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An Approach for Assessment of Electronic Offers

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Abstract. Internet and mobile technology enable businesses to invent new business models by applying new forms of organization or offering new products and services. In order to assess these new business models there has to be a methodology that allows identifying advantages that are caused by electronic and mobile commerce. The proposed approach builds upon the theory of informational added values that provides a classification of gains produced by information work. This theory is extended by the definition of categories of technology inherent added values that result in informational added values. These informational added values can be perceived by users of information products and services and therefore be used to assess electronic offers. The relationship between technology inherent and informational added values will be clarified with examples of real business models. Furthermore, a classification of basic business model types will be provided.

1 Introduction

Applications that build upon Internet technology like E-mail and the World Wide Web made possible a completely new use of digitally available information. Starting from a simple text-based information exchange, the Internet has become a world-wide information system and application platform. In the end of the 1990's the Internet hype facilitated the foundation of many new companies that formed the so called New Economy. Even after the industry cooled down and many of the Dotcoms disappeared, companies are still in the position to make money on the Internet and Digital Transformation of organizations is going on. There has to be something inherent to this technology that causes positive effects on businesses and also on every day's life.
An analysis of the Internet's characteristics shows important properties that can help to explain this phenomenon: Global interconnectedness and instantaneous transport of information based on standardized protocols combined with a previously not possible presentation potential allowed to offer products and services based on new business models. In the recent years mobile communication techniques introduced new technical properties and expanded already present ones. They have become a basis for new business models. But again, the same happened with these business models as with the Internet-based ones: Many of them were presented and most of them already disappeared, e.g. in the field of mobile payment [6]. In order to assess existing and future business models based on modern information and communication

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technologies there is a need for an evaluation methodology. Technological capabilities have to be identified as well as benefits that users and producers of electronic offers can achieve when using them.

The rest of this paper is organized as follows. Section 2 discusses related work in the field of assessment of business models and introduces the theory of informational added values. This theory allows describing advantages caused by information systems or goods and services that were produced with their help. These advantages are called informational added values and can be categorized depending on different aspects of utility. In section 3 Internet and mobile technology are analyzed in order to define characteristics of information and communication systems that are built upon them. These will be termed electronic added values and mobile added values. In section 4 it is explained how electronic and mobile added values can cause informational added values and how this can be used for an assessment of electronic offers. Furthermore, basic types of business models will be described and categorized that represent the building blocks for more complex ones. In section 5 an exemplary business model will be assessed with the help of the proposed methodology. Section 6 gives a summary and outlook.

2 Informational Added Values

Every business model has to prove that it is able to generate a benefit for the customers that will pay for it. This is especially true for businesses that offer their products or services on the Internet. Since the beginning of Internet business in the mid 1990s models have been developed that tried to explain advantages that arose from electronic offers. An extensive overview of approaches can be found in [11]. At first, models were rather a collection of at that time few business models that had already proven to be able to generate a revenue stream [3], [15], [18]. Later approaches extended these collections to a comprehensive taxonomy of business models observable on the web [13], [17]. Only [18] provided a first classification of eleven business models along two dimensions: innovation and functional integration. Due to many different aspects that have to be considered when comparing business models authors introduced taxonomies with different views on Internet business. This provides an overall picture of a firm doing Internet business [10], where the views are discussed separately [1], [2], [5], [14], [22]. Views are for example commerce strategy, organizational structure or business process. The two most important views that can be found in every approach are value proposition and revenue. A comparison of proposed views in different approaches can be found in [16]. While the view revenue describes the rather short-term monetary aspect of a business model the value proposition characterizes the type of business that is the basis of any revenue stream. To describe this value proposition authors decomposed business models into their atomic elements [9]. These elements represent offered services or products. Models that follow this approach are for example [1] and [22]. Another approach that already focuses on generated value can be found in [9]. There, four so called value streams are identified: virtual communities, reduction of transaction costs, gainful exploitation of information asymmetry, and a value added marketing process. Some approaches define an enterprise ontology to be able to describe actors and value exchanges in a given business model scenario [4], [17], [21]. However, no systematics is provided that

links types of offered products and services to generated values for participating actors.

Since companies use Internet technology to improve their value production, it has to be determined what kinds of benefit can theoretically be realized for customers, vendors or even involved third parties. The *theory of informational added values* [8] provides an analysis of the impacts of information work in information markets. Utility that can be perceived by users of goods that result from information work is represented as a set of *informational added values (IAV)*. As there are different aspects of utility, informational added values can be classified into eight main categories. There are efficiency, effectiveness, aesthetic-emotional, flexible, innovative, organizational, strategic, and macroeconomic added values.

- *Efficiency added values* can be realized when the speed or the cost-effectiveness of an operation increases. For example, customers of online services like online banking or brokerage can initiate transactions at home instead of going to a certain location during business hours and therefore save time. Not only is this beneficial for customers but also for service providers because the task of collecting data and filling out forms is already performed by the customer. In this way a better cost-effectiveness can be achieved.
- *Effectiveness added values* cover an augmentation in output quality. This can be either a better achievement of a given goal or that something is made possible that previously did not work. An example would be a search engine that is able to find the location of books in a library based on the title. If books were also available as electronic editions, then this would allow downloading the document. This would further increase the achievement of the given goal, namely to find and read a book.
- *Aesthetic-emotional added values* address subjective factors such as well-being, job-satisfaction or acceptance of performance. This added value can be found for example in above mentioned online brokerage example. The user can access stock exchange information through an online-portal where multiple charts with information about the current trading situation are presented. The customer is now able to see a lot of information at once, without having to search for it.
- *Flexible added values* allow a higher level of flexibility in the production of goods and services that consist of information. This can for example be found in the production of personalized music CDs where tracks can be arranged according to the individual wish of a customer. Therefore the variability of goods increases, i.e. there is a greater range of offered products. This variability can also be achieved for classical goods and services with the help of modern information and communication techniques, e.g. with production planning systems. It is suitable to extend the definition of flexible added values to the production of classical goods.
- *Innovative added values* cover the creation of entirely new products or services (or a combination of both) through the usage of new means of communication. Online services that provide driving directions would not be possible without the use of the Internet. Another example is the customer-individual production of bulk articles through mass customization strategies. The innovative aspect here is that these personalized articles are sold with only a slightly higher price. But from an

organization's perspective, innovative added values will disappear, when other companies offer the same product or service.

- *Organizational added values* cover the opportunity to build new forms of organization through the use of information and communication systems. This can affect companies' organization structures as well as the reorganization of their business processes. Focus here is on administrative and dispositional activities. Examples for the creation of organizational added values through information and communication technology are virtual companies as temporary, mission-bound networks or mobile access to enterprise resource planning systems.
- *Strategic added values* qualify advantages that go beyond the operational and tactical level by influencing a company's position in a market segment. If a significant competitive edge can be achieved or disadvantages regarding the market share can be avoided strategic added values are present. A strategic advantage is always based on one or more other added values, e.g. on the opportunity of worldwide customer acquisition for a small specialized company that has an added value with effectiveness impact on customer reach.
- *Macroeconomic added values* describe advantages that go beyond the level of single companies and result in impacts on economy or society as a whole. These added values also emerge from one or more of the other added values and denote improvements in the achievement potential of a society. For instance the effect of office automation to the occupational image of a secretary. Nowadays, the role of a secretary is more an executive assistant than a copy typist.

The different aspects of utility that are provided by these eight categories have also different user perspectives. Macroeconomic added values aim at improvements of a whole society. Strategic, organizational, innovative, and flexible added values can only be realized in organizations that offer goods or services. Efficiency, effectiveness, and aesthetic-emotional added values can even be realized by a single person. This can be a private user or employees of the above mentioned organizations. But organization-centric added values can also affect private users because improvements within companies can be handed on to customers for example by reducing prices or offering new or more products. It can also be noticed that often informational added values cannot be seen separately from each other. For example, there are interrelations between effectiveness and efficiency added values. In the library example, the goal achievement can be measured in increased speed of search and is therefore more efficient. Another example is increased customer satisfaction for a parcel service through enhanced skills in shipment tracking. An online tracking system produces aesthetic-emotional and effectiveness added values that can as well be accompanied with an efficiency added value, if this solution decreases the number of call center operators at the same time. Since strategic and macroeconomic added values can not appear individually, their existence can only be explained with the dependence on other added values. Therefore it can be stated that the determination of informational added values in electronic offers always depends on the particular point of view and the aspect one wants to examine. Also, it is not excluded that one added value causes another, e.g. organizational improvements can lead to cost savings or to higher job-satisfaction.

3 Electronic and Mobile Added Values

3.1 Concept

Informational added values as described in section 2 are impacts of information work that is performed in order to produce or use goods and services. This is based on technologies that provide new possibilities of handling and transport of information. Modern information and communication systems have advantageous properties that represent technology-specific added values. Such system technology-specific added values are not informational added values but they can cause them. IAV result from the use of information systems (or from goods and services that have been produced with their help) if users accept to pay for their anticipated benefit or if they appreciate them in another than monetary way [8]. To understand and discern conditions and results, technology-specific added values have to be identified. Technologies relevant to this question are the Internet and mobile communication techniques. Mobile communication builds upon techniques that are already used in Internetworking and adds some more properties to it. Therefore these two technologies will be analyzed separately to show, which characteristics dominate and which technology-specific added values exist in each case.

3.2 Electronic Added Values

In order to define general added values of Internet technology, its properties have to be analyzed. Networked computers are able to exchange digital data without any reasonable delay, i.e. *instantaneous transport* of information is possible. *Standardized* communication protocols like the TCP and IP as well as emerging standards for data exchange and media representation allow interconnection of computers based on different operating systems and application systems. These standards have led to a *global interconnectedness* of networks and computers. Every computer that is connected to the Internet is able to exchange data with every other in this global network even if they are separated by thousands of miles. Due to its non-proprietary character there are *no access restrictions* to the Internet. Another property is the enhanced *presentation potential* that was added to the Internet. Today, browsers are able to present not only text annotated with HTML-tags but also images, audio and even real-time video streams. Based on these properties four added values can be defined for Internet-based technology. These are called *electronic added values (EAV)*:

- *Reduction of temporal and certain spatial limitations*
  This added value is based on the properties instantaneous transport and interconnectedness. Online offers can therefore be accessed at any time and from almost everywhere without any noticeable time delay. Only a computer connected to the Internet is needed. Data exchange is not reduced to textual information so that digital products and services, e.g. music can also be transmitted. Even a combination with classical goods is possible where a product is ordered online and delivered by a logistics provider. This EAV mainly causes efficiency and organizational added values. It can be used for many business models because time and location independent access can be realized without much additional

effort. But to offer a 24/7 service a suitable server infrastructure has to be maintained.

- *Reduction of technical limitations*
  This EAV can be explained with the existence of communication and presentation standards. This facilitates the elimination of heterogeneity problems. A wide range of applications, especially business applications, benefit from this added value. Data and process integration can be achieved and inconsistencies caused by hand-offs will be reduced. This added value leads in particular to organizational, efficiency and effectiveness added values.
- *Unrestricted access*
  The concept of the Internet is based on free access through standardized protocols. Everybody is able to connect to the network without having to buy expensive technology, and the number of participants is not restricted. For example, a Web site of a small company has the same preconditions as the one of a global player. Everyone can offer and use information or services on the Internet so that transparency of the market increases. To benefit from this transparency search engines and directories are needed in order to find certain offers. This EAV mainly causes strategic added values that are based on efficiency, effectiveness, and aesthetic-emotional added values.
- *Multi-mediality and interaction*
  Multi-mediality describes the enhanced presentation potential of the Internet that can be used to stimulate users. This is extended with interaction capabilities that make use of the instantaneous transport of data. Thus, direct and personalized interaction is possible, e.g. for product configuration. This EAV often leads to effectiveness and aesthetic-emotional added values and can also cause innovative added values.

3.3 Mobile Added Values

Mobile communication techniques extend Internet technologies and add some more characteristics that can be considered as additional benefits. Therefore an own class of technology-specific added values is defined and named *mobile added values (MAV)*. These added values based on mobility of portable devices are:

- *Ubiquity*
  This MAV describes the possibility to send and receive data anytime and anywhere. It is originated 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. Additionally, persistent attendance leads to an increased reachability. For example it allows getting warnings about stock exchange loss even if the recipient is not reachable by other forms of communication. This MAV can cause all of the mentioned IAV, especially efficiency, effectiveness, and aesthetic-emotional added values.
- *Context-sensitivity*
  Mobile devices can be used for delivery of customized products or services fitting the particular needs of the user in his current situation. This can be achieved in

several ways. The current location of the user can be determined and, if necessary, correlations with the location of other users can be analyzed. Sensors that are built into mobile devices can send information about an user's vital functions over the mobile network. Two other possibilities are already known from electronic business. Personalized preference profiles and direct interaction can also be applied in a mobile scenario where they get a higher importance. Typical applications based on the MAV of context-sensitivity are location based services. Context-sensitivity also leads to all IAV, and in particular, innovative added values are possible.

- *Identifying functions*
  The possibility to authenticate the owner of any mobile device through his subscriber identification is immanent to a cellular phone network. The typical 1:1-attribution of a mobile device to its user (which is perhaps not true for any other technical device except a wristwatch) and the possibility to use further means of authentication on the device result in *identifying functions* of mobile devices. This MAV can be used for applications with security restrictions like mobile payment or for applications that utilize user profiles based on the behavior of the customer, enabling 1:1 marketing concepts. Mainly, effectiveness added values can be realized with identifying functions.
- *Command and control functions*
  Mobile devices can be used as remote control for other devices using personal, local, or wide area networks. Mobile technology extends previous Internet-based solutions, where remote control was only possible for stationary devices. Now, the combination with ubiquity allows that the target device may be mobile, too. This could be the mobile phone of other users or a device with ubiquitous computing technology so that rule based automation and device-to-device (D2D)-communication is possible. Command and control functions primarily cause effectiveness added values.

4 Assessment of Electronic Offers

4.1 Methodology of the Added Value Concept

After having presented informational as well as electronic and mobile added values, it is possible to analyze dependencies between them. Benefits of an electronic offer are assessed by comparing it with a non-electronic offer [12]. Since it is not sufficient to simply make a conventional (non-electronic) offer available through a web site or mobile device, e.g. digital photographs of a newspaper, informational added values are necessary to give users a reason for accessing it. In order to determine how and which informational added values can be derived from electronic and mobile offers, a methodology will be introduced next.

When comparing an offline solution to an according electronic offer, e.g. a newspaper with its online edition, then informational added values have to be created for at least one participating group of actors, in this case users or publisher. These IAV can only be derived from electronic added values that were used to create this offer. Figure 1 shows the systematics of application.

If EAV are applicable, this results in IAV that have not been existent in the offline solution. If a mobile offer is examined, then MAV have to be identified that are applicable to this solution. These MAV result in additional IAV compared with the electronic offer. In our example, the online edition of a newspaper results, among other, in efficiency added values, because news can be presented immediately instead of the next day. A mobile solution, where news can be pushed on the device, results in additional efficiency added values, because it allows reaching the user faster. Considerations like that have to be done for every EAV-IAV-combination in an electronic offer and for mobile offers respectively.

The diagram shown in figure 2 allows a structured analysis of the dependencies between EAV and IAV. EAV can be found in the rows of the matrix and IAV in the columns. For a particular business model it is analyzed if an EAV is applicable at all. If yes, then for all possible IAV an estimation of influence is given. In this model *strong influence*, *influence*, or *no influence* is possible. The estimation is dependent on the person who analyzes. A customer would probably have another estimation as the service offerer. Ideally, an independent person should assess the business model and consider all points of view.

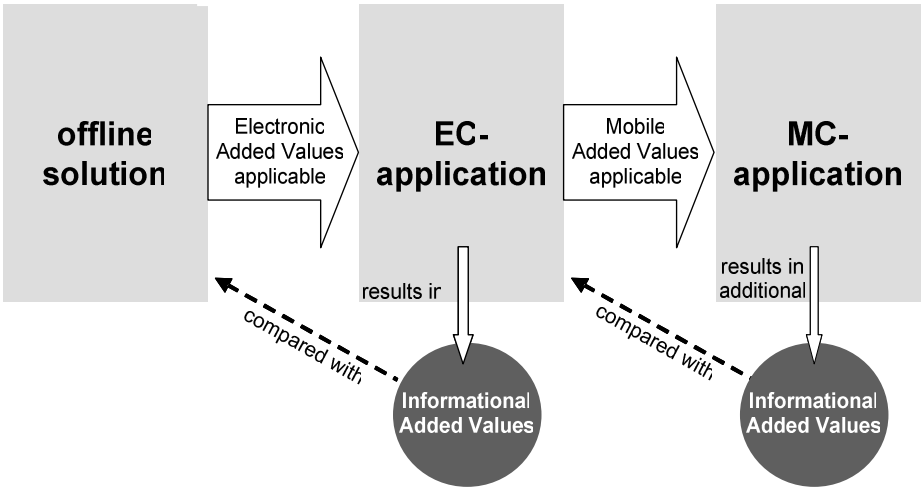

Fig. 1: Derivation of informational added values

There is only an ordinal scale provided, what can cause inconsistent assessments when more than one person separately analyze one offer. However, the possibility that dependencies between certain EAV and IAV are equally assessed is high, if for every IAV all necessary criteria are defined, e.g. efficiency added values describe the improvement of two criteria, namely time and cost.

4.2 Typology of Business Models

The evaluation of real business models showed that some few business model types recur. These basic business model types have been used for building up more complex business models. They can be classified according to the type of offered product or service. A categorization based on this criteria is highly extensible and thus very generic [19]. Unlike other classifications of electronic offers (see section 4.1)

this approach can also be applied to mobile business models that e.g. use location based services to provide a user context. Even future business models can be integrated that are not yet known.

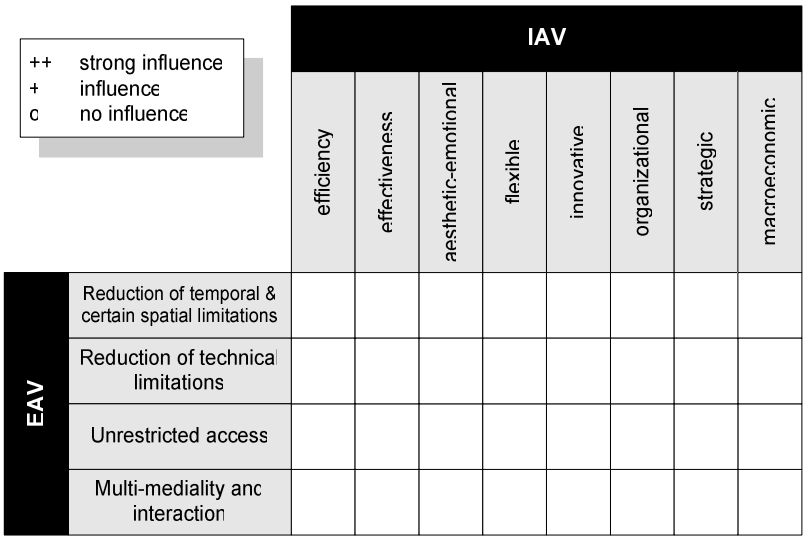

Fig. 2: Diagram for a structured analysis of dependencies

Figure 3 shows the categorization of business model types based on offered service. First, it has to be distinguished whether goods and services can be produced and exchanged exclusively in a digital way. If there is a part of production that cannot be done only by data exchange, i.e. there is a physical product involved. *Not digital* goods and services can be tangible or intangible. While physical products themselves are tangible services that only need physical objects to be performed are intangible. Hence two basic types can be derived: *classical goods* and *classical service.* Digital goods and services can be divided into *action* and *information*.

The category *information* represents the offering of data, e.g. multi-media content for entertainment purposes or daily news. Basic types are *context* and *content*. An offer has the basic type *context* if it describes, uses, or provides information about someone's situation, e.g. position, environment or needs. This can be achieved either by user profiling or more effectively by suitable mobile technology. The category *content* describes offers that provide news and information about politics, economics, entertainment, arts and so on. Online and mobile games are also included. Activities that process, manipulate, transform, select, or systematize data are contained in the category *action*. This category consists of three basic types: *Service*, *intermediation*, and *integration*. *Service* contains offers where activities using digitally encoded data are provided e.g. an online translation service. Activities that classify, search, select or mediate belong to the basic type *intermediation*, e.g. search engines. Finally, the category *integration* comprises offers that combine several other offers to one, probably with the use of personalization. This can even lead to user individual offers where the user does not even know about the combination of different offers. For example, an offer could be an insurance bundle specifically adjusted to a customer's needs. The individual products may come from different insurance companies.

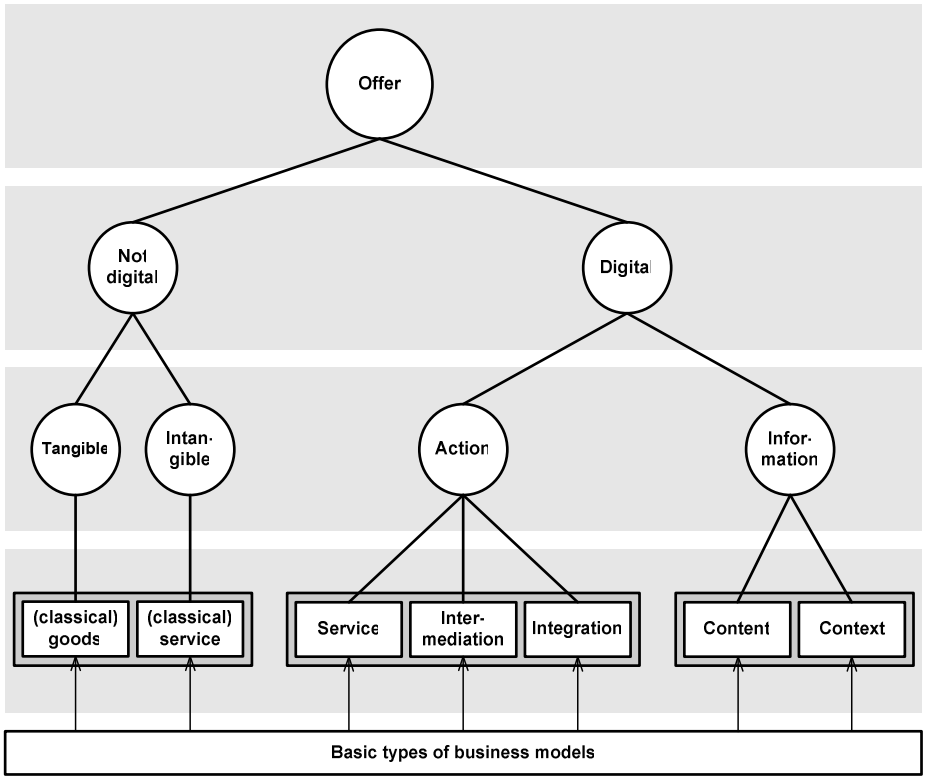

Fig. 3: Categorization of basic business model types

The goal of the proposed approach is to be able to assess business models and also non-commercial offers that are based on modern information and communication techniques. Therefore, an empirical analysis of real business models has to show, whether informational added values and the methodology to identify them is suitable. In a study, the methodology was successfully applied to 153 real business models of electronic and mobile commerce. In order to show how the approach was used, one example of an assessment will be presented next.

5 Example: The Business Model of TVinfo

TVinfo [20] provides television program information on the Internet. There is no printed edition. Unregistered users can browse the program and read news related to entertainment. Registration is free of charge and allows using more services. Registered users can customize their view, i.e. they can choose what channels will be displayed and also how information is presented. There is a service that allows putting a television program overview on private homepages. A personal agent can be used to find certain television programs based on title, director and actors. The agent searches the future television program based on these criteria. There is also the possibility to buy a program subscription which allows selecting movies online, and automatically program a digital video recorder based on special software provided by partner companies. This software can be ordered online as well as the subscription itself. Programs can be added to a reminder. Entries can be viewed online or sent to a mobile phone by a SMS-service. A second mobile offer is the possibility to download

the customized television program to a PDA using the AvantGo software [7]. These two mobile offers will not be considered below.

(Classical) goods
• Video recording software that is shipped on CD
(Classical) service
– – –
Service
• Data preparation service for video recording software • Television program service for own homepages
Intermediation
• Personal agent that searches programs based on preferences
Integration
• Combination of television program service and video recording software • Integration of news to the TVinfo Web site
Content
• TV and entertainment news
Context
• Personalized presentation of the television program based on user profiles

Fig. 4: Classification of the TVinfo's business model

Four participating groups of actors can be identified: Viewers, TV channels, TVinfo, and software vendors. For these groups all IAV have to be determined. Before this is done the business model of TVinfo will be classified according to the proposed categorization. For this purpose, a list is compiled where all seven basic business model types appear. For each basic business model type occurrences are documented. Figure 4 shows the classification of TVinfo's business model. For each identified basic business model type the dependencies between EAV and IAV can now be analyzed. One can thereby revert to general relations between specific EAV and IAV that are reflected in specific business model types. For example, the business model type integration uses two EAV, namely reduction of technical limitations and multi-mediality and interaction. These result mainly in effectiveness added values so that this IAV is likely to appear when using this basic business model type. In the following these considerations have been made and aggregated so that for each EAV the resulting IAV can be listed.

Reduction of temporal and certain spatial limitations has a strong influence on efficiency. Users save time because there is no need to buy a television program magazine at a store. Cost can also be saved but only if the user has not to be online very long in order to get the desired information. Greater effectiveness can be perceived by the online publisher, software vendors, and the TV channels. Combined with the unrestricted access much more potential viewers can be informed about the television program. *Reduction of technical limitations* allows users to automate video recording by using TVinfo's program data with the recording software. This results primarily in increased effectiveness and also leads to efficiency and aesthetic-emotional added values, because the user can save the time of manually programming the video recorder. The software vendors that cooperate with TVinfo will be able to

sell more of their recording software due to this effective advertising. From TVinfo's perspective more variants of its product can be offered and thus flexibility added values can be realized. Since such an automation of video recording has not been possible before this also causes innovative added values. *Unrestricted access* results in IAV for TV channels and viewers. TVinfo offers program information without having to register or pay. TV channels can reach more potential viewers with their television program and therefore realize effectiveness added values. Unregistered users of TVinfo are able to access full information what increases their contentedness. *Multi-mediality* and interaction allows personalization of the television program based on user input. Users are able to find information more quickly if their view is customized to their needs. This is more effective and also more efficient. Besides that personalization results in higher variability of the television program service and thus in flexible added values. Innovative added values are caused by the search agent that interacts with the user. As soon as an appropriate program is found it puts the information to a list so that the user is able to read it.

Since TVinfo has no printed edition the identified IAV have to form a strategic added value so that it can still exist on the market. Reachability is given by reduction of temporal and certain spatial limitation in combination with unrestricted access. The offer is highly customizable through the reduction of technical limitation and multimediality and interaction. Resulting from that the offer is primarily more effective compared to the offline solution. From the user's perspective also efficiency and aesthetic-emotional added values play an important role. TVinfo has increased flexibility in the production of its service and can also offer an innovative product in cooperation with its software partners. Figure 5 shows the matrix after assessment of the business model:

++ strong influence
+ influence
o no influence

EAV	IAV: efficiency	effectiveness	aesthetic-emotional	flexible	innovative	organizational	strategic	macroeconomic
Reduction of temporal & certain spatial limitations	++	+	+	o	o	o	+	o
Reduction of technica limitations	+	++	+	+	+	o	+	o
Unrestricted access	o	+	+	o	o	o	+	o
Multi-mediality and interactior	+	++	+	++	+	o	+	o

Fig. 5: Assessment of TVinfo's business model

6 Conclusion and Future Work

This paper presents an approach to assess electronic and mobile offers. The theory of informational added values was extended by the definition of technology-specific properties that are advantageous when using them to build up business models or other solutions based on information and communication techniques. These so called electronic and mobile added values are the cause of informational added values. In order to identify particular dependencies between EAV/MAV and IAV in real business models a methodology was proposed. First, a business model is categorized into basic business model types, and then each basic offer is evaluated in respect of the existence of EAV and resulting IAV. Thus, with the help of this methodology one can clearly describe cause and result of an electronic offer. In order to build a comprehensive framework for comparison of business models, resulting IAV have to be quantified based on some criteria e.g. cost savings, extent of data redundancy, number of variants or willingness to pay. Up to now, only an estimation of influence is given.

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