Beyond Mobile: Research Topics for upcoming Technologies in the Insurance Industry

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Abstract

This paper provides a first idea on changes induced by new ICT that goes 'beyond mobile'. Main aspects considered are value creation structures, value proposition of products and services and customer relations. Goal is to discuss these changes within the insurance industry context (primary insurers and reinsurers) and to foster thinking on new research topics that might arise due to the influence of Ubiquitous Computing (UC) technology. In order to do so UC is defined in a first step. Hereby we distinguish from notions such as Pervasive Computing (PC) and Ambient Intelligence (AmI) and provide a working definition for UC. In a second step implications of UC in the business context will be described generally, which will be followed by a general description of the characteristics of insurance industry. This will lead to the discussion of scenarios and the potential impact of UC in the insurance industry, providing us with a whole set of research aspects that need to be investigated further in the future. Hereby focus is the influence UC technology has on the business aspects for insurance industry rather than on technological questions arising.

1. Introduction

Without doubt the developments in the ICT area are the main drivers of the Digital Economy. Options for new forms of value creation provided by ICT means are matching some more general developments in western societies which will not be discussed here any further.

The emergence of the Digital Economy has a major impact on *(1) value creation structures* with new intermediaries and new forms of value creation networks arising [35, 16], *(2) inter-organizational value creation processes* where the customer becomes an integral part of the value creation process [36, 17], *(3) information intensive products* that can be disaggregated and reconfigured flexibly and mass customized in respect to customer needs [23], and *(4) infrastructures* comprising market services like trust building, payment, or logistics services as well as technical infrastructures such as wireless networks enabling customers to interact with companies and its peers in any place, anytime [19]. In academia as well as in industry currently the impact of wireless technologies is being discussed very intensive. From the business perspective particularly the development of sustainable business models for mobile commerce applications is considered to be one of the major challenges arising [23].

'Wireless' clearly marks one further step in the rapid development of ICT starting with mainframe computers in the sixties. In the eighties Personal Computers enabled decentralization of computing power and laptops made it mobile in a certain sense. With the emergence of wireless technologies – networks, devices and storage – the increasingly location independent Internet access enables and demands for innovative business models. With modern mobile phones and PDAs providing more computing power than mainframe computers in the early sixties, new applications are being developed and the value added of these devices – originally considered as 'gadgets' – becomes more and more sophisticated.

The next step related to ICT development is foreseeable: ICT means will be embedded in the environment and computing or access devices dedicated to a single use will disappear. Human-Computer interaction will take place through interfaces embedded in our environment, be it in a business or private context. Everyday objects will become 'intelligent' and will serve as an interface to information systems. Examples for products such as intelligent furniture, interactive tables or walls [38] or smart clothes [21] already exist and market launch is foreseeable.

As we know the insurance industry is and always has been one of the early users of ICT for data processing of information intensive products. So far ICT had a major impact on the industry and its business already. In this paper we will therefore explore how future developments of ICT in the field of UC will impact the insurance industry of the future by providing mini scenarios of applications. It shall serve as a foundation for further research from a business perspective.

Particularly considered will be aspects such as changing customer needs that lead to new products which will be produced in transaction cost efficient, innovative value creation networks that blur traditional industry boundaries and provide opportunities for new entrants and service providers. The paper will basically

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raise questions and reflects an explorative study which is based mainly on available literature as well as on observations made in research projects together with insurance companies.

The paper divided into five main sections: First we will *provide definitions* for the concepts of Pervasive Computing, Ubiquitous Computing and Ambient Intelligence in order to clarify their meaning and then *set a working definition for Ubiquitous Computing (UC)*, which will be applied throughout the paper. In a second step the paper explains the *implications of UC in the business context* and will then briefly outline *characteristics of insurance industry*. We will then merge these insights in order to explain the *impact of UC for insurance industry*. At the end a brief outlook on further research aspects that are crucial in the UC context will be provided.

2. Demarcation of Pervasive Computing, Ubiquitous Computing and Ambient Intelligence

Pervasive Computing, Ubiquitous Computing and Ambient Intelligence are concepts that are often used with slightly differing meanings. As a starting point, the authors provide an overview of these terms and will then set their working definition.

IBM considers information as the new currency of the global economy. For them Pervasive Computing enables people to manage and access information quickly, efficiently, and effortlessly through intelligent devices such as personal digital assistants, mobile phones, office PCs and home entertainment systems in one seamless, integrated system [11].

In a further step, interaction and information exchange between intelligent physical world objects is commonly called Ubiquitous Computing. According to Weiser [37], researcher at the Xerox PARC laboratories and father of the term ‚ubiquitous', UC is a method of „enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user." [20]. UC means the permanent availability of computing power and information technology in physical objects. More specifically, these intelligent objects possess the capability to interact with their environment, store information and communicate with other networked intelligent objects [24].

With microprocessors and sensors becoming smaller and less expensive over time, the idea of smart objects and intelligent ‚things' being embedded in our physical environment becomes reality. The Internet will thus be extended by the integration of distributed physical world objects that are able to interact and communicate with their environment. In this regard, Ambient Intelligence (AmI) goes one step further as it also considers Human-Machine interaction through intelligent interfaces as a crucial element.

In its definition of AmI, the European Union [12] emphasizes the communication, network and human interface aspect. AmI is derived „from the convergence of three key technologies: ubiquitous computing, ubiquitous communication, and intelligent user-friendly interfaces. In this regard humans will be surrounded by intelligent interfaces supported by computing and networking technology which is everywhere, embedded in everyday objects such as furniture, clothes, vehicles, roads and smart materials even particles of decorative substances like paint. AmI implies a seamless environment of computing, advanced networking technology and specific interfaces." Current research recommendations and initiatives of the EU stress the importance of a clear focus on scenario development for AmI business scenarios in the B-to-B and B-to-C context.

In the following discussion, a rather general definition of UC will be applied where intelligent objects are able to gather and store information regarding their environment and communicate with each other in networks. In order to explain the research issues arising through the use of UC in the insurance industry we will illustrate possible implications for value creation structures, new products, customer relations and therefore also for communication issues that emerge due to the introduction of this new ICT that goes 'beyond mobile'.

3. Ubiquitous Computing in the Business Environment

With the rise of UC, numerous applications in the business environment become possible as physical and informational world continue to merge and thus additional information on objects, processes and individuals may be gathered, exchanged and processed in a cost efficient way [7]. UC is the next step in the evolutionary development of IT integration within value chains. According to Fleisch [6] the degree of IT integration historically followed several steps: from integration of a single function (e.g. billing) to entire departments (e.g. accounting) towards process integration throughout several departments (e.g. ERP systems) and among suppliers (supported by standards such as EDI). A further evolution towards value webs [31] was enabled by concepts such as supply chain management, which deals with integration of processes and information among dispersed entities.

Currently the most advanced step is driven by the increasing miniaturization of devices that measure, process and transmit information. This leads to a new era, linking the physical world of a company with the information flows that exist beside the flow of goods [30]. Miniaturization and cost reduction have increased over time as technology moved from Mainframes towards Personal Computers. In a second step, intelligent devices such as PDAs and Mobile Phones (Pervasive Computing) appeared on the market, which is now evolving further towards intelligent objects (UC).

The following graph illustrates the convergence of physical world and informational world through the developments in IT, where manual interaction means non continuos information processing and automatic interaction represents continuos and automated information processing, enabled by passive and active tags, microprocessors, sensors and transmitters.

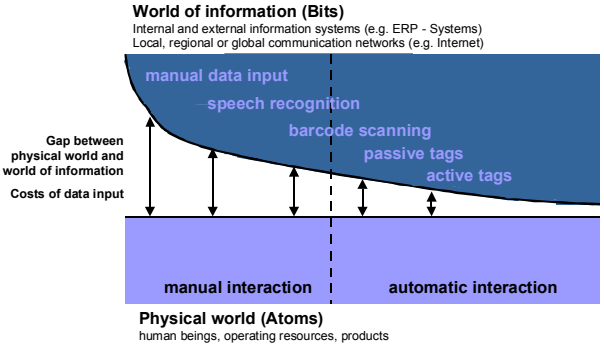

Figure 1: The merge of physical and informational worlds through UC [6].

UC will have a fundamental impact on industries as smart, identifiable objects may begin to network via the Internet and thus allow the creation of new services or new cost saving business processes [10, 7]. With new opportunities of cheap data capture and communication capabilities of objects, topics such as safety, liability, theft protection, maintenance of goods and personalization of services enable innovations that make economic sense from a transaction cost point of view [3]. In addition, new services may be developed given decreasing cost and increasing amount of granular information on objects, individuals or entire supply chains. With UC the following developments of e-business will be further accelerated [39, 18]:

- Increasing integration of economy and society, which means that these parties become an integral part of IT based value creation processes.
- Modularization of products, in particular information intensive ones.
- Development of new, customized products through re-configuration of modularized traditional products.
- Development of new services due to electronic exchange platforms for agents.
- Emergence of new industry structures due to dis- and reintermediation of value chains, which leads to the development of value webs and new infomediaries.
- Shift of power between suppliers and customers through more market like coordination mechanisms such as auctioning via agents.

Clemons and Hitt consider the key changes triggered by UC to be the following: increased transparency, differential pricing and disintermediation of the value chain [2]. These offer new opportunities in product life cycle management (value proposition), supply chain management (value creation structures) and customer relationship management that need to be evaluated in the industries affected by UC, such as life sciences, retail, automotive, logistics, construction and insurance. In our paper we focus on the latter.

4. Foundations of Insurance Industry

In order to be able to determine the impact of UC on the insurance industry, value proposition, value creation structures, and customer relations will be outlined briefly. From this starting point we are then able to identify and describe scenarios for the application of UC in the insurance context and identify future research topics.

Value Proposition of the Insurance Product

Every insurance company possesses a portfolio of risk. These risk differ in type and size, and distribution of loss is random. The event of loss is strongly determined by the following aspects [33]:

- large scale loss caused by a single risk (e.g. damage of large buildings),
- large scale loss caused by multiple small risk (e.g. floodings),
- high frequency of many small risk (e.g. car accidents),
- changing risk structure due to a changing environment (e.g. changing risk behavior due to moral hazard).

The core value proposition of the insurance industry is risk control and risk financing. At the same time these are the two core competencies that are of utmost value to an insurance company.

Risk control is preventive, proactive and focused on managing the cause of risk. It aims at avoiding risk through technical protection of objects (e.g. security stop of a defect lift) or preventive measures (e.g. regular check of a lift). Risk financing on the other hand is

curative, passive and focused on the effect of risk [9]. It offers companies the possibility of optimizing security and costs by transferring risk against a premium to insurance companies. This premium depends on the size of the risk and the probability of an event of loss. The more information an insurance company has on these two aspects, the better it is able to 1) determine the premium for a customer to sell his risk and to 2) diversify the risk within the existing portfolio of an insurance company. Thus, an informational advantage on risk compared to a company that sells its risk is crucial for generating positive financial results for an insurance company [8].

Without appropriate precautions of insurance companies the portfolio of risk may be unbalanced. The effect would be highly erratic financial results of insurance companies. For this the pooling and selling of risk among different insurance companies and reinsurance companies is a standard procedure for risk diversification. The pooling of risk relies on the foundation of insurance industry: the principle of solidarity [33]. This means, that several owners of risk join together in order to cover each individual's risk as a group. Pricing of risk coverage for the individual lies in a certain range that is determined by ones individual risk. However, one has never to bear ones individual risk on his own. In order to make this system work the dimensions risk need to be assessed. Historically this evaluation has been performed with the help of statistics on historical data of the insurance companies. Car insurance companies for example calculated a premium based on the risk group one represented by considering age of the driver, type of car driven, location where the car is used, etc. Until today little 'real-time' information existed on objects of risk. Information on risk is usually gathered before risk coverage is guaranteed (e.g. for life insurances) or is checked only periodically through inspection and maintenance (e.g. building or airplane insurances). Pricing is usually based on historic data that has only limited links to individual behavior (e.g. pricing of car insurance and life insurance depend on a few criteria that are only checked once).

Thus, the more information we have on a certain risk and the better these information are, the easier it would be to change risk structure (e.g. manage risk proactively to avoid damage) and to perform a better risk diversification, both representing the core value proposition of an insurance company. Ultimately, 'real-time' control on risk would allow for dynamic pricing, based on actual risk an insured object, person or process embodies.

Value Creation Structures in the Insurance Industry

For a better understanding we will explain the traditional form of collaboration between customer, primary insurance and reinsurance. However, this is a simplification of the entire value creation structure for the sake of clarity. An example of risk diversification throughout the value chain is illustrated below.

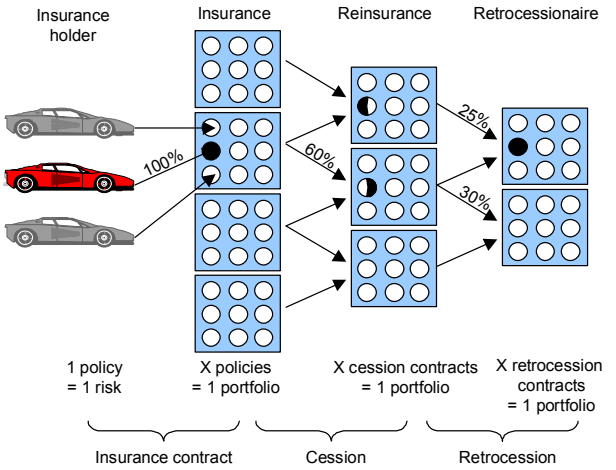

Figure 2: Risk diversification between insurance holder, primary insurance and reinsurance [32].

In a first step one's individual risk (e.g. car insurance) is insured by an insurance company. The primary insurer takes on the risk for a premium (calculated on the individual's risk group) and is liable in the event of loss. The insurance police is added to an existing portfolio of risks (e.g. other car insurance contracts of individuals). Other primary insurers act the same way, as illustrated by the squares in figure 2. In case a primary insurer wants to diversify his risk (as he might only have insured the 'high risk group' at the age of 18 to 25), parts of the risk portfolio may be taken over by reinsurance companies through cession. In this case one or several reinsurance companies are liable towards the primary insurer for the entire risk or for parts thereof. If the reinsurance company does not want to keep its share of risk in order to adjust it's own portfolio of risk it will retrocede its share to one or more reinsurance companies. Throughout this entire process information advantage on ones own risk portfolio structure and on the risk taken over determines the premium an actor is willing to pay for/ receive.

In the event of loss the primary insurer for example must pay for the damage according to the contract with the individual insurance holder. A part of the amount is covered by the primary insurer, the other part is covered by the reinsurance companies. The insurance premium is

divided in the same way. Payment of these liabilities is not made every time there is an event of loss for an insured individual. This means that clearing of payment between insurance and reinsurance companies takes place periodically, on an accumulated basis. Depending on the capabilities to manage, evaluate and diversify risk an insurance company will be more or less financially successful.

Customer Relations in the Insurance Industry

Compared to other players in the financial services industry such as banks, brokers or credit card companies insurance companies have a much lower frequency of customer interactions within a certain period of time. Long term insurance contracts (e.g. in health-, life-, building- or car insurance) hinder a regular customer interaction that might allow an insurance company to build up a learning relationship [18].

As indicated in the previous paragraph, interaction with customers exists on two levels: between insurance holder and primary insurance as well as between primary insurance and reinsurance. In the primary insurance market customers are usually served through independent insurance agents, financial service intermediaries or online insurance companies. Reinsurance companies traditionally do not maintain any direct end consumer contact. However, a clear separation of these roles is not possible as some insurance companies offer reinsurance products. Conversely reinsurance companies take over the function of a primary insurer when serving large customers directly without any intermediaries or risk brokers.

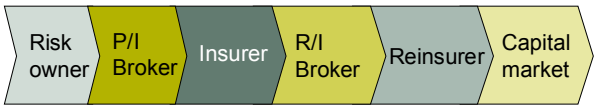

Figure 3: Traditional flow of risk transfer along the insurance industry value chain.

This traditional role concept of actors within the insurance industry is actually more complex in practice, with additional intermediaries between primary- and reinsurance companies, online insurance companies or the capital market as a platform for alternative risk transfer [8]. For reasons of clarity the role of these players will not be described at this point as it would not contribute to a significantly better understanding of future research questions. However, when discussing the impact of UC on the customer relations in insurance industry later on it is important to keep in mind the 'old' way of interacting within the value creation process.

5. Impact of Ubiquitous Computing on the Insurance Industry

As already stated the traditional role concept of actors that participate in the development, production and delivery of insurance products may alter through the use of UC technology. Higher interaction frequency with customers through new customer interaction channels lead to a better knowledge of customer needs and thus allow for cost efficient mass customization of insurance products with new value propositions that require entirely new value creation structures [2].

New Value Proposition of the Insurance Product

UC allows for new value propositions in the insurance industry context. In particular the new way of information gathering on risk relevant parameters (e.g. temperature, pressure, humidity, acceleration, state of the road, heart rate, etc.) at the source of risk (e.g. the insured object such as buildings, cars or individuals) through the use of active or passive tags leads to these changes, with more granular information available to insurance companies. They can use this additional information for risk evaluation, dynamic pricing and insurance product customization. The examples outlined below apply to „non life" insurance (e.g. cars) as well as to „life" insurance (e.g. health insurance). Additional fields of UC application would be surveillance, measurement and proactive risk management of transport vehicles (e.g. container ships, airplanes), buildings and construction (e.g. power plants, office buildings, bridges, etc.) as well as business processes (e.g. fulfillment guarantees of a logistics service provider or of production plants) [6, 27].

Scenario 1: In the case of car insurance attempts to customize product and pricing have been made for several years. Insurance policies are usually distinguished according to demographic group (gender, age), previous accident history, location (city, countryside), type of car (brand, displacement) and age of car. However, these criteria only roughly and through indirect measures capture the actual risk behavior of an individual driver. Statistical evaluation allows clustering of different risk groups only based on historical data. Customers are classified when signing their insurance policy and adjustments of their individual risk classification depends on the number of accidents during the contract period. Until now, this practice represented the best possible cost-benefit ratio and 'real-time' data gathering of one's individual risk behavior would have been inefficient. With UC new opportunities emerge for gathering these additional information. New products and differential pricing could be based on criteria such as: car on the move/car parked inside or outside a

building; car drives in the countryside/in a city, in different traffic situations; driver performs aggressive/ careful driving style; and so on. With this new wealth of data there are new ways of designing innovative insurance products, tailored to the individual [14].

Scenario 2: In the case of life and health insurances, similar opportunities of customization emerge. The usual procedure of risk assessment before determining the conditions for a life insurance policy is based on aggregated risk clusters such as demographic data, profession, medical track records, initial health check and assumptions on individual risk behavior (e.g. sports activities, smoking and drinking habits, etc.). Although the insured individual is obliged to report any major changes of the risk factors assessed, further data on risk behavior would be useful to an insurance company in order to customize its products, pricing and service offerings during the running contract period. Customization of today is limited to offerings such as reduced membership fees in sports centers or funding of training courses. However, the individual training activities usually lack of control and supervision. The idea of keeping a diary of the personal training sessions usually fails due to a lack of motivation to keep record. Furthermore such kind of self control won't allow real-time adoption of the training program which could be provided by a specialized service provider (e.g. a medical center). The use of UC in sports shoes [22] and watches [13] (e.g. heart rate check, body temperature, oxygen consumption, etc.) could help measure physical strain, condition and thus enable an online, real-time provision of individualized training programs to the person insured. Based on this data an insurance company would also be able to better differentiate pricing for health conscious people and to supervise and proactively manage the individuals risk by providing customized rewards that reflect a reduced risk behavior in reduced insurance fees.

Further examples could be innovative offerings of aircraft fleet or car fleet insurances (based on usage, maintenance cycles). Car rental companies might adapt their pricing according to the motto „pay as you drive and how you drive". In the construction industry, innovative insurance products for single risk items such as power plants, bridges or skyscrapers (based on maintenance cycles, constitution and encumbrance of building structure or weather influence) could be offered. This kind of active risk management and control may dramatically change the calculation base for insurance products as the underlying structure of risk changes as well.

Until today technology could not conveniently measure, control, monitor and evaluate the 'objects' of risk (e.g. a person, a car, etc.) in real-time and in a cost efficient way. With UC this paradigm changes and cheap, miniaturized, intelligent sensors, tags and microprocessors allow the merge of physical world and informational world for the first time. Cost and technology is no longer an obstacle to gathering additional real-time information on the source of risk. UC therefore will change major parts of the value creation process with information providers and service providers from different industries merging their competencies into one innovative service offering. Particularly the possibility of clearly identifying and evaluating the individual risk of a person, an object or a business process allows for price differentiation of customized products according to ones individual risk profile.

New Value Creation Structures in the Insurance Industry

As the value proposition of insurance industry changes, new actors offering supplementary services need to be considered for product and service offerings that will be provided by value adding company networks [16].

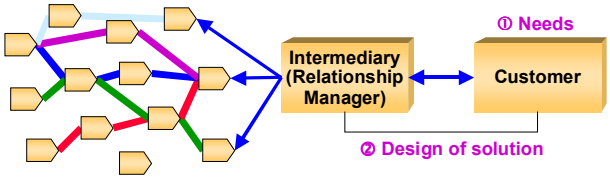

Figure 4: A value creation network of the future?

In our car and health insurance example companies that traditionally have little in common with insurance industry such as tire producers, car manufacturers, sport shoe manufacturers or health clubs become important actors as information- and service providers linked to the traditional and 'boring' insurance product. These actors will become an integral part of the value creation networks, where dispersed information need to be collected from various sources in order to offer a set of additional services around the core product, through one customer relationship manager. Through UC technology, companies in originally independent industries potentially could become data sources on risk relevant parameters such as customer behavior, state of physical objects and business processes. New intermediaries collecting information could become service providers of risk information, delivering granular data to primary insurance and reinsurance companies but also to open risk exchanges, e.g. the capital market. This means that the traditional role of insurance industry as a risk diversifier, and risk financier is partly endangered due to the breach of the 'information monopoly' on risk, traditionally held by the insurance industry.

With the numerous potential forms of innovative value creation structures and the increasing importance

of customers becoming an integral part of the value creation process for innovative products [18] insurance companies might loose parts of their revenue sources. The key questions arising from these developments for insurance companies are: What are the additional information that might be relevant to an insurance company? Which of these information may be gathered in a cost efficient way through UC? Who will gather these additional information? Who processes and prepares these information? Additionally, legal issues will be of tremendous importance as privacy might not be guaranteed within open networks of information providers and the knowledge of individual risk profiles and parameters (e.g. a persons health, the quality of a companies business processes, etc.) could be abused.

The deconstruction of the value chain due to these changes heavily depends on the flexibility of insurance companies to partner with outside companies and to proactively drive product development. Industry boundaries will be blurred in the financial services industry [2, 25]. New actors that are not mere primary insurance companies or reinsurance companies will offer innovative insurance products to end consumers and will thus develop a need for innovative risk transfer and risk financing products provided by traditional insurance and reinsurance companies. The clear distinction of roles and businesses for the latter two might vanish as more detailed information on risk will be available through UC technology. This means that primary insurers themselves will be better able to evaluate and control their portfolio of risk and diversify this risk in co-operation with other primary insurance companies. Additionally, big companies with huge financing divisions such as General Electric, Siemens or DaimlerChrysler themselves would have at their disposal a better informational basis for negotiating of their risk premium with reinsurance companies, for trading their risk on capital markets or for offering insurance products to their customers themselves.

Despite these fundamental changes of value creation in insurance and reinsurance industry, knowledge on risk management and sound diversification will remain critical success factors for economic success. However, this will only prove true if cost advantages may be maintained in comparison to risk coverage via capital markets [2]. With UC the availability of structured information on risk will increase dramatically and the competitive advantage of the insurance and reinsurance industry in order to calculate risk premiums, traditionally based on huge amounts of statistical data on risk, could vanish. The entrance of new competitors [36] such as large companies from different industries and the emergence of risk infomediaries will be facilitated [33]. At the same time efficient and effective internal use of information in order to evaluate objects of risk in a better way, design innovative products, customize marketing and manage risk will gain in importance. The value of mere risk administration and risk financing, one of the dominant activities of insurance industry today, might diminish [9].

New Customer Relations in Insurance Industry

As illustrated in the previous sections the way how products are designed, produced and delivered changes (see figure 4). Customers are increasingly becoming part of the value creation process. Especially the use of UC technology offers numerous opportunities to acquire a better customer knowledge that allows a better customization of insurance products. Hereby particularly new infomediaries and service providers (e.g. Adidas, DaimlerChrysler, Health Clubs, etc.) will play an important role as they do not only sell innovative insurance products but they also gather and provide valuable customer information for the development of new products. Traditionally insurance companies have little customer interactions and insurance policies usually are long term contracts. However, UC enables to offer new types of insurance products and services through different sales channels with a higher interaction frequency. Thus the customers experience with a traditionally 'boring' insurance product might change into rich proactive offerings through intermediaries such as Adidas.

In our previous examples of innovative car and health insurance products, which basically represent activity based pricing for the individual customer, companies such as DaimlerChrysler or Adidas would become risk infomediaries by providing customer information to insurance companies for real-time pricing. Adidas could offer, manage and control individualized training programs based on the data acquired from communicating sensors in Adidas sports shoes [22]. These information could be used by the health insurance company and prices would be adapted according to the training efforts of an insurance holder. One step further Adidas could offer new insurance products itself as an intermediary. The same would be possible for DaimlerChrysler by offering special insurance conditions to its customers if they have their cars checked and maintained regularly and if they drive according to the instructions of the Global Positioning navigation System (GPS) that suggests the optimal speed for road and traffic conditions. A prototype that is able to do so has been developed by DaimlerChrysler already [4].

These new channels of customer interaction may erode the traditional sales channels of insurance products such as sales agents, retail banks or via telephone. The

usual cost ratio of insurance products lies around 30 to 35 percent [34] related to the net premium. A major part are cost for commissions and administration. Internet has shown that the switch towards technology is accepted by most of the customers, as significant price reductions may be realized. With UC technology this customer contact may become even more intense and pricing would be adapted to the individual and thus would be considered as „just".

6. Future Research Topics

Value Creation Structures, Value Proposition and Customer Relations

To conclude, value proposition of products, value creation structures and customer interaction change dramatically with the rise of UC technology in everyday life. Accordingly, with industry transformation taking place new actors and new roles emerge. Primary insurers and reinsurers are more and more becoming part of highly complex industry networks. Due to technological innovations the participants of these networks have to cope with increasingly fragmented value creation processes. Large scale production and the modularization of goods and services lead to atomization of the value chain. Hereby the focus on customer needs is crucial in order to be able to provide customized products at competitive cost [26]. Outsourcing of organizational processes, such as customer relationship management through intermediaries, risk evaluation or the management of portfolio risk become more and more common.

Due to these fundamental changes companies have to adapt their strategies, organizations and business concepts as well [5, 25]. Business networking and collaboration with other players is one of the key concepts to stay competitive in this environment [31, 36]. Traditional insurance and reinsurance companies may offer new services that cover major parts of these value creation processes and thus become an important partner within the financial industry network. An insurance company may accept these changes (stay passive) or it may actively define and communicate its new strategy towards the affected stakeholders.

Systematic Communications Management

In order to anticipate these developments further research of strategic opportunities for insurance and reinsurance companies within these transforming industry networks is a first step to take. However, successful implementation of a newly developed strategy always depends on thorough communication of the new role as an actor in the changing industry environment. Communication within industry networks and within a company therefore is an important aspect that needs to be analyzed [2, 15]. Principal aim is to change the customers', the industry partners' and the employees' traditional mindsets rapidly through systematic communications management [15, 29]. Goal is to make these stakeholders understand the new role a customer, an insurance company, a reinsurance company or a new intermediary plays in the value creation process [1].

Until nowadays communication of strategies often lack of systematic and thus tend to be incomplete and ineffective [15]. However, in such a fast changing environment communications management becomes a critical success factor that enables companies to accelerate intra- and interorganizational change processes. The challenge is to change the mindsets of all actors involved. Changes have to be implemented not only in processes and organizational structures but also in each individual's behavior affected by and involved in these transformations [1, 15, 29].

Research Agenda

As a starting point there needs to be a further discussion of the different terms used to describe UC and their interrelation (there are more than the ones mentioned in this paper). This should lead to a clear definition of terms which will allow an in depth analysis of the impact of the different future technologies on the financial services industry in general and the insurance industry in particular. A further differentiation of business activities is necessary as well, which leads to the distinction between the intra-organizational view addressing mainly the application of ICT in order to optimize and create new business processes and the inter-organizational perspective targeting, for example, on new customer interfaces and its impact on CRM concepts and strategies. Based on these insights the impact of the emerging technology of UC on the general foundations of business models in the respective industries and especially in the insurance industry may be analyzed more deeply. The possible effects on value creation structures, on processes as well as on products and services need to be discussed.

Last but not least the question how to communicate these changes induced by technology needs to be considered in further research activities. Communication to customers, industry partners and employees has been identified as one of the crucial issues to successfully support change processes as it may accelerate transformation, increase acceptance and adoption of innovation and thus reduce possible inefficiencies occurring during change [28].

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