

Recognition of Future Trends on time with the Right Evaluation for the Software Industry

Marco Pister

Ekonomickej Univerzity v Bratislave Fakulta Podnikového Manažmentu
marco.pister@web.de

Abstract

Today through the digitization as well as the technologisation the world changes in an increasing measure which affects also the economic principles. The “Long-Tail-Principle” has replaced the “Pareto Principle”. Nowadays the big enterprises eat not anymore the small businesses; instead the faster businesses eat the slower businesses. The development during the last years has shown that the future is not only digital. The future will be completely different. Especially the conditions in the software industry are other, than they were in the predigital time (Hofmeister, 2013, p. 1). Therefore the recognition of future trends on time and the right evaluation of every trend are very important for every software vendor. The following paper shall help to understand on what sustainable and innovative software companies should focus on including a detailed description of the framework for innovation with the “Three Box Solution” from Govindarajan (2016). Background details like digitization, Cloud or Cloud Computing, Industry 4.0, Internet of Things (IoT) and the a short description of digital goods as an ideal introduction to the paper. The paper further includes a literature review of today’s challenges like strategies, globalization, political influences, the total network and the changed behavior of the buyer. This is important to understand and evaluate future trends on time. With the future trends it is also important to cover shortly the digital business models and the development of business models.

Key words: Future Trends, Digitization, Business Models.

JEL classification: O30, O31, O32.

1. Introduction

Due to digitalization as well as increasing technology today’s world is undergoing a persistent change and so are the economic principles. Instead of the Pareto principle, the Long-Tail-Principle has meanwhile become applicable. Nowadays it is not the big ones that swallow the little ones but the fast ones that swallow the slower ones. Developments in the past years have shown that the future will not only be digital but completely different. Especially in the software sector the prerequisites are different to those in pre-digital times (ref. Hoffmeister 2013, p. 1).

In order to persistently increase the productivity of a company as well as its growth – especially in the field of software development – innovation is doubtlessly an important prerequisite. New innovative business models, innovations in processes and innovations in (software) products not only increase the subjective customer benefits but also enable companies to distinguish themselves from others and thus achieve competitive advantages (see Ili 2012, p. 17). The software industry belongs to a comparatively young sector of the economy and, therefore, proves to have the most innovations. However, despite its relatively recent history, the significance of software in the business as well as in the private sector has meanwhile become very high, if not to say that the world of today would not be able to manage without the software industry. The turnover resulting from the development resp. sales of software has consistently increased since the year 2000 and, according to the opinion of experts, this trend will continue (see Friedewald et al. 2002, p. 151). Practically no other sector of industry has changed society as well as the business world as persistently as the software industry. It belongs to one of the constantly changing sectors and, therefore, differs clearly from other sectors. According to experts, this can be put down to the fact that software has specific characteristics and also that the market for software is very specifically aligned (ref. Buxmann et al. 2015, p. 3-4).

It is the objective of this paper to show what a software company with sustainable and

innovative ability looks like on grounds of a literature search and to define which challenges as well as strategies should be pursued in order to be able to recognize future innovations and trends and evaluate them correctly.

2. Terms and Basics

The main terms used in this thesis are: Digitalization, Cloud and Cloud Computing, Industry 4.0 and Internet of Things (IoT). In the course of this chapter the meanings of these terms will be explained and put into the respective context of the thesis. Furthermore important basics such as the characteristics of digital goods, the characteristics of the software business and strategies for innovations and trends will be clarified in order to gain a better understanding of the following exposition.

2.1 Digitalization

Not only in the IT sector, but practically everywhere digitalization is a topic. In general, considerable expectations are connected with the term digitalization because, in the opinion of experts, this term stands for innovation and the future. According to Krickel (2015, p. 42) there is no clear definition for the term of digitalization. Strangely enough, the terms digital as well as digitalization are not explicitly defined. However, when applying Information and Communication (IaC) technologies, the term digital is always used, whereby in this connection the conversion of analogue data into discrete digital data is meant, which are to be electronically stored or processed. This view is a purely technical one, however, it describes the key tasks of digitalization quite well (see Krickel 2015, p. 42). Due to the increasing networking of practically all areas of life, people, institutions or companies are becoming more and more dependent of digital data sources, services, terminal equipment as well as infrastructure with which they interact on a daily basis. Digitalization serves to enable sustainable technologies to be transported. Innovative technologies such as Cloud Computing, IoT or Industry 4.0 are the results of digitalization, which have also persistently changed the software sector and will continue to change it in the future (ref. Lepping; Palzkill 2017, p. 18-19).

2.2 Cloud and Cloud Computing

Cloud as well as Cloud Computing are keywords in today's IT, which nobody can get away from. There are meanwhile many different interpretations for the term Cloud Computing, but so far there is no standardized definition in the respective literature. However, there is a generally recognized description concerning the functions performed by Cloud resp. Cloud Computing: Cloud Computing enhances the provision as well as use of applications, IT infrastructures and platforms of any kind in the form of services which can be transported via the internet. The term Cloud shall indicate that the services available via the internet or an intranet are made available by a provider (see Baun et al. 2011, p. 1). Experts of the IT sector state that Cloud Computing belongs to one of the top-5 IT trends, which is now passing the hype-phase and entering the status of a practical entrepreneurial transfer. Meanwhile there is no discussion any more as to whether Cloud Computing is a practicable possibility but rather more which possibilities there are to offer resp. implement software on respective platforms (see Münzl et al. 2015, p. 1).

2.3 Industry 4.0

Although the initiative Industry 4.0 officially started in the year 2011, numerous people have not yet heard of this term before. This even applies to those people who occupy themselves with this topic, but, nevertheless, have not yet been able to give a plausible explanation for this term. However, in spite of all these circumstances, at least there is an officially recognized definition of Industry 4.0 in the respective literature in order to be able to categorize the term

in the frame of digitalization (see Sendler 2016, p. 17-18). According to Roth (2016, p. 5) the term Industry 4.0 stands for the so-called fourth industrial revolution. On grounds of this fourth industrial revolution, which has essentially been triggered off by the developments in IT, a completely new level of organization and control of the value-added chain shall be achieved via the life cycle of products due to a combination of automation and production technology. For the software industry this is not only a great challenge, but also a huge opportunity as a lot of new applications, services and IT systems have to be developed in connection with it (see Roth 2016, p. 5).

2.4 Internet of Things (IoT)

The term Internet of Things (IoT) has been existent for about 10 years now (Sendler 2013, p. 10). IoT stands for a new innovative level of development with regard to the internet. When being introduced, it first of all only presented a new possibility to communicate and to facilitate data switching. With Web 2.0 the portal for interaction and consequently for the social networking of any number of users was then created. Furthermore, in the course of Web 2.0 all the mobile terminals were integrated in this networking which meant that it was not necessary any more to be connected with a fixed location. Although a large part of the things already has interfaces for unlimited networking, the dream of IoT cannot quite be put into practice yet. This field is a very big challenge for the web technologies as well as for the software industry as the capacities of IoT for ubiquitous computing have long not been exhausted yet (see Sendler 2013, p. 10).

2.5 The Characteristics of Digital Goods

The term „digital goods“ is fundamentally defined as being „immaterial means to satisfy one’s needs, consisting of binary data and which can be developed, distributed or applied with the help of information systems” (Clement; Schreiber 2013, p. 43). Information goods are digital goods, which are bound to a carrier such as a CD-ROM and which consist of a clearly defined quantity of data considered to be useful by persons involved in the economy (see Clement; Schreiber 2013, p. 43). It is a very essential characteristic of digital goods that the creation of the so-called First-Copy (The First-Copy is characterized by a very high fixed costs share due to the high production costs, whereas the variable costs for the distribution of media are very low and can even be ignored in most cases). usually leads to very high costs, however, it is possible to reproduce digital goods quite economically. Furthermore digital goods are very easy to reproduce and without a great effort in comparison with analogue data (see Buxmann et al. 2015, p. 19-20).

2.6 The Characterization of the Software Business

The concept resp. the model of the value-added chain was first introduced by Porter (1985, p. 5) in 1985. By means of this concept companies were given an instrument for the analysis and improvement of their competitiveness. On the basis of this concept strategies such as differentiation or cost leadership can be developed (see Porter 1985 acc. to Buxmann et al. 2015, p. 142). The value-added chain in the field of the software industry can principally also be described by PORTER’s model (1985), however, it has a far more complex structure than most of the other sectors. According to experts, the generic value-added chains that are not dependent on sectors are less pragmatic as they are exposed to a multitude of innovative developments. As already mentioned, the value-added chain has a more complex structure in comparison to other sectors. In the following the ten key activities for the value-added chain in the software industry are named: Research, Development, Production, Marketing, Implementation, Operations, Maintenance, Support, Education and Replacement.

The software industry resp. the software business is characterized by being tremendously fast-

moving as well as by its very high adaptability. Hardly any other sector has become as fast-moving as the software industry due to a steadily increasing digitalization (see Buxmann et al. 2015, p. 142-144). In the software industry there have very frequently been network effects for example with the operating system Windows by Microsoft. Due to these network effects it occurred very often in the past that certain companies such as Microsoft became a type of monopoly. The experts explain though, that big companies can also be very innovative in spite of their monopoly, for a monopoly holds the risk that a certain blindness to the market is developed due to a lack of innovative ability and that new innovation capable companies take advantage of this (see Buxmann et al. 2015, p. 27).

2.7 Strategy – Innovations and Trends

„Strategic innovations are the source of a future profit flow. Without these innovative activities companies are not able to create competitive advantages and survive in the market economy“ (van Someren 2005, p. 28). A lot of people think that innovation is mostly connected with technology or R&D, but according to the view of the experts, this is not necessarily true. The creation of an added value or a competitive advantage is, acc. to van Someren (2005, p. 28), not necessarily dependent of innovative technical products or processes. New forms of distribution, new business models, new markets or new organization forms also show innovations and trends, which are capable of creating new added value and competitive situations in every sector as well as in every geographic market. For this reason the experts speak of strategic innovations. Historically seen, there have always been important strategic innovations in the market economy. However, due to the rapid developments in the field of IaC technologies in the last two decades, the impression could be won that society as well as the economy have meanwhile almost exclusively become independent on the innovations in this field. Acc. to van Someren (2005, p. 32) strategic innovations are, in most cases, driven by trends as well as megatrends which result in completely new opportunities. Experts state that new customer demands can be derived of the resulting trends and the companies develop the most varied solutions for these demands. Nowadays the great skill for the companies is not only to recognize the latest trends, but also to be able to evaluate them in the respective form. In the opinion of the experts, above all those companies are successful today, which recognize the trends early enough and place them in the proper perspective. Those companies, which are the fastest to offer the right solution, will be able to get a good place in the market (see van Someren 2005, p. 28-33).

3. What does a company with sustainable and innovative ability look like?

The fast growth in the information and knowledge society as well as the implementations regarding technical progress, but also the quickening growth of trade resp. the market, make us take a closer look at the following questions: Which information and competences will in future be necessary to maintain the competitiveness of a company and to bring forth innovations, and what should the required organization development look like? Experts assume that the organization development will have a special part to play in connection with the development of innovations in order to secure the future of a company (see Schram 2016, p. 3). Today neither a company nor a business process can do without IaC technologies. Acc. to Abolhassan (2016, p. 18) this is also the reason why meanwhile six of the ten most valuable brands are IT companies resp. companies which operate on an IT basis. It is a well-known fact that there is a very strong potential in digitalization for companies as well as economies. It is not a great secret either that the digital change has long become an innovation engine. Along with these developments in the IaC sector, the importance of software products is enormous as the new technologies would not be applicable without the respective software. For this reason the experts state that it is not only fundamentally important to recognize future trends in the closely

packed software market, but to evaluate these correctly (see Abolhassan 2016, p. 18). In this part of the thesis we will take a closer look at the framework. The Three-Box Solution by Govindarajan (2016), because this generally recognized model is a good example as to how a company should operate on the basis of future innovative developments.

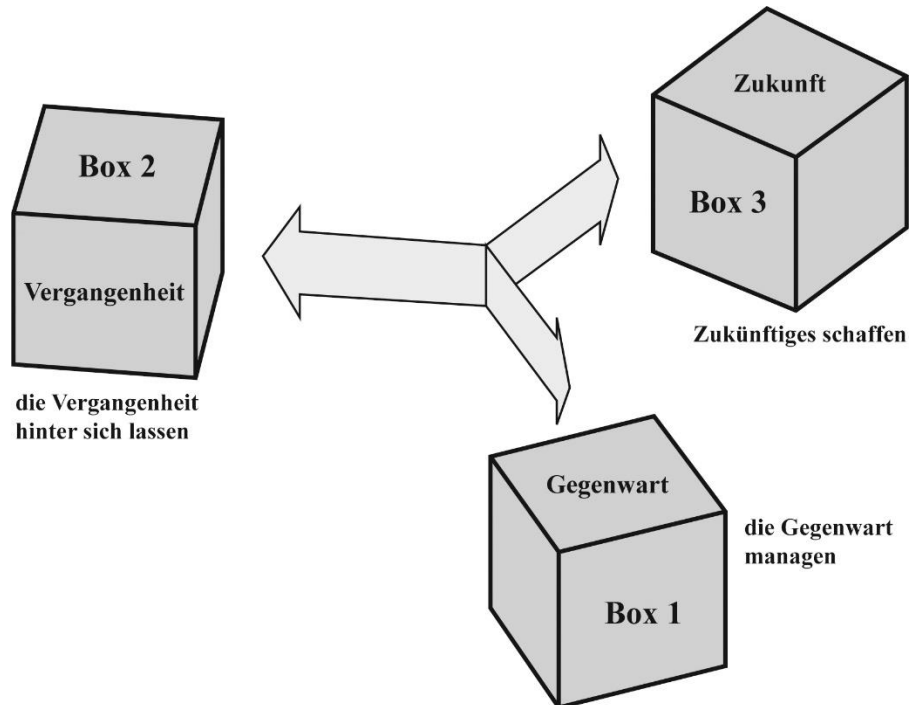


Figure 1. The Three-Box-Solution-Model

Source: Govindarajan 2016, p. 3

3.1 Framework for Innovations

Executives of companies have realized for a long time now that innovations demand a new composition of ways of thinking, skills, management approaches, methods and metrics. It has turned out that the development of new business models or the optimization of an existing business model are two fundamentally different challenges for the management. In the opinion of the experts, the simultaneous execution of both activities is a real problem. In the past the main objective was almost always to be able to maintain an existing competitive advantage whereas nowadays, acc. to Govindarajan (2016, p. 1) it is the priority to find new strategies and new innovative competitive advantages. In this connection experts state that, as soon as a strategy is applied, it will belong to the past. For this reason companies have to strive to develop strategies which meet with the business reality of tomorrow. Govindarajan (2016, p. 2) explains that nowadays companies have to recognize even weak signals which could cause a market change. If changes could be determined, they would have to be evaluated regarding the respective chances and risks for the own business model. In order to be able to deal with all aspects when developing new innovations, the so-called Three-Box-Solution Model was created by Govindarajan (2016, p. 2). This model is a simple and clear framework which shows the three challenges incurred (present, past and future), which managers have to face when developing innovations. The Three-Box-Solution-Model describes the three competing activities which an organization or a team is confronted with in order to develop a new innovative business model out of an existing business model (see Govindarajan 2016, p. 1-3). Diagram 3-1 clearly shows the Three-Box-Solution-Model by Govindarajan (2016). The three competing activities (boxes) will be explained in the following sections of this chapter.

3.2 Drafts for the Future (Box 3)

In this part of the Three Box Solution-Model the development of a new innovative business model is in the fore. The idea behind it is that pioneer new ideas resp. innovations shall be created, which are then to be converted into completely new business models or products. Acc. to Govindarajan (2016, p. 35) these innovations, which are to be applied in the future, shall be implemented in an experimental way. In doing this the chances and risks of an innovatively developed business model or product shall be investigated and evaluated by means of tests generated by assumptions. Furthermore, in the course of these investigations the effects on existing business models as well as possibly emerging new markets shall also be regarded. Govindarajan (2016, p. 37) explains that it is not the speed of the conversion that is of importance for the experimental development resp. the realization of new ideas, but learning from mistakes that have been made. Due to constant learning a very broad knowledge base is created for further innovative developments (see Govindarajan 2016, p. 35-37).

3.3 Leaving the Past behind (Box 2)

This building block has a focus on letting go of practically all current practices and values which are applied in a present business model or product. Experts explain that in the course of this building block skills are developed to build up future developments respectively innovations from day to day or as Govindarajan (2016, p. 79) correspondingly explains: The future of business models or products begins here. When letting go of current ways of thinking, practices and values, all weak signals of possible future trends shall be captured and analyzed in order to be able to anticipate the necessity of experimenting in an orderly manner (see Govindarajan 2016, p. 77-80).

3.4 Managing the Present successfully (Box 1)

This building block directs the principal attention to the optimization of a current business model resp. of all entrepreneurial activities. In the view of the experts the main focus of the business activities should be orientated to the short-term changes of customer needs. Hereby any innovations considered to be useful shall be integrated in an existing business model in order to expand and/or improve a brand and product offer. The objective of integrating innovations as well as optimizing business processes is to achieve a short-term increase in efficiency, to clearly reduce costs and deviations from the plan. Finally, according to the experts, a successful implementation of optimization measures shall lead to creating a corporate culture involving fast and resolute acting so that all entrepreneurial processes are more efficient, more cost-effective and faster (see Govindarajan 2016, p. 113-115).

4. Challenges on Software Providers and their Strategies

„Digitalization is the new Globalization as economic processes increasingly take place digitally“ (Gadatsch 2017, p. 193). Nowadays some experts even speak of the fact that some achievements of digitalization are hardly regarded as being innovative by society. One example for this is Location Based Services (LBS), as these services are taken as a simple app. resp. a “normal” service offer by a large number of smartphone users and not considered to be a real innovation. Gadatsch (2017, p. 193) states in this connection that not only new terms resp. keywords are being created but also that the technical possibilities as well as the resulting challenges are constantly increasing. In the opinion of the experts the various IT trends such as Big Data, Cloud Computing, Industry 4.0 or Social Web are currently blending to become megatrends of digitalization. Exactly these developments are confronting software providers resp. producers with constantly new challenges (see Gadatsch 2017, p. 193). In the course of this chapter an attempt will be made to show the most important challenges on software

providers and their strategies, whereby the most important effects and challenges concerning the changes will be discussed.

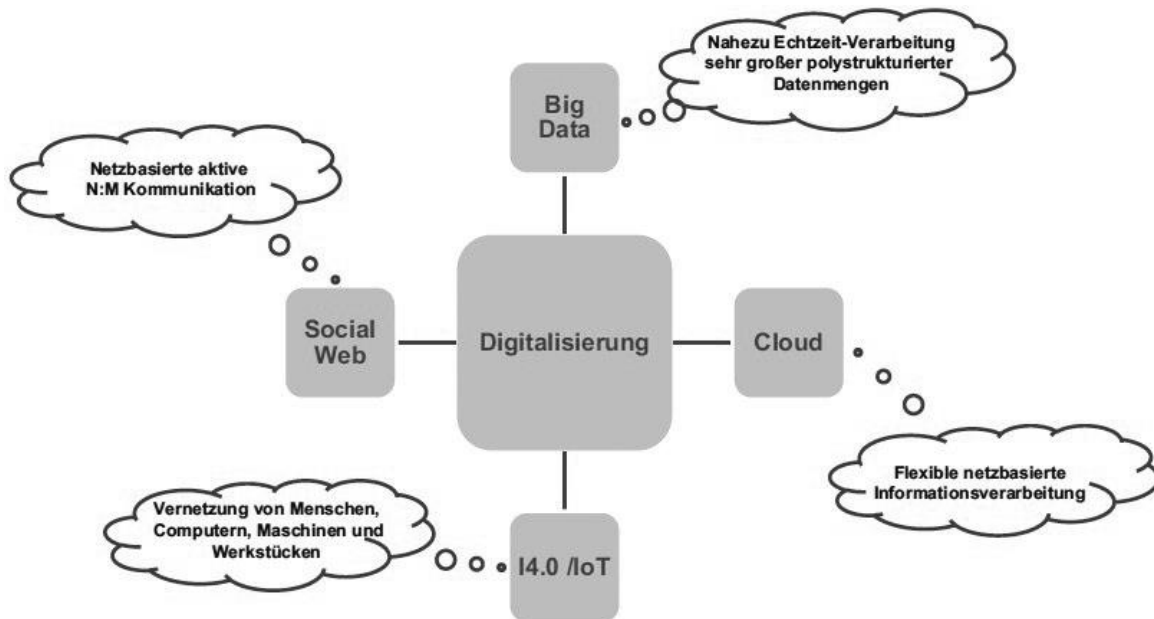


Figure 2. Overview of the most important megatrends

Source: Gadatsch 2017, p. 194

4.1 The Driving Forces of Innovations and Trends

All trends are usually propagated and discussed in public. Therefore neutral assessments of trends often submerge in the multitude of announcements and are very difficult to identify. Current megatrends such as Big Data, Cloud Computing, Industry 4.0, IoT or Social Web, which cannot be regarded detached from digitalization, are hereby an exception as they are considered to be the driving forces for innovations and further trends. In diagram 4-1 these megatrends, which are all results of digitalization, are clearly shown (see Gadatsch 2017, p. 193). Acc. to Urbach and Ahlemann (2016, p. 2) the technological developments of the past years can therefore be regarded as driving forces for innovations and trends. Although, according to experts, nearly all the innovations mentioned are not really pioneering innovations but progressions of existing and partly already established approaches and technologies, which have nowadays reached a certain maturity (see Urbach; Ahlemann 2016, p. 2-3) „and can be combined with each other in such a way that they can develop a significant usefulness“ (Urbach; Ahlemann 2016, p. 3). Due to the technological developments, more and more cooperations in the software industry are emerging in order to be able to use all innovations in the best possible way for the value added by the enterprise (see Buxmann et al. 2015, p. 62).

4.2 The Challenge of Globalization

Experts explain that the world economy is changing faster and faster due to the steadily increasing digitalization. National borders are of less importance for all those companies which operate worldwide resp. offer their services across borders. Acc. to Koch (2017, p. 3) globalization has an influence on all ecological, political, social and economical processes and, in doing so, new chances, challenges as well as risks arise for all those involved. Acc. to experts globalization also has an influence on culture. However, these cultural influences by no means penetrate all cultural levels, but are mainly restricted to the cultural surface of societies. Which, according to experts, means that the culture resp. cultural differences of a country still have to be taken into consideration (see Koch 2017, p. 3-4). Globalization has not stopped at the IT

sector. Due to technological developments as well as increasing digitalization foreign trade concerning IT services and software products is constantly expanding and creating new sector and market structures besides opportunities for growth. In the opinion of the experts an international presence has meanwhile become a must in order to continue to exist on the market in the medium resp. long term. However, experts admit that, although globalization is a real opportunity, companies, especially in the field of software development, often feel driven (see Baukrowitz; Chung 2012, p. 117), „rather than creating their business strategy in a forward-looking manner“ (Baukrowitz; Chung 2012, p. 117).

4.3 The Effects of Politics

Gadatsch (2017, p. 195) explains that the current trends of digitalization such as Big Data or Industry 4.0, are very often subject of political performances. Furthermore these innovations have increasingly become topics for a number of measures on federal and state level. In politics too the responsible persons have recognized that the innovative developments of the past years can decisively contribute to strengthening Germany plc. sustainably. Innovative developments of modern IaC systems are stated as an example, with the help of which farmers can increase their yield as well as the quality of their products. Acc. to Gadatsch (2017, p. 195) the development resp. the application of these IaC systems was commissioned by the Federal Ministry of Food and Agriculture in 2016.

4.4 Modified Customer Behaviour

Experts discuss that one of the main tasks of the digital transformation is to be able to adapt to the modified customer requirements resp. customer behaviour by means of technological solutions. A lot of new software applications have to be developed for the driving innovations such as Big Data, Cloud Computing, Industry 4.0 or IoT and that has to happen in even faster intervals (see Schnabel; Wippich 2016, p. 28). The experts agree that digitalization changes the traditional business models in more or less all areas of daily life. Digitalization has completely restructured the traditional relationship between provider and customer. Customer behaviour has significantly changed due to digitalization (see Lefkes et al. 2017, p. 547-548). The new technologies put the customers in the position to purchase via completely new distribution channels, to carry out applications of any type, to get information of any kind etc. In the opinion of the experts this new freedom has led to a completely different customer behaviour because the demands have automatically risen and will continue to rise. In order to be able to recognize these behaviour patterns, new analysis tools have to be developed, which is to some extent a very big challenge for the software industry (see Guß 2015, p. 37).

4.4 Ubiquitous Computing

The IoT is regarded as being the perfect example for ubiquitous computing in the eyes of the experts. Terms like Connected Cars, Smart Home or Wearables symbolically stand for a linking of objects of the real world with those of the virtual world (see Heinemann 2017, p. 14). Internet giants such as Google are advocates of digitalization and are driven by the connectivity of arbitrary systems as well as by the transfer of data and information (see Rannenber 2015, p. 522). Ubiquitous computing is, according to experts, one of the absolute top trends resp. targets of the IT and software sector. Acc. to Heinemann (2017, p. 15) experts assume that in the next ten years all mobile terminals can be converted into real household control centers and therefore the vision of total interconnection could become reality. It is already possible to a certain extent to control certain household apparatus via app. such as TV, heating, lights or stereo sets (see Heinemann 2017, p. 14-15). In this dynamically changing environment and constantly increasing competitive pressure especially the software sector is confronted with a very big challenge. However, according to experts, an innovative development could be created with

the business model SaaS (Software-as-a-Service), to be able to realize ubiquitous computing (see Könsgen; Schaarschmidt 2016, p. 662).

5. Understanding and Evaluating Future Trends

Especially in the past years it has become very important to carefully watch the IT trends to be able to prepare oneself in time for possible new challenges. Furthermore, acc. to Friedrichsen and Kepser (2011, p. 38) it is also very important to take the right measures so as not to be taken in by a short-lived hype. Experts state that there can be a risk in the usual watching and evaluating of upcoming trends because it could possibly happen that some dynamic cross-relationships between various trends are not recognized and, therefore, a wrong decision could possibly be made (see Friedrichsen; Kepser 2011, p. 38). In this part of the thesis three important driving forces for trends shall be regarded, which, in the opinion of the experts have a mutual influence on each other.

5.1 Digital Business Models

Cloud Computing is one of the latest trend topics of the present because it has made a multitude of new innovative business models possible. Another very important trend topic are the social networks which have not only become a hype in the past years but also a business model with which even a profit of billions can be made. The best example for this is Facebook, which has in the meantime moved up to the top five of the most valuable brands with its business model. Besides Facebook there are meanwhile a large number of other social networks e.g. Google+, LinkedIn and XING. In order to enable social networks, Ubiquitous Computing, Mobile Computing or Big-Data architectures to run smoothly, they require an elastic resource structure like the Cloud. All business models mentioned are considered to be driving forces for Cloud Computing. Every participant in this segment has to watch each signal very carefully so as not to miss a possible trend. Practically all of the developments stated are, in the opinion of the experts, capable of improvement resp. expansion. In diagram 5-1 these are shown once again in a clear manner (see Friedrichsen; Kepser 2011, p. 38-40).

5.2 Approaches and Trends of Innovations, Developments of Business Models

„The world is changing distinctly faster than it is perceived by most of the protagonists: In 1999 the first digital cameras were made“ (Gassmann; Frankenberger 2016, p. 17). The company Kodak completely misjudged the situation at that time which led to the fact that the company not only missed the trend but was entirely pushed out of this sector due to digital photography. This is only one of many examples of what can happen if a company recognizes a trend, yet evaluates it wrongly (see Gassmann; Franken 2016, p. 17). On the other hand, two very successful examples are Amazon and Google – above all, as both of them are considered to be pacesetters for the innovative digital business models. Amazon as well as Google have not only managed to recognize beginning trends at an early stage, but also to evaluate them correctly. The result is two types of digital business models which now belong to the best and most expensive brands in the world (see Hotz; Fost 2017, p. 682-683).

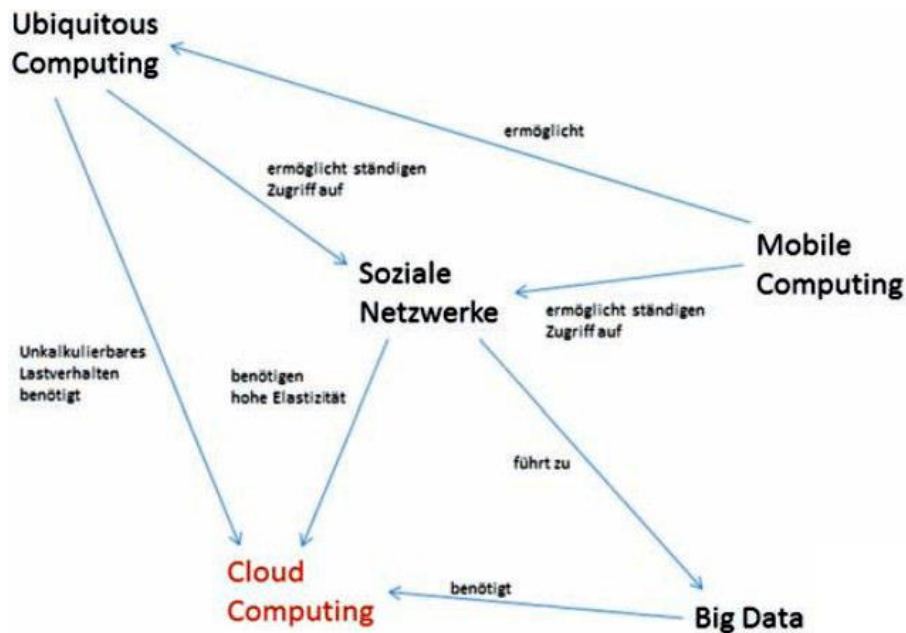


Figure 3. Overview of the most important driver for Cloud Computing

Source: Friedrichsen; Kesper 2011, p. 40

6. Result and Outlook

6.1 Summary

The topic of this thesis was how to recognize future trends in the software sector on time and how to evaluate them correctly. A respective trend research or futurology can help companies to recognize beginning changes at an early stage and enable them to react accordingly.

In the first part of this thesis the most important terms and basics were explained. Then, in the third chapter it was discussed what companies with innovative as well as sustainable ability possibly look like. The fourth chapter dealt with the challenges and strategies which software providers are faced with in times of digitalization. The fifth chapter looked at how future trends could be understood and evaluated in order to continue to exist successfully at medium resp. long term.

6.2 Outlook

A multitude of innovations and trends have drastically changed the economic world in the past years. Those software companies, which are able to recognize the signs of the digital world on time and interpret them correctly, will, in the opinion of the experts, be in the position to establish their products accordingly and distribute them. In the past digitalization presented itself as an obvious driving force for innovations and, if we can believe the experts, it will remain like this in coming years.

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