Business Modeling Framework For Personalization In Mobile Business Services

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Abstract	Is presented the structure of a formal framework for personalization features for mobile business services, which can be used to drive the business modeling of M-business services from a service provider point of view. It also allows to compute the revenue as linked to personalization levels and features. A case study has been performed in the area of personalized location based mobile services	
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Business modeling framework for personalisation in Mobile business services: a Case and sociological analysis

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ABSTRACT

This paper gives a formal six-level framework for personalization features in current and next generation mobile services, which can be used to drive the business modeling of M-business services from as service provider or system supplier points of view. I also analyzes the economic, sociological, information and psychic drivers for personalization in mobile services and why they sometimes differ from Web based services .A numerical case is provided from an operator introducing a location based personalized service.

KEYWORDS

Personalization, Mobile services, Business modeling, M-business, Sociology ,Location services

0-INTRODUCTION

Personalization was initially defined as the combined use of technology and customer information to tailor e-Commerce interactions and each individual customer (sic "Personalization Consortium" ,2001) . This definition however is rather superficial and does not identify:

-at service provider level, the production, authoring and storage ,nor the implications or not on individual tariffs (1)

-at personalized service level, the selection , the transformations, the structuring or the information exchange layout
-at user level, the usage , the feedback ,and the re-use
-at provider level, which tools and analytical applications to use to enable personalization

Furthermore, almost all reported work has been around Web site personalization (2, 3), and is characterized by a heavy reliance on simplistic user profile storage, usage ratings, and business intelligence/data mining tools, but not about personalization specifics when services are deployed via mobile terminals.
Several authors have mapped out the factors influencing the above process, but no one has defined and measured the features or characteristics of personalization, beyond storing some user or group profiles with preferences and log files of selections (declared interest, usage history, interests and usage by affinity with other users).

After having discussed in Section 1, the sociological and economic drivers of personalization in mobile services, this paper gives in Section 2 a formal six-level framework for personalization features in current and next generation mobile services, which can be used to drive the business modeling of M-business services from as service provider or system supplier points of view. Section 3 discusses the estimation and valuation of personalization features , and the Case in Section 4 illustrates all above.

1.SOCIOLOGICAL and ECONOMIC ASPECTS OF PERSONALIZATION IN MOBILE SERVICES

1.1.Personalization drivers: economics

Personalization operates from the economic theory point of view as a re-balancing mechanism in market asymmetries, by giving buyers more advantages than those usually enjoyed by buyers due to information asymmetries (covered in the 2001 Nobel Prize awarded to George Akerlof, Michael Spence, and Joseph Stiglitz). More precisely, by opening up for personalized mobile services while observing a good or enjoying yet another service, mobile service users will be able to tell the goods/service advantages/disadvantages and to communicate about them, and leave the goods/service content on the market or take them out of the market, instead of relying on third party information and true worth formation

1.2.Personalization drivers: sociology

There is enormous, but ambiguous behavioral and emotional " power" in personalization, and personalized mobile services will clearly belong to the scope of consumer sociology, to which alternative marketing methods (4) apply most of which rely on the principle of "tribalism" or the principle of "authentic marketing":

-In line with the sociologist's Michael Maffesoli's work, "flash" relations can be established between individuals who a-priori have nothing in common. This is called the "linking value", and mobile communications is, alike some parties or other activities, a mechanism therefore.
-in "authentic marketing", from a simple pool of authentic concepts /products, traditions , with a detail enhancing rarity or scarcity ,it is possible to transform the

user’s desire to be “rooted “ again into an advantage for a brand or a service .The interesting point is here the additional remark that research proves that some mobile services have or will use this principle as well as relays of the authentic concept/product/tradition or location, by extending its reach

There is one more principle, called “marketing by proxy”, where a group of users hijack a brand or service intended for one target group, or target circumstances, for use in another context chosen by that group. We have not collected any evidence of this process, sofar, in the current or planned personalization of mobile services.

1. 3.Effects of personalization on motivation

Mobile services personalization also opens one route to revisit the 1954 Maslow pyramid, whereby the needs of individuals (or employees) where aggregated hierarchically, and wherein it was believed that by acting on the needs one could influence the behaviors. But labor sociology has long ago shown that no one can decide the individual motivations, and that there is no direct relation between individual motivations and performances. Current sociological thinking (5) is rather that employees motivate themselves, as employees alone know which actions can meet their needs. Thus, the idea is to influence work /employment contexts and situations (6), and not to act on the Maslow needs and individual availabilities to have them fulfilled. Mobile services in a Mobile VPN context are thus essential means of deployment of this idea. This is called the concept of “stakes” which affects both the execution of the work tasks (interest, difficulties), its organization, relations (integration, isolation, networks, and tensions), the work context (company culture, perspectives), and finally salaries. The motivation, which is an emotional investment, leads to mix whom you are with what you do, while companies need contributors rather than pure motivated employees. Contributing workers work in teams, place relations before the personal image building, like responsibilities rather than individual performances. Mobile services in an enterprise environment not only enforce this “stakes” concept, but offer also the neutrality and trust needed for its deployment.

1.4. Mobile services and electronic rumors or disinformation

While some research, services or sites are tracking and tracing rumor formation on the Web, almost no research has neither looked into the diffusion patterns for rumors (and thus the control issues) using mobile services (voice or data) (7). The relative low user friendliness of mobile e-mail have so far been a limiting factor, but this is bound to change, and to be severely correlated with the extent of personalization in the mobile services. In this paper, it is enough to highlight that the proposed features and methodology allow to value for the user as well as for the supplier, the whole rumor emission, transmission and receipt, while it also at Levels 1, 4 and 5 offer ways to value denial of rumors, of course to the extent quantified values are sufficient to handle these issues.

5.Mobile services as they influence psyches

Whereas some individual psychiatrists have shown the role of the Web as a means to confront or amalgamate reality and virtual fiction, and have focussed the types of illusions in this context, mobile services offer paradoxically the possibility not to mix images or illusions with reality , by being “on the spot”, or “zapping” between sites and locations; consequently mobile services in general maintains with the user the mastering of the images and illusions, instead of just letting this user be subject to their power as often on the Web or in virtual realities (8). Psychiatrists also start to point at the stabilizing role of mobile services, as tools to be re-assured, and thus obviously mandate a personalized dimension as commoditized services will not have the same role.

2. FRAMEWORK FOR BUSINESS MODELING OF PERSONALIZATION in MOBILE SERVICES

2.1 Model

2.1.1 Personalization feature

A personalization feature is here defined as any service characteristic, often embodied in a service specification (UML, SDL), offered to individual mobile service subscribers outside a standard service bundle subject to regulatory oversight (typically: mobile voice, SMS, voice mailbox, access to subscriber support) .All such features are categorized and organized into personalization levels; there may be several personalization features at a given level offered by the same service provider .

2.1.2 Personalization levels

The proposed, and already widely tested personalization feature model below, organizes the personalization features into the following six levels of a personalized M-commerce/business service:

-Level 1: authentication level, at information security level but also within the context of cybercultures (9)
-Level 2: service structure level (location, neighbors, priority, codec range,...)
-Level 3: content level (search based, unfiltered push and filtered push)
-Level 4:personality profile of user
-Level 5: affinity level and affinity groups
-Level 6:M/e-Consulting level

There is not room to explain here how the personalization features are grouped into these levels, nor how a bundle of personalization features at a given level allows for a tarifing of personalized services per personalization level.

2.1.3 Individual user value

The business value for a service provider of a personalized M-business service depends on the "Individual user value", or value to the user from the personally perceived angle .For this individual user value, six factors are identified, which include price (dependent on the tariff fixed by the service provider for personalized services), response time to access the feature (determined essentially by network provisioning and management characteristics levels, possibly selected by the user from guaranteed QoS levels) and four other components with are : frequency of use , popularity , effectiveness, and an ergonomic attribute. A calibration is carried out, and reference values have been collected for different user groups and some communities.

The last four Individual user value factors are defined below:

1)”Frequency of use” is the first factor. If a person uses a service only once, it might have high value individual value to that user at that time (“immediate/occasional use”), but it has not lasting value to the person. If a person uses a service every day, it has much higher personal or user value.

2)Effectiveness: A second criterion that determines the user value of a feature is how efficiently and effectively a personalization service feature is able to meet the needs of the user. This can be called the “individual fit” .For example, the calculation of user value of SMS/MMS falls directly into the assessment of the individual fit quantification.

3)Popularity : The third criterion that determines the user value is connected to the “popularity of the service”. SMS for example is not very efficient or effective but it is still very popular. A popular service has a value that is not directly connected to the effectiveness and efficiency. The reverse may also apply, especially in enterprise/Mobile VPN services, i.e. that the enterprise wants to motivate its employees by offering to them a mobilising mobile service (see Section 1.3). Detailed modelling exits to justify an individual user’s decision to join or not electronic groups based on his assessment of the information quality and costs (10).

4) User friendliness: A fourth factor is the “friendliness of the user interface”, which greatly influences the experience and therefore the value of the personalization feature to the user. This subject is widely researched, e.g. in (11).

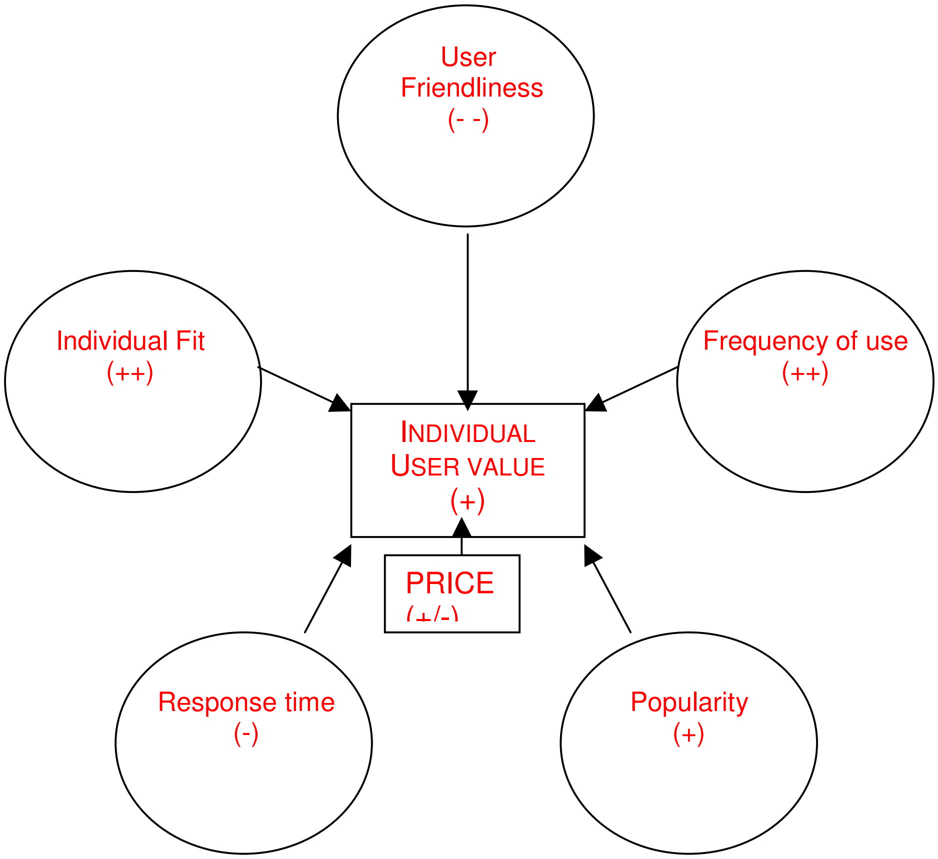
User Friendliness
(- -)
Individual Fit
(++)
Frequency of use
(++)
INDIVIDUAL USER VALUE
(+)
PRICE
(+/-)
Response time
(-)
Popularity
(+)

Figure 1: Factors influencing the Individual user value of personalisation features; the +/- labels are explained in Section 4 and pertain to the Case

2.1.4 Personalized service characteristics of a mobile service

At service provider level, a personalized service is defined as having some or all of the quantified characteristics defined in Table 1 below, applicable to any supported personalized feature as defined in Section 2.1.1 and categorized in Section 2.1.2.

Table 1: Quantified characteristics of a Personalised service of a mobile service.

Characteristic	**Definition and Units**
Price of feature	The revenue to the operator of the personalisation feature per session in Euro.
Frequency of use	The amount of times the service is used relative to all sessions of one user (in percentage)
Number of users	Number of users of the feature relative to the total number of people that have access to the feature (in percentage)
Business Value of feature	Total revenue to the operator per subscriber (in Euro)
Density of mobile terminals	Number of mobile subscribers of operator per km2
Total number of sessions	The total number of sessions per year per user
Annual revenue of personalised service	Annual revenue to the operator per km2 (in Euro)

2.1.5 Business value to service provider

The business value for a personalized service provider is an indicator, but not the business revenue, of that service or of one feature of that service.

The business value is the product of the revenue to the service provider per session (according to the tariff structure for personalized features as communicated and accepted by users), multiplied by the frequency of use, by the number of users of the service, by the individual user value. All these constituents can be evaluated either for a personalized service altogether, or for a specific personalization feature /characteristic as defined in next section.

Business value (of the personalised feature)=

(Tariff based Feature revenue to operator / session) * (Frequency of sessions using feature) * (Number of users of the feature) * (Quantitative weight derived from individual user value of that feature)

Please go to Section 3.2 for explanations as to the last factor.

2.2. Methodology and tools.

The individual user value is estimated from a causal graph with attributes, and from the personalized tariffs with associated access/response time classes.

It is very important to stress that by decoupling individual user value components from business value characteristics, it is possible to evaluate a personalized feature without first evaluating the number of subscribers; in other words, this allows for a bottom up user driven analysis.

The personalized service characteristics are derived from subscriber data.

The business value for the service provider is thereafter calculated, and allows the operator to tune its M-business service for optimal revenue, given intervals for the business value characteristics. It also allows to compare the business values of alternative personalized services, to generate a roll-out plan with best assured revenue, by timing right the sequence of the deployment of the personalized features.

3.VALUES OF PERSONALIZATION FEATURES

It should be noted that this paper does not address the social value of mobile services or their personalization.

3.1 Business value vs. Individual user value

It is important to make a distinction between business value to the service provider, and individual user value. The business value is probably the easiest to calculate, but it greatly depends on the Individual user value components (Figure 1) if the business value estimate is to be robust. For example, the business value of SMS services was very small when they were introduced, and in the beginning, so was the user value. But somehow the user value started to rise, and with that the business value also.

The Business value is expressed by simple characteristics. Of course these characteristics have to be determined per personalization feature, but they rely on the personalised service as a whole, with a heavy dependence on the dominant personalization level most of its features belong to.

User value is different. This is about the individual value per person. It is not important to know how many people use the service, as from a user's point of view this is not the dominant factor, only from a business point of view. The only personalisation factor where these two aspects contradict each other, and on purpose, is the Popularity characteristic. Therefore the individual user value can be estimated more easily, but at the expense of being more abstract as it is a compound indicator.

3.2 Estimation of individual user , and business values resp.

It is necessary to outline the process whereby the individual user feature values,and business values are been estimated , when a real business plan is calculated .

For all quantitative data, as used in this framework ,mostly for the business values , data are usually collected by operator market research groups using internal as well as external information sources .They can be supplemented by interval statistics and probability distributions .

For all features based on a qualitative assessment,and resulting in a label (see e.g. Figure 1) :
-Definition of features : this is done usually by the operator or value added service supplier as part of their technical and product decisions
-Definition of label values and ranges : this is done by the modelling group
-Expert estimation of individual user values: an individual or a group of experts give for each feature the qualitative label values representing the individual user value;if this is done by a group, consensus labels are chosen

-For target group individual feature value estimations, either one can rely on survey data in that group via a custom survey ,or one can use the segmentation done by marketing profiling companies or institutes ;this step is necessary to give the statistical distribution which expert estimations may not give

The calibration of the individual user values across features is usually done by estimating, for the same label values and ranges, the means across features,and a correction via the bias for each specific feature to ensure evenly spread fractiles .

3.3 Link between business value and individual user value

As stated in Section 2.2, the individual user value is calculated for each feature once this feature has obtained a label in terms of each of the factors in Section 2.1.3 (or Figure 1).
It belongs to the service provider to define:
-the range of qualitative labels
-the composition rule between labels
-a table which translates compound labels into a weight to be given to a feature
in that these three elements must be the same for all features . The Case in Section 4 provides one such example, but many other have been applied. Needless to say these calculation principles are open for criticism, but common to any multi-attribute decision making with qualitative elements.

4. CASE: PERSONALIZED LOCATION BASED SERVICES

The paper includes data from a Case study for a Mobile operator, which was about to deploy, and has since deployed, M-business location based services which include user location as a personalization characteristic made available to the user for these services

As lifestyle benefits, and limitations such as suspicions among users about revealing their location, are key elements of personalised location based services (12), it was relevant to work on the business elements thereof for this European operator. Below are given example values and calculations of the individual user features, and of the business value, from that Case. They serve only as illustrations of the methodology above in Section 2, and no conclusions are given here as to the service itself.

It should be noted that, in this precise case, the analysis is also of value to suppliers of equipment and systems of personalised wireless multi-channel location services proposing one-to-one marketing solutions.

The individual user value labels are given in Figure 1,for the personalization feature “Location information”, ranging from a major negative effect “- -”, to no effect on user value “+/-“, to major positive effect “++”. The overall individual user value is in this case the majority of those labels, i.e. 6 times “+” and 4 times “-”, leading, by a trade-off table chosen by operator, a compound label “+” with corresponding weight 1 assigned to that feature in its Business value.

The principal personalised service features were the following, and the corresponding estimated Business values per feature those in Table 2,and the ranking per feature that of Table 3:
-subscriber authentication, and authentication for the personalised location service
-presentation of location/space data and distribution to list of value added providers selected by user
-tariff/price per managed location information
-information search based on user location, and mapping information on server, with criteria selected by user
-information pushed down to user based on user location, without user selected categories of information he/she is willing to receive ,but based on agreements between operator and information providers
-information pushed down to user based on user location, from user selected categories of information he/she is willing to receive
-personality features (proprietary)
-affinity selection by user of peers based on mobile instant messaging protocols
-M-consulting, that is within one general area of expertise (medical, navigation/weather, lifestyle tastes, etc...), ability of user to get on-line or short-delay advice based on instantaneous user location

It will be noted that the individual feature values are causing reordering amongst business values of personalization features, for that service .A calculation is also given of the actual annual revenue linked to terminal density

Table 2: Case: Business value per feature, and individual feature values

Level	**-Personalisation feature -Individual feature value**	**Tariff of feature (Euro)**	**Frequency of use (%)**	**Number of users of feature (%)**	**Business value of feature (Euro) (without applying individual feature value weighing)**
1	Authentication (+ +)	0.08	5	10	0.0004
2/ Structure	Location information (+)	1.00	10	50	0.05
2/ Structure	Price of location content acquisition (++)	0.20	10	20	0.004
3/ Content	Information requested by search (+)	0.02	25	90	0.0045
3/ Content	Information pushed without filters (-)	0.00	10	100	0
3/ Content	Information pushed with user filters (content based selection) (+)	0.05	30	40	0.006
4	Personality profiles (++)	0.1	50	25	0.0125
5	Affinity – community (+)	1	5	5	0.0025
6	M-Consulting (+/-)	30	1	1	0.003

Table 3: Ranking of business values of personalisation features

	PERSONALIZATION FEATURE	Business value with weighing by individual feature value)	Business value without weighing
1.	Location information	0.25	0.25
2.	Personality	0.0625	0.0125
3.	Information pushed with user filters	0.06	0.006
4.	Information requested by search	0.045	0.045
5.	Price of location content	0.2	0.040
6.	M-consulting	0.0015	0.003
7.	Affinity	0.0025	0.0025
8.	Authentication	0.002	0.0004
9.	Information pushed without filters	0	0

Table 4: Top three features personalization features by annual revenue by km2

	Personalization feature	**Business value with weighting (Euro)**	**Density /km2 (high)**	**Total number of sessions per year per user**	**Annual revenue per km2 (Euro)**
1	Location information	0.25	5000	3000	3 75 0 000
2	Personality	0.0625	5000	3000	937500
3	Information pushed with user filters	0.006	5000	3000	90 000

5. Conclusion

Next generation mobile networks require next generation services, and these next generation services in turn depend crucially on radical changes in the definition, provisioning and tarifing of these mobile services. The present research puts forward personalization, via its economic, sociological and psychic drivers, as mobile specific enhancements, and offers a framework to evaluate the corresponding business models. In particular, it is proposed that a personalized service is built up from one or several personalization features, eventually bundled in personalization levels, which can be evaluated separately as to their individual usage value as well as their business value. The theoretical difficulties are linked to multi-attribute qualitative decision making, but casework with several operators has shown that the relative flexibility in the corresponding algorithmic parts allows them to differentiate in a traceable way. Likewise, the individual user values/estimates can be assessed and calibrated differently in different regions or cultures wherein these operators provide such personalized services.

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