The
Open-Closed Spectrum

Challenging the Boundaries of Business Systems

Trend Report 2012

CENTER FOR DIGITAL TECHNOLOGY & MANAGEMENT

CDTM

The Open-Closed Spectrum

Trend Report 2012

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Benedikt Römer · Julian Sußmann (Editors)

The Open-Closed Spectrum

Trend Report 2012

Class 2012 Spring

Center for Digital Technology and Management

The Open Closed Spectrum. Trend Report 2012

Edited by: Benedikt Römer, Julian Sußmann
ISBN: 978-3-9815538-0-2

The Center for Digital Technology and Management (CDTM) is a joint institution of the Technische Universität München (TUM) and the Ludwig-Maximilians-Universität München (LMU). This report was created by CDTM students and is part of a project cooperation with SIEMENS Corporate Technology. The CDTM is part of the Elitenetzwerk Bayern.

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Preface of the Editors

"Everybody can learn from the past. Today it is important to learn from the future."

As Herman Kahn – one of the founding fathers of modern scenario planning – states it is tremendously important for strategy and policy makers to get a deep understanding of and to prepare for possible future developments.

In this preface we give an overview of the approach for the creation of future scenarios and the development of innovative product and service ideas, which was used to create this Trend Report. This approach was developed at the Center for Digital Technology and Management (CDTM) and was refined during the last ten years in more than 20 projects. The methodology aims on creating foresight studies related to information and communication technologies (ICT). It relies on a tight cooperation between industry partners and academia. Combining the creativity and impartiality of interdisciplinary participants from academia with the knowledge of corporations it provides long-term foresights and innovative ideas on how to expand the participating company's business and how to prepare for emerging challenges. Recent industry partners have been large corporations as, for instance, Siemens AG, Telekom Innovation Laboratories and BMW AG for topics ranging from Smart Grid Infrastructures and Ambient Assisted Living Technologies to Urban Mobility Concepts.

At the core of the futures study approach is the CDTM Trend Seminar. The Trend Seminar is a course with around 20 selected students of various disciplines, such as business administration, economics, computer science or electrical engineering that work on a relevant topic related to ICT. Before the Trend Seminar starts the topic is defined, broken down to smaller modules and structured together with the industry partner.

The Trend Seminar itself is an intense seven week fulltime university course format. During this course the participating students dive deep into the new topic, apply knowledge they bring from their main studies, extend it in extensive research, learn and apply new methodologies, conduct trend analyses, design future scenarios and develop business ideas for new products or services. The Trend Seminar is structured into three phases: Basic Phase, Scenario Phase and Ideation Phase.

In the Basic Phase the class is split into five teams that look at different aspects of the overall topic. Following the PESTLE approach the status quo and trends in the fields of technology, society, economy, politics, law, environment and business are analyzed. The literature research is complemented by a series of input talks of experts from the project partner or other organizations. In addition, teams present the key findings to each other to provide a holistic knowledge base to build upon in the following phases.

The following Scenario Phase starts with a two-day workshop. The participants work in four new teams to spread the gathered knowledge of the first

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phase throughout the teams. Within the workshop driving forces for the overall topic are identified and structured. Two key drivers are used to span a matrix of four different future scenarios, which are envisioned for around 15 years in the future. The scenarios as well as the possible timelines to these futures are already sketched within the workshop. Afterwards each team describes and writes down a vivid view of the life in one of the four scenarios in detail.

In the third phase, the Ideation Phase, participants are once more regrouped in new teams. Each team's topic is a different perspective of the overall topic. The goal is to develop possible business concepts, which are then tested against the previously developed scenarios. The phase starts with a two-day workshop to learn and apply ideation methods. This approach, which is based on patterns described by Jacob Goldenberg, Roni Horowitz, Amnon Levav and David Mazursky, is a very structured way to develop new products or services. At the end of the workshop each team has a broad set of ideas as a starting point for their concept development. A selection of these ideas are then combined and further developed into detailed business concepts. The concepts are described using the approach of business model generation, which was developed by Osterwalder and Pigneur. At the end of the seminar, the concepts are presented to the project partner and guests.

After this short introduction of the CDTM futures study methodology, we want to thank several persons, who made this CDTM Trend Report possible: We thank Silke Sasano and Ulf Pillkahn of our project partner Siemens AG, who helped to define the topic and scope of the project, gave interesting kickoff talks and coordinated the contact to experts within their organization throughout the whole project. We thank Felix von Held, Felix Werle and Julia Butter for their support in the Scenario and Ideation Phase. Their experience and motivation is always leading to an enjoyable workshop atmosphere and excellent workshop results. Especially, we want to thank all students of the CDTM class of spring 2012, who put a lot of energy and enthusiasm in this project and by that made it a pleasure for us to supervise the course and coach the individual teams. We wish all readers exciting light bulb moments and inspiring thoughts about the future development of business systems' boundaries, which might open up or close done and by that change they way we will work in the future.

Benedikt Römer and Julian Sußmann
Center for Digital Technology and Management

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Preface

The world is constantly changing. Never before have had these changes happened at such a breakneck pace. Our environment is getting more and more complex. Knowledge is increasing exponentially; the amount of information acquired doubles in a very short time. This development causes changes as well as risks, dangers and new opportunities.

The question is, how does one react to all these new trends and changes? Do we have a clear overview of all possible consequences? Do we run the risk of being taken by surprise by unexpected developments? Which changes are really relevant to our type of business? What new chances do we see and what is of vital importance, what is irrelevant or unimportant?

With *Trend Monitoring* exists an instrument for scanning and monitoring the environment of the enterprise permanently. The stream of information is filtered and structured in such a way that a list of so called future elements describe the changing world. All these elements w put together in the Siemens Trend Box. This innovative tool will help anyone concerned with trying to anticipate the challenges facing Siemens today and tomorrow. Conceived and designed by Siemens Corporate Technology, this box holds Trend Cards, each featuring a key topic. They can be used for exploring the environment, developing business strategies, brainstorming, educating, or simply thinking creatively and holistically.

Based on those findings one Next-Big-Thing per year is identified. *'The-Next-Big-Thing'* is a concept that explores in great detail a topic that might be of great interest in the near future and might have a huge impact on the business of the enterprise. Selection criterions for The-Next-Big-Thing are besides others relevance, impact, potential of change and likelihood.

For 2012 the topic that was identified as The-Next-Big-Thing is *'Shift in the Open-Closed-Spectrum'*. It addresses the changing boundaries between closed – in the sense of controllable – and open system elements, that are more or less not controllable.

The traditional way of business is innovation, development and production in a more or less closed – in terms of confidential and hidden from external views – environment. Now we experience a tendency towards opening the ivory tower and connect with partners, other researchers, with customers and even talking to competitors is now an option in more fields, than we already do. We expect

- new ways of collaboration among all stakeholders

- new value streams and business models

- and a turbulent dynamic and changing players in our eco systems.

Open Innovation and Open Source (software) are popular examples, that show, that the tendency of opening the value chain – or parts of it – could change

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industries: how they produce, how they cooperate and how they make money. The underlying question for the Trend Report 2012 is to what extend could the shift from closed towards open influence...

- ... the manufacturing side of industry?

- ... the healthcare or the education system?

- ... infrastructures & cities?

Identifying new developments is just one stepping stone. Analyzing, the implications for "future readiness" is another. And here Siemens and CDTM found each other in a perfect match. Within this trend student teams analyzed new developments within "The-Next-Big-Thing"- concepts with Siemens as their industrial partner and sponsor. The first part of this report consists of a basic analysis of trends regarding technology, market, society and customer needs, the political and legal framework as well as emerging business models. In providing results from Trend Monitoring Siemens tried to practice the new way of 'Open' – with great success as the Trend Report shows. The second part of the report provides an outlook on the future and analyzes the identified drivers for future developments. As a result, possible business solutions in various future scenarios are deduced and analyzed for business feasibility.

Throughout the process the student groups were guided and coached by the CDTM program coordinators Julian Sussmann and Benedikt Römer. On Siemens side the project was coordinated by Dr. Ulf Pillkahn and Silke Sasano (both from Siemens Corporate Technology). We, on behalf of Siemens Trend Monitoring, want to thank the students for their tremendous work throughout the program and ultimately resulting in this Trend Report. We have been deeply impressed by the creativity, professionalism and determination of each student group. The results clearly have the potential to serve as a basis for real life applications in the field of urban mobility. Of course we also want to thank the program coordinators Julian Sussmann and Benedikt Römer for a perfect and very enjoyable collaboration that needs to be repeated.

With warm regards,
Dr. Ulf Pillkahn and Silke Sasano from Trend Monitoring,
Siemens AG, Corporate Technology
Berlin, Spring 2012
For more information about the CDTM and its related projects,
please visit http://www.cdtm.de

The entire trend report was written by CDTM students under the close guidance of research assistants in 2012. The papers compiled here do not claim to be scientifically accurate in every case; they are rather meant to give a structured and broad overview of trends relevant in the smart grid context.

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Contents

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

Short Version - Only Abstracts

List of Figures

Short Version - Only Abstracts

Short Version - Only Abstracts

List of Tables

Nomenclature

AES	Advanced Encryption Standard
API	Application Programming Interface
APP	Application
AR	Augmented Reality
CS	Crowd Sourcing
E-Cars	Electronic Cars
EHR	Electronic Health Records
E-Mobility	Electronic Mobility
GSM	Global System for Mobile Communications
HDD	Hard Disk Drive
HTTP	Hypertext Transfer Protocol
IC	Integrated circuits
ICT	Information and Communication Technology
IP	Internet Protocol
IPv4	Internet Protocol Version 4
LTE	Long Term Evolution
M2M	Machine-to-Machine
NFC	Near Field Communication
NIH	Not-Invented-Here
NSH	Not-Sold-Here
ODF	Open Document Format for Office Applications
OSS	Open Source System / Open Source Software
QR Code	Quick Response Code
REST	Representational state transfer
SDK	Software Development Kit

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SOAP	Simple Object Access Protocol Telematics Combination of Telecommunication and Information Technologies
UCC	Unified Collaboration and Communication
VDE	Association for Electrical, Electronic & Information Technologies
VPN	Virtual Private Network
W3C	World Wide Web Consortium
WSDL	Web Services Description Language
WSN	Wireless Sensor Networks
WWW	World Wide Web

Short Version - Only Abstracts

Part I

Trends

1

Information and Communication Technology Trends

Elias Atahi, Valeria Cortez Vaca Diez, Daniel Hugenroth, Nikolaus Neuerburg, Jonas Timmermann

Executive Summary

New open standards and interfaces enable interoperability among heterogeneous systems. Especially the aggregation and combination of data from different sources is necessary in order to take advantage of the increasing amount of information. Moreover, the large networking demand requires interdevice communication standards and basic technologies to enable more and new types of devices to participate in the Internet.

Near Field Communication (NFC) and Augmented Reality (AR) are being implemented to satisfy the demand of easy accessible information and frictionless interaction. Reduction in size, weight, power consumption and cost of sensors will allow their mass adoption and use of sensor networks to face new challenges. Similarly, a new era of mobility has been marked with the establishment of smartphones and tablets, also opening up new markets like application stores. Decentralized virtual currencies based on cryptography liberate users from current money systems.

Personal data is also an important commodity for future business. However, this aspect challenges software providers to pay attention on privacy protection

and forcing them to tackle security issues more seriously. Consequently, technologies enhancing privacy will give users more control over their own data and so causing to close interfaces. Recommendation and personalization services help to choose relevant information, but might result in undesired consequences.

Decentralized computational resources are being migrated to the cloud, making security an important aspect. Moreover, the integration of social media and other web based applications into existing systems lets users work directly in a central platform. This will impact the design of future working spaces and artifacts as well as the way people interact with each other.

2

Chapter 2

Trends in Society & Business Systems

Andrea Dreković, Philipp Englisch, Lirike Neziraj, Nils Ziehn

Executive Summary

Society and business systems have strong impacts on the open-closed spectrum and thus lead to major changes within the next five years. Currently there are different degrees of openness regarding various aspects of the society, the modern working environment and inter corporational aspects. In general, there are always some open and some closed properties to each one of the depicted current conditions. Looking into future developments, the meaning of the social consumer, the integration of external resources, education and talent management are considered as outstanding examples. Summarizing, there is a tendency to extent the degree of openness in most of the reviewed aspects. Closing, the society and business systems today already meet concerns of openness and will further pursue them. Otherwise, there is also some minor leaning towards closing some aspects of society and business systems due to the dimension of complexity, for example regarding recruitment.

3 Chapter 3
Political & Legal Trends

Jonas Hess, Caroline Meder, Carl Pfeiffer, Sebastian Wagner

Executive Summary

Recent years showed the existence of a strong coherence between changes in political and legal systems and shifts in the open-closed spectrum. A significant positive example of this correlation is the establishment of the Single European Market, currently the largest market in the world. The increase of transparency in European lobbyism due to targeted EU measures and non-governmental initiatives also shows the beneficial effects of mechanisms instrumented to open up systems.

Changes in political and legal policies either emerge as a response to current trends or, in reverse, force trends to react or both. This duality occurs in the case of diverging trends in Intellectual Property (IP) rights: Increasingly strict international protection legislations coexist with a growing acceptance of software patenting, which will likely pose a barrier to innovation in the future.

Moreover, increasing cyber attacks demand more sophisticated security measures and trigger demands for stronger privacy policies. Another key trend that substantially impacts the open-closed spectrum is eGovernment, which not only enables greater possibilities of citizen participation, but also enhances communication between governments and citizens. However, not all governmental actions result in immediate positive effects. Although numerous legislative measures have been agreed upon to tackle the tensions in the financial system, markets resist absorbing the laws intended to stabilize them.

4

Chapter 4

Business Trends - Media and Health

Konradin Breyer, Saksham Gautam, Thomas Knauer, Thomas Prischenk, Alysa Reuter

Executive Summary

The recent and upcoming shifts on the open-closed spectrum are having a significant impact on business models in the media and health industry.

Digitalization has radically opened up the media landscape and the increase of user-generated content is challenging established business models. The "freemium" business model, is an important revenue generator in this environment but has the tendency to lock users into a closed system. Consumers will obtain even more influence as media companies will collaborate with them in further fields of the value ecology. This will transform media rather into a dialogue than content broadcasting. Crowd-funding will open up the financial side of professional media creation. In the future, current online and social media marketing activities will be supported by advertisement campaigns that interact with users. Micropayment systems will give rise to P2P-transactions and make it possible to charge for low-valued digital content.

Online health and social media platforms make medical knowledge publicly accessible and enable patients to rate received health care and its providers, while some offer health record storage solutions. The use of telemedical applications is progressing in order to provide cost-effective treatments and overcoming distance barriers. For this, Home Health Monitoring, remote observation of

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health indicators, is opening up the traditional patient-doctor relationships to third-party service providers. Solutions using online tools to consult patients in rural areas, so called eVisits, show potential for cost savings while geographic boundaries are diminished. The lack of standardization in the field of eHealth systems urges the European Union and many other stakeholders to set up guidelines to ensure interoperability of solutions. Furthermore, a transnational approach supports collaboration in research and in healthcare environments.

5

Chapter 5

Business Trends - Energy and Manufacturing

Alexander Binzer, Fabian Gerlinghaus, Martin Kramer, Sabrina
Schewtschenko, Lars Stäbe

Executive Summary

The energy and the manufacturing industry are constantly shaped by emerging
new business models. Companies have to adapt to new structures which
influence their relationship to their eco-system in order to stay competitive in
their changing market environment. Market players have to carefully decide
to which extent and in which way they collaborate with external partners and
consumers.

The energy sector is revolutionized by the increased employment of renewable
energy. Clean and decentralized solutions diminish the oligopolistic power of
the former four market leaders in Germany, since energy production becomes
feasible for many new entrants. Consumers become prosumers who do not only
use but also generate energy. The liberalization of the energy market makes
high demands on the grid infrastructure and the development of energy storage
systems. A high level of communication and interaction between the different
market players becomes essential.

In the manufacturing industry, flexible production systems allow individual
products. Companies can reduce their costs significantly and better serve
their customer needs by using Co-Creation and Open Innovation instead of

traditional in-house development. Hence, manufacturing companies loosen their tight control over parts of their supply chain in order to profit from external input.

Part II

Scenario Planning

6 Chapter 6
Scenario Planning

6.1 Introduction

Based on the identification of future trends relating to the open-closed spectrum, the aim of this chapter is to create a framework in order to challenge potential product and business ideas. Given today's volatile business environment and a long planning horizon of 2025, the future gets less predictable. To account for this, the scenario planning methodology is used.

The Scenario Planning Methodology

First used as a tool for military operations, scenario planning today is commonly utilized by strategic decision makers across different industries. The methodology provides tools to anticipate the important external dynamics that will shape the future. These dynamics include aspects of the future that are likely to persist as well as uncertain ones who together form the input for the scenarios. Scenarios are plausible, relevant and challenging stories about the future. Whereas forecasts aim to predict one definite future, scenario planning creates several equally plausible futures. Good scenarios explore the possible, not just the probable, realities and challenge their audience to alternative views of the future. Products, ideas or organization's strategies can now be tested for robustness in all the plausible scenarios. Blind spots and incorrect assumptions can be reduced and new fields of opportunity can be created.

The Approach Used in this Report

Applying the methodology for the report was done in a workshop with experts in the field of scenario planning. The process of deriving scenarios consists of three steps. First relevant drivers had to be found. These drivers are the input for

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the further scenarios and describe how possible futures might play out. After a comprehensive environmental analysis of the past ten years, the team collected ten drivers relevant for the open-closed spectrum covering the sociological, technological, economical, environmental and political framework (STEEP). Each driver is described by a bipolar outcome, which defines the two directions it can develop towards. Second, the drivers are analyzed regarding their relevance for future scenarios. Their relevance is determined by the impact a driver has on the topic of the open-closed spectrum and the degree of uncertainty of the future development. Whereas drivers with a high degree of impact and a high degree of certainty are included in every scenario, the most uncertain drivers with a high impact are used to derive the different scenarios. Therefore the team rated and mapped every driver according to the Impact-Uncertainty-Matrix, see figure 6.1. Third, after the ranking, the two drivers with the highest level of impact and uncertainty have been classified as key drivers: Resources and the Concept of Ownership. By the combination of the bipolar outcomes of each key driver, the four scenario topics were deduced. In the following, teams were committed to each scenario in order to develop a clear picture of the respective scenario. The plausibility of each scenario was backed by the development of an individual timeline for each scenario starting from 2013 to the year 2025. The timelines introduce relevant events and their causal linking that lead to the scenarios in 2025. To generate a vivid and miscellaneous picture of the various futures the groups formulated news headlines and designed snapshots. In presentations and discussions the audience challenged the mental models of the scenarios and the teams had the opportunity to test and verify their interpretations and thoughts. Following the workshops the scenarios have been further developed and detailed.

Structure of this Chapter

The scenario-planning chapter aims to describe the influence of drivers on the open-closed topic and gives a holistic description of the considered scenarios. First in section 6.2 the relevant drivers will be introduced. The drivers are divided into the key drivers (6.2.1), having the highest uncertainty and impact, and the additional drivers (6.2.2). Each driver is depicted by a general description and the specific implications of both possible outcomes.

Following the examination of the drivers, the four scenarios are presented in section 6.3. The first scenario "A World of Collaborative Prosumers" in section 6.3.1 describes a future of decentralized resources and a shared concept of ownership, followed by the scenario "Back to Big" in section 6.3.2. Third the "The United States of Europe" scenario (6.3.3) is portrayed, which is antithetic to the first scenario as its future is described as one of centralized resources and a restricted concept of ownership. Subsequently, the chapter concludes with a presentation of the "Selfish Collaboration" scenario (6.3.4). As well as scenario

Short Version - Only Abstracts

II, it is also a hybrid between scenario I and III.

For each section, the future state will be illustrated by a distinct description. To give a significant presentation of life in the year 2025 in each scenario, several characters have been conceived. A journey through their daily lives gives the reader a vivid impression of what life will look like. For a deeper understanding of how the future states have evolved, a timeline will be provided and explained for each scenario, describing the causal linking of events from 2013 to 2025. At the end of each scenario, signposts are specified and described. Signposts describe events or developments, which indicate that a scenario may become relevant under certain conditions. They therefore have a high practical relevance to determine if the environmental state is shifting towards a specific scenario and which implications that might have for the future.

6.2 Driver Analysis

To picture the world's development as well as key aspects for the open-closed spectrum during the upcoming years, an understanding of the drivers of change is vital. Drivers are forces that considerably shape the future by developing in one direction or another and hereby significantly influence the manifestation of the open-closed spectrum.

The probability of the outcome in either way is not necessarily equal, however, the evolution is not foreseeable. Political, environmental and social occurrences determine the respective course. Notably, the drivers are not necessarily independent, meaning that the development of a certain driver can impact that of another. In this section, twelve drivers are distinguished and ranked by their uncertainty and impact on the spectrum in figure 6.1. Resources and the concept of ownership are the key drivers, as they entail the highest uncertainty and have the largest impact on the spectrum. The combination of these two and their bidirectional outcomes lead to four completely different future worlds.

6.2.1 Key Drivers

The course of development of a broad spectrum of factors determines which scenario will occour. In the following section, the two most influential drivers, concept of ownership and resources, are elaborated.

6.2.1.1 Concept of Ownership

The things you own end up owning you.

- from the movie Fight Club (1999) IMDB [572]

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Part III

Ideation

7

Chapter 7

Sustainable Cities

Daniel Hugenroth, Caroline Meder, Carl Pfeiffer, Jonas Timmermann, Nils Ziehn

Executive Summary

Swoosh is a 24/7, citywide delivery system that brings courier service to the masses. It features affordable, convenient and reliable transportation of goods for both individual and business clients. The fast and time-definite service allows pick-up as well as drop-off at all metro stations and even provides to-door delivery through its state-of-the art pipeline system in the later stages.

Individuals use Swoosh to send shopping purchases, carry-ons and further goods. Businesses and other institutions implement it to substitute higher-priced courier service and can expand their offering by providing home delivery. The possible transferable size ranges from small packages to euro pallets and each customer group either pays per shipment or obtains a volume subscription.

Initially, Swoosh primarily utilizes the existing metro system as a basis for the logistics service. Swoosh's wagons are coupled to metro trains and while the passengers disembark, a freight-handling system in an area adjacent to the metro platform automatically transships the freight. In later stages of development, depending on the demand within the respective city, the extent of over- or underground pipes that directly connect buildings to the grid can be successively expanded. Transportation from doorstep to doorstep can be realized in the final state of penetration.

The success of Swoosh highly depends on strong partnerships. Metro operators rent out transfer as well as storage space and toe the wagons. Cooperations with

municipalities serve the expansion and possibly subsidize the service. Industry partners manufacture the infrastructure and technological solutions; IT partners develop systems to control the flow of goods and customer tools for the use of Swoosh.

7.1 Introduction

In light of urbanization and the expansion of city structures, governments already face the daunting task of ensuring the attractiveness and sustainability of cities. Urban population, especially in many Asian metropolises, is expected to grow significantly. As more and more people join the middle class and mass consumption reaches a staggering level, environmental challenges are probable to continue to pose a massive threat to societal welfare. These problems are particularly apparent in densely populated areas where cars congest motorways and emissions are far above a viable level. Especially congestion and pollution display a central hurdle towards a satisfactory quality of life in cities. While various parties are developing technological solutions and legislature to target these issues, no comprehensive solutions have been realized.

Metropolitan centers must consequently modernize their infrastructure and remove bottlenecks to move towards a more robust environment. The logistics industry plays an increasingly significant role in dealing with the aforementioned challenges. Moreover, the demand for logistics services is expected to rise steeply within the future due to the higher global population and trade. It is thus vital for logistics service providers to test alternative transport solutions and to work continuously to improve supply chain efficiency. Highly effective traffic concepts, including off-street cargo transport, can especially reduce congestion and help to cut carbon emissions. Innovative and at times radical business models are necessary to address these demanding undertakings and, if they are successfully developed and implemented, are likely to shape sustainable cities of tomorrow.

7.2 Business Idea: Swoosh

Swoosh is a delivery system that offers low-priced transport of goods from and to metro stations as well as key building located within a specific city. It allows individual, business and other institutional clients to conveniently and reliably send shipments up to the size of euro pallets 24/7.

During the first stage of development, Swoosh relies on the metro system as the infrastructure backbone of its service. Specially equipped wagons are attached to the metro trains and that an automated freight-handing system in an area adjacent to the passenger platform (un-)loads the packages. In the next stage, depending on the city infrastructure, over- or undergroud pipelines are installed to directly connect significant buildings to the grid. The third stage of

8 Chapter 8
senseMi

Elias Atahi, Philipp Englisch, Thomas Knauer, Martin Kramer, Alysa Reuter

Executive Summary

senseMi is a holistic medical health solution that helps people to live healthier. An implanted chip measures and stores the key parameters of an individual's health state and automatically advises on possibilities to improve it. The self-treatment service is rounded of through professional medical assistance and a community to exchange experiences and knowledge.

Customers of senseMi are senseMi users that are wearing the chip and senseMi medical professionals assisting the senseMi users. The users are professional athletes, elderly, chronically diseased and highly health-conscious individuals. The medicals are doctors, hospitals and emergency services. Delivered values for senseMi users are real-time monitoring of individual health status, immediate information on individually selected parameters, maximum first-aid efficiency in emergency cases. senseMi uses different marketing channels in order to address all customer groups efficiently. Users purchase senseMi via a certified senseMi doctor who also consults them. In order to satisfy customers, dedicated personal assistance and incentives for certified senseMi medicals are provided. Two communities, one for medicals and one for the senseMi users give them the opportunity to share experiences and knowledge. Revenue for senseMi is generated through the certification of doctors, subscription fees for senseMi software in hospitals, senseMi chip sale and provisions through third-party applications and devices sold in the senseMi world. In order to incorporate all technologies and competences required and reduce overall expenses as well as

increase incoming revenues, senseMi has several key partners in the areas of energy harvesting and biocompatibility solutions, medicals as external marketers, health insurance partners and governments. In regard of the scenario robustness check, senseMi is strongly relying on a shared concept of ownership and thus the scenarios "Back to Big" and even more "A World of Collaborative Prosumers" offer the best chances for senseMi to be successful.

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9 Chapter 9
Manufacturing Industry

Alexander Binzer, Fabian Gerlinghaus, Nikolaus Neuerburg, Sabrina Schewtschenko

Executive Summary

The business model described in this chapter is based on the rapid development of 3D printing technologies. RepliGate provides an all-round solution for 3D printing, thereby making the technology available to everyone. 3D printers with 3D scanning functionality and cartridges containing the printing materials are sold to households. With the scanner 3D models of real objects are created. The printer can be used to print 3D models created with the scanner or those available on the RepliGate online shop. If a 3D model is too complex to be printed out with the 3D printer at home, it can be ordered at the online platform. RepliGate will print and ship the model. Furthermore co-creation tools are offered that allow the development of new 3D models in teams and to build up a user community. Target customers are wealthy end users with a high need for customization. RepliGate offers developers of 3D models a huge market and advertisement for their products. Revenue is generated by selling printer hardware and cartridges as well as by deducting a share of all sold 3D models. Key activities are hardware manufacturing, software development and protection of intellectual property. With scenario specific modifications, the business model is applicable to all four scenarios, described in the previous chapters. A success of businesses like RepliGate could lead to a reorganization of large parts of the manufacturing industry.

10

Chapter 10

Human Resources and Work-Life Balance

Valeria Cortez Vaca Diez, Andrea Dreković, Lars Stäbe, Sebastian Wagner

Executive Summary

In the following section, a business model within the topic of human resources and work-life balance is presented. Based on the need to align family life and a professional career, home offices and flexible working schemes gain importance. Furthermore, global cooperation and communication on complex projects is mandatory. Both aspects are taken into consideration by the business model of 2gather, a communication and collaboration solution accessible from everywhere.

First, the business model of 2gather is analyzed from different viewpoints. Afterwards, a business description is given. The customer segments are described, followed by the value proposition, the used customer channels and the customer relationships. In addition, the revenue streams are depicted. Then, the key resources, key activities, key partners and cost structure of the 2gather project are specified. Second, the robustness of the business model will be tested in all four scenarios: "A World of Collaborative Prosumers", "Back to Big", "The United States of Europe" and "Selfish Collaboration". 2gather is analyzed regarding challenges and opportunities that occur in those scenarios.

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11

Chapter 11

Lifelong Learning

Konradin Breyer, Saksham Gautam, Jonas Hess, Lirike Neziraj,
Thomas Prischenk

11.1 Executive Summary

Edugate strives to become the starting and finishing point for every educational
endeavor. It is an online platform that aggregates and structures open edu-
cational resources and provides rich social and crowd-sourcing functionalities,
creating a campus-like feeling and enhancing the learning experience online.
Edugate offers services that are tailored to the particular needs of individual
learners, universities and corporations. The users benefit from a well thought
through structure, a large education community and a smart recommendation
system. Higher educational institutions can outsource courses and exams via
Edugate, offering their students flexibility in terms of time and location. Finally,
companies can create closed educational spaces for training their employees more
efficiently. Especially in developing countries where access to higher education is
often not feasible due to financial reasons and geographical remoteness, Edugate
provides sophisticated channels for cost-efficient and convenient distance learn-
ing. Due to the fact that Edugate is not creating any educational resources
itself, the business model of the online platform promises a well-balanced cost
structure and high revenue streams. Based on comprehensive user profiles,
corporations can use Edugate to find and recruit learners that precisely meet
their requirements, which increasingly gains importance considering the war
for talents. Edugate aims at delivering the standard certification for skills and
knowledge acquired through online education, enabling users from all over the

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world to prove their achievements to potential employers. Lastly, the scenario robustness check shows that a shared concept of ownership is a major prerequisite for Edugate's business model, independent of centralization of resources.

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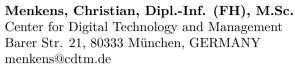Barer Str. 21, 80333 München, GERMANY
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