Empires help

Depending on the interface used by the participant, these offers and requests can be viewed conveniently via internet browser, less conveniently via i-mode, WAP or as a text message. The above-mentioned description is combined with a total rating, trust rating and the product-specific rating. This allows filtering of the offers according to a defined profile.

If the offer is interesting, a participant can 'prebook' this service. The participant offering the service is sent the ratings of the 'prebooking' participant. If the 'offering' participant accepts the prebooking, the contract is 'signed' via a confirmation message, i.e. a text message or email, otherwise rejected.

4.4 Social Security Contributions, Financing of the System and Tax

4.4.1 Social Security and Financing of the System

Participation in the system is free. However, 'employers' have to pay 10 % additional to the payment to the 'employee' as a social security contribution. The 'employee' can 'see' this contribution on his/her account but it is booked and valid only four weeks after payment so that the system provider can invest these contributions as a compensation for running the system. The contributions must be invested conservatively.

The system provider covers the costs for running the platform, including sending text messages for confirmation of a 'contract' and 'booking', creating offers, etc. Other communication costs must be carried by the participants.

The social security contributions are accepted as legally valid if the participant allows the tax authorities access to his/her account. Participants who do not make their accounts available lose the right to the paid contributions. These are transferred to the social security funds of the country in which the transaction occurred.

4.4.2 Taxes

Income is taxed outside the system.

4.5 "Community Cent" and Community Projects

4.5.1 Overview

The employees must pay one Euro cent per earned Euro ("community cent") to finance projects to benefit the community as a whole. This community cent is transferred into a separate fund directly from the payment transaction so that for every 1 Euro of payment only 99 cents are actually paid out.

Each person with a fund of community cents can suggest a community project for their use. These projects are carried out on a non-profit basis, only the labor costs are covered. Other costs can be covered by churches, charitable organizations or other community groups.

4.5.2 Examples

Examples for possible projects are the collecting of information for a Wikipedia entry ("History of our village", research on the internet (e.g. collecting a list of

webpages which offer advice for bicycle repair), improving the access to information, leisure facilities (recording of interesting view points and places of interest along the bicycle path Graz-Thalersee, including commentary in mp3 form).

4.5.3 Time Factor

Community cents which are not used within one quarter year are transferred to the community account of a person nominated by the participant or if no person is nominated, onto the community account of the person (either employee or employer) with whom the most transactions were undertaken in the quarter. This ensures that the community cents are put to use.3

4.5.4 Period of Validity for Social Project Suggestions

Each suggestion for a project runs for 48 hours. If the project fails to find enough supporters within this time to bring together enough community cents to cover the labor costs then the project will not be carried out until another person suggests it or the same person suggests it again one month later.

Each person with community cents is given access to the list of community projects suggested by people whom they trust.

The collected community cents are then transferred to the account of the person bringing the highest number of community cents to the project. Projects with labor costs which exceed the usual minimum wage for an 8-hour day are distributed between the supporters who bring the most community cents into the project, according to the amount they bring. The person or people are then the contact person(s) and request contracts using the described system. Potential employees responding to a request for assistance do not see that the request is a community project.

5 Conclusion

The system presented in this paper extends the labor market. Services can be traded which are currently difficult to trade due to excessively high transaction costs. The creation of such a system will have consequences for the low-paid labor market, allow people simplified access to the labor market and enable the integration of those in long-term unemployment. Before establishing a company, demand can be tested via the system.

The attractiveness of 'cash-in-hand' labor is expected to decrease (especially if accompanied by increased sanctions) as this illegal work would not lead to evaluation and evaluations will become key in winning new assignments. Also, this system allows the collection of social security contributions.

The current age pyramid in many industrial countries provides the system with sufficient potential demand (well-off senior citizens) and sufficient supply (active senior citizens and senior citizens in need of extra income).

The successful implementation of the suggested system could have considerable consequences for the economic situation of a country. If assistance for day-to-day requirements were easily available and affordable, many people who are limited in their

mobility and/or people who find it difficult to live independently due to advanced age or physical disability would have the option of assistance whenever required without having to turn to specialised services, such as old people's homes, careworkers, etc.

More generally, the creation of the system will lead to increased communication between neighbours and citizens and allow the participants to develop their strengths and talents. Hobbies can become an interesting additional source of income and may even allow the start of a new of business.

Acknowledgements

References

Heise.de News Service (2005): Sicheres Online-Banking trotz Phishing, http://www.heise.de/newsticker/result.xhtml?url=/newsticker/meldung/59567&words=eTAN, 2005.

Jøsang, Audun; Roslan Ismail; Colin Boyd (2007)[1]: A Survey of Trust and Reputation Systems for Online Service Provision, Preprint of article published in Decision Support Systems, 43(2) 2007, pp.618-644, http://www.oasis-open.org/committees/download.php/28303/JIB2007-DSS-Survey.pdf.

Schierz, Peter; Riesslegger, Helmut; Schütze Jörg (2008): Ansätze zur spezifischen Forschungsleistungsevaluation bei Forschungsgruppen; Multigap: No lost idea 2008, Edited by Renate Buchmayr, forthcoming, pp. 75-84.

Riessleger, Helmut; Buchmayr, Florian; Schütze Jörg (2008): Verwaltungsprozesse: Konzept eines Leitfadens zum erfolgreichen Verfahrensmanagement auf externer Gutachtenbasis; Multigap: No lost idea 2007 revised, Edited by Peter Schierz; Jens Nothnagel, forthcoming, pp. 222-228.

---

[1] The work of Jøsang et al. (2007) represents the state of the art and provides the research framework.