Critical Success Factors for the Management of innovative Mobile Business Models

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Abstract
The discrepancy between the expectations and the actual reality with regard to mobile business models in the German-speaking part of Europe, shows how difficult it is to estimate the potential proceeds of innovative cellular services. On the basis of solid theories from innovation and technology management, a model especially designed for innovations in the context of cellular business models is being developed. This empirically verified model serves as an instrument for the management of innovative cellular services and allows for practical recommendations for action on how to arrange and develop such services. Recommendations for action that are theoretically sound and oriented towards the real economy should sustainably increase the success probability of cellular business models.

Introduction and Presentation of the Problem
In recent years, hardly any other branch of industry has been in the public eye so much as the information, communication and media industry. A permanent structural change, a strong orientation towards growth, as well as an above-average dynamic field of competition, characterize this branch of industry. The belief in the generation of new success potentials through the use of the Internet, in the IT sector or of new technologies in the telecommunication sector has turned out to be way too optimistic. The discrepancy between the expectations and the actual reality shows how difficult it is to estimate the potential proceeds of new technologies. At this point, the question arises as to whether suitable theories and concepts in innovation and technology management do not exist for this branch of industry or whether the existing concepts are not adequately used.

Theoretical Classification
Mobile Business stands for all the communication processes as well as the exchange of information, goods and services via cellular end-user devices. In comparison to eBusiness, the data is transmitted via cellular communication networks in Mobile Business. In addition, these cellular networks, in connection with the corresponding end-user devices, open up new areas of application, which cannot be accessed via the wire-bound network [1].

In the following, Mobile Business will be limited to cellular business models, with the exclusion of business models around the Enabler technology RF-ID. In a broader sense, cellular business models are those services, whose creation of benefit is causally connected to the use of the cellular network. Therefore, the purchase of logos, background images or ring tones also is a part of cellular business models. In a narrower sense, cellular business...
models are those services, whose benefits are created by the use of the cellular network. Here, video-phoning, mobile parking or an SMS information service are offered as examples.

![Diagram 1: Differentiation of eBusiness, mBusiness and Cellular Business Models](image)

From the definition and differentiation of cellular business models, specific advantages and characteristics arise, which can be found in the specialist literature under ubiquity, localizability, reachability, context-specificity, personalization and data pro-activity.

**Approaches in Technology and Innovation Management**
The term management primarily has two meanings. On the one hand, in the functional sense, it means a description of processes and functions, such as planning, organization, leadership and control, and, on the other hand, in the institutional sense, it subsumes the people who carry out the management tasks. Decisions on the use of established technologies, e.g., those which have been available on the market for a longer period of time, or decisions on the use of technologies, which did not originate in their own R&D, are classified as technology management. On the other hand, the introduction of a new product exclusively belongs to innovation management [2].

**The Adoption and Diffusion Theory**
In the context of innovation management, adoption is the adoption of an innovation by an interested individual. Each individual goes through a process from their first perception to the final adoption of the innovation [3].

In the literature, there are a number of phase models which help to explain and describe the process of adoption in detail. All the concepts originate from the elaboration by Rogers, who differentiates between five ideal-typical phases [4]. At the Knowledge Stage, the individual notices the existence of the innovation for the first time. This happens by chance or is planned, as the result of a deliberate search for a product or a service with particular qualities. During the Persuasion Stage, the individual tries to find out about the costs and benefits of the innovation on the basis of further information about the product or the service. In the event of a positive assessment of the innovation, it will be tested out. Depending on
the outcome of the test, the individual decides whether or not to purchase and use the innovation (Decision Stage). In the Implementation Phase, the innovation finally is actually used. In the meantime, the individual's experiences with the innovation can be positive, which leads to a confirmation of the decision (Confirmation Stage). This can result in further activities, such as the purchase of the same product again [5].

The adoption process is influenced by a number of factors with regard to course and duration. In the literature, product-specific, adopter-specific, as well as environment-specific factors are mentioned [6]. The product-specific factors are those qualities of the innovation which can be subjectively perceived by the individual. These qualities have an influence on the intensity and the timely outcome of the adoption.

The relative advantage reflects the degree to which an innovation is perceived to gratify individual needs better than one that has been previously used or another innovative product alternative. The economic benefits resulting from the advantageousness of the product, which express themselves, for example, in cost-effectiveness, are also summed up under the term 'relative advantage'. In the meantime, the existence of network effects is also mentioned as a criterion of relative advantage worth taking into consideration, since the degree of the gratification of needs and/or benefit increases with an increasing number of users of a service (e.g., eMail).

The compatibility reflects the degree to which an innovation is perceived as being compatible with the existing values, norms, experiences and needs of the consumer. Often, the technological innovation demands changes in one's behavior, which leads to only a low degree of compatibility.

The complexity reflects the degree to which an innovation is perceived as something that is hard to grasp. In general, the complexity is higher, the more the individual subjectively perceives the technological novelty of the product, the more dynamic the innovation processes are, the more difficult the anticipation of the consequences of an adoption are, and/or the greater the investment volume is. A consumer with a relatively high degree of knowledge regarding the innovation will be inclined to perceive a lower degree of complexity than a consumer with a relatively low degree of knowledge regarding the innovation. A technological innovation is often characterized by a relatively high complexity, which shows itself in the existence of different product attributes, which are partly unknown to the consumer.

The trialability reflects the degree to which the adopter can test an innovation beforehand. In particular, the insecurity connected with the adoption can be reduced by means of the possibility of testing the innovation's suitability. In general, the trialability is impeded by the existence of different product attributes, which are partly unknown to the consumer. Whether innovations are tested or not depends, however, on the individual's feeling of whether he or she can finish the testing phase without difficulties or negative consequences. An example of this would be the automatic termination of a test subscription.
The observability of the innovation refers to the recognizability of the innovation's qualities and the benefit linked to it. This quality can be divided up into the communicability and visibility of the innovation. The communicability reflects the degree to which the qualities of new products can be introduced to potential adopters. One can assume a quicker adoption of an innovation when there is a relatively simple communicability of a series of product qualities determining the purchase than when there is a relatively difficult communicability. The visibility aims at the "visual perceptibility" of the qualities.

According to Rogers, an innovation is more successful, the lower its complexity and the higher its relative advantage, compatibility, trialability, and communicability are [7].

In addition to the five criteria of Rogers, the literature often cites perceived risk as a relevant product quality. This criterion describes the insecurity linked to the innovation. The criterion of perceived risk is not completely free of overlapping with other criteria [8].

In contrast to the adoption theory, which tries to explain the individual's behaviour in dealing with innovations, the diffusion theory examines the diffusion of an innovation in a social system with regard to time. Therefore, the object of diffusion research is the speed of adoption of the innovation or the period of time it takes until an innovation has been accepted by a certain segment of the members of a social system. Consequently, the single decisions, made by the individuals and examined as part of adoption research, are observed in their aggregated form [9].

If the number of adopters is cumulated over time, the result is an S-shaped diffusion curve. The comparison of different innovations' diffusion curves shows a great difference in the time the diffusion of innovations takes. The World Wide Web is an example of an especially quickly diffused innovation. In comparison, there has been no other novelty so far with such a short diffusion time. While the telephone needed 40 years to reach ten million users, the WWW had already reached this number after two years [10]. The diffusion of innovations in the telecommunication sector, which can often be observed and is increasing relatively fast, can be attributed to the positive network effects [11]. These network effects, at first, lead to a rather hesitant diffusion of the innovation. This is because the innovation is used by far too few people at the beginning of the diffusion process, since there are too few further users in order to gain a great benefit from the innovation. However, as soon as a critical mass of adopters is reached, a diffusion takes place, which is carried out by the adoption itself and which results in a left-skewed diffusion curve [12].

Approaches to the Explanation of User Acceptance
Acceptance research is a research approach as part of the social-scientific accompanying research, which explores the reasons for the acceptance or rejection from the side of the users of innovations [13]. In business administration, the field of acceptance research has become established in marketing studies and in economics and computer science. Marketing studies is primarily about the acceptance of new products or services, and seldomly about their subsequent use [14]. Economics and computer science as part of acceptance research deals with the acceptance of information systems, from which their frequency of use depends on [15]. Different models, which try to explain the phenomenon of acceptance, have
developed in acceptance research. The most different influential factors, which can have an effect on the user's acceptance, have been brought in for explanation.

**The Technology Acceptance Model (TAM) and its Expansion**

The Technology Acceptance Model (TAM) is one of the most widely used acceptance models in the Anglo-American world. In this model, the perceived benefit and the ease of use are brought in to evaluate the user's acceptance [16]. External stimuli have an effect on both influential factors. The greater the benefit of a system, and thus the perception of its ease of use, the more likely the user is to make use of the innovation [17].

Studies have shown that the perceived ease of use has little influence on acceptance. Sometimes, the influence could not even be proved. It is argued that it depends on the kind of task as to whether this influential factor is important for acceptance or not. With activities in which the information system itself is an inherent part of a task (e.g., the search for teaching materials), it could be proven that the perceived ease of use had a much higher influence on acceptance than when the quality of service was only peripherally dependent on the information system (e.g., the purchase of teaching materials) [18]. Expansions of this model were carried out by Dahlberg.

To include security and trust factors into TAM, two factors are added to the original TAM. The factors disposition to trust and perceived trust complete the trust enhanced technology acceptance model (TETAM). The two new factors are adapted from the trust construct proposed by McKnight, et al. Disposition to trust describes whether a person is attitudinally willing to trust others or not. Perceived trust indicates whether a person perceives that a particular technological solution is secure and trustworthy or not [19].

**Task Technology Fit Model (TTFM)**

The goal of the Task Technology Fit Model (TTFM) is to explain the users' evaluation of information systems. Thus, the TTFM only indirectly deals with the acceptance phenomenon. Since the evaluation of the ability to provide services of a system has a decisive influence on the acceptance of a system, the TTFM has also established itself as an acceptance model. The evaluation of the information system is influenced by the three general factors of task, technology and the individual [20].

The influential factor technology sums up influential factors, which can be attributed to the characteristics of the information system or to the characteristics of the services offered by the information system. The qualities of the tasks, which have to be fulfilled by the individual, also flow into the model. Here, variables such as the level of difficulty of the task, diversity, and dependencies on other factors, influence the suitability of the technology. Finally, it is also the individual's capabilities and skills, which have an influence on the evaluation of the information system. All three influential factors have an impact on the acceptance of the system for fulfilling the individual tasks. The evaluation of the system results from this, and, in the end, also its acceptance. Thus, the TTFM is a widely used model for evaluating the degree to which a system is suited to handle previously specified tasks [21].
The Theory of Perceived Risk

The theory of perceived risk goes back to Bauer. He pointed out that risk in consumers’ behavior is involved in such a way that each action of the consumer will have consequences, which the consumer cannot anticipate with certainty and of which at least some could be unpleasant [22]. In the literature, there are different approaches as to in which dimensions the risk can be perceived.

The degree of perceived risk represents a function of the following two factors, without making a statement about their functional association [23]:

- The degree of loss, in case unwanted consequences occur as a result of the purchase decision
- The perceived amount of security, that the consequences will be undesirable

On the basis of this basic consideration, so-called two component approaches were developed for the operationalization of the construct of perceived risk. Risk-reduction strategies start trivially from these two components and can be seen in a reduction of the possible loss and in an increase of security to avoid undesirable consequences. Bettman makes a distinction between the components of inherent risk and handled risk. While inherent risk can be understood as the conflict potential which comes about from a product class, handled risk represents the conflict potential which still exists when choosing a brand from a product class at the moment of the purchase decision. Thus, handled risk can also be described as the remaining perceived residual risk when purchasing a certain brand. The difference between inherent and handled risk results from the measures exploited by consumers to reduce risk.

Inherent Risk

This risk varies with the different product classes and is primarily dependent on the subjective perception of the consumer. All in all, the degree of inherent risk is defined, on the one hand, by the subjective opinion of the consumer, that he/she can apply his/her reasonable brand selecting criterion, and, on the other hand, by the individual importance attributed to a satisfying choice of brand from a particular product class. The addition of both judgement factors, a reasonable brand selecting criterion and individual importance, equals inherent risk [24].

Handled Risk

Inherent risk represents the initial level of risk which is modified into handled risk by means of risk-reduction activities. This means that, at first, handled risk is dependent on inherent risk. Handled risk decreases with the amount of product-specific information, with the usefulness of the information, and with the trust in brands of the relevant product class. Thus, perceived risk is a sum of the estimation of insecurity and importance with regards to the choice of brands in a product class.

Following Cox, the fundamental existence of purchase goals is assumed, which are connected to every purchase. To the extent which a consumer fears that he/she cannot reach these purchase goals, the consumer perceives a risk linked to the purchase decision.
This risk can consist of possible social consequences, financial loss, physical danger, loss of time, or a non-functioning product. The perceived risk accompanying a purchase decision is defined by the components insecurity and purchase consequences [25]. The component insecurity refers to the consumer’s expected probability of the non-fulfilment of the goals connected to the purchase decision. The component purchase consequences covers the effects of the purchase decision. By multiplying the numerical value of both components, one obtains an indicator with which one can conclude the degree of perceived risk.

Following the perception of risk, different patterns of behaviour with regards to the handling of risk can be identified. In general, consumers can be distinguished according to their willingness to accept risk. The basic types of the so-called risk inclination are the risk-friendly, risk-averse, and risk-neutral types of consumers.

For the measurement of perceived risk, the components negative purchase consequences and insecurity are suitable for operationalization. However, because of the high complexity of technological innovations, it is expedient to extend the two components to concrete risk items [26].

**Shortcomings of Existing Approaches to the Management of Cellular Business Models**

After the most important terms have been explained and differentiated from each other, and after the central theories of innovation and technology management have been presented, a comparison will be made in the following in order to demonstrate the necessity of further research.

Adoption theory neither explicitly takes into consideration the risk dimension, nor does it carry out a prioritization of product qualities. The diffusion theory does not take into account the reasons for the adoption of the innovation. The models for the explanation of users’ acceptance are, for the most part, a retrospective analysis of innovations that have not been adopted. None of the existing acceptance models fits the present problem. The theory of perceived risk only looks at the risk dimension; and does not take into consideration how strongly it works against the adoption or which other factors are opposed to the risk.
### Theory | Explanation Goal | Weakness
--- | --- | ---
Adoption Theory | Explanation of the diffusion of an innovation at the user’s level | Number and missing prioritization of the product qualities
Diffusion Theory | Explanation of the diffusion of an innovation at the aggregated level | Reasons for the diffusion are not taken into account
Model for the Explanation of User Acceptance | Mostly an explanation for the reasons of (non-)use | No model entirely fits mServices; models partly explain ex post non-use
Theory of Perceived Risk | Expansion of the adoption theory by the product quality of perceived risk | Only takes a look at the risk dimension

Table 1: Comparison of the Theories of Innovation and Technology Management

By comparing the central theories of innovation and technology management, it can be seen that it is necessary to make expansions for the analysis of the output in cellular business models.

### Risk-benefit in the Adoption Process (RBA)

For the analysis of risk in the output, expansions are carried out on the basis of existing models in order to achieve knowledge on the adoption-probability of innovative cellular services.

![Diagram 3: Risk-benefit in the Adoption Process](image)

In the analysis of the adoption-probability, the dimension of expected benefits is compared to perceived risk.
The Risk Dimension

Service Risk
The purchase goals, which are connected to every purchase, are taken as a starting point for the operationalization of perceived risk. To the extent which a consumer fears that he/she cannot reach these purchase goals, the consumer perceives a risk linked to the purchase decision. For the systematization of the risk items in service and cost risk, one at first falls back on the characteristics of technological innovations, since negative purchase consequences refer to particular characteristics of technological innovations.

Purchase consequences related to technology and the consumers primarily concern the ability to provide service and the creation of benefit of the technological innovation and thus, in combination with the component of insecurity, result in risk items, which can be attributed to the service risk.

<table>
<thead>
<tr>
<th>Service risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology-related purchase consequence</td>
</tr>
<tr>
<td>The transmission technology for cellular phones is not so advanced yet, that I can make calls anywhere</td>
</tr>
</tbody>
</table>

Table 2: Example of Technology- and Consumer-related Purchase Consequences

Examples of negative technology-related purchase consequences might be:
- poor quality of individual product components
- inadequate ability to provide service or inadequate reliability

Examples of negative consumer-related purchase consequences might be:
- inadequate possibility of integration
- little user acceptance, difficult to use

Cost Risk
Market- and provider-related purchase consequences primarily concern the change in costs and/or the change in cost assessment. This can be explained by the fact that, with the occurrence of corresponding purchase consequences, the ability to provide service of the technological innovation remains untouched, whereas one has to reckon with a change in costs, at least with a change in cost assessment.
Table 3: Example of Provider- and Market-related Purchase Consequences

Examples of negative market-related purchase consequences are:
- strong decrease in price after purchase
- at a certain time after the purchase, more efficient technology appears on the market

Examples of negative provider-related purchase consequences are:
- inadequate support of the provider with the installation
- no repairs done free of charge, long waiting periods for repairs
- later on, the provider's information turns out to have been inaccurate

After the evaluation of perceived risk and its probability of occurrence, it has a direct influence on the purchase behavior.

The purchase behavior with technological innovations is characterized by the fact, among others, that the adoption process takes a relatively long time. Because of the length of the adoption process, an influence can be exercised on perceived risk by employing appropriate risk-reduction strategies. It is thus necessary to split up the entire risk of the adoption decision into partial risks.

As a rule, purchase and adoption decisions are characterized by a more or less strongly distinctive amount of insecurity. Only in a decision situation which can be characterized by complete information regarding the goal-related results, i.e. when it is already known during the decision which form and development the decision-relevant data will take in the future, can one speak of a purchase decision with security. If a buyer or decision-maker takes into account at least two situations around him/her, of which, however, only one occurs, then one can speak of a purchase decision with risk. In practice, purchase decisions are made with incomplete information, i.e. with insecure expectations concerning the future development of the decision variables.
By becoming aware of the technological innovation and the emergence of a general wish to purchase, the potential adopter becomes aware of a risk connected to the technological innovation. Thus, inherent risk corresponds to perceived risk at the beginning of the adoption process. During the evaluation and testing phase, a potential adopter will try to reduce the perceived risk by means of suitable measures. In the following, the extent of the actual decrease in risk by employing risk-reduction strategies is called the risk-reduction effect:

Diagram 4: Perceived Risk in the Adoption Process of Technological Innovations

The diagram above illustrates the course of the decrease in perceived risk. The difference between perceived risk and non-perceived risk via the adoption process, shaded grey in the diagram, is also called a risk corridor.

Parallel to the risk-reduction effect, also the technological know-how of the potential adopter is increased by the use of measures for risk-reduction, which can lead to the fact that parts of the so far non-perceived risk enter the consumer's awareness. This restructuring of risk from the so far non-perceived into the perceived part leads to an increase in the share of perceived risk. This effect is called the risk-recognition effect. Both the risk-reduction and the risk-recognition effect come into force due to risk-reduction strategies, which are mostly information of the potential adopter. Both effects have the same cause, but an opposite effect.

Under the rational assumption that the potential adopter is provided with appropriate information as part of the successful innovation mangement in order to reduce perceived risk as part of his/her risk-reduction strategy, the perceived risk should approach the non-perceived risk, despite the reverse trend.
The Benefit Dimension
The adoption-probability rises with an increase in expected benefit, with advances in the adoption process and with a decrease in perceived risk.

The dimensions in which benefit can be created and perceived are many and diverse. In the following, it will be attempted to subsume the essential dimensions under 3 categories.

Economic Benefit
The most dominant dimension is the economic, and, in the last instance, all the other not difficult or incomprehensible dimensions will be transferred into the economic. Here, the auto industry and the trade of addresses are offered as examples. In the former, it concerns the offsetting of possible damages, arising from claims for compensation and the loss of reputation, in comparison to the costs of an expensive recall action. From an economic perspective, it doubtlessly appears sensible to refrain from an expensive recall action of vehicles with minor defects, provided that the threatening claims are less than the costs of the recall action. In this example, it will be decided on the basis of potential costs. An address trader, who makes money by selling personal or at least aggregated personal data, is in charge of appraising the potential sales. If a business of this kind has detailed personal data (income, age, habits) at its disposal, this business must, from the economic perspective, weigh the possible proceeds from selling the data concerned with the threatening legal consequences, in order to finally determine what action to take.

For the present analysis, it appears appropriate to enlarge the dimension money by the time aspect, because the perspective of time is not always explainable in monetary units. The value of time varies depending on the context and situation parameters; so the time saved will be valued differently in the case of the use of an mParking service in a situation where time pressure already exists, than in the case of the use of the same service on a shopping tour on a day off.

Thus, in the context of the adoption of an innovation, the economic dimensions of time-saving and money-saving arise as variables.

Service-Specific Benefit
New potential benefits arise by means of cellular applications. As analyzed already by Amberg, the need exists for a model in which these new benefit dimensions could be grasped [27].

Due to the heterogeneity of the services offered, it is very difficult to put the qualities of mobility (ubiquity, localizability, reachability, context specificity, personalization, data proactivity) into a unified framework. A classification of these qualities into the benefit dimensions of time independence and place independence of the use of the service appears to be the best way to grasp a service-specific benefit.
Social Benefit
A further, difficult to isolate and quantify benefit dimension is that of social benefit. A new kind of communication has come about in recent years through the ever stronger penetration of communication services. Here, the only very minor substitution of correspondence by email is offered as a clear example. In the year 2000, only 6% of world wide correspondence was substituted for by the use of delay free electronic mail, which also has considerably lower marginal costs [28]. This effect is explained by the enlargement of the individual social sphere, which has clearly increased since these kinds of communication possibilities have existed.

The social sphere of people includes all their social contacts, which they maintain on the basis of family, ethnic or similar interest ties. Traditionally, the social contacts of people are strongly characterized by the limited reach of their communication, such that they are more strongly interacting with spatially closer agents than with ones further away. So, with regard to social contacts, certain ties with other agents predominate due to their proximity.

New media enlarge the social space of human agents, in that they allow for social contacts independent of the space and time limitations of the human medium. Admittedly, the extensiveness of communication by the new media does not reach to interpersonal communication on the spot, however, social contacts are now possible, for example, on account of similar interests, that were not possible to maintain by traditional media. The social sphere of people is changing. While previously communities of place and family were dominant, the importance of the community of spirit, the community of interests, is growing due to the new media, where people with similar interests, who were up until now separated by distance, can meet and communicate with one another in the new information sphere [29].

In order to be able to portray and/or measure a social benefit in its broadest sense, the categories of fun/enjoyment/entertainment and the improved possibility of staying in contact with friends appear to be most appropriate.

Empirical Examination of the RBA Model
For the safeguarding of the quality of an empirical study, it is necessary to select the sample for the validation of the model in accordance with the aims of the research question. Before one can begin to construct the sample, one must first set down the base population. In the present case, the base population is that part of the Austrian population that owns a cellular phone. With the help of a proportional plan, the systematic selection of the subjects led to the construction of the sample. The distribution of the discriminating characteristics of sex, age and highest level of education achieved within the base population studied was calculated from an Austrian market study [30]. In order to achieve a correspondingly high significance of the statements, the sample size was set at 700 people. In accordance with the base total of all cellular users in Austria, a reduced representation was taken from it for the sample, which demographically corresponds to the base total of German-speaking cellular users. The construction of the sample was done according to the quota-method in which the characteristics sex, age and education from the base total were applied to the sample. The sample was asked in accordance with the RBA model for the classes Information (SMS-service), Communication (cellular telephoning) and Transaction (mobile parking). Thus, the
model was used three times for the sample. The analysis was conducted with the help of a standardized questionnaire, which was used in the oral interviews.

In the course of the empirical examination, the RBA model underwent a multiple regression and a causal-analytic examination of the direct and indirect effects. The basic idea of causal analysis is that conclusions on the relations of dependency between the latent variables are drawn on the basis of empirically measured variances and co-variances of the indicator variables by the estimation of the parameters [31].

In the following diagram, the results of the causal-analytic examination are shown.

![Diagram 5: Results of the Causal-analytic Examination](image)

In the diagram above, the indirect effects between the service-specific, economic and social benefits as well as the cost and service risk are shown by arched lines.

As a result of the analyses, it can be stated that the influence of the three benefit dimensions, according to the RBA model, is, to some extent, equally strongly distinctive, and that the benefit dimensions highly correlate to one another and have a positive effect on the adoption-probability. For the construct of risk, the cost risk indirectly exercises a negative influence on the adoption-probability by means of the service risk.
This led to the finding that a potential adopter is primarily concerned about the benefit side of the adoption of an innovation before examining the actual provision of services. The dimension of cost can be seen as an exogenous quantity, which does not have a direct influence on the adoption decision.

The service risk is thus jointly responsible for the degree of the adoption-probability and the cost risk. This could be based on the amount of the costs, since, in the cellular services sector, these will be determined primarily by the intensity of use (e.g., the length of the calls) and will not normally extend into the cost dimension of capital goods.

A potential adopter thus feels the risk, that an important service, like a telephone conversation, the purchase of a parking ticket or the purchase of an entrance ticket for example, cannot be achieved. The risk of paying too much will be determined by the service risk and does not have a direct effect on the adoption-probability.

The Specific Results of the Business Model Classes

On the basis of these different benefits which are created in the different business model classes, a division into three classes was made. The class Information was represented by an SMS service, the class Communication by cellular telephoning and the class Transaction by a Mobile Parking service. By comparing the determining factors, conclusions can be made on the typical differences of the business model classes. While the risk in the class Information in comparison to the corresponding benefit has little influence on the adoption-probability, the perceived risk in the classes Communication and Transaction clearly contributes a greater influence on the adoption-probability. The risk in the class Communication is clearly more strongly perceived. The high existing market penetration can be explained by the high amount of expected benefit.

Risk is most strongly perceived in the class Transaction. In this class, different kinds of risk are perceived that, in the end, influence the adoption-probability.

By taking a closer look at the benefit side, it is apparent that this most strongly influences the adoption-probability in the class Communication.

In the following diagram, those values for a risk and benefit dimension are isolated, which have a correspondingly high Beta (>0.1) and an outstanding significance (<0.005).
By taking a closer look at the benefit dimension, it is apparent that the economic benefit has an insignificant influence on the adoption-probability in the Information class. In this class, the service-specific benefit and the social benefit are most strongly pronounced. In the class Communication, the service-specific benefit and the social benefit dominate the economic benefit.

In looking at the class Transaction, it is apparent that also in this class, the service-specific benefit, i.e. the use independent of time and the economic benefit, and thus money-saving, influences the adoption-probability.

As already explained above, both perceived risk as well as expected benefit are low in the class Information in relation to the other classes. A higher level of risk is apparent in the class Communication, which is overcompensated for by very high benefit expectations. This also explains the high degree of market penetration of these kinds of services at the moment. The highest level of risk is perceived in the class Transaction, which is opposed to low benefit expectation. One can see from the diagram above that, in order to achieve a better comparability, the risk values were only laid out in absolute amounts. The particular perceived risks naturally have a negative connection to the adoption-probability.

**Theory and Reality**

As it was said at the beginning, the discrepancy between the expectations and the actual reality shows how difficult it is to estimate the potential proceeds of new technologies. The question as to whether suitable theories and concepts in innovation and technology management do not exist for this branch of industry or whether the existing concepts are not adequately used, cannot definitely be answered.

From the perspective of the present results, the price war of mobile network operators in Germany and Austria appears incomprehensible. However, when one takes a closer look at the prevailing conditions and the services advertised, one recognizes similar strategies of the
mobile network operators. Most of the mobile network operators in the German-speaking part of Europe try to provide end users with a product or set of products with very low prices, even partly given away. These products of the mobile network operators, which are placed effectively in the media, are, however, only products whose marginal costs are close to nothing, while innovative services, like video-phoning, for instance, are only in the background of the particular companies. Therefore, the price battle turns into a communication instrument to win over and bind the customers. The regular clientele is only in a second step enthused about innovations and improvements of the cellular business models by being talked to directly. For this second step, the following recommendations for action are presented.

**Recommendations for Action**

As is illustrated in diagram 6, benefit has a stronger influence on the adoption-probability than risk. From this point of view, a strategy of the maximization of benefit is preferred to a strategy of the reduction of perceived risk, as long as the influence of perceived risk is less at each adoption phase than the influence of the benefit expectation at each adoption phase. For cellular business models of the class Information, the social and service-specific benefit should be given priority to in order to raise the adoption-probability. An example of this is the communication of the access to information, independent of place and time, or placing emphasis on the entertainment possibilities (e.g., passing one's time with cellular games of chance). For cellular business models of the class Communication, the service risk should be reduced in order to assure the creation of benefit. This can, for instance, be done by giving a video telephone as a gift with the signing of a performance contract in order to reach the critical mass of devices and thus to assure the provision of services. For cellular business models of the class Transaction, the social and service-specific benefits should be emphasized, since these influence the adoption-probability most strongly. Building on this, measures for the reduction of service risk can be taken. The benefit can be better communicated by emphasizing the time saved in comparison to the alternative service.

If these measures are taken, a greater adoption-probability of innovative cellular business models can be expected according to the developed and verified model. This model should represent an instrument for the management of innovative cellular services and minimize the discrepancy between the expectations and the actual reality. With regard to the right time to use these measures, further research is necessary and planned.

**References**


