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Added Value-based Approach to Analyze Electronic Commerce and Mobile Commerce Business Models

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Abstract

In this contribution we propose to apply the *theory of informational added values (IAV)* on electronic commerce (EC) and mobile commerce (MC).

We state that for the success of electronic and mobile offers it is not sufficient to merely make a conventional offer available with new media. Instead, the use of electronic and mobile communication technology is only remunerative if it results in obtaining distinct supplementary IAV. This depends on the exploitation of certain faculties of the used technology. For EC, we call these the four *electronic added values (EAV)*: reduction of temporal and certain spatial limitations, reduction of technical limitations, multi-mediality of access and egalitarian access. For MC, we call these the four *mobile added values (MAV)*: ubiquity, context-sensitivity, identifying functions and command and control functions.

We can find EAV and MAV as typical properties of EC or MC applications. EAV are the basis for the superiority of Internet applications compared with offline solutions. The relationship between the separate EAV and IAV will be explained and analyzed. Proceeding analogously for mobile applications, we analyze the relationship between MAV and resulting IAV. The outcome is an extension of the theory of informational added values with the concept of electronic and mobile added values. This allows for an application of the theory to both EC and MC in order to analyze and qualitatively evaluate any given business model. For determining its crucial added value we have to identify the EAV/MAV which are capitalized and can deduce the IAV resulting for each party involved. The concept put forward is a suggestion to approach business models, with the focus on typical evaluation criteria for Internet/mobile business models. It is also suitable to compare different business models and to put their added value for the involved parties in a context. In this way, objective criteria are established reducing subjectivity and allowing to make certain predictions. The paper ends with a critical review and the perspective for further research.

1 Extending the theory of informational added values to EC and MC

The examination of electronic commerce shows that the success of an electronic offer is not an inevitable consequence only of its existence. Particularly, it is not sufficient to simply make a conventional (non-electronic) offer available through a web site. Compared to the conventional offer, added values are necessary which give every party a reason for accessing an offer. To determine and classify these gains, the *theory of informational added values* of Kuhlen [1996] is suitable. We introduce the concept of *informational added values (IAV)* in section 2.

For purposes of this paper, the terms electronic commerce (EC) and mobile commerce (MC) are used in their original, broader sense. We define EC as any kind of

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business transaction in the course of which transaction partners employ electronic means of communication, may it be for initiation, arrangement or realization of performance (cf. ECOM [1998]). We define MC as a subset, on condition that at least one side uses mobile communication techniques (associated with mobile devices).

Gonzalez [2001] states that “Taking an application wireless involves much more than simply porting an existing Internet site to a browser-enabled phone. Mobile applications differ greatly from ones created for personal computers and laptops because their users have a different set of needs and expectations.” For moving from EC to mobile markets, values have to be added to make this step successful. Opposed to this, mobile applications are often still only transformations of conventional Internet applications or EC business models on mobile devices. As an analogy, we can analyze the transition from a conventional offer to an electronic one. Business models can only be rewarding if they provide reasons for substituting present offers with online offers, just the same as there have to be reasons for the transition from electronic applications to mobile ones. From this fate we conclude that the theory of informational added values can be transferred on the transitions to EC and to MC. As Kuhlen [1996] articulates, “both sides, supplier and customer (...) expect from participating in information markets a gain, often measurable in economic categories.”

We apply the theory of informational added values as an integrating theory making it possible to evaluate the range of added values required for the transition from conventional offers over EC to MC. Some authors have dedicated research to this aspect. To give related works, we refer to Hansen [1996], Oesterle [1999], Mahadevan [2000] or the Compass approach put forward by Amberg [2003]. Putting their focus on other aspects, they do not contain a clear-cut separation of gains of Internet technology from gains of mobile technology. In turns, Zobel [2001] discusses business models in MC without an explicit consideration of advantages already existent through Internet. The theory of informational added values allows reflecting on supplementary IAV in either step. It is therefore a model facilitating and structuring the qualitative analysis of business models.

We have to adapt the qualitative dimension of the theory and complement them with suitable dimensions. For this purpose in section 3 we identify the typical advantages which stem from the use of Internet technology and separately, those originating from mobile technology. These are characterized by their ability to trigger possible IAV. The characteristics rooting in Internet technology are categorized and will be termed as *electronic added values (EAV)*. They are properties that are an expression of the technical superiority of the Internet compared to conventional, offline solutions. We will identify and describe EAV in section 4.

Similarly, we identify the typical advantages of the use of mobile communication technology and mobile devices compared to the use of Internet technology with fixed networks. We call these advantages *mobile added values (MAV)* and discuss them in section 4. The outline of the entire approach is shown in figure 1.

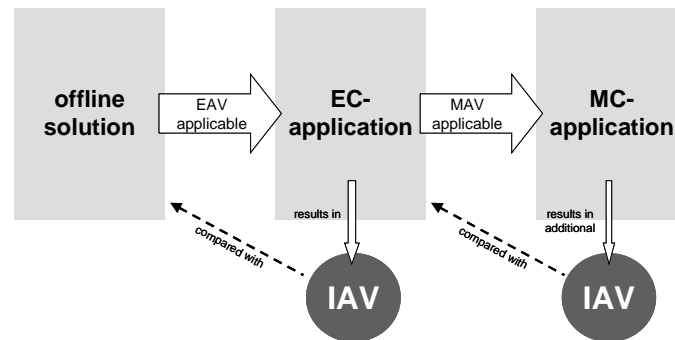


Fig.1: Extending the theory informational added values on EC and MC.

In order to make an ontological assessment for the theory of informational added values and to determine in which tradition of strategy evaluation it can be seen, we refer to the viewpoints stated in figure 2. The figure shows the most important directions of strategic management, with their respective focus on the generation of shareholder value (*value based view*, with Rappaport as most prominent representative, e.g. Rappaport [1986]); the requirements of customers (*market based view*, strongly influenced by Porter [1980]); and the competencies crucial for the strategy (*resource based view*, recurring to Hamel/Prahalad [1994]).

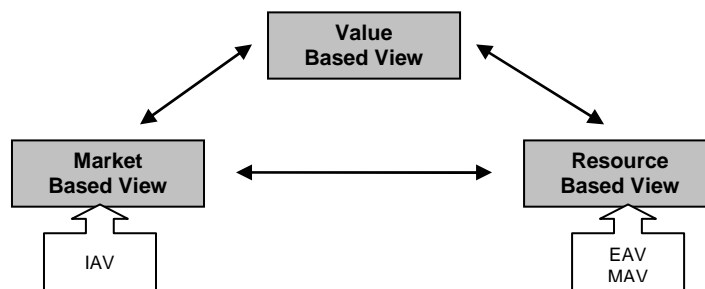


Fig.2: Attribution of the concept of added values to the basic directions of strategic management

The proposed extension of the theory of informational added values on EC and MC intends to assess gains for the involved parties using the IAV concept and to analyze exploitation of EAV and MAV for business models. Thus, the theory can be regarded as linking traditions of both resource based view and market based view.

In addition, we can state as an intermediary result that some or all of these EAV or MAV are the cause of any supplementary IAV of an EC or MC business model. In section 5 we show the proceeding for the analysis of business models and finally, in section 6, draw conclusions and provide a critical review of our approach.

2 Informational Added Values

In his *theory of informational added values*, Kuhlen [1996] discusses the impacts of information work in information markets. In order to determine the different influences and to isolate criteria, he chooses the analytical approach and separates the qualitative aspect from the aspect of utility, thus helping to understand and discern

conditions and results. As far as it is required for the purposes of this paper we will discuss the categories of the supplementary gains of utility.

Kuhlen terms resulting gains as *informational added values (IAV)* and classifies them into eight main types: organizational, strategic, innovative, macroeconomic, efficiency, effectiveness, aesthetic-emotional and flexible added values. Furthermore he subdivides all IAV into two categories, the first four on a micro-level, impacting individuals and the second quartet on a macro-level for entire organizations. Obviously, micro IAV can result in macro IAV and contribute to these.

Efficiency added values cover the increase of operating efficiency and cost-effectiveness.

Effectiveness added values cover an augmentation in output quality. An instance would be increased customer satisfaction for a parcel service through enhanced skills in shipment tracking. (If this solution at the same time allows decreasing the number of call center operators, we also have an efficiency added value.)

Aesthetic-emotional added values cover increase of subjective factors as well-being, job-satisfaction or acceptance of performance.

Flexible added values cover a shift to a higher level of flexibility. This is particularly important in the production of goods and services consisting of information.

Organizational added values cover the opportunity to build new forms of organization through the use of information and communication systems. This can affect company organization structure as well as the operating sequence of business processes. Examples for the creation of organizational added values through Internet technology are virtual companies as temporary, mission-bound networks.

Innovative added values cover the creation of an entirely new product or service (or combination of both) through the usage of new means of communication. An instance is the customer-individual production of bulk articles through mass customization strategies, which are enabled by the use of Internet technology.

Strategic added values qualify advantages that go beyond the operational and tactical level by creation of a significant competitive edge. Instances can be the opportunity of worldwide customer acquisition for a small specialized company or protection against the loss of a complete market segment which could be the consequence of lacking Internet presence.

Macroeconomic added values qualify advantages that go beyond the level of single companies and result in impacts on occupational images, economy or society as a whole. An instance is the effect of office automation to the occupational image of a secretary, who, nowadays, resembles in most cases more to an executive assistant than to a copy typist.

As we explained in section 1, IAV are the resulting benefit of electronic or mobile solutions. Given the immaterial character inherent to customer contact in EC and MC, it can be concluded that the value added is a consequence of the information contained in offers.

Either supplier or customer or both may experience IAV. In some cases, other involved parties may also experience a benefit in terms of IAV. An EC example for the latter could be a recruiting event based on Internet technology, where applicants, companies and the intermediary gain IAV. Informational added values may represent the resulting benefit of an EC solution as well as of an MC solution.

3 Electronic Added Values

3.1 Concept

After introducing the theory of informational added values to assess the result of EC or MC solutions, we will now reflect on the characteristics from which these gains originate. This is done with the *concept of electronic added values (EAV)* which serves for an analysis of the advantages arising from the use of Internet technology.

We therefore define EAV not as the benefits of EC solutions, but as those properties of Internet technology and its utilization, which are responsible for gaining supplementary IAV in comparison to conventional solutions. They are the answer to the question: *What can "E" do, what could not be well realized before?*

We have to underline that EAV only represent a potential that could be exploited; however without employing them no supplementary IAV is gained.

The four typical properties we identify are *reduction of temporal and certain spatial limitations, reduction of technical limitations, multi-mediality and interaction, and egalitarian access*. These will be described in sections 3.2 to 3.5.

3.2 Reduction of Temporal and Certain Spatial Limitations

The *reduction of temporal and certain spatial limitations* refers to the fact that the Internet as a medium is available anytime and almost anywhere and therefore the offers are usually accessible independent of the moment or the location of the user. The reduction of spatial limitations is not considered to eliminate local restrictions absolutely since there is still the necessity of a physical connection plug to the web.

Once connected, users can easily access offers from servers situated all around the globe. Frequently, not only the request can be made at any time or from any location, but the output is received without further delay. General or customized information, banking services or human workforce by means of tele-working, all can be transmitted digitally over the net. This can be easily combined with a multitude of conventional offers, where separate steps of the transaction are not executed via Internet, "buying books" to give only one example for a great variety of usecases.

This EAV can be used for almost any offer since distant all-time access makes it available almost without additional expenses. Most significant impacts on IAV will be those affecting organizational and efficiency added values, albeit this EAV may result in any IAV and therefore even cause changes on the macroeconomic level.

3.3 Reduction of Technical Limitations

The EAV *reduction of technical limitations* originates in the uniform communication standards and harmonized data presentation. Widespread acceptance of Internet protocols allows interaction of heterogeneous users and/or devices, to a great extent independent of software or hardware involved. This open structure is one of the constituents of the Internet. The compatibility of interaction means facilitates an important amount of applications, e.g. to avoid media discontinuity, inter-organizational integration of data and business processes, contributing in particular to major gains of productivity in b2b applications.

As a consequence, most IAV generated by this EAV are in the professional domain, such as organizational, efficiency and effectiveness IAV, the combination is likely to lead to innovative added values.

3.4 Multi-mediality and Interaction

The EAV *multi-mediality and interaction* refers to the enhanced possibilities of Internet's presentation potential on the application layer, which allows combining multiple channels for simultaneous stimuli of the user's senses. Through interaction, we also have the possibility to coordinate any offer or demand individually.

Even though television has already combined acoustic and visual media, there is something genuinely value adding in this characteristic's combination: Interaction adds the formerly inexistent feed-back channel, which allows to customize information, offers and services provided; even conventional products can more easily be tailored to customer's wishes (mass-customization).

The IAV typically caused by this EAV are those of effectiveness and of aesthetic-emotional added values, and as a consequence as well the possibility to create a multitude of innovative added values.

3.5 Egalitarian Access

Egalitarian access describes the fact that Internet users can be regarded to a great extent as equal in access and rights. Moreover, users can remain anonymous, or at least disguise their real identity.

This EAV leads to increased transparency. In companies as well as in society, information distribution gets faster and is more difficult to control. Good examples are all kinds of online communities, where individuals cannot wholly be differentiated from another. The EAV even allows for the creation of new democratic structures.

4 Mobile Added Values

4.1 Concept

In section 3 we provided the concept of EAV according to the properties of Internet technology with fixed networks. As we shift the focus to MC solutions and ask for the causation of their supplementary IAV, we analogically proceed to the *concept of mobile added values (MAV)*. Following the analogy, MAV refer to properties of mobile technology and its utilization. Thus, MAV answer the question: *What can "M" do, what "E" cannot? Or: What does "M" have, that "E" does not?* As before, MAV only represent a potential, and an MC solution does not have to take advantage of any MAV. But in order to gain the supplementary IAV, at least one MAV has to be employed; otherwise, the use of mobile technology is not remunerative.

The four typical properties we identify are *ubiquity, context-sensitivity, identifying functions and command and control functions*. These will be described in sections 4.2 to 4.5.

4.2 Ubiquity

Ubiquity is the possibility to send and receive data anytime and anywhere and thus, eliminate any spatiotemporal restriction. It is originated not only in the technical possibility, but also in the typical usage of mobile devices which accompany their user nearly anytime and anywhere. It permits the reception of time-critical and private information. Thereby and by persistent attendance for transactions it is, for in

stance, possible to get warnings for stock exchange loss even if the recipient is not reachable by other forms of communication.

Ubiquity effects in accessibility of mobile services anytime, anywhere for the customer which affects reaction time and convenience aspects of services. But it effects also in reachability of customers. This means primarily to reach a single customer anytime, anywhere. A secondary meaning of reachability of customers results of the high level of spread and acceptance of mobile devices (first of all, mobile phones) throughout broad levels of the population. This fact allows reaching not only one narrow, but nearly any target group by mobile services.

This MAV may result in any IAV; typical ones are organizational or efficiency. It may even result in a macroeconomic added value.

4.3 Context-Sensitivity

Another typical attribute is context-sensitivity, which describes the delivery of customized products or services fitting the particular needs of the user in his current situation. This is particularly enabled by three features:

- *Personalization* allows creating specific products and services through preference profiles. These may be generated by information the user provides about him, but also by applications tracking his attitude. As on one hand a mobile devices is typically used only by a single user and on the other hand one user typically uses only one mobile device, resulting data is of high quality.
- *Interactivity* allows creating specific products and services through direct information exchange. Both sides can react without any delay on actions or requests of the other.
- *Location determination* allows creating specific products and services for the user in his current location or by referencing on the location of other users.

In particular, combinations of these concepts allow determining a user's context. Typical applications based on the MAV of context-sensitivity are *location based services*. Context-sensitivity permits e.g. local and personal advertisement from nearby shops, local news, weather reports or site-and-preference-directed event lists.

This MAV may result in any IAV; typical ones are innovative, efficiency and effectiveness.

4.4 Identifying Functions

The ability to authenticate the subscriber as well as the device is already immanent to a mobile network. Together with the aforementioned typical 1:1-attribution of a mobile device to its user (which is perhaps not true for any other technical device except a wristwatch) this provides a capability to authenticate the actual user with a feasibility already sufficient for most applications. As may be necessary it is also easily possible to apply further means of authentication on the device, from a personal identification number to biometric identification or mobile signatures.

This allows much easier than conventional Internet techniques to use mobile devices for transactions of monetary value. The mobile phone has the potential to become what is discussed under the headword *personal trusted device*. Another interesting application would be real-world authorization via a mobile device, e.g. for the access to secured areas.

This MAV is of lower overall importance for directly enabling mobile applications as ubiquity and context-sensitivity are. However, it is very important for some special applications such as payment and therefore it facilitates most applications which generate direct revenue. Identifying functions can result in organizational, innovative, efficiency and flexibility added values.

4.5 Command and Control Functions

The last property to present are *command and control functions* of mobile devices. Mobile devices can be used as remote control for almost any application or device. For this purpose they use networking capabilities of any range, from the personal or local area network up to the wide area network.

If the target is an application, it has just to be connected to the Internet. If the target is a device (which can be almost any electrical device), control may be realized e.g. using networking capabilities via ubiquitous computing technology or embedded mobile devices.

This MAV will gain importance in the future, especially in the form of rule-based d2d applications. An interesting example could be remote maintenance of vending machines. Command and control functions may result in almost any IAV, typical ones are notably innovative and efficiency. Through their d2d potential they may in the future even result in macroeconomic IAV.

5 Analysis of Business Models

As we mentioned already in section 1, the proposed concept can not only be used for considerations about future applications, but also for categorization and analysis of existing EC/MC business models.

Our starting point was the claim that a solution on ubiquitous networks can only be successful if in comparison to matchable solutions, supplementary IAV can be realized. This will be only the case when (at least one) EAV/MAV is involved.

Hence, as a first step, a business model has to be analyzed for properties with the potential of being value adding. Once identified, these are used as a starting point for employing the proposed matrix (Fig. 3). The grid makes it possible to draw clear cause-effect relationships between EAV and IAV for each business model and subjectivity in the evaluation process can be reduced. (For the analysis of MC business models, we substitute the EAV with MAV, and proceed analogously.)

We will illustrate the analysis with the example of a business model offering an event guide on mobile devices. Partly, the added value of this offer is already possible by exploiting EAV. Making information available with a remote connection reduces temporal limitations and hence, creates efficiency, effectiveness and flexible added values. The immediate possibility to buy tickets (and reception of a virtual ticket) is a reduction of technical limitations, creating effective added values for customers and event organizers. Multi-medial display of information will create an aesthetic-emotional added value for the user, at the same time improving the effectiveness of advertisements and offers for the company. Egalitarian access is not elementary for this business model.

Analyzing the business model for MAV, we use the matrix with MAV instead of EAV on the vertical axis. Ubiquity improves efficiency and flexibility for customers. Context-sensitivity implies the potential to contact customers proactively in appropriate situations, causing effective and aesthetic-emotional added values. Combined with identifying functions, innovative offers can be generated, even with the perspec-

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tive of a strategic added value in form of a competitive advantage. Command and control functions are not vital for this business model.

EAV \ IAV	Micro				Macro			
	Efficiency	Effectiveness	Aesthetic-Emotional	Flexible	Organizational	Strategic	Innovative	Macro-economic
Reduction of temporal and spatial limitations								
Reduction of technical limitations								
Multi-mediality								
Egalitarian access								

Fig.3: Analysis matrix for assessment of the relationship between EAV and IAV

6 Conclusions and Critical Review

The outcome of this paper is an extension of the theory of informational added values with the concepts of electronic added values and of mobile added values. This enables to categorize applications either according to the EAV/MAV used or to the IAV obtained, in order to compare business models, reducing subjectivity by drawing clear cause-effect relationships between EAV/MAV and IAV for a given business model. In compliance with the reflections on the necessity of supplementary IAV, Gonzalez [2001] states for MC that "In order to deliver on user expectations, developers must create a comprehensive application *specifically targeted for wireless devices*, rather than just adding wireless accessibility to an existing Web site."

From a critical point of view, we could consider the need for more detailed research on whether the IAV proposed by Kuhlen are exhaustive. Even though the IAV (in particular on the micro level) provide apt measures for analysis, some discussion might enhance the theory's application. E.g., it might be not of crucial importance for a business model whether a macroeconomic added value occurs. A second criticism could cover the aspect of asymmetrical information. It is evident that business models can benefit to a considerable extent from the exploitation of existing asymmetries or vice versa from their elimination. Even though it is in fact covered by the IAV of efficiency, nevertheless it should be highlighted.

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