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TOWARDS SUSTAINABLE INNOVATION

A five step approach to sustainable change

Tectum

Sven Pastoors, Ulrich Scholz, Joachim H. Becker, Rob van Dun

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INTRODUCTION

Sven Pastoors

Summary

This chapter provides a brief outline of the subject and the book's content. The terms sustainability and innovation should not be considered separately, not only when talking about sustainable innovation. They are closely linked to one another. The main goal of sustainable innovations is to develop new products and technologies that have a positive impact on the company's triple-bottom-line. Thus, they have to be ecologically and economically beneficial as well as socially balanced. Thereby, they are strengthening a company´s market position. In doing so, companies focus their activities on the one hand on technological and innovative developments and, on the other hand on the wishes, expectations and problems of their customers.

Nevertheless, almost half of all the research and development work results in products, which will never reach the market. Companies spend a large amount of time and money on developing new products, based on both their experience and knowledge of the market. Yet, they often find it difficult to understand that their products and

their applications need to be adapted to customer needs. They fail because their products are designed in an excessively complicated manner or are not developed to meet the requirements of the customers.

This book aims to help companies to generate sustainable innovations successfully. In doing so, the structure of the book is based on six possible phases of a sustainable innovation process: Awareness, Problem identification, Ideation, Incubation, Implementation and marketing.

Sustainability and innovation

"*We can't solve problems by using the same kind of thinking we used when we created them.*" (Albert Einstein)

The terms sustainability and innovation should not be considered separately. They are closely interlinked with one another. The main goal of sustainable innovations[1] is to develop new products and technologies that have a positive impact on the company's triple-bottom-line. Thus, they have to be ecologically and economically beneficial as well as socially balanced. Thereby, they are strengthening a company´s market position. In doing so, companies focus their marketing activities on the one hand on technological and innovative developments and, on the other hand on the wishes, expectations and problems of their customers. Basically, three different starting positions are possible:

- There are already other existing products, which might solve an existing problem. By means of market research it is investigated

1 Sustainable innovation couples the protection of natural systems with the notion of business innovation while delivering essential goods and services that serve social goals of human health, equity, and environmental justice.

whether and how the existing customer requirements and problems can be solved better, easier or less expensively with the aid of new approaches (continuous improvement process).

- There is no alternative available on the market yet: the market does not indicate a need, but there possibly is a desire. In this case, customer problems are checked and evaluated whether those could be solved by applying the new technology. and how a demand for the product could be generated (real innovation).

- All solutions to an existing problem are very expensive and centralized (e.g. when main frame computers solved math equations or obtaining medical care at an hospital). Therefore, the solution is only accessible for a relatively small number of customers. There is a need to make this technology far more accessible and affordable (disruptive innovation).

The market technology dilemma describes the contrast between requirements and wishes of customers on the one hand, and the technological possibilities on the other. Not everything customers want is technically possible or morally desirable. As a consequence, new technological developments must first be adapted to the wishes of the customers or new needs must be created. This is particularly true when it comes to innovations. A mere six per cent of all new products manage to become permanently established on the market (Vahs/Burmeister 2005, p. 25).

Almost half of all the research and development work results in products, which will never reach the market. Companies spend a large amount of time and money developing new products, based on both their experience and knowledge of the market. Yet, they often find it difficult to understand that their products and their applications need to be adapted to customer needs. They fail because their products are designed in an excessively complicated manner or are not developed to meet the requirements of the customers. This is es-

pecially the case for high-tech innovations, as the innovators deem to believe that more sophistication equals more value for their customers, whereas this typically is not the case. Contrarily to popular believe, innovation is not carried out by genius scientists in a lab that have breakthrough ideas that change the world, but is rather perceptive, requiring the innovator to understand the problems of the customers, the ways to reach the market and an idea of what value truly is for its users.

The success of a product is strongly dependent on the willingness of the users/customers to provide information. Companies learn what is wanted and required directly from their end-customers and local retailers. This information should subsequently be incorporated into the product development.

Therefore, companies and customers must look to the future together in order to find out which problems should be solved. In doing so, they need to take into consideration that all customers are different and that each one of them has specific requirements. However, they are all connected by the desire to solve their problems with the aid of new technologies. This not only means that products should be developed to be more focused on the customer, but also that high-quality technical products should be developed flexibly in order to be able to fulfil a wide range of customer wishes.

Innovations and new product ideas should be communicated to the market at an early stage, as the customer initially should be convinced of the value of the new products. Customers do not buy innovative products merely because they are new. Novelty alone is not a selling point. The majority of customers are rather critical regarding new technologies. The balance is quite delicate, as products or services should not be considered to be too radically different so that potential customers don't see its uses, whilst they should provide more utility than previous alternatives. In the first place, the potential buyer should be made aware of the crucial advantages of the respective

product. Thus, it is important to increase the range of use of new products in order to create acceptance as early as possible. Therefore, right from the start, marketing activities should receive equal consideration within the development process. Furthermore, innovations should be communicated in a stronger value-oriented manner.

Structure of this book

This book consists of two major parts. The first section (chapter 1-8) comprises eight chapters which cover all basic information relating to sustainable innovation. First of all, the need for sustainable innovation and the concept of sustainability are explained in the initial two chapters (chapter 1 Sustainability and chapter 2 Corporate sustainability). Sustainability describes the ability of a community, organisation or a company to operate in such a way that they also have the capacity to endure into the future. This applies not only for every individual and every company, but also for humanity as a whole. On the long run, the global community cannot live at the expense of future generations. This also includes individual communities not being allowed to consume in such a way that they burden people in other regions of the world.

In the following two chapters the process of innovation and creation of sustainable products is demonstrated (chapter 3 Innovation and chapter 4 Systematic Innovation). These chapters focus on entrepreneurial management and innovation strategies.

Besides a fitting strategy companies need an appropriate culture and suitable systems in order to innovate successfully. Innovation requires internal change, or the willingness of a firm to do so. Companies that want or need to innovate, need to foster innovation. That means to nurture or cherish innovation within the business environment. Finally, the first part of the book is completed by a case study about the invention of the IPod.

In the second part of the book (chapter 9-15) the five-step-approach towards sustainable innovation will be explained. This process starts with creating awareness for a specific sustainable challenge. Relatively often, problems have had an impact for some time before they are recognised or brought to the attention of someone who can do something about them. When a company becomes aware of a problem it often has no idea what it is about and how to solve it. As there is no answer to the problem yet, a creative solution has to be found. When a person encounters a problem, the natural tendency is to immediately propose possible solutions. Consequently, the thought and discussion focuses on the merits and problems of proposed solution(s), rather than an in-depth discussion of possible causes of the problem itself. Thus, in chapter 9 different techniques how to define a problem will be introduced.

One important step to understand a problem is the identification and definition of the customers' needs and wishes (chapter 10 Customer Insights).

After a company identified and understood the problem, a solution has to be found. One way to do so is creative problem solving. The term problem solving describes the process of working through the details of a problem in order to reach a solution for each kind of problem, including sustainability issues. Besides logical or systematic thinking, problem solving may require creative skills. Thus, the following chapters focuses on the generation of new ideas, which are needed to create new products and services (chapter 11 Ideation), and the selection of the best ideas to solve the problem (chapter 12 Idea evaluation).

The improvement of the new ideas or products takes place via quality and environmental management (chapter 13)[2], or through new approaches, such as Cradle-to-Cradle (C2C/chapter 14). C2C is an

2 The starting point environmental management is the critical examination of the life cycle assessment (LCA), an analysis of the environmental impact of products throughout the entire lifecycle.

innovative, positive and integral approach to sustainability, which is not based on reduction, but rather on unlimited reuse of raw materials. In contrast, life-cycle assessment is used to assess the possible impacts of a product, procedure or activity on the environment during the course of its life (life-cycle). Subsequently, a marketing strategy is developed, which takes the ecological and social aspects into consideration. Green marketing allows a new, ever-increasing customer group to be addressed, the 'LOHAS' (chapter 15).

In doing so, the structure of the book is based on five possible phases of a sustainable innovation process:

- **Awareness of a problem**: Prior to the start of the innovation process all parties involved have to become aware of an existing problem.
- **Identification & Definition of the problem**: After recognizing a problem the stakeholder has to define the problem as accurately as possible. Very often, a company can only overcome the challenges that arise with changes in the framework conditions by means of innovations. Innovative ideas can only take hold, however, if the market accepts them. Therefore, a company has to understand its customers.
- **Ideation & Evaluation of the solutions**: Ideation is the creative process of generating, developing and communicating new ideas to solve the defined problem.
- **Testing & Enrichment of the solutions**: Companies follow philosophies like Cradle-to-Cradle or management systems like corporate social responsibility (CSR) or lifecycle assessment (LCA) to ensure lasting success of sustainable products.
- **Implementation & Marketing of the solutions**: Ending and starting point of a sustainable innovation process is the so called green marketing.

CHAPTER 1: INTRODUCTION TO THE CONCEPT OF SUSTAINABILITY

Sven Pastoors

Summary

"We are living beyond our means" – a striking statement made by the press as well as leading scientists! For a good 50 years, both scientists and companies have been growing increasingly aware that we are living beyond our means and are exhausting our natural resources. We are removing more from nature than can be replenished naturally.

Sustainability is a concept that seeks to tackle this problem. It describes the ability of a community, organisation or a company to operate in such a way that they also have the capacity to endure into the future. This does not only apply to every individual and every company, but also for humanity as a whole. In the long-term, the global community cannot live at the expense of future generations. This also includes individual communities not being allowed to consume in such a way that they burden people in other regions of the world.

Sustainability is a cross-sectional task, because it affects all the areas of our lives. Its implementation is a global challenge. Due to globalisation, the social, economic and ecological consequences can be felt worldwide. Environmental and development problems cannot be solved by one country alone; rather they must be solved together in close collaboration.

1.1 The concept of sustainability

"Sustainable development satisfies the needs of the present generation, without endangering the possibilities of future generations to meet their own needs."[3] Since 1987, this United Nations definition has characterised the discussion about the terms sustainability and sustainable development. Sustainability[4] describes the ability of a community, organisation or a company to operate in such a way that they also have the capacity to endure into the future. This does not only apply to every individual and every company, but also for humanity as a whole. In the long-term, the current global community cannot live at the expense of future generations. This also includes individual communities not being allowed to consume in such a way that they burden people in other regions of the world.

Even though the first calls for the sustainable use of the natural resources were already made in antiquity, the efficient use of natural resources did not play a role for a long time (Rogall 2012, p. 29-31). The term "sustainability" itself derives initially from the forestry sector in the 18th century.[5]

3 "Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." United Nations, 1987, p. 34.

4 Here, sustainable development and balance between the economy, community and organisation is meant.

5 "Fell only as much wood as the forest can endure! As much wood, as can regrow!" (von Carlowitz, H.-K., 1713)

The discussion about sustainable development originates from the global economic crisis of the 1970s. This crisis made it clear that we are endangering our own livelihood through the exploitation of natural resources. Today, sustainability is an economic concept. Economic, ecological and social developments must not be separated from one another or played off against each other: no permanent economic and social progress without an intact environment – no intact environment without economic and social well-being.

Sustainability is a cross-sectional task, because it affects all the areas of our lives. Its implementation is a global challenge. Due to globalisation, the social, economic and ecological consequences can be felt worldwide. Environmental and development problems cannot be solved by one country alone; hence they must be solved together in close collaboration. From this, the three dimensions of sustainability can be deduced:

Ecological sustainability (**E**cological):

- Ecological sustainability describes the considerate handling of resources and the environment.
- It covers every step of the product life cycle (extraction of raw materials, production, packaging, marketing, transport, use and disposal).
- A way of producing and living, which only stresses the natural resources to a limited extent so that they can regenerate, is considered ecologically sustainable (Rogall 2012, p. 47).

Social/ethical sustainability (**E**thical):

- Social/ethical sustainability describes responsible behaviour of all the people involved in a process.
- The aim is to keep social tensions limited and to settle conflicts in a peaceful and reasonable manner.

- Within a company, this concerns, for example, handling of the employees, the relationship to interest groups, or the responsibility of the company towards the community (concept of corporate social responsibility/CSR) (Rogall 2012, p. 47f.).

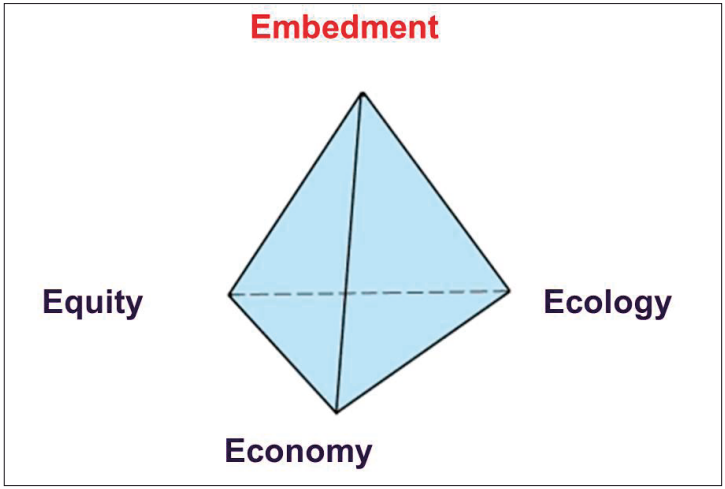
Economic sustainability (**E**conomical):

- Economic sustainability is distinguished by the efficient allocation of resources.
- Every organisation (a company, state or community) should not economically live beyond their means, as this inevitably leads to damage for the future generations.
- Economic actions are considered sustainable if the business model can be permanently practised (Rogall 2012, p. 48).

Embedment:

- The fourth "**E**" is generally still known as "Embedment", the embedding of sustainability considerations in the processes and structures of an organisation.
- The prerequisite for embedment is a change in awareness of all the parties involved.
- The measures in the embedment area include, for example, education and training, or functioning innovation management (Rogall 2012, p. 49).

Figure 1.1: Four E's of sustainability



Source: Own representation.

1.2 Problem statement

For a good 50 years, both scientists and companies have been growing increasingly aware that we are living beyond our means and are exhausting our natural resources. We are harvesting more from nature than can be replenished naturally. The exploitation and contamination of natural systems are visible in many different ways:

- Shortage as a result of exploitation of our natural resources (e.g. freshwater, tropical forests, oceans)
- Climatic change and the increasing use of fossil fuels (e.g. oil, coal)
- The pollution of our environment and the associated risk to our health (e.g. through incorrect waste disposal)
- Destruction of ecosystems and biodiversity[6] (c.f. Rogall 2008, p. 31)

6 "In the simplest of terms, biological diversity is the variety of life and its processes; and it includes the variety of living organisms, the genetic

Exploitation of renewable resources

We consume more resources than the ecosystems can replenish during the same period. The most important resource is fresh water. Our nutrition, our standard of living and many industrial processes depend on the availability and quality of clean drinking water. Yet 96 % of our planet's water resource is saltwater, and 3 % is locked up in ice. Only 1 % is potentially suitable for human consumption. Today 2.5 billion people live without clean drinking water (UNICEF/ WHO Report 2012). Therefore, the struggle for control of clean drinking water is threatening to become one of the primary sources of future conflicts.

In addition, deforestation is leading to an acceleration of climate change and desertification of large land areas. At the beginning of the 20th century, tropical rainforests covered around 12 % of the earth's surface; today they have shrunk to 6 % (FAO 2005). A further problem is soil sealing and erosion of arable lands. Each year, more farmland is lost through sealing and erosion than can be reclaimed for cultivation. Additionally, overgrazing and overfishing are leading to destruction of ecosystems. Total global fish stocks have halved since the beginning of the 1970s (Rogall 2008, p. 35).

Climate change

The global average temperature is dependent upon a large number of factors, such as solar and seismic activity or the concentration of greenhouse gases in the earth's atmosphere. In the last three billion years, the earth has seen several major climatic changes. The last glacial period, which led to the extinction of many animal and plant species worldwide, only ended about 12,000 years ago.

differences among them, and the communities and ecosystems in which they occur." (Keystone Center, 1991)

Since the industrial revolution, humans have released an ever-increasing amount of greenhouse gases; the CO_2 concentration in the atmosphere increased by 35 % from 1850 to 2005, more than in the previous 650,000 years. This has warmed the atmosphere by 0.8 °C, and this will rise even more in the years to come. If the earth's temperature were to rise by an additional 1.2 °C, the critical level would be exceeded (Pachauri/Reisinger 2007, p. 2). If we fail to limit the further increase in the average temperature to 1.2 °C, this will have serious consequences for life on this planet. A further sea level rise would reduce the world's freshwater reserves. This would lead to an increase in desert and steppe lands and declining crop yields (Pachauri/Reisinger 2007, p. 10). In addition to malnutrition as a result of poor harvests and a rising risk of epidemics, the extreme weather conditions themselves would directly threaten millions of people. According to estimates of the World Health Organization (WHO), the European heat wave of the summer of 2003 caused approximately 70,000 deaths (Robine 2007).

In the coming years, climate change will also bring about extreme economic costs and threaten the livelihoods of hundreds of millions of people (Stern 2006, p. 1). In the long term, this development can only be stopped if every country on the planet takes measures to decrease CO_2 emissions. The only politically enforceable solution is to allocate each person equal emission rights. However, this means that western industrialised countries in particular would be required to rapidly reduce their CO_2 emissions.

A fundamental cause of climate change is the burning of fossil fuels. Although the world's fossil fuel reserves are slowly approaching their end[7], demand for them continues to increase. Despite the opening up of new reserves and technical developments, over the long term

7 In 2006, the BMWi (the German Federal Ministry for Economic Affairs and Energy) estimated that oil reserves would last a further 41 years, natural gas reserves 63 years and coal reserves 161 years. (BMWi 2006)

we can expect continued price increases. The growing scarcity of fossil fuels will, therefore, also lead to an increase in international conflicts.

Environmental pollution and the resulting health threats

Industry, agriculture, transport and private households release hazardous substances during energy generation, heating and manufacturing processes, which are poisoning our environment. This adversely affects not just existing ecosystems, but also, to a large extent, our health. In particular, incorrect waste disposal leads to air, water and soil pollution on an enormous scale. This is especially true for those regions where waste is improperly disposed of or incinerated. An example of this is Lake Aral in Uzbekistan, where improper waste disposal and pollution has led to an extreme draught shrinking the lakes sizes and contaminating the remaining part to inhabitable levels.

Destruction of ecosystems

Until now, we have come to know only a fraction of the animal and plant species living on the earth. It is estimated that there are about 30 million different species, of which we only know 5 %. But many ecosystems might not be able to adapt to the new climate conditions. Approximately 20-30 % of all animal and plant species are threatened with extinction. In the next ten years alone, an estimated 1.5 million species will become extinct (Pachauri/Reisinger 2007, p. 10). In addition to the ethical concerns that arise in connection with the extermination of animal and plant species, each single species loss restricts genetic diversity on earth and thus our development potential forever. Possible consequences include epidemics, crop failures and pest infestation.

The challenges resulting from our lifestyles are global in nature, and they can only be solved by all countries working together. The impact of these changes will be felt by each one of us. Climate change and habitat destruction are political challenges. Our entire global industrial society needs restructuring, ecologically and sustainably.

The Paris Agreement

In December 2015, 195 countries (out of 206) finally agreed on a universal, legally binding global climate deal at the Paris climate conference. The agreement sets out a global action plan to avoid dangerous climate change by limiting global warming to well below 2°C. Within the context of the agreement the governments agreed on the following goals to reduce carbon emissions:

- Keeping the increase in global average temperature to well below 2°C above pre-industrial levels;
- Limiting the increase of the global average temperature to 1.5°C compared to today´s level, since this would significantly cut the risks and the impacts of climate change;
- Getting the reduction of global emissions started as soon as possible;
- Accomplishing rapid reductions afterwards in accordance with the best available science (European Commission, 2016, Paris Agreement).

During the Paris conference, countries submitted comprehensive national climate action plans. Since those proposals were not enough to keep global warming below 2°C, the governments committed themselves to agree on further measures.

Although, the agreement focuses primarily on measures to stop climate change it also includes regulations concerning social and eco-

nomic sustainability. To prevent possible conflicts and to support developing in adapting the agreement the governments agreed:

- To strengthen the capacity of the national societies to deal with the impacts of climate change;
- To provide international support for adaptation to developing countries.

The governments agreed also on economic cooperation, to avert and minimise loss and damage associated with the adverse effects of climate change. Besides, they acknowledge the need to cooperate and enhance the understanding, action and support in different areas such as early warning systems, emergency preparedness and risk insurance (European Commission, 2016, Paris Agreement).

The agreement is due to enter into force in 2020. But we still have a long way to go before we will be in a position to implement individual measures. Partly because exploitation of natural resources will continue to increase as the world population and economies in emerging countries continue to grow. And partly because social agents (i.e. corporations, governments, policy makers, etc.) have failed to get a grasp on the challenges we face, given how little time we have left.

1.3 Social-economic effects making sustainable acting difficult

To prevent a shortage in resources and to slowdown climatic change, every state, company and even the individual consumer must rethink and invest in renewable energy sources and sustainable innovations. However, a series of social-economic phenomena are making sustainable trade and the implementation of sustainable innovations difficult.

The tragedy of the commons

Public goods are freely available for all the potential consumers. Furthermore, no one can be excluded from their benefit. They are made available both by the state (e.g. roads, internal security) and by private providers (e.g. Google or Wikipedia). A particular form of public goods is the so-called common goods. As with other public goods, no one can be excluded from the use of common goods (e.g. free nursery places, place to lie on a public beach). However, as they are only available in limited quantities, the consumers rival each other for their use.

If goods are freely available despite limited resources, there is usually rationing in the form of a waiting period. The more limited the goods become, the longer the user must wait for them. The result is a resource-consuming fight for acquisition during which each part attempts to be the first to appropriate the resources. (Tietzel/Müller 2000, p. 316)

As no member of society (private persons nor companies) can be excluded from the use of the common "environment", it often results in overexploitation of free-available natural resources. The individual members of society would like to profit from the free-of-charge use of the environment, without footing the bill for its accessibility. Examples of problematic use of natural resources without exclusive property rights (public goods) include:

- Deforestation of the rainforests (overexploitation),
- The plundering of wild animal stocks, particularly in developing countries,
- Over-fishing of the world's oceans,
- The use of the atmosphere for the disposal of pollutants (e.g. air pollution by motor vehicles).

A solution for this dilemma would be the definition of user rights under state control or the regulation of limited resources, e.g. through catch limits or emissions trading.

Free-rider problem

As individual society members cannot be partly or fully excluded based on economic, political or technical grounds from the use of goods provided once, there is often a free-rider problem with public goods. Individual users conceal their real purposes during the decision about the financing of public projects in order to not be drawn into their financing. They reckon that the goods will be provided without their contribution. The free-rider problem leads to a suboptimal distribution of the goods in question:

- Some of the users of purely public goods, such as sewerage system, street lighting or embankments are often not willing to pay for the development and upkeep costs. As a result, such goods are not offered by private providers or not in sufficient quantities. Public goods are therefore usually provided by the state and financed with fees.

- With common goods, such as the fish stocks in the North Atlantic or the atmosphere (for CO_2 emissions), the free-rider problem threatens to result in overexploitation. Due to free access, free riders profit from the self-limitation of other users when their usage correspondingly intensifies. This problem of collective trade is known as "tragedy of the commons". (Rogall 2012, p. 78)

Externalisation of costs

A further problem arises through external effects. Holger Rogall describes external effects as follows: "External effects (shifting of costs and usage without payment): If people economise, this can have a positive or negative effect on society. Positive external effects raise the quality of life of other members of society, without them paying for the additional benefits. With negative effects, costs are generated, which the society members rather than the perpetrator must pay." (Rogall 2012, p. 67)

The negative external effects (external costs) to the environment and the demands on other public goods are neglected in the company balance sheets, the budgetary calculations of the public sector and the considerations of private households. The economic term for the shifting of costs to the general public, other persons, or regions, or to future households (e.g. draining of wastewater into rivers, which then have to be cleaned at the expense of the community) is "externalisation", (Schubert/Martina 2011.) States, companies, but also private persons thereby consciously or unconsciously burden others with a part of the costs for their behaviour. The most important forms of externalisation of environmental costs include:

1. Externalisation of costs to the general public: A product is manufactured in such a way that the general public rather than the perpetrator is responsible for a part of the ancillary or subsequent costs. An example of externalisation of costs to the general public is the manufacturing of products that require specialist disposal (e.g. dangerous chemicals such as drain pipe cleaner etc.). The disposal is taken care of by the public sector, in other words the taxpayers, who also bear all the costs for the disposal. Were these disposal costs to be included in the price of these products, many of them would not be manufactured or bought in the first place. Hence, companies externalise these costs as to not incur them.

2. Externalisation of costs to other countries or regions: A product is manufactured in such a way that the ancillary or subsequent costs fall to another country or region, such as the production of food for the EU in developing or emerging countries (e.g. beef in Argentina, cocoa in Ghana or palm oil in Indonesia). In many places, the traditional lives and economies forms of peoples within these countries are endangered by the export of crops from monocultures. The costs arising from this are not incurred in Europe, but in the countries involved.

3. Externalisation of costs to future households: Products are manufactured in such a way that parts of the costs are only incurred years later. In some countries, for example, poisonous pesticides are still used to generate higher yields and in order to save money on environmentally friendlier measures for pest control. Pesticides take around 20 years to reach the groundwater. The costs for cleaning the groundwater or drilling a deeper well are passed on to future generations.

To move companies and private persons to a more conscious handling of resources, many organisations demand calculation of all the resulting costs (internal and external) into the price. However, this would not guarantee damage prevention, or a further unequal distribution of the burden (unstressed environment as expensive goods) is expected.

The NIMBY effect ("Not in my backyard")

One of the obstacles dealing with sustainable innovations or the construction of renewable energy power plants is the NIMBY-effect. The NIMBY-effect refers to organized opposition by residents to a proposal for a new development because it is close to their homes. These residents often believe that though the developments are needed in

society in general, they should be realized somewhere else. Opposing residents themselves are called ‚Nimbies'.

The NIMBY effect may also apply more generally to people who advocate some change or proposal (for example, eating less meat, wasting less food or austerity measures like budget cuts and tax increases), but oppose implementing it in a way that would require sacrificing on their part: they support progress but they are not willing to change themselves.

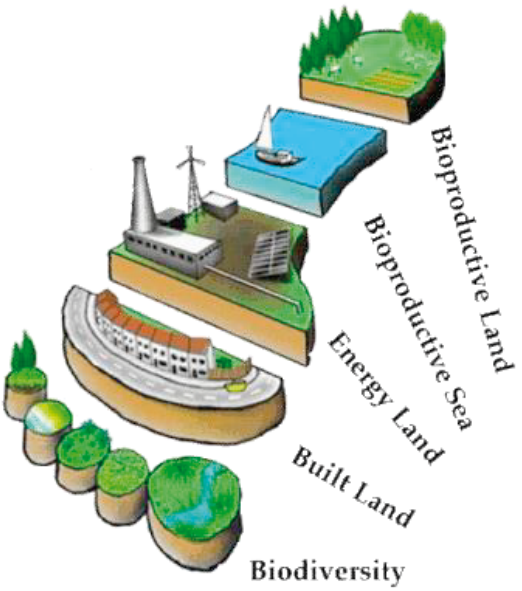
Examples of projects likely to be opposed are:

- Renewable energy generators, e.g. wind farms and solar panels;
- Infrastructure development or large-scale developments, e.g. new roads, (freight) railways, light rail and metro lines, airports, seaports, power plants, electrical transmission lines, mobile telephone network masts, wastewater treatment plants, landfills and incinerators, or new industrial parks and shopping malls;
- Social infrastructure, e.g. schools, kindergartens, hospitals, youth hostels or sports stadiums;
- Accommodations perceived as primarily benefitting disadvantaged people, e.g. subsidized housing for the financially disadvantaged, supportive housing for the mentally ill, halfway houses for drug addicts and criminals, or homeless shelters for those with no fixed address;
- Innovations or changes of all kinds, e.g. new products or an altered traffic system.

1.4 Different ways to measure the sustainability of a product

One way to measure the sustainability of a product, a process, a company or a way of life is the ecological footprint. "Human activities consume resources and produce waste, and as our populations grow and global consumption increases, it is essential that we measure nature's capacity to meet these demands. The Ecological Footprint has emerged as one of the world's leading measures of human demand on nature. Simply put, Ecological Footprint Accounting addresses whether the planet is large enough to keep up the demands of humanity." (Footprintnetwork, 2014)

Fig. 1.2: The ecological footprint



Source: ecological-footprints, 2014.

The ecological footprint illustrates the amount of biologically productive land and sea area necessary to supply the resources a human population consumes, and to assimilate associated waste. Using this assessment, it is possible to estimate how much of the Earth (or how many planets like Earth) it would take to support humanity if everybody followed a given lifestyle.

Thus, the term ecological footprint stands for an accounting system for bio-capacity. It tracks the amount of bio capacity and how much of it is used by people. Bio capacity represents the planet's biologically productive land areas including our forests, pastures, cropland and fisheries. These areas, especially if left untouched, can also absorb much of the waste we generate, especially our carbon emissions.

In more specific terms, this means that an ecological footprint analysis compares human demands on nature with the biosphere's ability to regenerate resources and provide services. It does so by assessing the biologically productive land and marine area required to produce the resources a population consumes and absorb the corresponding waste, using prevailing technology. Footprint values at the end of a survey are categorized for Carbon, Food, Housing, and Goods and Services as well as the total footprint, the number of planets like Earth needed to sustain the world's population at that level of consumption. This approach can also be applied to an activity such as the manufacturing of a product.

In conclusion, ecological footprint analysis is a tool of comparing consumption and lifestyles, and checking this against nature's ability to provide for this consumption. The tool can inform policy by examining to what extent a nation uses more (or less) than is available within its territory, or to what extent the nation's lifestyle would be replicable worldwide. The footprint can also be a useful tool to

educate people about carrying capacity[8] and over-consumption, with the aim of altering personal behaviour. Furthermore, ecological footprints may be used to argue that many current lifestyles are not sustainable. Such a global comparison also clearly shows the inequalities of resource use on this planet at the beginning of the twenty-first century.

Ecological footprint analysis is now widely used around the world as an indicator of environmental sustainability[9]. It can be used to measure and manage the use of resources throughout the economy as well as to explore the sustainability of individual lifestyles, goods and services, companies, cities, regions or nations.

Carbon footprint

Another way to measure the sustainability of a product is the carbon footprint. Given that ecological footprints are a measure of failure, many companies choose the more easily calculated "carbon footprint" as an indicator of unsustainable energy use. A carbon footprint is defined as "the total sets of greenhouse gas emissions caused by an organization, event, product or person." (Carbon Trust, 2014)

However, the total carbon footprint cannot be calculated because of the large amount of data required and the fact that carbon dioxide can be produced by natural occurrences, too. It is for this reason that authors Wright, Kemp, and Williams define the carbon footprint as "a measure of the total amount of carbon dioxide (CO2) and methane (CH4) emissions of a defined population, system or activity, considering all relevant sources, sinks and storage within the spa-

8 Maximum number of people that can be supported indefinitely in a given environment resp. on earth.

9 A number of NGOs offer ecological footprint calculators (e.g. http://footprint.wwf.org.uk/)

tial and temporal boundary of the population, system or activity of interest. Calculated as carbon dioxide equivalent using the relevant 100-year global warming potential." (Wright/Kemp/Williams 2011, p. 61-72.) Greenhouse gases can be emitted e.g. through transport, land clearance, and the production and consumption of food, fuels, manufactured goods, materials, wood, roads, buildings, services etc. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other greenhouse gases, emitted.

Most of the carbon footprint emissions for an average household come from "indirect" sources, i.e. fuel burned to produce goods far away from the final consumer. These are distinguished from emissions which come from burning fuel directly in one's car or stove, commonly referred to as "direct" sources of the consumer's carbon footprint.

1.5 Eco-efficiency vs. Eco-effectiveness

In academic discourse, a great variety of approaches exist to foster and implement sustainability in companies (e.g. ‚cradle to cradle', ‚life-cycle assessment' or ‚green marketing'). All these approaches are based on one of the following fundamental hypothesises:

- Eco-efficient techniques seek to minimise the volume, velocity, and toxicity of the material flow system and by this the harm done to environment. By doing this, eco-efficiency is based on the assumption of a linear flow of materials (cradle to grave): raw materials are extracted from the environment, transformed into products, and eventually disposed of. Some materials are recycled, but often as an end-of-pipe solution, since these materials are not designed to be recycled. Thus, the principal aim of these approaches is to improve efficiencies (doing less bad).

Common approaches based on eco-efficiency are e.g. ‚lifecycle assessment' or ‚environmental management systems'.

- Eco-effectiveness proposes the transformation of products and their material flows in a way such that they form a supportive relationship with ecological systems and future economic growth. The goal is not to minimise the cradle-to-grave flow of materials, but to generate cyclical, cradle-to-cradle ‚systems' that enable materials to maintain their status as resources over time (recycling). The eco-effectiveness fosters the relationship between ecological and economic systems and raise issue how that relationship can be symbiotic if not regenerative. This concept is a shift in mind-set from eco efficiency ("doing less bad is not good"). ‚Cradle to cradle' is the most frequently practised approach based on eco-effectiveness is.

Eco-efficiency

Eco-efficiency is the quotient derived from the monetary value of a product and the costs for the general public resulting from the production processes (or the influences exerted on the environment, measured in suitable units, e.g. with the aid of the ecological footprint).[10] The World Business Council for Sustainable Development (WBCSD) introduced the term in 1991. The aim was to reduce negative ecological effects and the use of resource during the entire lifecycle (of a product) to a level that is compatible with the Earth´s estimated carrying capacity (cf. www.wbcsd.org).

10 "Eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the Earth's estimated carrying capacity." (WBCSD, 2014)

Fig. 1.3: Eco-efficiency

The economic council for sustainable development defines eco-efficiency using the equation:

$$\text{Eco} - \text{efficience} \quad \frac{\text{monetary value of a product}}{\text{Influence or effect on the environment}}$$

Source: WBCSD, 2014.

A product is considered eco-efficient if the following three criteria are equally fulfilled:

a) economic competitiveness,
b) fulfilment of the human requirements and raising of the quality of life, and
c) fewer resources are required than nature can regenerate within the same period.[11]

In doing so, both the manufacturing process and the use and later disposal (for products) are included in the balance ("from the cradle to the grave").

Eco-efficiency serves companies as a characteristic factor, with the help of which the production processes and products are designed more economically. The increase in environmental compatibility is a positive side-effect. Eco-efficiency therefore creates a classic win-win situation. Environmental resources are saved and therefore costs reduced. Ecology and economy benefit equally because the company can produce more with a lower energy and resource requirement. At the same time, the ecological effect must be monitored in every

11 Cf. *Bjorn Stigson, President of the WBCSD*: "This is what eco-efficiency is all about: combining the goals of business excellence and environmental excellence, and creating the link through which corporate behavior can support sustainable development." (WBCSD, 2014)

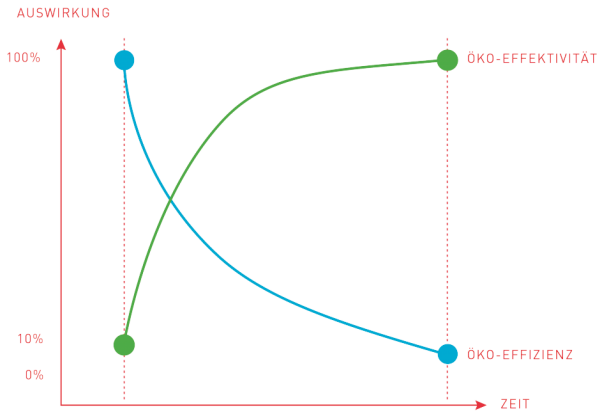
phase of the production. Both the manufacturing process and the usage and disposal of the product are included. The lowest possible resource use should result in a multiple gain, in which the intensity of the materials and energy are reduced, pollutant emission is reduced, and the environmental load is reduced through the use of recyclable materials.

Examples of practical implementation of eco-efficiency in the economy are environmental management systems and the life-cycle assessment. The aim of the system is to keep resource use throughout the entire life cycle of a product **(Cradle-to-Grave)** as low as possible**.**

Eco-effectiveness

However, there are also critical voices, which view the eco-efficiency aims as being too limited: Reduction, reuse and recycling may slow down the process of contamination and depletion, but it won't stop it. They therefore preach eco-efficiency solutions such as **Cradle to Cradle.**

Fig. 1.4: Eco-efficiency versus eco-effectiveness



Source: EPEA, 2014.

The central assumption to **Cradle to Cradle** is: Waste is food. This means: All the products are developed in such a way that they can either be traced back to biological nutrient matter in biological cycles, or remain as technical nutrient matter in technical cycles.

Green marketing

The third approach, **green marketing**, attempts to connect the ideas with one another. With green marketing, the company or the individual products are no longer the focus, but rather the consumers. Correspondingly, it focuses on the companies developing sustainable products and solutions with their customers. This way, added value is created for all those involved (economy, people and environment).

Training questions:

1. **Name the two different starting points for sustainable innovations? What are the main differences? Please give an example for each.**
2. **Explain the NIMBY-effect and give an example.**
3. **State the four dimensions of sustainability (4 "E" s) and explain them. How are the connected?**
4. **Why is embedment of special importance?**
5. **Explain the difference between the Ecological Footprint and the Carbon Footprint.**

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Internet resources

Carbon Turst (2014): Carbon Footprint, online: www.carbontrust.com

ecological-footprints (2014), online: www.ecological-footprints.wikispaces.com

EPEA (2014): Eco-efficiency versus eco-effectiveness, online: http://epeaswitzerland.com, request 30.09.2014

Footprintnetwork (2014): the ecological footprint http://www.footprintnetwork. org/en/index.php/GFN/page/footprint_basics_overview/

German Federal Ministry for Economic Affairs and Energy (BMWi 2006), online: http://www.bmwi.de

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CHAPTER 2:
CORPORATE SUSTAINABILITY

Rob van Dun

Summary

Sustainability in business is not such a new phenomenon as it is believed to be. Arguably, the efforts of becoming more sustainable have had a greater impact last decade or so than in the entire century before it. An increasing amount of companies realize that sustainability is not an obligation, but an opportunity for them to innovate or to be successful. We need to look at the history of sustainability to understand where we come from and where we are heading.

Sustainability never was an issue prior to the industrial revolution, after which the first major and polluting companies came into existence. For decades on end, companies were able to completely disregard the environment as they promoted so much economic growth and welfare. Effects of their operations where unclear or simply accepted as a side-effect of industrialization.

It took some major ecological crises to raise some awareness amongst inhabitants and governments that the rate at which those companies were polluting the environment was far higher than ever before. In an effort to improve natural conservation and to provide incentives

for companies to consider the environment, the first environmental laws were passed. Companies had to comply or risk tremendous fines. Some fled to different regions or nations, typically those where environmental laws are far more lenient.

As early as the 1960s, consumers were getting involved in the sustainability of companies and they would stop buying products that were unethically sourced or unsustainably produced (Greennovate, 2011). With their reputations at stake, the first companies started policing themselves and corporate social responsibility was born.

Fast forward another odd 30 years of tree planting and giving money to charity to end up in 1994 where the first framework for sustainability was introduce (Elkington, 1994). This triple-bottom-line framework forces companies to not only think about one bottom-line (profit), but also consider environmental and social performance. By now, all of the world's biggest companies have adopted this framework in some way, shape or form and continuously consider their triple-bottom-line in decision making. To improve their corporate sustainability, their only decide to go in a certain direction if it has a positive impact on all of the bottom-lines: People, Planet and Profit, the well-known 3Ps of sustainability.

Making the environmental and social performance part of the management systems and including key performance indicators in those areas automatically forces managers and employees to try to improve their performance; what you measure is what you get. Sustainable companies set goals for the next period (e.g. 5 or 10 years) and through measuring this along the way, they seek to achieve these in the long-run.

Whereas sustainability in the past was a cost, companies nowadays realize they can do well by doing good, which means as much as improving profitability together with improving the People and Planet dimensions of sustainability. This new paradigm for sustainability provides companies with opportunities, rather than posing a threat.

2.1 An introduction to corporate sustainability

Companies, for over the last decades, have been pondering about whether business can really prosper by becoming more sustainable, or whether this is all wishful thinking. Everything we've seen has convinced us that business really can lead the way. In order to understand where sustainability in business is heading, it's important to have a brief overview of sustainability in business for over the last decades.

Before we can embark on that journey, we need to get one thing out of the way, the term sustainability itself. The most used definition is that of sustainable development, coming from the Brundtland Report, which reads: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). A growing number of leading corporations, especially multinationals, are embracing practices associated with sustainable development (Bradbury, 2003). In business terms, this means creating organizations that can sustain financial, human-social, and environmental resources over the long term. This requires attention on a "triple bottom line" (Elkington, 1994) rather than maintaining interest merely in short-term financial health alone. Sustainability does not come across as a set of technical problems to be solved but also as an opportunity for revitalizing businesses in a revitalized economy that exists to serve, rather than exploit, natural and human/social systems. Traditionally, it has been thought that environmental expenditures reduce profitability. However, as early as in 1997, Russo and Fouts already concluded that in general, environmental policies that go beyond compliance result in higher economic performance, moderated by industry growth.

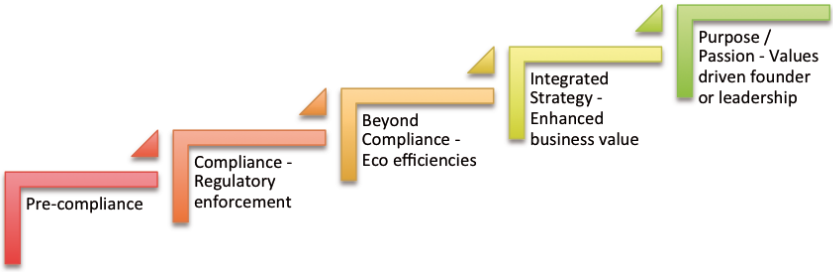
The triple-bottom-line framework mentioned above, which will be discussed later in this chapter, is a holistic approach to sustainable business and adopted by many a business all over the world. It proposes that businesses focus not only on one bottom-line, which is

the traditional focus on financial performance, but on environmental and social performance as well. It assumes that businesses have a level of responsibility to address environmental and social issues pertaining to their environment. The companies that do this can be defined as green businesses. For the sake of simplicity and clarity, let's define sustainable business as a business that has a minimal to none-negative effect on the environment and communities they operate in, whilst at the same time retaining their profitability in the long run (Cooney, 2009). This is a good journey for business to be on. After all, we invented business to make our lives better, not worse. Looking at the past decades, however, we have to conclude that business was anything but sustainable, except for some far and in between companies doing well by doing good.

2.2 The Emergence of Sustainability in Business

Figure 1 depicts the journey of sustainable business as will be described throughout this section.

Figure 2.1: *The 5-Stage* Sustainability Journey



Source: Wallard, 2010.

The journey starts in the 1800s, at the start of the industrial revolution, back then there was no such thing as sustainability, but resembled more of a war between industry and the environment. Coal was

burned freely with no filters and the air quality in industrial cities already started worsening rapidly. Without any environmental laws, companies were able to release more pollution every single year. It seems that no one seemed to care, as the industrial revolution created so many jobs and with that so much prosperity. Surprisingly, this went on for over a century (Greennovate, 2011).

By the middle of the 20th century, the levels of pollution were jaw dropping. An illustrative example of this is when London was London's *Great Smog of 1952.* This air-pollution event killed as many as 4000 people in only five days' time and leaving another 100.000 ill. More recent research even suggests around 12.000 fatalities (Bell et al., 2004). This event, albeit horrible, created the public awareness that was needed so desperately. All over the world, similar events started occurring, which in turn created a lot of momentum for those citizens that had been demanding environmental laws for years then. Politicians in the United States and United Kingdom passed their Clean Air Act and Clean Water Act during the late 50s and early 60s to regulate the worst of the abuses, being a relatively early example of environmental regulation.

This period continued well within the 1970s until around 1980 where local governments created command and control-like regulation leaving companies responsible for paying pollution damages. As a result, businesses all over the world started installing very expensive pollution treatment equipment in order to clear their air and water. Companies failing to do so were closed down or given tremendous fines. In economic terms, companies were now forced to internalize their externalities, rather than letting society pay for these. Obviously, those businesses incurred additional costs that they wanted to be kept to a minimum. They would only install so-called "end-of-the-pipeline" equipment when being forced to do so, which of course is a very reactive approach. At that point in history, there existed a trade-off between profitability and sustainability where installing sustainable measures meant lowering profitability. Not surprisingly,

companies only did the very minimum, with some moving their unsustainable production facilities oversees to countries with less strict environmental regimes. Investing large sums in "sustainable innovations", mostly end-of-the-pipeline solutions, presented a cost that firms would rather not incur. So, the debate continued, with business on one side and environmentalists on the other. Would they always have to choose between profits and sustainability?

The governmental regulations helped the environment a little, but it took increasing oil and energy prices to get companies thinking when they figured out they could actually reduce their costs. Following the 1973 Arab-Israeli War, the OPEC decided on an embargo against the US, causing a rise of the global oil price from $3 to $12 a dollar. This oil crisis created an enormous shock to business and the global economy. It was a wake-up call for businesses that starting realizing they could save energy and thus costs by plucking some of the low-hanging fruits. This meant that they had to innovate in terms of process optimization, a strong focus on quality management and taking waste seriously. They set a great example and were soon followed by others that saw an opportunity to increase profitability again as they discovered the benefits or a more active approach. After all, prevention is better than installing end-of-the-pipeline solutions that only added extra costs. They would save money, reduce their risk and simultaneously improve their products. With governments, wary of their producers going overseas and businesses finding new ways to make things work, the 80s and 90s of the previous century were known for its "greening" initiatives (Hart, 2011, p. 23); making manufacturing and production a little more sustainable.

Saving money was not the only reason for business. Companies also needed to work on their reputation. If they would help out in local communities, planting trees left and right, treat workers fairly and make cleaner and safer products, sales would probably increase. If they were caught cheating, polluting the environment and using dangerous chemicals within their products, they would lose cus-

tomers. With so many multinationals already producing overseas, all process were hard to oversee, and with developing countries not having stringent environmental laws, those companies had to police themselves. In an effort to coordinate this effectively, large companies set up Corporate Social Responsibility (CSR) departments for self-regulation, where they monitored compliance with diverse laws, ethical standards and industry norms. Although companies strived to help out in the communities, saving the planet through tree planting, this was simply not enough. By and large, they continued doing business and usual with this CSR department spending money on charity programs that had a negative effect on their profits, as they were not even breaking even on those costs. MIT Sloan and Boston Consultancy Group reported that over 75% of those companies did not break even on their sustainability investments. As a result, companies refrained from investing in those initiatives. Something needed to happen for sustainability to gain traction.

With over 100 years of not doing anything, via end-of-the-pipeline solutions and with CSR initiatives having very little to show for, sustainable development seemed destined for failure. Companies would have to go beyond their greening initiatives that only marginally reduced their footprints, waste and costs. With companies seeing sustainability only as a trade-off, they were not going anywhere. There needed to be a change of paradigm, an approach that would work for them, that would make their shareholders and customers happy. Something that would be beneficial for them… In the meantime, governments kept on passing more stringent environmental laws, Al Gore[12] raised public awareness for sustainability with his documentary *An Inconvenient Truth* and the vast majority of scientists concluded that the climate was already changing for the worse.

12 Al Gore is an American politician and environmentalist who was Vice President under the Bill Clinton administration (1993-2001). Later, he narrowly lost the 2000 presidential election to George W. Bush. In 2007, he received the Nobel Peace Prize, among others for his cooperation to combat climate change.

2.3 Moving from Obligation to Opportunity

The paradigm change came when in 1994 John Elkington introduced the *triple bottom line*, which so many international companies have adopted, enabling them to create business value that goes beyond the traditional single bottom line; profit. Some of the pioneering companies have by now shown that they can "do well by doing good" (Benjamin Franklin). They incorporate sustainability in their everyday decision-making, being a part of their corporate strategies and business models. And by doing this, they create shared value for all of their stakeholders, attract the best employees who would rather work for sustainable companies and they find new customers willing to pay for their sustainable products. Oh, and they reduce their costs through process innovations, zero-tolerance policies towards waste and carefully reviewing their value chains.

In doing so, firms take responsibility in achieving sustainable development. After all, bigger firms have the financial, technical, and organizational capabilities to address environmental issues. They can transfer these capabilities, developed partly in response to stringent environmental regulations in some countries, to subsidiaries and suppliers in countries with lower levels of regulation. These capability transfers allow domestic managers and workers to learn about current environmental management principles and technologies, which is likely to lead to spill over effects into the local economy and to benefit other local firms as well. Firms can leverage their existing resources and capabilities in their environmental strategies. Research has shown that a fit between a firm's existing resources and capabilities and its environmental practices contributes to competitive advantage from environmental strategies (Christmann, 2002, p. 28).

What has changed is that since the new millennium, companies have started viewing sustainability not as something they should do for something else (e.g. governments or NGOs) but for themselves. Because it pays off, as so many different studies have shown over the

last decade. The paradigm has changed and companies have moved away from their trade-off mentality which dealt with sustainability as an obligation, but view it as an opportunity to be innovative, reduce costs, have a positive impact on their communities and the environment, attract new customers and improve their profitability.

A final step towards sustainability is redefining the purpose of the business along the values held by either the companies' founders or leadership, focusing on what is important to them.

2.4 The Triple Bottom Line Framework

As the *2011 Sustainability & Innovation Global Executive Study and Research Project* conducted by MIT concluded, sustainability is nowadays firmly on managers' agendas as sustainability directly impacts profits. Yes, that is right. There is profit to be made by doing well. Not through marketing yourself as being green, but by actively making sustainability part of the decision-making process and corporate strategy. When developing strategies, tactics and solutions to problems, employees and their management will nowadays consider each dimension of the triple bottom line, which consists of People, Planet and Profit (the commonly known 3Ps of sustainability). They are considering the positive and negative impact of the companies' solutions on the community, environment and financial bottom line. And depending on this cost-benefit analysis, they will decide what to do.

The phrase "triple bottom line" (TBL) was first coined by John Elkington in 1994, owner of SustainAbility, a British consultancy firm (Economist, 2009). He argued that companies should prepare three separate bottom lines. The first one is the more traditional measure of profit – basically the bottom line of the profit and loss account. The second is the measurement of the firm's social responsibility in some way shape or form, in other words its "people account". The

third bottom line is that of its "planet account", a measurement of the firm's environmental responsibility. The triple bottom line thus consists of three Ps: profit, people and planet. It seeks to measure the financial, social and environmental performance of the corporation over a period of time, almost always equalling a year. In their sustainability reports, firms report on this performance. One of the main principles behind the TBL is that what companies measure is what they seem to get. After all, what they measure is what they are very likely to pay attention to, moving them towards becoming increasingly sustainable organisations.

Mentioned in this chapter numerous times already, the triple bottom line is perhaps the most commonly used framework in business to manage, monitor and evaluate performance. That is: Social, Environmental and Economic performance. Although one of the challenges of putting this framework into practice is the measurement of social and ecological performance, the framework enables organizations to take a longer-term perspective and thus evaluate the future consequences of their decisions (Slaper/Hall, 2011, p. 4-8). What the triple bottom line successfully managed to do is shed a different light on what is often believed to be the purpose of business. Milton Friedman, one of the most influential economists in recent history, has always claimed that "the social responsibility of business is to increase its profits" (Friedman, 1970, p. 1). The triple bottom line counteracts this commonly held belief by introducing to other bottom lines that should be of importance to the management. In essence, the purpose of business is no longer to merely focus on shareholder value, but on stakeholder value, which is a wildly different approach. Another influential scholar, Michael Porter now claims that companies should seek to create shared value in order to be successful. According to stakeholder theory, the business should be used as a vehicle for coordinating stakeholder interests, instead of maximizing shareholder profits.

Companies are believed to be sustainably only when they have a positive performance on all of the three bottom lines, rather than focusing on merely one. What successful companies do is taking in consideration what effects or impacts certain strategies, solutions or ideas would have on their triple bottom line and only choose for them when they fulfil all three criteria. In doing so, companies improve their social, environmental and economic performance simultaneously and thus have gone beyond the trade-off mentality in which sustainability was seen merely as a cost, not as something that could be profitable in the long run.

Figure 2.2: The triple bottom line framework.

People

The social dimension of the TBL framework requires companies to think about the impact their actions have on all the people (stakeholders) involved with them. This includes everybody'; suppliers, wholesalers, employees, and managers. All throughout their value chains, sustainable companies seek to assure good health care, safe and healthy working conditions, good working hours, opportunities for education and advancement, not exploiting the labour force etc. Typically, it does also include the welfare of the communities the company does business, including those in far-away places overseas.

The difficulty here is to draw a line; shall this include the own employees only? Or also their families? Does it include supplying firms' welfare and the communities around their buildings? What happens if employees need to be laid off to remain competitive? All these questions can be very hard to answer and requires that management discusses this and decides on a strategy, that in their opinion caters to the activities of their organization.

The measurement of "People' refers to the social dimensions of a community or region. It includes variables such as education, equity and access to social resources, health and well-being, and quality of life. The examples listed below are a small snippet of potential variables (Slaper/Hall, 2011, p. 4-8):

- Unemployment rate
- Female labour force participation rate
- Median household income
- Relative poverty
- Percentage of population with a post-secondary degree or certificate
- Average commute time
- Violent crimes per capita
- Health-adjusted life expectancy

Planet

The environmental dimension of the framework requires companies to focus on reducing or even eliminating their ecological footprint. They continuously strive towards sustainability via reducing water usage, waste, energy usage and so on and so on. They realize that although going green might be profitable in the long run, it's not only about the money. They carefully consider all their processes and practices and seek opportunities to reduce, recycle and reuse materials, energy and water. They might create closed-loop systems and provide their own energy through installing solar panels on their rooftops. This goes beyond optimizing processes and attaining efficiencies, as sustainable companies conduct life-cycle assessments[13] in which they find out where in the product's lifecycle it is most unsustainable and focus on improving this. Next, they will seek to innovate sustainable through the development and marketing of green products or changing their inputs from non-sustainable sources and fossil fuels to renewable energy and resources.

Variables that seek to measure the "Planet" dimension should represent measurements of natural resources and reflect potential influences to its viability. It may include aspects such as air and water quality, energy consumption, waste, footprint et cetera. Some of the more specific examples include (Slaper/Hall, 2011, p. 4-8):

- Sulphur dioxide concentration
- Concentration of nitrogen oxides
- Excessive nutrients
- Electricity consumption
- Fossil fuel consumption
- Solid waste management
- Hazardous waste management
- Change in land use/land cover

13 Life-cycle assessment is a technique to assess environmental impacts associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling. See chapter 14 for more details.

Profit

Whereas the social and environmental dimension might have been relatively new, the financial or economic dimension that seek to measure profit is as old as Methuselah and needs little explanation. Profit is the economic value created by the organization after deducting the cost of all inputs, including the cost of the capital tied up. It therefore differs from traditional accounting definitions of profit. In the original concept, within a sustainability framework, the "profit" aspect needs to be seen as the real economic impact the organization has on its economic environment. This is often confused to be limited to the internal profit made by a company or organization (which nevertheless remains an essential starting point for the computation).

Hence, "Profit" variables have to deal with the flow of money. It could look at income or expenditures, taxes, business climate factors, employment, and business diversity factors. Specific examples may include (Slaper/Hall, 2011, p. 4-8):

- Personal income
- Cost of underemployment
- Establishment churn
- Establishment sizes
- Job growth
- Employment distribution by sector

Implementing the triple bottom line framework

In 1997, Shell was the first-ever company to introduce the triple bottom line in their first annual sustainability report, paving the way for others to following. Nowadays, an ever-growing number of companies are now implementing the triple bottom line framework in an effort to become more sustainable, with many taking the liber-

ty to tailor it specifically to their company, but still sharing the same widely-held belief that the purpose of business is to create value for all stakeholders involved.

Choosing what to measure is of great importance when implementing the triple bottom line framework. More experienced companies, such as Henkel, might develop their own focal areas. Others might resort to stick to the 3Ps. Luckily, there is help when defining standards and variables.

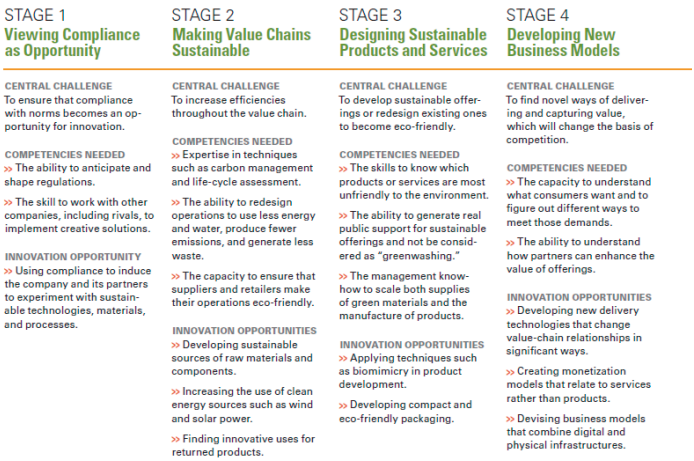
The *Global Reporting Initiative* (known as GRI) is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change, human rights and corruption (GRI, 2015). They have developed a set of standards that can easily be adopted by companies wanting to become more sustainable and in doing so, they provide transparency and comparability.

2.5 Sustainable Innovation: Challenges and Opportunities

With sustainability having gained a lot of momentum over the last years and companies implementing strategies to create corporate sustainability, there are lots of opportunities to innovate sustainably. In their 2009 Harvard Business Review article Nidumolu et al. claim that "sustainability is now the key driver of innovation". Within this article the authors explain how the need to become sustainable provides numerous opportunities for companies to innovate. In dealing with sustainable firms, they have identified five distinct stages that companies go through in their roadmap to sustainability. Figure 9.1 shows the first four of these stages. But not all companies go through all of these stages or in this order. Nor have they completed all of these stages. Through seizing the innovation opportunities ex-

plained below, companies can improve their corporate sustainability by improving their performances at the triple bottom line.

Figure 2.3: Sustainability Challenges, Competencies, and Opportunities



Source: Nidumolu/Prahalad/Rangaswami, 2009, p. 57-64.

The sustainable innovation process

There is no precise definition for sustainable innovation, reflecting the general difficulty in defining the concepts of sustainability and sustainable development. The innovation consultancy company Arthur D. Little defined "sustainability-driven" innovation as "the creation of new market space, products and services or processes driven by social, environmental or sustainability issues" (Arthur D. Little, 2004).

The challenges of a changing environment are a central starting point for long-term company planning. Companies cope with a

changing environment through the consistent application of sustainable innovation processes, continuous customer-orientation and through the constant use of green marketing (see chapter 16). In order to implement more sustainability in companies and organisations, it is necessary that they change and develop further. The process of change, however, does not take place automatically, but must be actively accompanied and pushed by the company's management. This includes:

- the understanding that change is needed;
- the vision and will of the top management to change,
- the belief of the employees in the implementation of this vision. At the same time, technological, legal and economic conditions must be taken into consideration.
- the choice of sales approach through green marketing

Being economically successful is an important target for almost all companies, there are only few exceptions. However, it is equally important for companies to act in an ecologically responsible manner and to accept social responsibility. Without sustainable thinking, economic success is hardly realisable in the long run. Therefore, sustainability is an important competitive factor. Ecological aspects, along with economic and ethical responsibility, have become one of the three pillars of success of a company. Most innovative companies are aware of these three columns and strive to implement them successfully. Traditionally, companies were mainly focused on one "bottom-line", that of profit. Nowadays these three columns form the triple-bottom-line.

Thus, companies support social establishments, cultural initiatives and sponsoring programmes. Furthermore, they are committed to target achievement in the framework of social responsibility, in that social standards will not only be checked in their own products but also in the products of the suppliers and partners. In addition to

their social commitment, successful companies also regard ecological aspects. These include the conscious development of energy efficiency in their own facility management, reduction of CO_2 emissions, ecological evaluation of investment and acquisition decisions, or the use of renewable energy. This helps to build-up a strong market image for the long-term, which is necessary to satisfy customer needs in core markets and to adapt to new trends.

In order to sustainably secure the continuity of the company, a high level of innovative capability is essential. This also includes efficient process chains as an important criterion for a successful company. During the manufacturing of products and services, companies emphasise highest quality, which is continually checked and improved. Furthermore, companies aspire not only unique innovations, but also continuous product improvements. In order to achieve this, they maintain constant contact with the customers and desire direct feedback about the offer of products and services. From this procedure, companies expect to gain the ability to learn continuously and therefore, aim for a permanent improvement process within the company. The starting point of the change process is the company's changing macro-environment and the sustainability strategy formed in accordance to that.

Training questions:

1. **Why were end-of-the-pipeline solutions as described in the first section not popular amongst business?**
2. **What management practices do sustainable companies engage in that their non-sustainable counterparts do not do systematically?**
3. **Explain, in your own words, what the triple-bottom-line framework entails.**
4. **The article "Why sustainability is now a key driver of innovation" describes 5 stages in which companies can innovate. Provide 2 examples of companies for the first for four stages.**

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CHAPTER 3:
WHAT IS INNOVATION?

Sven Pastoors/Ulrich Scholz

Summary

Achieving growth is one driver for innovation in corporations: "Companies cannot grow through cost reduction and reengineering alone... Innovation is the key element in providing aggressive top-line growth, and for increasing bottom-line results" (Davila et al., 2006).

By fostering innovation, companies particularly strive for the following goals:

- Competitive advantages over the competition.
- Increase of turnover and earnings and thereby financial independence.
- Increase of market share and long-term customer commitment.
- Improvement of the company image.
- Long-term growth, securing jobs and creation of new ones.

A company can only overcome the changes in the internal and external environment by means of innovation. Therefore, many companies perceive the innovation process as the starting point for future-oriented development. Innovative ideas can only take hold, however, if the market accepts them. Thus, the innovation process must not only be organised under purely technical aspects, but in particular, must be designed as an interdisciplinary process in the case of technical innovations, and the employees must be involved in all the important company departments. The tasks of research and development departments (R&D) are an implementation process upstream of the innovation process. The innovation process ends with the introduction of the new solution (the new product) into the market, or internally in case of process innovations.

3.1 The term innovation

Innovation[14] can mean a real world-first, or a subjective novelty from the point of view of an individual company. Thus, there are a large number of definitions. The scientists Vahs and Burmeister define an innovation as a targeted implementation of new technical, economical, organisational or social solutions, which are aimed at reaching the company objectives in a new manner (Vahs/Burmeister 2005, p. 15.).

The statement by Hauschild supplements this definition. He defines innovations as qualitative new products or procedures that differ perceptibly from the previous situation (Hauschild 2004, p. 56). At the same time, according to Schumpeter, a differentiation is made between product, process, social and organisation, and business innovations.

14 The word "innovation" comes from the Latin words ‚novus' meaning ‚new' and ‚innovare' meaning ‚to change something'.

A further definition of the term innovation can be found at the Organisation for Economic Co-operation and Development (**OECD**):
"146. An **innovation** is the implementation of a new or significantly improved product (goods or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations.
147. This broad definition of an innovation encompasses a wide range of possible innovations. An innovation can be more narrowly categorised as the implementation of one or more types of innovations, for instance product and process innovations. This narrower definition of product and process innovations can be related to the definition of technological product and process innovation used in the second edition of the *Oslo Manual*.
148. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be *new (or significantly improved) to the firm*. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations". (OECD 2005, p. 46)

A factor that currently influences innovation is the increasing trend towards internationalisation. This trend expresses itself through increased competition, to which companies in turn will have to adjust to redefine markets and the global position. Additionally, there is a clearer individualisation of customer needs, an increased customer focus on the topic of sustainability and a reduction in product life-cycles. Through this increasing innovation speed, companies are placed under increasing pressure to succeed.

3.2 Types of Innovation

A distinction is made between innovations in literature using three different criteria:

- The field of the innovation
- The degree of newness of an innovation
- The type of formation

Assignment according to the area of the innovation

According to Schumpeter (Schumpeter 1939, p. 256), innovations can be assigned corresponding to the areas in which they can be implemented. Schumpeter differentiated between the following innovation categories:

- Technical innovation: The term "technical innovations" describes all forms of practical implementation of technical knowledge in new or improved products and production procedures.
- Service innovation: The services are the focal point of service innovations. Burr defines service innovations "as primary implementation of a new kind of service idea in the market." (Burr 2007, p. 75)
- Business model innovation: A business model innovation is a conscious alteration of an existing business model or the creation of a new business model, which better satisfies the needs of the customer than the existing business model (such as IKEA, Dell and Zalando).
- Design innovation: Design innovations are innovations which are primarily oriented for the customer benefit like, for example, the usability and life expectancy of a product.
- Social innovation: The term "social innovation" refers to the process of formation, implementation and dissemination of new social practices. Social innovations are directly related to the search for solutions for social problems and challenges. At

the same time, it is often about new types of communication and cooperation (Howaldt /Jacobsen 2010).

Assignment according to the degree of newness of an innovation

The typecasting of the individual types of innovation can be oriented regarding its market novelty value. In this sense, *new* can mean a real world-first, or a subjective novelty from the viewpoint of an individual company, employee, etc. The novelty is not the only part of an innovation; rather it must cover a requirement; it must appear beneficial in the eyes of the user. Here a differentiation is made between:

- Real innovation: a new solution to an existing problem creating new customer benefits.
- Quasi new products: expansion or modification of existing products
- Me-too products: differentiation in the image of the product and the price

Assignment according to the formation of an innovation

Furthermore, innovations are differentiated according to their type of formation:

- Within the **closed innovation** process, the innovators are only within the company
- Within the **open innovation** process, the company not only depends on its own innovative power, but it also uses external information and expertise (above all with the aid of the internet).

3.3 The (closed) innovation process

A company can only overcome the challenges that arise from changes in the framework conditions (i.e. the changes in the internal and external environments) by means of innovations. Therefore, many companies perceive the innovation process as the starting point for future-oriented development. Innovative ideas can only take hold, however, if the market accepts them. Thus, the innovation process must not only be organised under purely technical aspects, but in particular, must be designed as an interdisciplinary process in the case of technical innovations, and the employees must be involved in all the important company departments. The tasks of research and development departments (R&D) are an implementation process upstream of the innovation process. The innovation process ends with the introduction of the new solution (the new product) into the market or internally in case of process innovations.

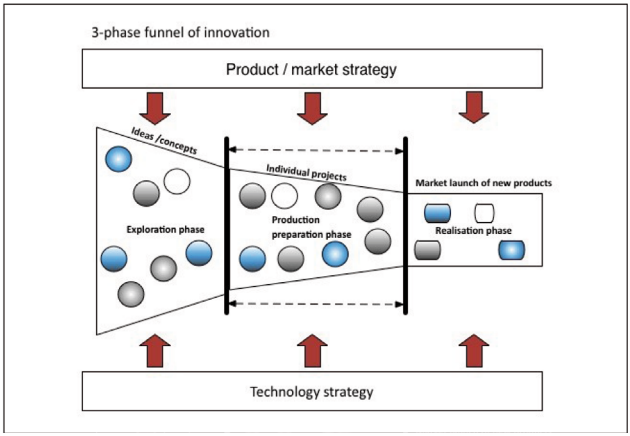
In doing so, the bottleneck is not the lack of good ideas or non-existing technology, but primarily the willingness and courage to implement this quickly into the market. Besides, the new products and services have to be seen in a social context. Therefore, a visionary management is needed that recognises the need of a social change process and creates a culture of innovation, creativity and readiness to take risks within the company. In practice, innovation models are used as a management tool, for example, in order to standardise real running processes. The designs of the process models, which are dependent on the respective goals of the company, are just as diverse as the possible applications of the models. Thus, there is no single correct process model.

3-phase funnel model of innovation

There are numerous process models in innovation management given in literature. One innovation process model is the 3-phase funnel model (Figure 3.1). This model also takes into consideration both

the innovation search fields and the influence of the product/market strategy of a company and its technology strategy on the development of innovations.

Figure 3.1: The "3-phase funnel" of innovation

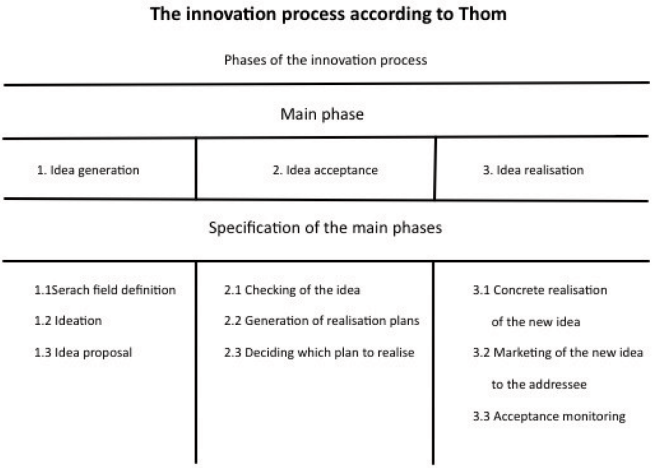


Source: Hermann/Möller2006, p. 101.

Innovation process according to Thom

Thom already developed a practical model for innovation which is split in different phases, as shown in Figure 3.2 (Thom 1992, p. 9). The special feature in the process model by Thom is that he has further specialised the main phases and has thus provided handling instructions for the implementation of the innovation process. Consequently, with the aid of specification rules, the workflow for structuring innovations was established for the first time.

Figure 3.2: The innovation process according to Thom



Source: Thom, N., 1992, p. 9.

Thus, it becomes clear that there is no standard model that is suitable for every application. Rather, due to the different targets, emphases and questions, the different models have found their validation and recognition in literature. It is common to all the models that the starting point of innovations is change in the company's environment. The company must not see this as a threat, but instead as an opportunity. Then, opportunity is sought in the presented search fields. Furthermore, idea generation, idea evaluation and idea realisation are derived from this.

3.4 The open innovation process

Contrary to the conventional closed form, with open innovation the innovation process opens up beyond the company's boundaries. In doing so, internal and external ideas flow equally into the development of new products, services and business models. The information exchange and networking of expertise are typical for the open innovation process. They support companies furthermore by optimising the process procedures both according to new technical aspects as well as the customer wishes. The opening of organisation innovation processes and the active use of ideas from the external world thereby lead to expansion of the own innovation potential (Reichwald/Piller 2009, p. 150 seq.; Gassmann/Enkel 2004, p. 14 f.).

Open innovation can be divided into three areas:

- Outside-in: The outside-in process is the integration of external knowledge in the innovation process. The ideas come from outside and are used for innovations within the company. The expertise of suppliers, customers and external partners (e.g. universities) is used to increase the quality and speed of the innovation process. Already in 1986, Eric von Hippel described the lead-user method – the integration of particularly advanced consumers in the development of new products. The outside-in process illustrates that the place in which new knowledge is created need not correspond with the place where the innovation is made (Gassmann/Enkel 2004, p. 6).

- Inside-out: The inside-out process is the externalisation of internal knowledge. New processes are already created in the company, and these are tested with the aid of customers and for example outsourced through the foundation of a start-up. Companies use this process, for example, to earn licence fees for patents and innovations, which are not used for the operative business activities. The inside-out process illustrates that the place in which knowledge or innovation is created need not

correspond to the place where the innovation is used and implemented into new products (Gassmann/Enkel 2004, p. 7 seq.).

- Cooperative Process: The cooperative process is a combination of the outside-in and inside-out processes: the internalisation of external knowledge in connection with the externalisation of internal knowledge. During this, mutual ideas are developed. For example, processes between manufacturers and suppliers are optimised through collaboration. The creation of standards and the setting up of markets are the focal points of the cooperative process. The environment is actively integrated during the development of the innovations. A market is generated around the innovation through the simultaneous externalisation of this innovation (Gassmann/Enkel 2004, p. 10 seq.).

Prerequisites for implementation and use of open innovation are the willingness to be open to the ideas of others and to share knowledge with others. The company actively connects customers, suppliers, business partners, external creative individuals, students, lateral thinkers and experts from other sectors with different backgrounds in idea development. At the same time, knowledge, new ideas and innovative concepts are mutually generated through the external source of ideas.

The Internet is the driver of current development in the area open innovation and the open innovation process. Consumers and users communicate in Web 2.0 and in social media networks independent of time and place. New on-line applications, like user design tools, internet-based test and analysis tools, and ideation platforms support mutual idea development. (Die Ideeologen, 2014).

In today's business environment, where changes occur very rapidly and technological development is very fast, open innovation rapidly gains popularity. This is accelerated by ever increasing research and development costs, that are simply too high to be paid for by

just one company or institute. Moreover, companies have started to realise that cooperation might be more profitable than focusing too much on competition. As a result, innovation is very often carried out in a cooperation of numerous parties, sometimes including traditional competitors. This typically happens in so-called valleys, of which the most famous one is Silicon Valley. Companies that work in related industries and develop similar technologies prefer close to each other, as this enables close cooperation and the creation of important technology networks.

A different way that external information can be internalised is through knowledge-spill overs, which are especially apparent when two or more companies cooperate for the development of new technologies. This, however, is not always intended by any of those companies, especially when they work together with competitors in their product markets, and hence is seen as a risk, where valuable information is spilled over. Joint ventures and strategic alliances typically struggle to protect his knowledge from their partners. Although the effects are similar to those in Cooperative Processes, as the companies do not intend this, this is not considered to be open innovation, but a negative side effect of close cooperation.

Types of open innovation

Crowdsourcing
Companies design on-line idea competitions on open innovation platforms, in which creative people from every sector can take part and generate new ideas. With the aid of open innovation communities, Internet users develop solution suggestions for the targeted problem. At the same time, organisations use so-called swarm intelligence. (Die Ideeologen, 2014)

Co-Creation

Co-creation is a further opportunity to support idea development through open innovation processes. The difference between co-creation and crowdsourcing is that the idea givers must work together on a solution. (Die Ideeologen, 2014)

Lead-User Innovation

The users are often hidden behind the development of successful products. This process is also known as customer innovation (*user innovation*). The innovations developed by the users are as diverse as the requirements of the customers are different. As a rule, these come about purely from the customer's own need. (Vahs 2014, p. 269) Customers (both user companies and individual end consumers) therefore do not only further develop existing products according to their needs, but even generate totally new products. Inventions offer huge economic potential for companies, but also risks (Vahs 2014, p. 269). Creative customers take an active role in the innovation process and innovative companies invest a lot of money to seek them out as sources of innovation.

Sustainable lead user process

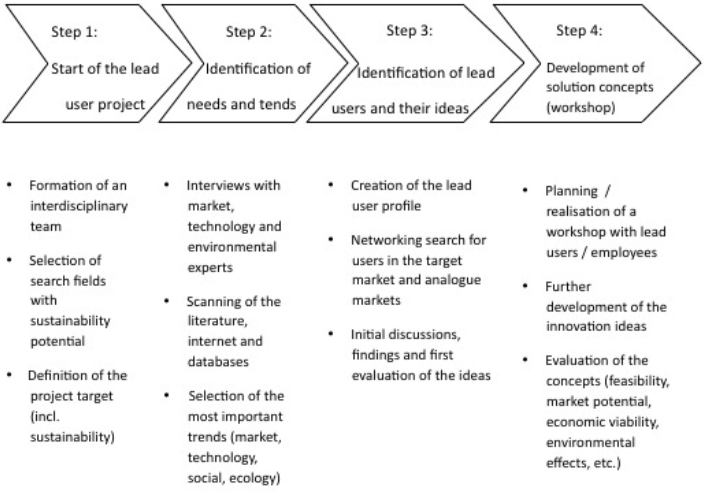
In the past, customers told the manufacturers their wishes and preferences, often primarily in the framework of market research questionnaires. But because questionnaires are aimed at the masses, they almost never register the needs of advanced customers, the so-called Lead Users. Lead users are advanced customers, whose needs are seen as representative of the market. They are generally well educated, highly qualified and race ahead of the masses. Furthermore, they recognise early the requirements for a product and are also generally able to name them. Lead users therefore know the needs before they appear in the market. (von Hippel 1986, p. 796 f.)

By creating solutions for their own problems and requirements, lead users themselves also profit from their innovations. The motivation for the *lead user* to develop innovative products lies therefore in their own use of their new products and not in their commercial marketing, as it does for companies. *Lead users* often find no products on the market that suit their market leading requirements. *Lead users* are therefore always a step ahead of the market. Therefore, it is only a matter of consequence that they are used as the predictors of customer requirements. Companies from the widest range of sectors are already making widespread use of this and have been involving *lead-users* in their innovation projects for many years, like for example Johnson & Johnson, 3M, HILTI, Deutsche Telekom or Kellogg's (Herstatt et al., 2001, p. 3 f.). They have successfully further developed their range of products in this way (ibid.). Vahs and Brem advantages and disadvantages of this method as follows: "In this respect, the sourcing and evaluation of customer information involves certain risks and is often connected with high financial costs and a great deal of time. But it also ensures the consistent alignment with the innovation process to the customer benefit and thereby reduces the risk of failure during the launch of the new product onto the market." (Vahs/Brem 2013, p. 269)

The lead user approach according to Herstatt, Lüthje and Lettl is made up of a multi-step process in which the companies use their customers in order to further develop their products. Companies organise workshops with their advanced customers, together with employees from marketing and technology they then design concepts that will be tested for their marketability with average customers in a later step. The individual steps in the sustainable innovation process were summarised by Herstatt, Lüthje and Lettl as shown in Figure 3.3. The starting point is the formation of an interdisciplinary team and the selection of search fields with sustainability potential. In the 2nd phase, the needs and requirements of the customer are investigated, the customer insights. In the 3rd phase, the user profile is created, and the research starts in the target and neighbouring mar-

kets. In the 4th phase, solution concepts are developed together with potential users. Those affected become those involved; the customer plays an active role in the innovation process.

Fig. 3.3: The four steps in the sustainable lead user process according to Herstatt, Lüthje and Lettl



Source: Herstatt, Lüthje, Lettl, 2003, p. 62.

An example of lead-user innovation in practise is often seen in computer game development. Blizzard Entertainment, the developer of popular games such as World of Warcraft, StarCraft, Hearthstone and Heroes of the Storm, ask a small group of interested and motivated players to play their games and share feedback with them. This so-called beta testing allows the developer to make changes to the utility of the game, using the knowledge and preferences of passionate gamers that can be considered as a proxy of other gamers as well. Through months of beta testing, the developer is able to make

valuable changes to its products/services that provide more value to its customers.

Training questions:

1. **Name the targets the companies are striving for through innovations.**
2. **Define which innovation categories are to be decided between.**
3. **Name and define the typification of the innovations and support your statements with respective examples.**
4. **Name and define the four steps in the sustainable innovation process according to Herstatt, Lüthje and Lettl.**

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CHAPTER 4:
SYSTEMATIC INNOVATION

Rob van Dun

Summary

Innovation is the process of making an idea or invention valuable. To facilitate that process, systematic innovation is required, which entails the purposeful and organized search for changes and systematic analysis of the opportunities such changes might offer. The overwhelming majority of successful innovations exploit changes in any or more of the following seven sources for innovative opportunity. These seven sources can be divided into internal and external sources.

Internal sources

Characteristic for the internal sources for innovative opportunity is the fact that they are typically only visible to those operating within the company or industry. As a result, it is unlikely that non-experts or those individuals that lack knowledge of that specific sector are able to recognize these opportunities.

1. The unexpected successes, failures and outside events.
2. Incongruities.

3. Process Needs.
4. Industry or Market changes.

External sources

In contrast to the internal sources, the external for innovative opportunity are not only visible to industry or company insiders, but to a broader public.

5. Changes in Demographics.
6. Changes in Values and Behaviour.
7. New knowledge and Technology.

4.1 Introduction to systematic innovation

Finding a precise definition of innovation is difficult, as there exists a myriad of different opinions of what entails innovation and what does not. In this chapter, a rather extensive definition of innovation is used, in order to cover all different sorts of innovations with it:

Innovation is the process of making an idea or invention valuable.

Essential to this definition is that innovation itself is a process, rather than an outcome. It is a task that needs to be done, rather than the outcome of this very process. In popular use, "an innovation" is any new idea that is brought to the market or put into practise. Defining innovation as a process has the advantage of being able to influence it, defining a starting and ending point. For something to be called an innovation, the outcome of the process needs to be of inherent value. That value can be interpreted liberally, being either value that customers are willing to pay for, or a process innovation that improves entire processes or organizational innovations that create a valuable contribution to a company's performance. Innovation includes all processes trough which new ideas are generated and con-

verted into useful products, services, processes, ways of organization and business models that in some form are novel. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers. Another prerequisite is that innovation must be economically feasible to put into practice or bring to the market.

There is a clear difference between innovation and invention. Many of the prerequisites of innovation do not apply to invention. It does not yet have to be valued, nor economically feasible. Inventions are new scientific or technical ideas. The can be patented if they are novel enough, provide utility and are non-obvious. The only requisite of an invention is that it needs to work. Essentially, it only is the idea itself and does not have to satisfy a specific need and does not necessarily have to be commercialized. However, inventions often provide the basis for technical innovation through which new ideas are transformed into new technologies that can then be applied to new products.

This book has a strong focus on sustainable innovation, either through means of process, product and service innovation. As such, it aims at both entrepreneurial "green" start-ups as well as established companies that feel the need to innovate in order to improve their (sustainable) performance – both in the short as the long-run.

For entrepreneur's innovation is the very tool by which they seek to leverage changes as an opportunity for different products and or services. It is capable of being presented as a discipline, capable of being learned, capable of being practiced. Innovation, therefore, is closely related to entrepreneurship but not limited to it. Entrepreneurs use innovations – of any kind – to seize opportunities in an ever-changing environment, either within an industry or changes in demographics, perceptions, values and knowledge (Drucker, 1985).

For the existing company, innovation is the deliberate application of knowledge, information on purpose to improve existing products, services, business models or ways of organization and seek opportunities to market new ideas through the creation of something valuable to (potential) customers. Also for them, innovation is of utmost importance, in some industries more than others, to sustain their competitive advantages.

Consider the following relatively old quote from Chad Holliday, CEO of DuPont: "We will not be able to sustain our businesses over the long haul because they are based on two assumptions that no longer hold. One is that cheap, unlimited supplies of hydrocarbons and other non-renewable resources will always be available. The other is that the earth's ecosystems will indefinitely absorb the waste and emissions of our production and consumption". (Holliday, 2001).

As the CEO of a petrochemical company, Holliday is aware of the changes within his industry and the overall environmental in an early stage and explains the need for his company to react to these changes through innovation. In order for DuPont to remain profitable in the long-run, they need to develop new processes and products in an early stage, or risk being overtaken by more innovative competitors that serve the same customers.

4.2 Concept of Systematic Innovation

Systematic innovation consists of the purposeful and organized search for changes as well as the systematic analysis of the opportunities such changes might offer. The overwhelming majority of successful innovations exploit changes in any or more of the following **seven sources for innovative opportunity**.

Those sources can be separated in internal sources, that are only visible within the company or an industry and some more general external sources in the macro-environment which are visible to everyone.

- Internal sources (within enterprise or industry)
  1. The unexpected
  2. Incongruities
  3. Process Needs
  4. Industry or Market changes

- External sources (outside enterprise or industry, in society or globally)
  5. Changes in Demographics
  6. Changes in Values and Behaviour
  7. New knowledge and Technology

4.3 Internal Sources for Innovation

Characteristic for the internal sources for innovative opportunity is the fact that they are typically only visible to those operating within the company or industry. As a result, it is unlikely that non-experts or those individuals that lack knowledge of that specific sector are able to recognize these opportunities.

The Unexpected

According to Drucker (1985), what he refers to as "the unexpected" is one of the most predictable sources for innovation. He distinguishes between unexpected successes, failures and outside events. For all three of those, something that happens unexpectedly is a symptom of changes that have already occurred. The fact that an outcome is unexpected indicates that the cause and effect relationships that some companies and their managers have internalised are no longer true. Without them noticing, something has changed that

causes an outcome to occur that disrupts their reality that is unexpected.

In short, possibly the best source for successful innovation is from an Unexpected Success or Failure. Exploitation of this requires analysis simply because an unexpected success is a symptom. Suppose a competitor is having unexpected success in a particular market segment. Management must find out why this is happening, asking themselves what it would mean to them if they exploited it. (Swaim, 2011)[15]

The unexpected success
Every now and then, companies find themselves wondering why some of their own or their competitor's products are such a surprise hit among customers. This is especially true if a new product or service is bought by customer groups that were previously unidentified or believed not to be interested. Something within that product causes it to be attractive to them. The same is true for a competitor's product of which everyone "knows" that it is a lousy idea and no one in his or her rightful mind should want to buy those products or services. When the competition shows that they were actually right, it might be hard for companies and its managers to acknowledge that they were wrong instead. When something is an unexpected success, it is indicative of a change in expectations, values or buying behaviour of a considerable number of customers. The customer, in the end, is always right. Managers and experts need to accept that they had not previously recognized these changes in order to use this specific source.

The changes in the market place simply happen, whether they like it or not. Rather than dismissing them, managers should seek to find out what exactly has changed and if possible for what reason. Al-

15 http://www.processexcellencenetwork.com/innovation/columns/failure-and-the-seven-sources-of-innovation/

though this might make them vulnerable, it might allow them to innovate based on these changes that seem to have happened. Once they have figured out what has changed, it is a fairly easy task to innovate further. After all, the product or service is successful already. A question that needs answering is what this specific success means for the company's other products, business units, target groups and most importantly their understanding of the market place.

The problem with unexpected successes is that they are often overlooked. Unlike with failures, successes might not ring any alarm bells and managers that focus merely on problem-solving might take them for granted too easily, without feeling the need to understand why they did not expect the product to succeed in the first place. This is one of the reasons why entrepreneurial management is important for both the existing as the new company. Its policies and practices should help managers spot those opportunities and should foster a more entrepreneurial mind-set.

Unexpected success is sometimes overlooked because of managerial hubris. Thus, it happens quite often that the initial innovator is not the one that is most successful on the market. When they don't endeavour to understand, what has changed underneath but a competing company does, the latter might be the one exploiting it. Hence, in many cases aware competitors are able to exploit the success instead and outperform the initial inventors in the end. This phenomenon is demonstrated by a Swiss pharmaceutical company that started to sell medication – developed for the human body – to the veterinarian market after the companies who had developed these medications refused to sell the drugs as veterinary medications because they felt to noble to do so (Drucker, 1985).

Another and fairly old example dates back to the early days when Marriott (nowadays one of the biggest hotel chains) was still a restaurant chain. Management observed that one of their restaurants in Washington, DC was outperforming all others in their chain in

terms of monthly revenues. Upon investigation, they found the restaurant was located across from the National Airport. This was before airlines served meals on planes and they discovered that airline passengers would stop by the restaurant and purchase sandwiches and snacks to take on the plane with them. Marriott met with the old Eastern Airlines and suggested they provide food to be served on the plane – thus the beginning of the airline catering business. Of course, now many airlines, in an attempt to control costs, have eliminated meals and passengers are left to bringing the snacks with them again[16].

The unexpected failure

Failures, unlike successes, cannot be rejected and are usually noticed. Unexpected failures occur when something happens that does not comply with the assumptions about reality everyone in an industry had been making about consumer behaviour. Although they might be noticed a lot more than the unexpected success, they still need to be investigated to expose the underlying changes. Innovators need to discover trends and customer values: they need to observe, analyse and listen. Innovation itself is perceptual meaning that it does not happen in a vacuum with one genius inventor cranking out one innovation to the next. It demands of the innovator to find out what happens in the market place, what customers want, how they react to things, why they act the way they do. The unexpected failure should be a starting point for managers and expert to figure out why a new product or service failed, even though they all knew it was going to be successful. That also applies to competitors as one company's failure might be turned into an opportunity by another.

16 Taken from Peter Drucker. Innovation and Entrepreneurship (1985). Page 327.

In Innovation and Entrepreneurship (1985) Peter Drucker illustrates how the unexpected failure needs further investigation with the example of the Ford Edsel: "Ford Motor Company developed a new automobile, the Edsel, in 1957. The auto's design stemmed from extensive market research about customer preferences in appearance and styling, yet the Edsel became a total failure immediately after it was introduced. Barely a soul wanted it. Instead of blaming the "irrational consumer", Ford's management decided there was something happening that was not in line with general automobile industry assumptions about the reality of consumer behaviour. After reinvestigating the market, they discovered a new "lifestyle segment" to which they quickly responded by producing the superbly designed and produced Thunderbird model – one of the greatest successes in US auto history. Will the highly acclaimed innovation, the GM Chevy Volt follow in the footsteps of the Edsel?"[17]

Incongruities

Incongruities are best defined as gaps between what reality is and what is expected to be reality. The reason for an incongruity is often not understood but it is considered a fact that incongruity occurs due to certain underlying faults. An incongruity is a symptom of change; a symptom of an opportunity to innovate. Like the unexpected event, whether success or failure, incongruity is a symptom of internal change within an industry, a market or a process. The incongruity might be visible to the people within or close to the industry, market, or process. Yet, it is often overlooked by the insiders due to a missing willingness to accept the change, which is why it is a source for innovative opportunity to start with. Solving the problem of incongruity, which in practise means aligning what actually

17 Taken from Peter Drucker. Innovation and Entrepreneurship (1985). Page 327.

is with the assumptions about the industry itself, enables managers to seize the opportunities that unfold before them.

Wasted efforts

Every now and then, the efforts of industry insiders do not seem to solve a particular problem. When that is the case, either the problem is unsolvable, or the efforts are directed towards a symptom, rather than a problem. Whenever reality is not fully understood, the assumptions of company insiders and even experts about what the problem consists of, is off. As a result, the efforts they undertake are futile. That individual that truly understand where the problem lies and thus has a good perception of what reality actually looks like, can get rid of this incongruity and solve them problem differently, leaving grant opportunities to innovate.

A striking example of the industries wasted efforts is that of traditional encyclopaedias. For hundreds of years, the encyclopaedia was the main source of knowledge and information for the majority of individuals. In its effort to include as much of it as possible, the leading publishers and perhaps most notably *Encyclopaedia Britannica* tried doing this by making them thicker, costlier and updating them more often to keep up with the rapid pace of developments and an ever-increasing interest in the global domain of its readers. All of the traditional companies focused on creating an ever-increasing volume. But that did not solve the problem, which was only solved when a new company challenged the established ones when it started creating an online encyclopaedia, with far more and always up-to-date articles, millions of contributors and billions of visitors. It is this *disruptive innovation* that caused the *Encyclopaedia Britannica* to cease being printed in 2012, finally realizing their defeat. The best thing, this "new" online version is free of charge and accessible to everyone, greatly furthering the knowledge of every individual on the planet. The wasted efforts of an industry give way especially to disruptive innovations, typically introduced by newcomers, rather than industry incumbents. When everyone else was focusing on

printing even larger volumes at even higher costs, the solution to the problem was printing nothing and making it free for everyone. You might have guessed it; Wikipedia is the company that saw an opportunity to remove the incongruity between the industry's efforts and what the problem actually consisted of. Obviously, it was new technology that gave way to this innovation too.

The misinterpretation of value

One of the most commonly occurring incongruities is the mismatch between what companies believe their customers value and what customers actually experience as valuable. This might seem unbelievable at first, but many companies have a poor understanding why their customers even buy their products. Sometimes, they even have a completely different opinion of what customers buy. This is most common in high-tech, where sophistication is often believed to be equal to value, although the opposite may be the case. Products can be (far) too sophisticated, leaving customers clueless about how they are supposed to use it. For some reason, many companies believe that more is more. Adding all sorts of features should be valued, in their opinion, because only then customers have it all.

Take a look at the outdoor industry and the often times overly featured products they make. Although some customers might be able to understand what all features on a backpack are supposed to do, many of them have no clue and never use ice-axes and crampons and by no means have the need to use those. However, those overly featured packs seem to sell, basing it on the number of backpacks that have so many cords and loops the user needs to be careful as to not get tangled. In essence, a backpack is a rucksack that sits on your bag comfortably and enables the customer to haul gear from place A to B. All the features on those packs support none of that and only seem to make them cumbersome and heavy, whereas simplicity and lightweight are for many customer important values.

It happens rather often that companies simply fail to understand what actually represents value to the customer. In the end, they believe that they are the experts? They know what is best for the customers. The fact that those irrational customers do not get it is not their fault, it is a lack of knowledge. Right? **Not at all**!

Companies are not paid to reform customers, but to satisfy their needs. The customer is always right. If many of them do not understand what a product is supposed to do, well, it means it does not convey value to the customer. Companies only get paid for providing value and in order to do that, they need to do something really well. Why else do customers pay the profit margins of those companies?

On the contrary, many customers get much more value from some products than companies even seem to realize. According to economic theory, their willingness-to-pay should be at least equal to the purchase price, giving them a surplus. They are happy and do feel anything but indifferent to the product or brand. Their manufacturers seem to truly understand what value is for that specific target group.

The companies that succeed in the market are those who align what the customer buys and what is being sold. Although this might appear silly, there often is a discrepancy here. Many readers will understand that a car is not merely a means of transportation from place A to B, it represents freedom, a certain lifestyle, and certain values. They are willing to spend fortunes on this, because the value it represents is far greater than what it technically is. On the other hand, who cares about the brand of a permanent marker? A marker does probably not mean anything to the customer, all he or she buys is a means to write something that does not wash of easily. The cheaper, the better probably.

To illustrate how great the innovative opportunities are, the airline industry serves as a good example. Within that specific industry, customer loyalty is a rare feat, especially for shorter trips. Their customers do not even buy them directly from the "shop" or airline website. Instead, they look for the best offers on websites that make a fortune on comparing airline fares. They will most likely select the cheapest option and switch from one provider to the next for as little as €1 or $1 difference. This is what made Richard Branson, one of the wealthiest Brits, so successful. He started Virgin Atlantic mostly out of frustration with the other airlines and realized that customers were probably willing to give up some "quality" in exchange for lower prices. He started out with only one Boeing 747 and now dedicates his life to adventurous and hyper-ambitious products that further the limits of what men is capable of through the fortune that he made in the airline and record industry. A wildly successful entrepreneur that was able to provide what true value is to the customer.

In similar fashion: Linux was a great operating system, stable and relatively fast. But, hard to operate. Microsoft Windows on the other hand was easy to use. Guess who won in that industry. The company that understands what truly represent value have started the race with a head start, as they can innovate in that specific direction, amplifying everything that they do and create a competitive advantage that is very hard to beat and what customers are willing to pay for.

Processes without progress

"That's just the way things go down here" or any similar quote hinting at unnatural and frustrating processes that are too easily taken for granted. Its users or operators have at some point in history accepted that it is part of the deal and do not longer look for alternative ways to do it. A while ago, they might have found themselves wondering how on earth anyone could work with something that counterintuitive, cumbersome or time-consuming, but did not find a way to solve it or did not care to try. Many people have come across those situations, assuring themselves and the people around them

that there is a better way. Yet, nothing has happened. When the logic or rhythm of a process is off, there exists an incongruity within that process. It is the symptom of change waiting to happen. A process needing to be innovated. A superior solution that almost sells itself. Of course, only industry or company insiders that work with that process understand them and those innovative and creative enough can turn their frustration in very rewarding process innovations. The incongruity within the rhythm or the logic of a process can easily be eliminated and converted into an opportunity when focusing on understanding the customers' needs and working on improving the process/the product accordingly (Drucker, 1985).

Process Needs

Just like the Unexpected and the Incongruities, the Process Need occurs within the process of a business, an industry or a service. Contrary to the first two sources, the process need is task-focused, rather than situation-focused. It aims to improve an existing process.

Many insiders, experts and employees that use or work with a particular process have identified the need to improve parts of it. That may be because they are cumbersome, wasteful, illogical, not routinely or any other reason. However, they are unable to define a solution to their problem, do not have an alternative and are stuck with the process as it is. They might have given up and have accepted that it is just part of their lives. The efforts to improve these "processes without progress" will eventually fade away.

Where these incongruities or inconveniences occur, they might not only cause frustrations but also opportunities to solve an immediate problem. It forms an opportunity to successfully innovate by solving that specific problem. This opportunity is only visible to industry insiders. Process needs occur when there is a weak or missing link in a process that needs fixing. Solutions can be complicated or rel-

atively easy, but in any case, the solution to the problem will be accepted instantly because it is "a better way". Given that everyone in the company or industry experienced the same problems, a process-based innovation is likely to be accepted because it is so "obvious", even though no one had thought of it before. An innovation that improves a process or a part of it soon becomes the standard and is typically successful.

Once upon a time, during the late 90s of the previous decade, Steve Jobs envisioned a product that would change the music industry and Apple's future forever. He wanted to attract new customers to the Mac "environment". At the time, his hub strategy involved making the Mac computer central to everything media related, ranging from videos to photos to music. At the time, however, the music industry struggled a lot with illegal downloads as Napster became increasingly popular. He knew that the future of music was in MP3 downloads, rather than the physical album that customers would buy at record stores (of which few have survived). When looking at competition and every other portable media player (PMP), his team at Apple noticed a couple of missing links within the process of using them:

- Transfer time from computer to PMP took too long for even an album's word of songs (up to 10 minutes for around 12 songs). USB technology was too slow;
- The storage space on smaller PMPs was far too low (typically only 1 album);
- The size of players with hard drives was far too big to be convenient.

All of these problems in the process of using an iPod were known to industry insiders, but it took ingenuity and a different approach to solve them all at once. The fact that Apple had a Toshiba 1.8" hard drive with 5 gigabytes of capacity laying around also helped them forward. Having identified the process needs for portable music players, his design team began to work on prototypes that would fix

them all. Within 6 months' time, just prior to the Christmas shopping season in 2001, the first iPod were being shipped. Two years later, in 2003, Apple would launch iTunes to change the music industry forever. Although many Apple fans and pundits alike questioned the iPod during the product's presentation, it was an instant hit among customers worldwide, changing the company's future forever. Remember: the high-tech sector was still in shatters after the dot.com bubble burst leaving many technological companies severely wounded. Without the iPod, there possible wouldn't have the iPhone and consequently no smartphone as we know it today. The iPod was, among other reasons, so successful as it fixed all the problems other PMPs had. For the interested reader, the iPod case can be found in the appendix of this chapter, illustrating the essence of systematic innovation, as well as entrepreneurship and fostering innovation.

Nota bene: Obviously, market and industry changes (the next source), as well as new knowledge were instrumental to the creation of the iPod. Most successful innovations are based on opportunities arising from different sources, if not almost all of them. This notion will be discussed at the end of this chapter.

Industry and Market changes

Sometimes, industry and market leaders neglect newcomers that aim to do things differently, simply because they surely feel that "that's not how it works around here". A couple of years later, they find themselves fighting these newcomers that now pose a real threat to their profitability, which proves to be a lost fight should this newcomer have reacted on changes in the industry or markets.

A company's strategy is always contingent on the environment. The industry, in particular, provides the rules by which the game needs to be played. Compare this to a game of chess (or poker) where different players pursue different strategies based on their assumptions

about how the others are going to play and what the rules are. When markets and industries change, and players are not able to change accordingly, they are playing chess on a checker board (which has 100 squares instead of the 64 in chess). Although the changes might even be visible to outsiders and seem obvious, incumbent companies often see them for threats, rather than opportunities. Rather than seeing what they can and need to change, they seek strategies that might protect them from having to change. A classic mistake, made by so many companies that lack entrepreneurial management or spirit.

Change in industries or markets are major opportunities for innovation. It requires a new answer to the question "What is our business?" Essentially, companies need to change their business models in accordance to those changes, which essentially is business model innovation.

Consider the differences between the consumer-packaged goods (CPGs) industry and retail of non-consumables (often referred to as durable goods). CPGs (or fast-moving consumer goods, both terms are used interchangeably) are those low-cost products that are sold/bought quickly and frequently, examples include food, soft drinks, batteries, pens, cosmetics, shaving products, laundry products et cetera. Generally, the products that are sold in supermarkets. Durable goods are those that are not consumed and have a longer lifespan and higher costs, examples include consumer electronics, sports equipment, toys, home appliances et cetera.

Looking at those industries, for a long time, there was little difference. Until rather recently, the markets for especially durable goods changed dramatically. For one, some physical products are not even physical anymore (think of books, magazines or music), but the places where they are sold are very different from before. All around the world, local stores are going bankrupt as they cannot compete with the newcomers any longer, for they have such an elaborate as-

sortment, have lower prices and consumers can find their way to their stores far easier. This goes for home appliances, garden equipment, toys, barbecues, televisions or laptops. Those newcomers in retail are Amazon and every other major online store that you can think of. They are the winners in these industries, where the traditional smaller or even very large stores are the clear losers. The ones that are able to survive are the niche players, the experts that have expertize and where it pays off to actually drive to the shop and get feedback, get advice.

On the contrary, in the CPG industry, your local supermarket is still the same as ever and hardly anyone will buy his or her groceries online. Two seemingly similar industries, yet they have developed very differently over the last decade. Yet, the wary supermarket will now offer an online store where you can enlist the CPGs you need and will bring it to your home at a time convenient to you, because they too realize that online is increasingly important. If they don't, someone else will. With many two income households where time, rather than money is scarce, this will be a "future" development.

Newcomers like amazon, Alibaba and other major online retailers have changed business processes massively. Department stores and traditional stores have fought it all the way, coming up with different ways to attract customers to their stores. They saw the internet as a threat, rather than an opportunity and now have to pay for it. They should have brought the store to the customer, offering what they needed.

Why is there such a difference between the industries? The answers are quite simple, yet fundamental to how those two industries work and differ:

- Firstly, CPGs are by definition low cost, meaning there are only minor absolute differences in price, although they may be high in percentage. Whether an avocado costs 40 cents or 80 cents

is a 100% difference, yet it only equals 40 cents. Not something the average customer is willing to investigate alternatives for. Economic theory teaches us that the percentage of the income spend on a good has a major effect on the price-elasticity on that good. In other words, customers do not really feel the difference if it is an avocado, whereas a 10% difference on a TV might actually be 100 Euro or Dollar. That's a major difference, probably something the average customer might be willing to spend some time online for looking for the best bargain.

- Secondly, CPGs are bought very frequently and do not get that much consideration. In addition to that, they have a relatively short shelf life and cannot be stored.
- Thirdly, CPGs are more of a commodity than durable goods. How much difference is there between batteries of brand X and Y? Not that much. Hence, there is no need for a massive assortment of different products in different colours, different sizes, different varieties as with consumer electronics, clothes and everything else customers buy online.

4.4 External Sources for Innovation

In contrast to the internal sources for innovative opportunity, the external ones are not only visible to industry or company insiders, but to a broader public. We differentiate between changes in demographics, changes in behaviour and values and new knowledge and technology. Many of these, you will find in the standard PEST (or any of the closely-related variants of this) framework, as they do indeed constitute the external environment. These sources for innovation are indeed all based on changes in social (demographics), philosophical (values), political (behaviour) and intellectual (knowledge and technology) environment. An important notion is that the external environment cannot be influenced by the company itself, which means that they need to adapt to any changes that happen within it.

Changes in demographics

The word demography stems from Greek, in which demos means people and thus is a picture of the people. That picture contains, among a great many factors the population's size, age structure, composition, employment, education status and income. Demographic changes thus consist of at least one of these factors changing. In innovation, changes in such demographics make for very reliable, unambiguous opportunities to innovate.

- One of the reasons that demographic changes are so clear is the fact that the lead times are very long. We have known for years that the baby boomers are currently all retiring, causing some major complications for healthcare and social security systems. It doesn't take a rocket scientist to understand that someone who is born today, will turn 18 in exactly that same amount of years. Although this may feel slow, it is actually very rapid. From the one day to the next, the kid will age by 1 year. That is great information for universities, driving schools or any company targeting 18-or-so year olds.
- A second reason for that reliability is the fact that it can already be studied what people of a certain age buy, how they behave or what they want. That means that when a large portion of the population is aging, they will most likely conduct themselves in the similar fashion.
- Another reason is that the changes are very unambiguous in a sense that they either change or they don't. Demography, which is the study of vital social statistics of a population will hence enable the innovator to know exactly by much it has changed (or will change for that matter) and when it is to be expected.

Given the fact that lead times are often very long, demographics are easily studied and that the implications of the changes are already observable, it seems almost too obvious to be a source for innovative opportunity. Yet, it is often overlooked just for that simple reason.

Demographic changes are believed to be slow, even though something might change from one day to the next. The fact that people see it coming for so long, and do have time to react well in advance, does not mean that it is slow. It is just predictable.

Despite the relatively recent focus on Millennials, Baby Boomer households in the US (born between 1946 and 1964) represent both the largest portion of the nation's household population (37.5%) and investable assets (45.5%). In total, they hold $14.5 trillion(!) in investable assets. Can you imagine the opportunities that this generation has on innovation? Combine that information with the fact that 42% of all baby boomers in the U.S. want to retire and live in the South Atlantic region (Florida) as well as the Mountain region (Rocky Mountains). That information is readily available but gets neglected too much. This creates a market for up-scale housing, golfing, cruise tours, toy stores for grant children, and medical centres in all of those areas.

In conclusion, for those genuinely willing to go out into the field, to look and to listen, changing demographics is both a highly productive and a highly dependable innovative opportunity.

Changes in Values and Behaviour

The meaning and the consequences of the following two statements are totally different. Either "the glass is half full" or "the glass is half empty". When these perceptions change, great opportunities arise. The facts do not change, just the meaning we give to it.

The perception of health care for example, which in the past was an area of little importance and now is considered to be one of the most important personal needs. The baby boomers mentioned before and even more so the generation before them had to be beaten into the hospital with a stick should their health be at stake. Nowadays, emer-

gency rooms are occupied with people having nosebleeds, splinters, headaches or anything of the sort. That is nor healthy, nor financially maintainable. We have started valuing health far more than previous generations and that creates tremendous opportunities for innovators in the health care and food and beverage industries. The superfoods of today sell for three times the price as a couple of years ago when they weren't considered superfoods, but just beans and berries. All of these examples show how over time perceptions, values and behaviour change. Why they change is irrelevant for entrepreneurs and innovators. All that matters for them is that something has changed, creating vast opportunities to innovate.

The meaning of sustainability has changed a lot over time and with it our societal values and behaviour. We buy products which we believe to be sustainable, we try saving energy and waste and consciously consider our ecological footprints. We value sustainability and behave accordingly, creating opportunities for sustainable innovations that could possibly be sold for a premium.

Let's combine changes in demographics and changes in values and behaviour and stick to baby boomers. The first baby boomers have now retired and started living in place like Florida and Colorado, where they spent their times strolling the beach, playing golf, walking through the mountains and enjoying the slow lives in those specific regions. Thus, they already worry about their health, they want to prevent any disease as much as they can. Health care used to be hospital care for the ill, nowadays it is shifting towards decentralized health centres, home care and so on. This creates opportunities to innovate in home care products and services. This gave rise to new innovations such as Intel's Health Guide. Microchip producer Intel created this device that is able to measure health indicators and communicate with a doctor directly. There are many examples of remote health monitoring, where elderly people have "devices" that they can use to monitor their health. Such innovations are based

on changes in demographics, values and behaviour, new technology and changing market structures all at the same time.

Figure 4.1: The Intel Health Guide

New Knowledge

New knowledge and technology, out of all the seven sources for innovative opportunity, is often believed to be the most important source for innovation. Although it is hot and generates a lot of attention, this is not per se the case. And even where that to be true, those innovations are just a relative small fraction of attempt to innovate in this area, as it is so risky. Much riskier than all the other sources due to some of the characteristics of knowledge and technology. Especially knowledge-based or technology-driven innovators need to make sure that their intended innovations are based on more than just this very source or they will fail. Rather than focusing on their idea or product, they need to gather as much valuable feedback as possible. They wouldn't be the first to overzealously focus on per-

fecting a prototype or product for five years before they even dare to show it to someone else who can't even begin to understand what the product is or what it does. That entrepreneur might than realize that what he has been working on for the last couple of years does not provide any value for anyone else and that he needs to get back to the drawing table to begin from scratch, but now incorporating the feedback that he received.

Existing high-tech companies sometimes have made the same mistake far too often, they tend to push a technology on the market which no one cares for, simply because they believe it to be superior to the previous generation of technology. Or they focus on what they believe quality entails; a product that is so sophisticated and has so many features that it can only be successful. So, ask your customers what quality is in their opinion. Bose and JBL make some of the best music speakers currently on the market. They are sleek, have good sound and – very importantly – are completely fool-proof having only a couple of buttons on them. In the 1990s however, every single manufacturer of stereo systems went over-the-top with regards to buttons, features, size, options, and equalizer. All for too complicated for the quintessential user that just wanted to play a CD. That happened because they were innovating upward on a more=more curve which entailed outcompeting on another on the number of buttons per square centimetre. I question whether customers already back then believed that to be quality.

An important characteristic of new knowledge is the fact that lead times are very long, even today where product life cycles are getting increasingly short. The term lead time describes the period between the emerging of knowledge, via its transformation in a workable technology till this technology is used in products for a reasonable price. That lead time may still be up to 25 years. Even some of the greatest innovations of recent times, the smartphone or Tesla's electric car, are mostly based on relatively old knowledge such as computer, touch-screen technology, and battery technology. It took so

long for all of those different technologies to be mature enough to actually create a smartphone or electric car to sell them successfully.

The fact that that a wide range of multiple technologies is used in high-tech products is another characteristic, which is referred to as the convergence of knowledge. A product such as the smartphone or electric car can only be produced when all sorts of different technologies have converted and are mature or developed enough to work. The first modern-era electric car was produced by General Motors and even though they leased out some of them, it still had limited range and came at a high price. And even Tesla Motors found it hard in the beginning to make it work. Elon Musk, CEO of the car manufacturer always made it his mission to produce a reasonably priced car. But to achieve that, he had to introduce the Roadster and Model S first to work on this technology a bit more and to reduce costs enough to finally produce his magnum opus which is the Model 3 that was unveiled March 31, 2016 and only distributed in 2018.

High-tech and knowledge-based innovators need to consider their business models extremely carefully as it is so turbulent and hard to grasp. They might need to develop a complete system that creates the infrastructure and environment to use that new knowledge. An example of this is Thomas Edison. He invented the light bulb in 1879, but was unable to sell it as there was no mass-electricity. After all, why would people want electricity when there was no use for it at all? There was no infrastructure whatsoever. So, Edison went ahead to innovate in the mass distribution of electricity, which was the necessary infrastructure for him to sell his light bulbs. In 1880 he succeeded spreading electric light, beginning in New York City, after which the rest of the world followed rapidly.

Training questions:

1. **Explain, in your own words, why companies should seek innovative opportunities within their internal and external environment.**
2. **What is the difference between process needs and customer needs?**
3. **Why are changes in demographics such a reliable, unambiguous and transparent source for innovation?**
4. **Explain in your own words the unique risks of high-tech and knowledge-based innovations.**
5. **Explain what sources of innovative opportunity are exploited by Apple in the iPod case study.**

Recommended literature:

Schumpeter, Joseph A (1976). Capitalism, Socialism and Democracy, New York.

Drucker, Peter (1985). Innovation and Entrepreneurship: Practice and Principles, New York.

Christensen, Clayton M. (2003). The innovator's solution: creating and sustaining successful growth, Harvard.

CHAPTER 5: ENTREPRENEURIAL MANAGEMENT

Rob van Dun

Summary

Entrepreneurial management is an important requirement to make innovation successful. Not only for start-ups, but also for the existing companies which want to incorporate innovation. Where a start-up may lack "the management" it needs, an existing firm needs to adopt entrepreneurship and policies and practices that enable it.

Established firms need to focus on the opportunities, rather than the threats to profitability that they face. In order to do so, they have to:

- View changing environments not as threat, but opportunity.
- Find out about their competitors believes
- Enable and support entrepreneurial employees
- Shift their focus and resources towards opportunities
- Perceive sustainability as an opportunity

With regard to the structure of the company, existing firms face two major challenges: To separate the new from the old and its responsibility for innovation.

Start-ups face completely different challenges, they need to manage their innovativeness and create sustainable ideas, business plans and the company that is needed to bring an innovation to the market. The challenges pertaining to start-ups include:

- Validation of the idea to provide value
- Defining of the business model
- Focus on the market, rather than technology or the initial idea
- Human resource management to ensure they have enough personnel to facilitate fast growth
- Financial funding to keep things going

5.1 The significance of entrepreneurial management

Entrepreneurial management is one of the most important requirements to make innovation successful. Not only for the new venture, but also for the existing business that wants to incorporate systematic innovation. Where a new venture lacks "the management" it does need, an existing business needs to adopt entrepreneurship as well as policies and practices that enable it.

In academic literature, there is a lot of debate about what entrepreneurship entails, raising the question what an entrepreneur than is. Although this is an interesting debate, we use Kuratko's (2009, page) definition of the entrepreneur: "an innovator or developer who recognizes and seizes opportunities; converts these opportunities into workable/marketable ideas; adds value through time, effort, money or skills (…)" (Kuratko, 2009, p. 4). Arguably, this definition on the one hand excludes those individuals who set up their own firms as a means to be more flexible or self-employed, rather than doing anything new or innovative. On the other hand, however, this definition leaves room for what is often called *intrapreneurship* (i.e. entrepreneurship within an existing firm), which is gaining popularity (Duncan et al., 1988, p16-21). Moreover, this definition explains that

innovation and entrepreneurship are closely related topics, since entrepreneurs apply innovation as a tool to do something different in order to be successful.

Entrepreneurs that set up new businesses obviously need to do something innovative, whether that is providing new products or services, finding new ways how to market them or a new way of organisation that adds value. They have to stand out from the rest in order to be able to compete. They cannot be considered to be one of the many. For that, they need to innovate. Once they have done so, they need to learn how to manage their new businesses. Entrepreneurship requires the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit.

Entrepreneurship is not exclusively required of the entrepreneur or start-up companies, but of any organisation that aims at innovation. In line with Drucker, entrepreneurship will be defined as the systematic search for opportunities and exploitation of innovations to create value and economic growth and the management of all the challenges that occur throughout this process (Drucker, 1985, p143). As a result, entrepreneurial management than "involves the specific management behaviours which entrepreneurs must engage in, in order to drive the market process and produce innovation" (Stokes, D. & Wilson, N. 2010, p34). As mentioned earlier, this applies for both new and existing companies, although they face completely different challenges.

5.2 Managing an existing firm

The existing firm, and in particular a very successful one, typically struggles to become or sometimes remain innovative. The managers of companies such as Nokia and Motorola where not asleep at the switch when Apple produced the first smartphone, they simply

did not recognize that customers might actually desire such a phone, and believed that their tried-and-true technology was superior to that of Steve Jobs' firm.

Both firms had in common that they were the leading companies in respectively the European and American market. They already produced phones that had access to the internet (e.g. Nokia's WAP), and seemed to know everything about their customers. But why did they fail? And, why specifically these two renowned and leading firms?

Companies that are successful "know" the rules of an industry and understand what their customers require. They have internalized some cause-and-effect relationships, which always occurred in the past, which constitute their reality about their industry and business. They know which button to press in order to gain market share, they seem to know everything. Until their reality is shattered…

Sometimes companies seem unable to adapt new policies and practices when the environment they operate in changes. Instead, they copy what made them successful in the past. That might work for a while. But in rapidly changing environments (such as the mobile phone industry), copy-pasting what made a firm successful in the past might not be effective on the long-run. What was successful in the past might no longer work. Unable to adapt to the changing environment and with management pressing the same buttons, they are quickly replaced by those companies that are more reactive, that are capable of understanding the new rules and how this influences their reality. That is why it is so hard to stay number 1. Ask any sports coach how hard it is to win back-to-back championships, tournaments or trophies. Only the best in their game are able to do this, at the expense of hard work and adapting to changes in the environment. As the reigning champion, you are the one to beat and everyone else is trying to achieve just that.

Additionally, firms can develop managerial inertia: the phenomenon whereby managers fail to update and revise their understanding of a situation when that situation changes, a phenomenon that acts as a psychological barrier to organizational change. (Huff et al., 1992, p55-75) Such failure to revise their "law of nature" leaves even the most successful managers vulnerable to failure. Hence, change is key for any firm to prevent this phenomenon and closely scan their environment for changes that affect their business. Thus, the existing firm needs more entrepreneurship, managers and employees that are willing to accept change and seek out opportunities to cope with this. In order to remain or become entrepreneurial, existing companies have to confront their business-as-usual and to be willing to change. Fortunately, though, even those who are not natural entrepreneurs and risk-seeking adventure junkies can learn entrepreneurial management. For the typical manager or employee, however, this means facing a couple of tough challenges.

To academics who want to study literature on entrepreneurial management, most notable are the original works of Peter Drucker (1985), who defines 4 major challenges, as well as Robert Hisrich, Michael Peters and Dean Shepherd (1998), who establish similar but slightly different barriers for success. The following challenges combine both Drucker's and Hisrich's work.

5.2.1 Change, hit the ground running

Most of us simply don't like changes, both in our personal and professional lives. As a result, we try to avoid it as much as we can. And who may blame us? After all, it makes perfect sense not to be willing to even perceive and accept changes. Changes poses all sorts of threats as we feel unequipped to deal with new situations. For our ancestors, change meant having to deal with new environments, different predators and creepy crawlies that were either edible or poisonous. In similar fashion, when our (business) environment changes, we have to deal with new players and to learn new things. The

scariest of all is not being able to continue business-as-usual because the context has changed. This changing context, however, is exactly the reason why companies need to adopt change and create mechanisms to cope with it. Here follow some:

1. Be eager to innovate: This requires acceptance of change as a stable, not an exception to the rule. Provide incentives for managers and employees to look out for new opportunities and spend their time working on new ways to solve existing problems. Google, for example, gives its engineers time to spend time on passion projects that creates unforeseen ideas and technologies they might want to introduce later.

2. Stop focusing on products and business units that no longer sell: When products reach the peak (or maturity phase) of their respective product life cycle it is time to stop focusing on them. They are bringing loads of money already. Rather than making drastic changes to those products, focus on building operational excellence through close cooperation with your customers. Use this cooperation to obtain feedback as to make your own product obsolete. Spend your research and development (R&D) budget on new products or services. The same goes for complete business units or product lines for which demand is declining. Rather than spending all of your energy on solving the problems of existing products, you should focus on opportunities.

3. Share success stories: According to Drucker (1985), the unexpected success can be made transparent when it is discussed during management or team meetings. Instead of focusing on the problems that need to be solved in the short run, discuss the (unexpected) successes. Reward managers and employees that innovate. Make innovation and innovative output part of the management information or key performance indicators that are discussed during those meetings. The main goal of all this is to shift the focus from problem or threat towards embracing change.

4. Make someone responsible for innovation high-up. Appoint a Chief Innovation Officer that oversees all things innovative for many departments. He or she has to ensure that the division management gives the employees time and money to develop new ideas.

5. Get rid of your arrogance: Even if you believe that you know what's best, don't underestimate the power of trends. Small competitors that all of a sudden start doing something completely different might not desperate, but could have spotted developments that you simply haven't seen yet. Study the reasons why they are acting differently. The same goes for new players that enter your industry or market. What do they do differently? Focus on the assumptions that underlie their products/services and find out which tidal wave they could be riding. Simply because you are bigger or better at the moment does not mean you will be in the future. Ask Nokia, Motorola and BlackBerry employees what happened to their companies (fun fact: BlackBerry is headquartered in Waterloo[18], Canada)

6. Measure innovative performance: Set up key performance indicators (KPIs) with a strong focus on innovative output. How much of your sales are generated by newly introduced products? How much of your revenue is spent on R&D and how does that compare to your competitors or the industry average? Which new products/services exceed expectations? Using these KPIs will direct your focus towards innovative output, expose unexpected successes and failures, and creates a sense of urgency.

18 Waterloo, a city in present-day Belgium, is mostly known for Napoleon Bonaparte's defeat on 18 June 1815

All of the measures above have one common goal: adopt and embrace change. By implementing some of these measures you force employees to think long-term. Installing policies and practices that provide incentives to innovate should propel your company forwards. Don't be scared to make drastic decisions. Realigning your business with the changing environment is of paramount importance if you want to be successful not only now, but also in the future.

Take Dutch technology giant Philips as an example. They analysed that in two of their at-the-time most important business units (Consumer Electronics and Lighting) they were not as competitive as before. This was largely due to the fact that these technologies were relatively old, attracting many low-cost and commoditizing competitors from South East Asia. As a result, they expected the financial performance of these divisions to decrease in the coming years. Although Philips had traditionally always made lighting products and consumer electronics products (mostly notably radios, TVs, CDs et cetera), they knew that they had to sell these divisions they were not so competitive in any more, and focus on their relatively new but more innovative and promising Healthcare and Consumer Lifestyle divisions. This massive change required Philips to redefine their purpose and markets. It completely changed everything they did. They would not have done this if it would not have been absolutely necessary. However, they understand perfectly well which division or products would no longer sell in the future. As the Philips example illustrates, when companies are willing to perceive and adopt change, they will hit the ground running.

5.2.2 From Threat to Opportunity

One of the most harmful threats to entrepreneurship is having a risk-averse corporate culture. Most managers focus on ad-hoc decision making, minimizing risks and putting out all sorts of fires. All

of this screams short-term, often at the expense of recognizing and seizing long-term opportunities.

1. View changing environments not as threat, but as opportunity: Changes to the status quo of business are often solely perceived as a threat, but it only is that if you are unable to change. Key to your success is the ability to understand these changes in an early change and not get surprised by them. If you accept that changes are happening (both in the external and internal environment), you can pre-empt those changes by figuring out how they can work in your advantage. This, obviously, requires a good understanding of where major changes happen (see chapter 4 *Systematic Innovation)*. Continuously ask yourself what major trends you are able to recognize and what this means for your business specifically. Find out where there is a silver lining to be found. Can you use new technologies to enter new markets? Can demographic changes help you find new target groups?

2. Find out about competitors' believes: Competition surely poses a threat in terms of your firm's profitability. You need to watch them closely and figure out what they are doing, but more importantly where they are going. If all of a sudden they change directions or develop new products, which you consider questionable, you have to ask yourself why they changed. They may have a very good reason for that. Perhaps, they have recognized trends and developments that you are not aware of. What's an opportunity for them could be an opportunity for you as well. So, figure out what it is.

3. Enable and support entrepreneurial employees: Your own employees can be a tremendously valuable source for creative solutions and new ideas. Opportunities are not visible to all of us simultaneously as they are largely dependent on people's backgrounds and experience. (Shane, 2000, p.) That means that every employee might see different opportunities. Don't judge their ideas, yet. The fact that you don't understand it, see the same opportunity, or acknowledge the relevance does not mean that they are wrong at all. Instead, encourage them to think outside of the box, combine their prior knowledge with new ideas. After all, 3M executives might not have understood in the beginning when one of their employees explained the Post-It to them.

4. Shift focus and resources towards opportunities: As explained with the example of Philips earlier, redirect your focus and resources to areas where you are able to excel and are innovative. If you want to be successful in the future, you need to make sure that you make your own product obsolete. In other words, you need to develop a product that will be the successor of your current product.

5. See sustainability as an opportunity. So, sustainability is this megatrend, but what does this mean to us? It means that we will have to integrate sustainability in all our decisions. That's not a bad thing, at all. In their article "*Why Sustainability Is Now the Key Driver of Innovation*" (2009, page) Nidumolu, Prahalad and Rangaswami explain that sustainability provides plenty of opportunities to increase profitability by closely focusing on the supply chain, staying ahead of strict environmental legislation, finding new target groups for green products and services, and discovering new business models to provide value to your customers. All of this with the underlying goal of "doing well by doing good".

   The article defines different stages in which companies can introduce sustainable innovations for future success. In doing so, the authors argue that sustainability and increased legislation should not be seen as a threat, but rather as an opportunity for companies to improve their operations and profitability in the long-run.

5.2.3 Management Structure

Managing for opportunities is something completely different than managing for risk reduction. As such, it requires a different structure, as the rules of the game are wildly different. Although the intensions are good and companies are leaning towards embracing change and opportunities, they need to think of how to set up their company for innovation.

Most companies are structured too bureaucratically to act fast, where so many managers have to decide whether a new idea is any good or not. Before the final go is then given (the "green light"), costly time has already vaporised if given at all. In start-up world, this green

light mentality of waiting for an approval is not commonly seen. Instead, they start taking initiative until some tells them to stop, or, in other words, they receive a red-light signal. The key difference being that ideas are generated faster and no additional restrictions (e.g. return-on-invest metrics) are in place. This is only one key difference between start-up firms and more mature firms, but it plays an important role in the innovative output of those firms. This leads existing companies to not react to changes in the environment as quickly as they should and hanging on to business as usual too much. In doing so, they miss opportunities that are typically seized by newer, smaller companies that act faster and more agile. In essence, this negatively affects the innovation output of those firms simply as not everyone sees the same opportunities, resulting in many possible good ideas to be shut down before they can be proven to work.

When Steve Jobs was still the CEO of Apple Inc., he understood the need for agility and the need to focus on only a few things at a time. This was an entrepreneurial characteristic that is very uncommon among more mature firms, especially the ones with the size of Apple. It allowed Apple to create disruptive innovations and create completely new industries, which traditionally were only done by start-up companies.

It's exactly the agility of start-ups and the rapid decision-making that more mature companies lack. They manage, but are to slow to innovate. They seem to focus on too many (and not so important) things at the same time.

Separate the new from the old

As the rules for the "new" ideas are so different from doing business as usual, Peter Drucker (1985, page) suggests a strict separation from those areas with the organization. That means that the existing firms needs to set up teams or departments that have more freedom, are less bureaucratic and sometimes even isolated from the rest of the company. A good example of this is Apple's organizational struc-

ture. In an effort to illustrate this, Horace Dediu of Asymco has separated the functional areas into sustain and disrupt (along Clayton Christensen's theory of disruptive innovation). In essence, this enables half of Apple (i.e. the disruptive part of the organization) to act similar to a massive start-up company without many of the constraints the typical more mature firm has. An additional advantage of this is that new innovations should not be measured along the same metrics as older products or services; return-on-investment is, for instance, a poor instrument to assess whether an innovation should be marketed or not as the new innovation typically is undervalued at first.

Figure 5.1: Apple's organizational structure according to Horace Dediu

Source: Dediu, 2013.

Responsibility for innovation

It is essential for an existing company to make someone high up in the company responsible for innovation. Within the existing business, this person should oversee where innovation is needed and setting up the organizational structure, set up the policies that enable opportunity seeking and willingness to change. This person (e.g. the Chief Innovation Officer) can compare company's total innovative performance with company's innovative objectives. Thus, he may develop a systematic review of innovative efforts to see what still needs improvement. It was Steve Jobs himself who was responsible for all innovation things at Apple. Being the CEO, this enabled him to steer the entire organization the direction he wanted. Everything important went through him and he believed his chief responsibility to be making new ideas work. According to insiders, over ninety per cent of all Apple employees had never met Jobs in person. Instead, Jobs often met with only 100 of the employees, the so-called Top-100 with whom he discussed strategy and used as a managerial tool as discussed in the following example.

Entrepreneurial Management Steve Jobs style

One of Apple's greatest strengths is its ability to focus on just a few things at a time, an entrepreneurial trait difficult to imagine at a corporation with a market value of $320 billion. Saying no at Apple is as important as saying yes. "Over and over Steve talks about the power of picking the things you don't do," says one recently departed executive. Obvious? Perhaps. Yet few companies Apple's size – and very few of any size – are able to focus so well and for so long.

Jobs himself is the glue that holds this unique approach together. Yet his methods have produced an organization that mirrors his thoughts when – and this is important – Jobs isn't specifically involved. Says one former insider:

"You can ask anyone in the company what Steve wants and you'll get an answer, even if 90% of them have never met Steve."

No decision-maker at Apple is far removed from Steve Jobs. Through his tight-knit and largely long-serving executive team, Jobs quickly sees everything that goes on at the company. He also routinely reaches outside these inner and outer circles to collaborate on critical projects with key employees. This organization chart, which includes most but not all Apple executive officers, is based on Fortune's reporting, in addition to some limited information Apple releases publicly.

There is a small group at Apple that most certainly has met Steve Jobs. It's called the Top 100, and every year or so Jobs gathers these select few for an intense three-day strategy session at a proverbially secure, undisclosed location. Everything about this Top 100 meeting is shrouded in secrecy, starting with its very existence. Those tapped to attend are encouraged not to put the meeting on their calendars. Discussing their participation is a no-no, even internally. Attendees aren't allowed to drive themselves to the gathering. Instead they ride buses that depart from Apple's Cupertino, Calif., headquarters to places like the sumptuous Chaminade Resort & Spa in Santa Cruz, Calif., which satisfies two Jobs requirements: good food and no golf course. Apple goes so far as to have the meeting rooms swept for electronic bugs to stymie snooping competitors.

The Top 100 meeting is an important managerial tool for Jobs. He and his chief lieutenants use it to inform a supremely influential group about where Apple is headed. The elaborately staged event also gives Jobs an opportunity to share his grand vision with Apple's next generation of leaders. The Top 100 meeting is part strategic offsite, part legacy-building exercise.

Jobs generally kicks things off personally. Each session is as well-crafted as the public product debuts for which the CEO is so famous. For presenters, the career stakes are high, and the pressure is nerve-racking. "The Top 100 was a horrifying experience for 10 or so people," recalls one former vice president, who took the stage some years ago. "For the other 90 it's the best few days of their life." Jobs sometimes uses the occasion to unveil important initiatives. "I was at a Top 100 when Steve showed us the iPod," says Mike Janes, who

worked at Apple from 1998 to 2003 and remains close to Apple executives. "Apart from a tiny group, no one knew anything about it." To be selected for the Top 100 is to be anointed by Jobs, an honour not necessarily based on rank. Jobs referred to the group, but not the conclave, in an interview several years ago with Fortune. "My job is to work with sort of the Top 100 people," he said. "That doesn't mean they're all vice presidents. Some of them are just key individual contributors. So, when a good idea comes … part of my job is to move it around [and] … get ideas moving among that group of 100 people." Privately Jobs has spoken even more strongly about the Top 100's importance. "If he had to recreate the company, these are the 100 people he'd bring along" is how one former Apple executive describes Jobs' characterization.

Source: Fortune, 2011.

The Apple example illustrates that the successful mature and existing firm needs to make someone responsible and accountable for the innovative performance. Essentially, they have to act more like an entrepreneurial start-up then they are used to. In order for them to learn entrepreneurial management, they have to become entrepreneurial. That requires a completely different set-up of functions, a different corporate culture and someone with enough leadership qualities to guide it in the right direction. The bottom-line is that the company is open to opportunities and willing to adapt quickly to changes in the environment.

5.3 Managing Start-ups

The management of start-ups has received lots of attention among academics, but also battle-hardened entrepreneurs who have shared their experiences and wisdom with fellow entrepreneurs looking to successfully start-up their own company. Some of the most important findings and challenges specifically for those who are aspiring

to start-up their own company and manage it for success, are discussed within this section.

New and inherently entrepreneurial start-ups have a completely different challenge than those experienced by existing firms. Rather than learning entrepreneurship, they need to learn management. They are very innovative, but need to think ahead too. New ventures need to focus on four major management tasks:

1. The idea
2. Focus on the market
3. Human resources
4. Funding

5.3.1 The idea

Quite possibly, the "idea" itself is not the most important aspect for entrepreneurial start-ups. Obviously, the initial idea needs to be good as to be able to start working on it, but it is far from absolute. Very often, the initial idea is only a mere direction, and needs to be tested and changed along the way. The initial ideas behind even some of the most successful start-ups were very different than what made them successful. YouTube, for example, was meant to be a dating website, but the founders found out that sharing videos was actually what their target group found far more interesting. Twitter, now famous for having 140 characters in which their users can write short messages, started out as a SMS service for friends (i.e. when a user sends one SMS to a single friend, the service itself would distribute the same message to a number of different other friends). In short, entrepreneurs might have an idea, but that needs to be fine-tuned, beta-tested, or changed according to the needs of the intended customers or users.

Essential for creativity, and in similar fashion for idea generation, is prior knowledge. In fact, creativity is only possible with knowledge. Looking at the world of start-ups (and specifically in high-

tech), many founders of new businesses are employees and/or industry experts that have been able to link their prior knowledge about technologies/products to new opportunities. Shane (2000, page) describes how prior knowledge allows experts or the ones holding the knowledge to spot different opportunities in the discovery process. He describes how 8 former MIT scientists that were involved in the invention of three-dimensional printing became entrepreneurs, as they were able to relate this cutting-edge technology with their understanding of how the markets work, how to serve them, and in which ways the technology can be used. These 8 entrepreneurs saw very different opportunities, merely based on their own prior knowledge. The Post-It (the brand name for 3M's sticky note) was conceived in similar fashion.

The Post-It Story

Dr. Spencer Silver, a 3M scientist, was busily researching superstrong adhesives in the laboratory. In the process, he discovered something peculiar: an adhesive that stuck lightly to surfaces but didn't bond tightly to them. Not entirely what he was looking for initially, but still something that could be valuable, he thought. "It was part of my job as a researcher to develop new adhesives, and at that time we wanted to develop bigger, stronger, tougher adhesives," said Silver. "This was none of those."

What Silver discovered was something called microspheres, which retain their stickiness, but with a "removability characteristic," allowing attached surfaces to peel apart easily. For years, Silver struggled to find a use for his invention. But that didn't keep him from touting the merits of his creation to colleagues. "I came to be known as Mr. Persistent because I wouldn't give up." Meanwhile, Art Fry, another 3M scientist, was frustrated. Every Wednesday night while practicing with his church choir, he would use little scraps of paper to mark the hymns they were going to sing in the upcoming service. By Sunday, he'd find that they'd all fallen out of the hymnal. He needed a bookmark that would stick to the paper without damaging the

pages. Thinking back to a seminar he'd attended on Silver's microspheres, he had what he now refers to as his eureka moment. "The one where you get the adrenaline rush."
Partnering with Silver, they began developing a product. Once they found themselves writing messages on their new notes to communicate around the office, they realized the full potential of the idea. "I thought, what we have here isn't just a bookmark," said Fry. "It's a whole new way to communicate." Fry decided to make 3M corporate headquarters his proving ground and supplied the entire company with the new adhesive notes. Employees immediately loved them. 3M decided to start marketing these sticky notes and the rest is history, making the Post-It one of 3Ms most successful brands.

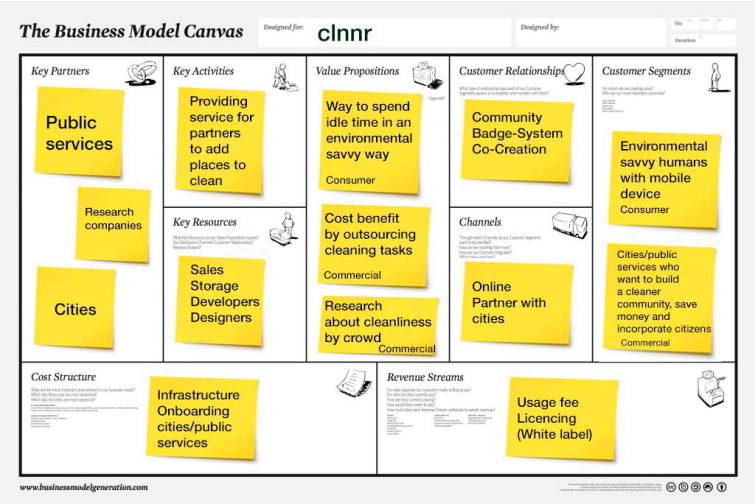
Source: Post-It.com. http://www.post-it.com/3M/en_US/post-it/contact-us/about-us/

These examples illustrate that the discovery of opportunities is very often based on applying existing knowledge to new situations. This knowledge enables individuals to see opportunities that others don't see. That's why so many entrepreneurs leave their jobs and start their own businesses, in the same industry, using similar technologies but for different audiences, brought to the market in different ways or having different usability.

An increasingly popular means to visualize all the assumptions behind the idea, is a business model canvas, which is a strategic management and entrepreneurial tool (Osterwalder, 2004). It allows the innovator or start-up to describe, design, challenge and invent their business model. It is not wordy, not too specific and not set in stone. Instead, many start-ups might use only one A3 sized paper sheet and put sticky notes in the designated areas (sticky notes, as they need to be changed constantly). Find an example of such a canvas below. It might sound repetitive by now, but it needs to be stressed again. The idea should be rather flexible, that's why sticky notes are used. The successful entrepreneur and innovator seeks feedback from the

market, staples himself to the customer and adopt a market focus. The business plan, or in this case business model canvas, is a result of this.

Figure 5.2: The Business Model Canvas.



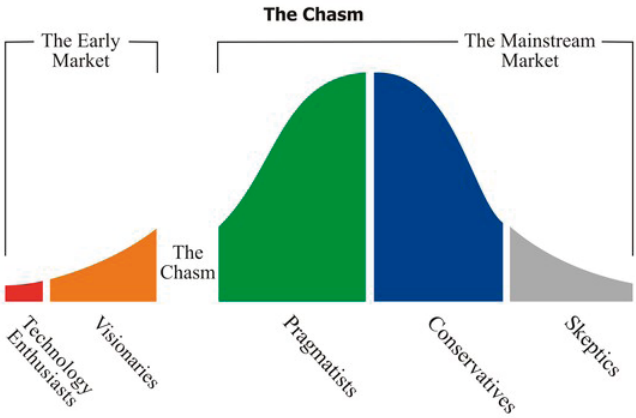
Source: Gambier, 2015.

5.3.2 Focus on the market

If the idea is not set in stone, entrepreneurs need to realize that they need to bring their ideas to the market, at some point. That means, having to deal with critique, feedback and perhaps realizing the intended target group simply does not accept this new idea. It might even be too novel, too sophisticated; the potential customers simply don't understand the innovation, or don't see uses for it. If the idea itself is too genius, it might be hard to sell it. Too often do engineers, programmers and high-tech innovators focus on creating a very sophisticated product or service. But customers care whether they see a use for a product. They generally don't care about sophistication

(perhaps some hard-core nerds and likeminded tech-savvy individuals being an exception to the rule). These innovations struggle to make it to the mass market, and only some early adopters might buy these products. In marketing and innovation, this notion is being referred to as the inability to cross the chasm (Moore, 1991, page) as explained below. Crossing the chasm means to market and sell products not only to some early adopters, but to mainstream customers. This often is a real struggle for start-ups firms.

Figure 5.3: Crossing the Chasm



Source: Moore, 1991.

Tech enthusiasts and visionaries might be willing to try something new and sophisticated, but the mainstream market typically doesn't. The Linux operating system was found to be far better and more stable than the former, but the latter customer groups simply found it too hard, with the interface being everything but user-friendly. Instead, they preferred Microsoft Windows, which might not have been as sophisticated or stable, but much easier to use for those mil-

lions of people using it. Another example is that of the Segway Personal Transporter. Although almost everyone in the Silicon Valley believed this product to be the next big thing, it failed to meet their expectations miserably. The balancing of this battery-powered electric vehicle was so genius that all the tech enthusiasts and experts expected sales to skyrocket quickly. Steve Jobs once said that it would be "as big as the PC", and world-famous venture capitalist John Doerr deemed the Segway to be more important than the internet (source). But, unaware of this, consumers did not want to buy one, as they didn't see it being useful. Instead, you might see some tourists operating there on guided city-tours, but they are not common-sight as was expected. Genius engineering, but not carefully adopted to the market. Segway, in turn, have started turning things around when they introduced its Hoverboards, which are a success among teenagers and young adults.

Entrepreneurs that do not want to make the same mistake really have to adopt a market-focus. They need to staple themselves to their potential customers and get as much feedback as they can, checking whether the assumptions behind the idea hold true. Innovation is perceptional, meaning that the innovators have to get out of their offices and take it to the street and get as much feedback as they can. In the end, "businesses are not paid to reform customers, they are paid to satisfy them". (Drucker, 1985).

Remember, the initial idea is not cast-in-stone yet, it needs to be tested and checked. Your customers are a valuable information source, collect as much feedback as possible and change the idea where needed. So, focus on the market and develop the idea according to what is needed there, what customers value, rather than what you believe to be valuable or quality.

5.3.3 Human Resources

Attracting quality personnel, in time, is perhaps one of the biggest challenges for any business, including start-ups. Typically, costs need to be kept to a minimum as there always will be a lack of funds in the beginning. Yet, the entrepreneur simply cannot do everything by himself, nor should he or she want this. At some point, additional personnel needs to be recruited. But not all individuals are willing to work for a start-up as it is almost by definition hectic, a lot of hard work and requires a level of flexibility not often wanted. Quality personnel might be hard to find, but the entrepreneur needs to go out of his or her way look for them, and get them enthusiast. There is simply too much to do, the founder needs to spend the time wisely, focusing on core activities and not getting lost in the details. Some start-ups that are successful will grow very fast, sometimes by 400% in only a couple of months or a year.

That means the founder need to think of whom to recruit and select, based on what qualities or skills? There is no textbook cookie-cutter-standard approach to this, so the entrepreneur needs to base much of it on intuition, but should also look for individuals that have experience with start-ups and have a proven track record. Those may be rewarded in salaries, or even equity in the firm. The bottom-line is, starting to hire others might be daunting at first, and probably the entrepreneur should have started doing this before it is even realized. The message here being: just do it! But do not go berserk with the funds available.

5.3.4 Financing

Financing is probably required in an earlier stage, i.e. if the founder(s) are not able or willing to finance all previous "steps" themselves. As a result, financing typically is among the top priorities of the founder/innovator, as they need funds to keep things going. Sometimes a little, sometimes a lot, but the ground rule is that the more successful the start-up the more money is needed to keep hiring and expand-

ing operations, which is almost a paradox. The financing of start-ups is typically done in various rounds or stages.

At the very beginning of the start-up, the Family, Friends and Fools (or Founder) (FFF) typically provide the necessary funds to start things up. They are among the first to believe in the new ideas of the people they love. If you are opting for any of these three F's, please treat them as any other investors, meaning drawing up an official agreement and ask for a specific amount that should enable reaching specific milestones. Gullible grandparents, loving aunts should be omitted, unless they know the risks up frond, can afford losing the money and are business-wise enough to understand what's going on. Angel investors (i.e. successful businessmen and entrepreneurs who are keen on helping others out in the earliest stages) might be able to lend a helping hand too. These are all forms of seed capital, meaning that those external investors will get an equity stake in the firm in exchange for their investments. Nowadays, additional funding might come from incubators and crowd funding. Be aware of any (local) governmental grants and competitions/challenges for start-ups or innovation too!

During later stages, the first rounds of venture capital financing will commence, where additional external financing will be obtained. Often, this is referred to as a Series A round, which is the name for a start-up's first significant investment round where venture capitalists can obtain preferred stock, typical after FFFs and angel investors have obtained common stock. When successful for a while, the start-up company (that is now a small- to medium-sized enterprise) can opt for an initial public offering (IPO) or an exit (e.g. selling the company for a profit to investors and or larger organizations).

N.B. Giving out equity in return for investments is a risky feat. As external investors acquire more and more equity in the founder's company, so will they increase their importance and influence. Be careful about the selling of equity to those who might not have the same

objective. Even FFFs, let alone venture capitalists, might force the entrepreneur/founder to do things he or she might not have done otherwise.

Training questions:

1. **Explain, in your own words, why both the existing firm and start-ups need to learn entrepreneurial management to become successful innovators.**
2. **Why is it important for existing firms to view changes in the environment as an opportunity?**
3. **Why is the Business Model Canvas an important and popular tool for entrepreneurs?**
4. **Explain why innovators need to focus on the market, rather than on the products they want to innovate.**

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CHAPTER 6:
INNOVATION STRATEGIES

Rob van Dun

Summary

- Entrepreneurs and innovators need strategies to bring novel products, services or processes to the market. Innovations can aim to obtain a leading position in the market, or try to achieve control in a sense that no (or only a few) competitors can enter the same market. The following approaches are some of the most important innovation strategies:Going all-in is only possible for very novel innovations. It is very demanding in terms of resources and requires the company to continue innovating and cut costs. It is probably the riskiest strategy of those being explained in this chapter.

- Creative imitation, as a strategy, requires good understanding of what value is created for the customers and in doing so, how they can creatively design a different product or service aimed at the same customers as that of the competitor.

- Entrepreneurial Judo is a strategy in which the innovator uses their opponent's (read: competitor) strength against him.

- Niches are highly specialized market segments that have their own rules. Companies can manoeuvre themselves in such a niche, making it very hard for competitors to enter the same market profitably. These niches are then controlled by the company.

- Ever since firstly coined by Harvard Business School professor Clayton Christensen, disruptive innovation has become one of the most influential theories in the field of innovation and strategy. Both new firms and existing firms aim to turn current non-customers into customers.

6.1 The significance of innovation strategies

Having discussed the importance of entrepreneurial management to new ventures and existing businesses, this section focuses on innovation strategies. A strategy is nothing more than a commitment to a set of coherent, mutually reinforcing policies or behaviours aimed at achieving a specific competitive goal (Pisano, 2015, p1). An innovation strategy is a plan made by an organization to encourage advancements in technology or services, usually by investing in research and development activities (Greer, 2013, p107). Rather than focusing on the internal processes (see chapter 5 Entrepreneurial Management) and the creation of an environment in which innovation may occur (see chapter 7 Fostering Innovation), this chapter focuses on the successful marketing of innovations.

Innovation strategies are as important for any business as entrepreneurial management is. In his book Innovation and Entrepreneurship, Peter Drucker (1985) distinguishes four distinct entrepreneurial strategies that still are employed today, namely

1. "Being fustest with the mostest"
2. "Hitting them where they ain't"
3. Finding and occupying a specialized "ecological niche"
4. Changing the economic characteristics of a product, a market or an industry.

The work of Drucker provides the basis for this chapter, complemented with more contemporary works of among other Clayton Christensen. Please note that these strategies are not only suitable for start-up firms, but also the larger established firms that seek to innovate and develop new products/services or enter other industries and markets.

6.2 Going All-In ("Being fustest with the mostest")

Familiar to the ones ever having played poker, the term all-in refers to shoving all your coins in, risking it all. The player either loses all he has, or at least doubles the number of chips before the big gamble. As the naming suggests, this strategy is mainly defined by trying to become the unchallenged leader in an industry or market.

Drucker (1985) refers to this strategy as "*Being Fustest with the Mostest*", which is a quote from an American Civil War general when asked why he was successful. This particular strategy is only suitable for products that are truly new, something wildly different from what has been around before. It demands lots of resources being allocated towards this new product. If successful, the firm will be the industry leader for a fair amount of time. If it fails to market this new product, the firm will be significantly damaged. Firms that choose to take this strategy can be very successful financially, being able to charge premium prices for their products and selling them like hot cupcakes. However, even when successful, the company needs to make sure they make their own product obsolete: they need to develop their own successor product, because if they don't, a competi-

tor will probably do this. In order to do so, the entrepreneurial firm will need to keep investing in research and development.

In addition, the firm who gained leadership through successful innovation and a successful deployment of this strategy, has to make sure it cuts his prices. Although this is a general rule in strategic management, this is especially true in this case. To remain unchallenged, the innovator has to ward off competition, which is eager to capture a bit of market share. As the initial innovator should have been able to obtain economies of scale and rid down the cost-curve, they now have lowered their marginal costs for a while. This advantage has to be paid forward to the customer, as competitors will otherwise seek to enter this market or industry with similar products, as there is a profit-incentive for them to do so. Lowering the prices, however, might prevent these competitors from entering as their costs typically are higher than that of the initial innovator, as they lack learning-effects.

A common mistake that entrepreneurs make is that of profit creaming, where they only serve the top-end of the market, where profit margins are greatest and customers are willing to pay a premium for its products. Not lowering their prices attracts a lot of attention from competitors, leaving the vulnerable to "*Hitting them where they ain't*" strategies.

6.3 Hit them where they ain't

When others have successfully gone all-in and are selling their new and highly innovative products, other players might want to enter the same markets. Although the initial innovator might have first-mover advantages, the next players to enter the market do have one major advantage: they already know that there is a market for a certain product and do not have to risk it all. Moreover, they do not even have to innovate from scratch, but can start with what the in-

itial innovator does and make some changes left or right. This is a legitimate strategy, and not mere copycat behaviour that Western companies so often blame the Chinese and Koreans of! Being called "Hitting them where they ain't" (another civil war general's quote) they focus on attacking the original innovator where he is not acting or protecting its innovation. This can be done in multiple ways.

Creative Imitation
Being different from copycat behaviour, firms that deploy creative imitation seek opportunities to do things differently. In order to do so, they obviously need to get creative. It requires a thorough understanding of the market and industry and seeks to find weaknesses in the innovation of a to-be competitor. Being successful with "creative imitation" means that one understands better what the innovation represents than the people who actually made it. This strategy aims at market leadership, too, but it is much less risky than the first strategy. If the new product is already known, it is much easier to find out what customers buy and how to fit their specific needs. The main risk with this strategy – besides misreading the trend in the market – is to offer too many products for too specific needs, resulting in a hard to manage, segmented market.

Entrepreneurial Judo
The basic idea behind the sport Judo is to try to use the opponent's strength against himself. Or, alternatively, find a weakness in the opponent's defence. According to Drucker (1985), this principle can be transferred to innovation. The concept is to try to prevail in a market others created, but simply don't care about it. This opportunity arises mainly in two situations: with corporations who think the new product or service is not good enough for their customers, or with corporations who try to get just the high-profit part of a market by creaming it. Entrepreneurial Judo aims at entering a market where the established leaders do not defend it or simply do not care about it. It also intends leadership in a market, but it does not challenge the leaders where they are aware of competition, but in areas where they

do not care what's going on. This happens a lot and indeed, Asian firms are very quick to react to this, enabling them to quickly enter a market and develop a product that is intended for a different target user. The Japanese, South Korean and Chinese giants are very adept at developing a very competitive product at a fraction of the price of the initial innovation that provides a lot of value for their customers.

Case study: the battle for the smartphone customer

For almost a decade, Nokia and Motorola where the unchallenged cell phone market leaders in respectively Europe and the US. They were innovative and by no means asleep at the switch. Their R&D teams continuously improved their products. So, phones became better and better, having more and more options. Nokia had WAP, which enabled its users to access the internet, the phones had touchscreens too. Yet, somehow they seemed to have missed out on the smartphone trend.

In the meantime, Steve Jobs was back in charge at Apple, which then was mostly selling Mac computers and iPods. He realized that the computer market had become commoditized, meaning that price-cuts happened very fast and winners in this industry where not so much the original equipment manufacturers (OEMs), but Intel and Microsoft, who had their product in almost every single computer. Competition was fierce, with the likes of IBM, Dell, Hewlett Packard, Toshiba and some Asian newcomers such as Acer, Asus and Samsung all competing in the same market. He believed Apple needed to escape this competition by means of innovation and in one instance happened to change the music industry altogether with the introduction of the first iPod portable media player. When this industry became more and more crowded with competitors, he spotted the opportunity for a smartphone.

So, Jobs did what he did best: create completely new and highly innovative products that attract so many customers through sleek design and stunning usability. The development of the iPhone took loads of resources and Apple went all-in on this, deploying the "Fus-

test with the Mostest strategy". In one instance, he created a completely new industry.

After being shown the vast opportunity and market for Apple's products, the likes of Sony Ericsson (still the Japanese-Swedish joint-venture then) but more importantly HTC and Samsung went to their drawing tables and quickly start innovating in the same direction. They had the major advantage that there was a proven market and they had an idea what a smartphone, in terms of features, should have, as Apple paved the way. Not that much later, both Korean firms introduced their smartphones, which became an immediate success. But how were they able to capture so much market share that soon? To answer that question, one must note that Apple sold its iPhones for a premium price, only going after that part of the market that was willing to pay up to $800 for a smartphone. Additionally, as Apple achieved economies of scale by expanding its production, as well as learning-effects through the volume that they sold, they reduced their costs, without cutting their prices. Samsung and HTC, being aware of this, saw the opportunity to creatively imitate Apple's iPhone by carefully considering what represents through value for its customers (although Apple maintains that Samsung completely stole their idea). In doing this, Samsung created its first Galaxy S flagship series and HTC its Desire series. Creative imitations that quickly gained popularity among non-Apple adapts.

They did this, because there was a profit-incentive for them, as the price of a phone was far beyond that of their expected costs. Should Apple have lowered their prices, perhaps they might have prevented this from happening. Additionally, Apple focused on a rather narrow part of the market, the top-end. Although profits there are highest, the number of people residing in this segment is relatively small compared to the mid- and low-end of the market. HTC, Samsung and also LG later on understood the opportunity for lower price smartphones and started developing phones with lesser features, selling them at a fraction of the price of the typical flagship phone.

6.4 Finding a Niche

Many innovations, especially those of family business and smaller firms are successful as they target a niche that is typically overlooked by the mass producers and bigger players. More often than not, smaller sized enterprises have a very good idea of who their customers are and how they can help them solve their problems by means of innovation. They have stapled themselves to the customer and develop solutions for them, tailored specifically to them. In niche markets, the rules of the game are different. There is only a very limited number of players in those markets and in order to be successful, the products have to stand out in terms of perceived quality or benefits for the customer. There are lots of opportunities to innovate for those niches, more so than in mainstream markets. However, niche markets can be profitable but do not necessarily allow for a lot of growth as they are by definition rather small.

In general, the following rules hold through for niche innovators:

- They have specialized skills that allow them to serve customers far better than any competitor lacking those skills;
- They have entered a marketplace that is so specialized that competitors simply cannot enter them due to vast entry barriers;
- They aim at control, rather than leadership in a mass market and
- They are not engaged in fierce price competition.

6.5 Disruptive Innovation

"TechCrunch Disrupt is the world's leading authority in debuting revolutionary start-ups, introducing game-changing technologies, and discussing what's top of mind for the tech industry's key innovators. Disrupt gathers the best and brightest entrepreneurs, investors, hackers, and tech fans for on-stage interviews, the Start-up Battlefield competition, a 24-hour Hackathon, Start-up Alley, Hardware Alley, and After Parties" (TechCrunch, 2015).

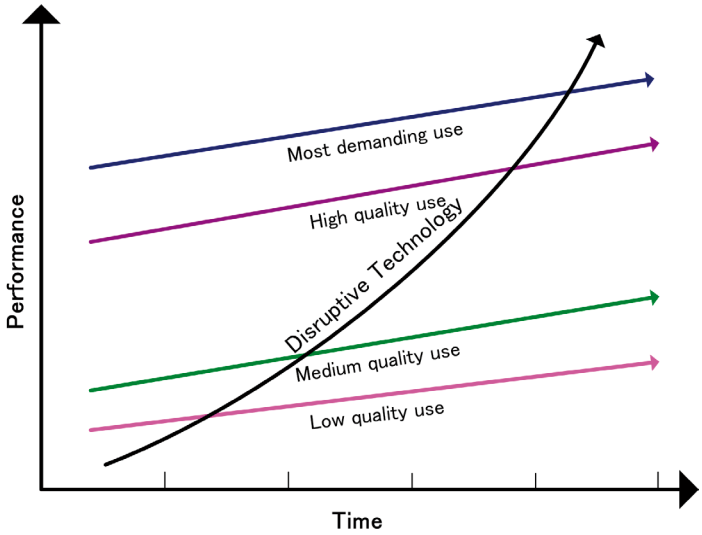
Nowadays, disruption is the name of the game. Especially in the Silicon Valley. It is popular amongst start-ups and tech companies. Every single one of them seeks to disrupt. There are disrupt conferences, disrupt contests and disrupt competitions. In short, disruption is all the rage. But what is it about and what does it mean for business?

It was in 1995 when Clayton Christensen, a Harvard Business School professor first coined the term disruptive technology. In *Disruptive Technologies: Catching the Wave (1995)* and later in his famous book *The Innovator's Dilemma* (Christensen, 1997) he explained how successful companies can overly emphasize customers' current needs, and fail to adopt new technology or business models that will meet their customers' unstated or future needs. As a result, those companies might fail. This notion comes very close to Joseph Schumpeter's *creative destruction* (1942), which describes how innovative entrepreneurial entry destructs the current established companies through the introduction of new technologies that are simply superior to those of the established firm.

Thus, disruptive innovation explains how successful companies still end up failing. Of course, badly managed companies are doomed to fail. It is more interesting to understand why previously successful companies like Kodak, Nortel and Blockbuster that seemed to do everything right did not survive. In every market, there is a trajectory of performance improvement that every customer is able to make use of as products' performances increase over time. But where this trajectory lies, is different from one customer to the next. Some customers can be satisfied with very basic level of performance whereas others are very demanding and will only be satisfied with very high levels of performance of technology. Disruptive innovations typically enter the market with very low level of performance, but their performances steadily improve. So, in the early days the disruptive innovation is considered to be not good enough by most of the market, but seems perfectly acceptable to those that never really cared for more quality to begin with. Those customers are tempt-

ed by lower prices or functionality that other technology did not jet provide. A company serving more demanding users that require a lot of technology do not feel threatened by this new competing technology because none of their customers is willing to buy such low-quality products. So, they continue doing business as usual and not pay too much attention to this new kid on the block. The problem is that the disruptive innovation will improve over time until it is good enough for the most demanding customers that now want to have one too. At this time, it is far too late for the established firm to do something about it because they failed to adopt this new technology.

Figure 6.1: Disruptive innovation



Digital image recording technology was inferior to analogue photo cameras in the very beginning. So, professional photographers and passionate hobbyists would not use them. Less demanding customers did like the fact that they would not have to develop their own

pictures in a dark room and could take quite a few before the memory was full. Kodak, making high-quality photo cameras did not feel threatened by this new technology and went on making even better cameras for the most demanding customers. Digital cameras, being the disruptive innovation, quickly got accepted in the low-end of the market. They were able to develop very fast, making the appealing to the mid and even high-end of the market within a couple of years. At that time, Kodak and Fujifilm, not having invested enough in digital recording and still banking on their old analogue technology, quickly lost market share in these markets as their customers now started buying digital cameras from companies like Canon, Sony and Olympus.

Another example is the word processor on computers. In the beginning those processors were low quality leaving many users frustrated with the fact that they could not keep up with fast typists. Demanding users, such as professional secretaries that typed all day, simply would not want to have one because they were too slow. So, typewriter companies rationally listened to these customers and went on making even better typewriters. Word processors were a huge success among less demanding customers in the low-end of the market. Those customers did not type very well and for them it was a great benefit that they could fix their mistakes with only one push on a button. This group was willing to forgo the lack of speed in exchange for that new functionality. Due to the fast development of computers, word processors became much quicker until the point that even the fastest typists wanted to use these word processors for everyday use. You'll be hard-pressed to find a single typewriter today, because they became obsolete in only a couple of years.

What these examples have in common is a disruptive innovation that initially only provides little quality and will not be used by most of the market. However, they typically come at a fraction of the costs and give more and more people access to this kind of technology (think about the development in computing, going from mainframe

computers to the same technology now being used in your phones, tablets, laptops, smart watches etc.). In the early stages, only the low-end of the market that accept low quality are buying these disruptive innovations. In time, however, the have the ability to capture every customer, posing tremendous threats to established firms banking on older technologies.

What makes disruptive innovation so interesting is that it's not about how radical or sophisticated the innovation is, but about the fact that it disrupts the same markets and value networks of established products and technologies. The business model is more important than the technology itself. Disruptive innovations bring great success to entrepreneurs, whilst creatively destructing the established industry leaders. Perhaps, that might be the reason why it gets so much attention. Especially in the Silicon Valley where high-tech entrepreneurs want to compete with industry giants for the same or similar technology. Or, the established firms do not want to become another Kodak, Nortel or Fujifilm and seek ways to disrupt themselves.

A disruptive innovation is not a breakthrough innovation that makes good products a lot better, but it has a very specific definition. It transforms a product that historically was so expensive and complicated that only a limited target group could buy them, into something that is so much more affordable and accessible that many customers can make use of a comparable technology.

The Innovators Dilemma (Christensen, 1997) consists of top managers having to decide between making even better products for existing customers that can be sold for higher margins or going after new markets with people who are not your customers. This is the dilemma that can be exploited by entrepreneurs.

For established firms, it means that they really have to decide between the former or latter strategy. They can either make even better products that they can sell for higher prices or worse products

that will ruin their margins. The solution is not that simple. But they have to understand that competing technology that now is pretty worthless and not a threat, can quickly become one if you give it enough time. So, what they have to consider is whether they will defend themselves in the high-end of the market by applying disruptive innovation themselves. By going after the low-end of the market themselves, those established players can fully benefit from the performance increase over time and make their own products obsolete. Because if they do not do it themselves, someone else will. It is an illusion to expect that you can hold on to your customers for very long if there is a simpler and cheaper technology available to them. Copy-pasting success formulas of the past is a recipe for disaster. It is better to apply disruptive innovation yourselves and protect the company from low-end competitors that apply entrepreneurial judo and/or disruptive innovation than to be asleep and the switch and admit that you have underestimated an entrepreneurial start-up.

It is often not the technology, but the business model that makes an innovation truly disruptive. Every organisation has the capability to disrupt, it is not a privilege for start-ups only. But there needs to be a corporate space where disruptive innovations can flourish. Otherwise corporate antibodies will force the innovation to look like something that has been done before (think copy-pasting) and lead it to failure. That is why entrepreneurial management remains important for all innovation strategies to successfully put into practice.

To close this chapter, a few free tips on how to spot disruptive innovation opportunities for entrepreneurial start-ups as well as the existing firm:

1. Look for markets where there is a constraint that limits potential customers from buying. Look for areas where those customers cannot solve their problems because they either do not have to skill to do so, do not have the funds or simply do not have access to a solution. Any product that can solve those poten-

tial customer's problems can be a disruptive innovation as you make non-customers customers.
2. Identify which important jobs cannot be done and has people (read: potential customers) frustrated. This is similar to innovation based on process needs. When a product or service is able to ease that person's pain, a disruptive innovation is able to go after those customers that would otherwise not buy anything.
3. Remember to play the innovation game differently. Do not spend time figuring out how to do things better as they are already done. Do not try to beat competition by creating even more quality. Instead, focus on turning non-users into users by making a product or technology just that much more affordable, simpler and accessible.
4. Do not focus on high-end users but those less demanding.
5. Use focus groups, prototypes and valuable feedback from customers to investigate how their problems can be solved by a different product or technology.

For (future) managers willing to innovate, it might be hard to accept that there is no data. Data only exists on the past and this sometimes requires a company or start-up to create data itself by trusting in intuition, bringing something to the market and gathering feedback along the way.

Training questions:

1. **Name and explain the requirements for the going all-in strategy to be successful**
2. **Why is creative imitation a far less risky strategy than going all-in?**
3. **Why can entrepreneurial judo hit the initial innovator or competitor where they are not defending?**
4. **Give 3 examples of companies/products that in your opinion employed business model innovations.**

5. **Explain, in your own words, what is so "disruptive" about disruptive innovations**
6. **Why do you believe disruptive innovations are so popular among both start-ups and existing firms?**

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CHAPTER 7:
FOSTERING INNOVATION

Rob van Dun

Summary

Innovation is almost synonym to change; change within the company's industry, demographics and technological among others. Innovation also requires internal change, or the willingness of a firm to do so. Companies that want or need to innovate, need to foster innovation. That means to nurture, promote the development or to cherish innovation within the business environment.

In order to foster innovation, companies need to have at least the following:

- A sense of urgency, the understanding that innovation is needed fast;
- A shared vision as to why innovation is necessary;
- A leader to take the first steps and
- The capability to change.

The hardest of the four prerequisites for innovation to happen is a firm's capability to change. The good news is, it can be learned. There are numerous examples of that in real life. We can learn from the best in the world and apply their practices everywhere. The practices themselves can be grouped into three main categories:

1) **Time and Space**
   Employees that innovate need time to do so and a habitat to work in that is inspiring and fosters creativity. Google's 70/20/10 model for Business Innovation is possibly the most famous example of giving employees the time to think of new solutions or work on passion projects.

2) **Maximize Diversity**
   Innovation does not happen in a lab, with someone having a flash of genius. It is hard and purposeful work that requires a lot of collaboration. Great ideas come from creative collisions where multiple ideas collide into something bigger. As such, the wider range of ideas, the better.

3) **Interaction and Connection**
   In order to be successful, innovators need to first of all believe in their own ideas (just not too much) and get feedback from whoever they can. They need to interact, both internally and externally to have deep-level learning of possible problems and customer needs and wants.

7.1 Innovation is Change

Where does innovation come from? Where does it begin? What does it look like? How does it become embodied in the people and the culture of organizations? All these questions and many more will be answered in this chapter, in which there will be some contemporary examples of how businesses seek to foster innovation.

To foster innovation means to nurture, promote the development or to cherish innovation within the business environment. As such, it is closely related to change management, yet a bit more specific. Every single company does it differently. They do what they believe should make their employees feel comfortable and productive at the same time. How to implement what's discussed within this topic is still up for debate. Yet, in order to start the innovation process and to allow for innovation to take root, there are a number of capabilities that (aspiring to be) innovative firms need to have.

Let's face it, innovation means change. Not going from one place to the next, but change as a stable, a constant process. Change does not come easy. Perhaps it is one of the hardest tasks of the manager or leader, to make change happen. According to John Kotter (1996), in order for change to happen, there are certain preconditions:

1) **A sense of urgency**. Most likely, change needs to happen fast. Within start-ups, this is a no-brainer as speed is always of utmost importance. For the existing firm, everyone needs to start realizing that change is going to be needed, and fast too! Because, otherwise… You should be able to fill in the dots by now. If not, remember Nokia, Motorola, Kodak, Blockbuster, and Fujifilm… The list is long, very long. Companies that do not want to end up on the same list better move fast.
2) **A shared vision**. In order for a strategy, which change in itself could perhaps be, their needs to be an underlying vision that is shared within the management team and can be communicated within the organization. Simon Sinek, author and TED favourite has clearly established the need to "start with why". A vision is of utmost importance, giving answer to why the company does what it does. If that is unclear, no one is willing to follow (Sinek, 2011).
3) **Someone to take the first steps**. When change is on the horizon, people freeze and typically do not want to cooperate. People in general do not like change as this requires them to

rethink what they are doing, why there are doing it and need to reconfigure their role in the bigger picture. Leadership and someone taking the first steps are thus of utmost importance to show how it is done and where the company is heading.

4) But especially the **capability to change** is of importance. What good are a sense of urgency, a vision, and a leader that is willing to take the first step if the company and its employees lack the abilities to change (i.e. knowledge, competencies, culture, leadership style and the right structure). The good news is, those capabilities can be learned, they can be built by implementing the steps prescribed in section 7.2!

In one of his TED talks, mayor Kevin Faulconer[19] explains how governments tend to discourage innovation rather than fostering it, simply because they don't know what is going to happen and find it hard to understand. They seem to dislike disruption. He feels that governmental organisations are very uncomfortable with uncertainty as they cannot predict what is going to happen. He might be right, but that does not only hold true for governments. It also holds true for some of the larger organizations that are almost too bureaucratic and static to change, although certainly not all (as the Google example indicates). Some companies are unwilling to face the challenge of innovation and do not want to spend their time and effort in trying to innovate. They certainly need to build the capabilities required to foster innovation successfully.

7.2 Required capabilities to innovate successfully

Any second TED event focuses on what is done to foster innovation in any other business. There are hundreds of examples, ranging from installing half-pipes for skating to gourmet-style restaurants where

19 Kevin Faulconer is the mayor of San Diego, California, USA who hold a very popular TEDx talk on Fostering Innovation.

employees can dine freely, from free green transportation to fire department-like poles to move from floor A to B easily and fast. All great initiatives, but hard to grasp and understand why those are being installed in the first place. One might think all of it is costly and counterproductive. Fostering innovation is a balancing game between what makes employees feel comfortable and what is too much and becomes a mere distraction.

In an effort to group all those different initiatives, there are some common denominators that enable us to differentiate between 3 main capabilities (Skarzynski & Gibson, 2008):

1) Time and Space
2) Maximize Diversity
3) Interaction and Connection

7.2.1 Time and Space

Innovation requires failure. Over ninety (that is 90!) percent of all new ideas fail or never make it off the drawing board. Failure is something that our societies are not really able to cope with. That goes for managers as well as employees, for students and teachers. Throughout all of our youth and adolescent lives we are taught not to make mistakes, not to be creative, because it is not manageable. We are punished for making mistakes and thereby unlearn to be creative. Especially in schools. Now, suddenly, we need to learn to make mistakes if we want to be innovative at all. That is tough and requires a culture in which employees do not feel judged when they make a mistake, when their ideas do not work out, or when they miserably fail. They need to trust their fellow employees and team members, as well as their management.

Failure is part of the game and should not be punished, because all it would do is create a risk-averse culture, which is the biggest impediment to innovation. Prime Minister Shinzo Abe of Japan backs

this claim up, stating that "an aversion to risk has hindered Japan's attempts to replicate Silicon Valley's success as a hub of innovation" (Bloomberg, 2015). "Here in the U.S. and Silicon Valley, risk-takers are respected," Abe explained. "This, I believe, is something that is most needed by Japanese businesspeople."

In order to prevent these risk-averse cultures from developing or, perhaps more realistic, breaking this culture, leadership is needed. Employees need to be granted the time and space to try, learn, fail, learn and eventually succeed. Time-pressure may stifle them, so does a very "corporate" environment where they feel judged if they should fail.

Team building and sharing mistakes and success are of great importance to stimulate employees to make mistakes and occasionally fail. Team building that goes beyond the regular diner and wine in which employees work very closely together is a first step. At Synapse[20], they have annual Mountain Madness outings in which their employees reportedly trust each other with their lives before they trust each other with their source codes. Such events build trust, but most importantly, the employees needed to be shown that they can make mistakes. Every single day. Only then will they fully realize that making mistakes is okay and that failure is part of the game. Thus, building trust is important!

Looking at the facilities of companies like Google and other innovative firms, one might find a multitude of crazy offices, playgrounds, barbecue areas, great restaurants, free snacks, top-quality espresso bars, half-pipes, tents, igloos, hammocks, and the list goes on and on. The idea behind all of those perks of working is to create a *habitat* (Bright, 2011) in which employees feel comfortable, at ease and able to think outside of the box for a change. It is playful and not

20 A Seattle based product design, product development consultancy firm working for some of the biggest corporations

too "corporate", stimulates creativity and playing around. Visit any start-up incubator and you will very likely stumble upon the same kind of perks. Firms that successfully foster innovation build a habitat, an environment in which employees go out and be creative. Innovative teams need to blow off steam once in a while, as it is hard work that requires a lot of concentration. Companies realizing that human capital is their most important form of capital happily spend some money on facilitating them. Innovators need a comfortable and challenging place that allows them to step out of their comfort zones, test where their limits are and see what actually works in practice and what not. The average corporate setting does not necessarily facilitate this. The prescription here is to create a space that everyone would want to work in, where they would feel comfortable enough to make mistakes and that encourages them to be creative.

Next to creating psychological and actual space for employees, they need time to work on things creatively. At Google, for example, they introduced the 70/20/10 model for business innovation. Within the model 70% of time should be dedicated to core business tasks, 20% of time should be dedicated to projects related to the core business and 10% of time should be dedicated to projects unrelated to the core business (Battelle, 2005)[21]. The employees can spend this time on anything or anything that might be valuable for them in the future and often result in creative new ideas.

Making time for play can be a strong way to foster innovation, as play is a great means to break down barriers between different companies and individuals, it fosters communication among groups and sheds a new perspective on seemingly unsolvable problems. It challenges our childhood mentality. We are born curious and innovative. Playtime can restore those capabilities.

21 John Battelle (December 1, 2005). "The 70 Percent Solution: Google CEO Eric Schmidt gives us his golden rules for managing innovation". CNN Money magazine. Retrieved August 12, 2011.

In similar fashion, the development must go from concept to commercial products and services. Bigger problems need to be broken down into smaller ones, which separate teams could tackle and strive to solve. Along the way, it is advisable to collect as much feedback as possible, both from experts and laymen as to not bias the opinion of insiders too much, possibly overlooking critical flaws in argumentation or discovering that some assumptions do not hold true. Customers are the greatest source of valuable input so use their feedback!

In his book *The Art of Innovation* Tom Kelley of IDEO, an international design and consulting firm which is based in Palo Alto right in the middle of Silicon Valley, claims that a good prototype is worth a thousand pictures. This is because the actual building of a prototype is a kinaesthetic process. Learning goes much more effectively by doing than by thinking. Building a prototype allows the innovator to spot additional opportunities, design flaws and difficulties. A prototype is also something anyone can see, understand, feel, which is very important as this is communication too. It allows for the gathering of feedback and can be a starting point for valuable improvements that otherwise could possible not be envisioned (Kelley & Littman, 2001).

Concluding: the message should be clear. If fostering innovation is a priority, employees need to find a balance between feeling comfortable and challenged to think outside of the box, but simultaneously can work hard. Human capital is of utmost importance and comfortable employees are simple more productive than those constantly counting the hours until they can leave the premises and go home to a more comfortable and cosy environment. Create a habitat, make playtime, and fool around. Essentially, the relationship with colleagues needs to be as good as with friends, as the same trust should be there and mistakes should not be punished. After all, it took a mistake to develop one of 3M's most successful products.

7.2.2 Maximize Diversity

Scott Bright of Synapse argues that innovation essentially boils down to the process of making ideas valuable. Essential to the ideation process, where individuals share and create new innovative ideas, is a diverse team. The more diverse a group of individuals, the more diverse will their ideas are. Some of those might be very wild, some very much out of the box, some downright crazy. But that is what companies need for the process of innovation. The sharing of ideas, editing ideas of others and finally connecting different and perhaps seemingly unrelated ideas to one another generates truly innovative ideas. The challenge is to turn those into actual marketable and valuable products of services that customers would be willing to pay for as they see its value and utility.

More diverse teams create more creative output, as they have very diverging ideas that are more creative of nature (Hewlett et al., 2013). Homogenous teams are harmful, as they limit the number of possible outcomes through the reinforcements of commonly shared ideas and assumptions. Innovators have to realize that new and valuable ideas are born out of creative collisions. Compare this to what CERN, the European Organization for Nuclear Research, is doing in its large hadron collider. They shoot two particle beams at close to light speed and make them bump into each other to create high-energy collisions. Those experiments provide amazing research opportunities and ultimately proved the existence of the *Higgs boson* (i.e. an elementary particle commonly referred to as the "God particle"). The difference being here is that what happens at CERN is rocket science, but creative collisions within innovation teams should not be as long as there is sufficient diversity. Although everyone pretends to acknowledge that diversity is good for any sort of firm performance, in practice not every company chooses to maximize diversity. Probably, they are afraid of discussions and friction. But that is actually exactly what is valuable as it improves learning within organizations. Everyone nodding at every single new idea and saying yes

to every suggestion simply does not create the innovative and creative output that is needed.

Creative collisions occur when very divergent (and seemingly unrelated) ideas are transformed into new ideas by using the best parts of them. That inherently means that next to very divergent thinkers (your typical "creative" type), also a more analytical convergent thinker is needed to connect the loose ends, to start laying the puzzle where the different ideas fit in (Zyphur, 2009, p. 4).

As explained before in the chapter about *Entrepreneurial Management*, creativity is only possible when there is knowledge. More specifically, prior knowledge allows individuals to see different opportunities, think of different ideas. As a result, the more prior knowledge is acquired and the more diversity is produced, the more divergent opportunities and ideas are created. In essence, that is the main reason why maximizing diversity is a good means to foster innovation.

7.2.3 Interaction and Connection

Interaction between teams, groups, different entities, with customers and laymen is of importance to foster creative collisions. This helps to further diversify the feedback and input and allows the company to use both inside out as outside-in knowledge. This sharing and open dialogue is essential.

During the last decade, companies have increasingly realized that the cannot innovate all by themselves. They need their suppliers and customers to help them. They hire innovation and development consultancy firms. They cooperate with tech centres and universities. They start incubators where entrepreneurs are supported and can develop new products or product ideas. They organize competitions, use open innovation and communities to connect with their environment as much as they can. All this intends to make use of all the knowledge they could possibly use. Typically, not all of that

knowledge and the required capabilities can be found internally, so they need to cooperate. Strategic technology alliances are very popular nowadays where firms work closely together on new technology for a while to split up later. They might have hundreds of these at the same time. All of this is a testimonial of the importance of interaction and connection.

Companies can start internally, encouraging employees and managers to share best practices, their successes and failures. This requires an environment in which failure is not frowned up. At Synapse, employees that have discovered something new, good or bad, will "bang a gong". Others will gather around them and listen to what this individual found out and might help them to try things they had not thought of before or prevent them from making the same mistakes. Similar things happen at many companies, where an open dialogue is valued and team members work closely together towards the same goal.

Prototypes help gathering necessary feedback for further product development. Sharing these internally and externally can help to explain what a product does, or how parts interact. Prototypes help others to think of solutions they previously have not thought of.

Innovation is perceptual. A common myth is that it happens in a lab by an individual with his eyes close having an epiphany moment after which he will shout "Eureka". Archimedes relaxed in a public bath when he discovered that the volume of irregular objects could be measured rather precisely by measuring the amount of water they displace, and not in his lab. Innovators work together, are open to feedback, go out and experience the problems that customers experience, the share ideas and above all understand that for creative collision to occur, they must foster an environment where innovation is possible.

Training questions:

1. **Explain the relationship between maximizing diversity and the occurrence of creative collisions.**
2. **What is your opinion about all the "perks" at innovative companies, such as skateboard halfpipes, playgrounds, sleeping pods et cetera? Does this lower or increase employee productivity?**
3. **What could be reasons for innovative companies to create a "habitat"?**

Recommended literature

Hewlett, Sylvia/Marshall, Melinda/Sherbin, Laura (2013): How Diversity Can Drive Innovation, in: Harvard Business Review. 2013

Kelley, Tom (2001): The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm, New York.

Sinek, Simon (2011): Start with Why: How Great Leaders Inspire Everyone to Take Action, New York.

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CHAPTER 8:
THE BIRTH OF THE IPOD

Rob van Dun

The following case study about Apple's iPod will provide a valuable example of how to innovate in the high-tech sector, but also contains *Entrepreneurial Management* (chapter 5), *Entrepreneurial Strategies* (chapter 6) and *Fostering Innovation* (chapter 7) and as such will serve as a holistic case study on innovation.

The birth of the iPod

The destiny of Apple changed drastically 10 years ago with the release of a deceptively simple digital music player. On October 23, 2001, Apple lifted the curtain on the very first iPod, which packed 5GB of music storage into a sleek white box no bigger than a deck of cards. Apple chose to unveil its portable digital music player in a low-key special event held on Apple's campus in Cupertino. The press and Apple fans alike met the iPod with severe scepticism. Pundits openly wondered what business Apple had selling consumer music gadgets. Many proclaimed doom (not the first or last time Apple's future was called into question, mind you).

By 2004, the iPod became a wildly successful product for Apple, and certain myths and legends sprung up about its creation. When historians 100 years from now recall the legacy of Steve Jobs, they will no doubt mention the iPod in the same breath. But while Jobs had an integral role in the birth of the iPod, no one man created the device. A diverse team of Apple employees and contractors brought the iPod to life.

A twinkle in Jobs's eye

Apple's relationship with digital music started innocently enough, from seemingly unrelated events in 1999. That year, Steve Jobs discovered the latent potential of a long-dormant Apple-invented technology: FireWire. The serial bus standard enabled data to be transferred at alarming speeds compared to common standards of the time.

Apple realized that with FireWire, Mac users could transfer videos shot with digital camcorders (which already used the standard) and edit them on their computers. The next round of iMacs, Steve Jobs decided, would contain FireWire ports. Apple approached creative app giant Adobe to author a simple, consumer-friendly movie editing application, but Adobe declined. That's when Apple decided to create iMovie and feature the Mac as the centre of a "digital hub" strategy, where the Mac served as the nucleus of an ever-expanding digital media universe.

By the late 1990s, digital music had become big news. Illegal file sharing site Napster, in particular, shoved the issue in everyone's face. Despite the legal issues, it quickly became apparent to most in the tech industry that Internet-downloaded MP3s were the future of music distribution. Around 2000, Apple realized it had a large hole in its upcoming digital hub strategy when it came to music. To fill that hole, Apple bought the rights to SoundJam MP, a popular Mac MP3 player application, and hired three of its creators to work at Ap-

ple. One of these men, Jeff Robbin, would head development of an Apple-branded digital music application. Robbin's team simplified SoundJam and added CD-burning features to create iTunes, released in January 2001. As iMovie had done with FireWire-attached camcorders, the iTunes team naturally sought to allow users to transfer songs from iTunes to the portable MP3 players of the day. They had trouble.

The need for the iPod

Behind every successful product lies a problem in search of a solution. The inspirational problem, in the iPod's case, involved the pitiful state of the young MP3 player market in the late 1990s. Portable MP3 players had been around since the mid 1990s, but Apple found that everyone on the market offered a lacklustre user experience. Steve Jobs had a strong term for gadgets like that: "crap". Everyone at Apple agreed.

Figure 8.1.: The original iPod, announced on October 23, 2001.

Flash memory-based players of the era held only about a CD's worth of songs. Hard drive players held far more, but were relatively big,

heavy, and they sported difficult-to-navigate user interfaces that did not scale well when scrolling though thousands of songs.

Moreover, most portable media players (PMPs) used the pokey USB 1.1 standard to transfer music from a host computer to the player, which made the user wait up to five minutes to transfer a CD's worth of songs. When moving thousands of songs, the transfer time could shoot up to several hours.

Considering the poor state of the PMP market, Jobs decided that Apple should attempt to create its own MP3 player, one that played well with iTunes and could potentially attract more customers to the Mac platform. He assigned Jon Rubinstein, then Apple's senior VP of hardware, to the task. Rubinstein began preliminary research for ideas on how to proceed. From the beginning, he had two ingredients in mind: a speedy FireWire interface to solve the transfer problem, and a particular 1.8-inch 5GB hard drive from Toshiba that could make Apple's music device smaller than any other hard drive-based player on the market.

With most of Apple's engineers tied up in Mac-related projects, Rubinstein sought help from outside the company to further determine the feasibility of an Apple music player. Through personal connections, Rubinstein heard about a man with the right qualifications and experience to do the job. He gave him a call in January 2001.

Exploring the possibilities

On that day in January, Tony Fadell happened to be riding on a ski lift when his phone rang. It was Jon Rubinstein calling. He invited Fadell to visit Apple to discuss a potential project, but he kept quiet about its exact nature.

Rubinstein felt that Fadell made an ideal choice to explore Apple's portable digital player options due to Fadell's ample handheld com-

puting experience. He had worked at General Magic (on an OS for PDAs called Magic Cap) and later at Philips Electronics, where he led development of a Windows CE-based palmtop computer called the Nino. At Philips, Fadell had seen the potential of digital audio players through an encounter with Audible, an Internet audiobook vendor that wanted to bring its digital audio products to the Nino. Fadell considered himself a devoted music fan; he enjoyed deejaying events in his off hours, and he fantasized of a day when he didn't have to drag his bulky collection of CDs between gigs.

He began to wonder if Audible's approach could be the solution to his problem and brainstormed ways that he could combine digital audio with music. Fadell explored the idea at Philips, but found little interest in the ideas among management. After a brief stint at RealNetworks, Fadell left to form his own digital music company called Fuse Systems. Fuse developed a digital jukebox that would rip CDs to an internal hard drive, but the company had trouble raising funding in a time when venture capitalists fetishized software over hardware. Fadell had received the call from Rubinstein just as Fuse ran out of money. Fadell went into initial talks with Apple in February 2001, thinking at first that Apple wanted to build a PDA. Soon, Apple offered Fadell a six-week contract as a hardware consultant. Just after signing, Rubinstein revealed Apple's true intentions.

"Apple thought that they could bring a better [MP3 player] to market and they asked for me to do some designs," said Fadell in an interview with *Macworld*. "How could one be built, what kind of components, how much would it cost, and to do all the basic research and design for what was to become the iPod."

Figure 8.2: The Philips Nino, a Windows CE-based palmtop computer that Fadell helped develop prior to the iPod.

Apple paired Fadell with Stan Ng, a veteran Apple product marketing manager, to help him mesh with the company's unique culture. During that six-week period, Fadell met with almost everyone he knew in the handheld industry while keeping his true goals secret. He studied competitors' products and settled on the need for a small, ultra-portable device with a large capacity and long battery life. Fadell brewed up three prototype designs for a potential Apple music player, each model crafted from foam core boards with rough interface graphics pasted on. Lead fishing weights gave each mock-up the approximate weight of a final device. "It was all very, very rough," recalls Fadell. "I only had six weeks and it was only me really doing all the work."

When his contract expired in mid-April 2001, Fadell presented his prototypes to Apple executives, including Steve Jobs, in an important meeting. Fadell purposely offered his two least promising mock-ups to Jobs first (one of which would have used flash memory, the other with removable storage) and hid the third under a decorative bamboo bowl Jobs kept on the conference room table. As Fadell

predicted, Jobs liked the third mock-up best. During the same meeting, Apple's Senior VP of Worldwide Product Marketing, Phil Schiller, presented mock-ups of a player featuring the now familiar scroll wheel. Schiller personally thought of the idea as a solution to a troubling interface problem at the time. Other MP3 players used plus and minus buttons that would move, one item at a time, through a list of songs, which would grow tedious if the unit held a thousand songs – basically, you'd have to push the button a thousand times. With a wheel, a quick flick of the finger would navigate through the list at any rate the user wanted – especially since Apple would make the scroll speed accelerate the longer you spun the wheel. Steve Jobs liked the ideas he saw and offered Fadell a job at Apple to continue his work. After a period of uncertainty, Fadell joined Apple full-time in April 2001. The iPod project – then code named "P-68" – had officially begun.

Forming a team

With Apple's portable music project officially in gear, Fadell needed to settle on a release schedule. After some consultation with Apple's marketing department, Fadell decided that iPod would ship during the 2001 Christmas shopping season, which only gave him six months to form a team, develop a product, get it manufactured, and push it out the door. While Apple dominates financially today, 2001 marked an uncertain time for the company. The recent tech stock crash loomed fresh in everyone's minds, and Apple was just barely breaking even financially. The company's main focus was on the Mac computer line, and it had few resources to spare for other projects.

Fadell knew he had to finish iPod quickly so Apple wouldn't shut down the project; he had to justify its existence as a financial drain on the company. He also felt that competitors would beat Apple to market with a similar device if Apple didn't work as fast as it could. To build the core iPod development team, Fadell hired engineers from his start-up company, Fuse, and veterans from General Mag-

ic and Philips. "We weren't able to take other engineers or other resources from other parts of Apple, because they were already constrained," says Fadell. "We couldn't shut down the Mac to build the iPod, right?"

Apple placed Fadell's team, which consisted of about 25 regulars and a varying number of contractors, in what could be considered the Siberia of Apple: one of the oldest, dingiest buildings on its campus. (The building was so dilapidated that Apple had to kick the iPod team out after a couple of projects to substantially renovate it.) The iPod team's open cubicle workspace made for a rowdy and playful environment. Fadell tells of the team members' attempt to write their initials in wet concrete outside the building (they were caught), and about the time one of the engineers accidentally stuck a screwdriver through a lithium polymer battery. It exploded, causing a nasty fire that sparked an internal FBI-like investigation scene with Apple Legal looking on.

Hashing out the details

With the launch deadline looming, Fadell's team didn't have time to develop all of the iPod's components in-house. While the power supply and display design drew from Apple's expertise, the heart of the iPod, a specialized MP3-playing chipset, came from a San Jose company called PortalPlayer. A company called Fostex would manufacture the included Apple-designed earbuds. Fadell says earbuds were an obvious design choice because they're more portable, harder to break, and don't mess up your hair like traditional headphones do. Meanwhile, Jeff Robbin, the programmer in charge of iTunes development, began work on the software end of the iPod. With so little time to debug a custom operating system to run on PortalPlayer's MP3 chipset, Robbin sought the help of Pixo, a Cupertino company that ultimately provided the iPod's basic OS.

Robbin's team, which included Apple interface designer Tim Wasko, would create the high-level user interface and music playing software in the iPod, as well as the version of iTunes that would sync with the iPod at launch. Both teams put in long hours creating the device: 18 to 20 hours a day, seven days a week, according to Fadell, which took such a toll on his personal life that his girlfriend broke up with him.

While developing the iPod, Apple used a shoebox-sized prototype that enabled easier debugging while also obscuring the ultimate size of the device. Even within Apple, not everyone was certain of all the iPod's intended characteristics. And what characteristics it would have. As with all its products, Apple wanted the iPod to stand out visually. While the software and hardware teams chugged away, Jonathan Ive's industrial design group got to work crafting the exterior appearance of the iPod.

iPod's outer beauty

After dozens of prototypes, Ive's team settled on a design: a simple box, the size of a pack of cards, clothed in a white polycarbonate front that set into a mirror-finish stainless steel case.

Figure 8.3: The Braun T3 Pocket Radio, designed by Dieter Rams, an inspiration of Apple's Jonathan Ive (picture courtesy of The Museum of Modern Art).

Two elements dominated the iPod's face: a simple rectangular display, and the now-iconic scroll wheel, which (unlike late models) physically moved when you spun it. The iPod's physical appearance eerily resembled the Braun T3 Pocket Radio designed by Dieter Rams, one of Ive's admitted design heroes. Ive intended the iPod's "shockingly neutral" white and stainless steel case to set it apart from a world of black and dark grey portable digital gadgets. The iPod would have no removable battery door, no on/off switch, and no screws. Apple would seal the iPod's inner technological wizardry away from the prying hands of the user, silently conveying a simple message: it just works.

The finishing touches

So much about the iPod was new for Apple. Coming from a company accustomed to selling computers, Apple wasn't quite sure how to sell a consumer music gadget, which undoubtedly would be aimed at a different audience than the Mac. Even the label on the iPod's box demanded special consideration for Apple: as a consumer audio gadget, the iPod had to comply with different trade laws regarding warning labels than those for the Mac. To help with those tasks, Apple brought in outside experts who would assist in crafting the initial iPod marketing campaign. One of those experts, a freelance copywriter named Vinnie Chieco, gave the iPod its name.

In response to Steve Jobs' digital hub strategy, Chieco began brainstorming about what interfaces with a hub. Chieco imagined a spaceship as being the ultimate hub from which a smaller craft – a pod (think "Shuttle pod" in Star Trek) – could come and go. Better yet, iPod wasn't descriptive of the music player's function, allowing the iPod's capabilities to evolve over time without needing a name change. Steve Jobs liked it, and the name stuck. After considerable work, Apple marketing managed to pull together a campaign that emphasized style and fashion over tech specs, which were familiar approaches for personal audio products. It would turn out to be a winning strategy.

Source: Edwards, 2011.

Training questions:

1. **Explain, in your own words, why companies should seek innovative opportunities within their internal and external environment.**
2. **What is the difference between process needs and customer needs?**
3. **Why are changes in demographics such a reliable, unambiguous and transparent source for innovation?**
4. **Explain in your own words the unique risks of high-tech and knowledge-based innovations.**
5. **Explain what sources of innovative opportunity are exploited by Apple in the iPod case study.**

Recommended literature:

Schumpeter, Joseph A (1976). Capitalism, Socialism and Democracy, New York.

Drucker, Peter (1985). Innovation and Entrepreneurship: Practice and Principles, New York.

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CHAPTER 9: IDENTIFICATION OF SUSTAINABILITY ISSUES

Sven Pastoors

Summary

These days, companies and customers face increasingly sustainability challenges. When they get aware of a problem they often have no idea what it entails and how to solve it. As there is no answer to the problem yet, a creative solution has to be found.

Creative problem solving exists for as long as humans have been thinking creatively and solving problems. The term problem solving describes the process of working through the details of a problem in order to reach a solution for each kind of problem, including sustainability issues. Besides logical or systematic thinking, problem solving may require creative skills. In that sense, creativity is the ability to find a solution or to develop a product, which is evaluated as functional, original, unique and adequate by a professional group and discerning persons.

When a person encounters a problem, the natural tendency is to propose possible solutions. Consequently, the thought and discussion focuses on the merits and problems of proposed solution(s), rather than an in-depth discussion of possible causes of the problem itself. However, creative problem-solving usually begins with defining the problem. Depending on the problem statement this may lead to a simple non-creative solution, or to finding a ‚textbook solution'. The creative problem-solving process may also lead to the discovery of creative solutions by others.

9.1 Creative problem solving

As mentioned before, companies and customers face many sustainability challenges. When they get aware of a problem they often have no idea what it is about and how to solve it. As there is no answer to the problem yet the company has to find a creative solution.

Creative problem solving exists as long as humans have been thinking creatively and solving problems. Problem solving is the process of working through details of a problem to reach a solution. A problem may occur when there is a difference between what "should be" and what really "is". Thus, a problem expresses the difference between the desired and the actual situation. It´s directly or indirectly related to a desired outcome or standard of behaviour. Identifying a very clearly defined and specific problem is the first critical step to successfully implementing the problem-solving process.

Besides logical or systematic thinking problem solving may require creative skills. The psychiatrist and creativity scientist Gottlieb Guntern became famous through his precise definition and clarification of the term creativity. Guntern's understanding of creativity is the ability to find a solution or to develop a product, which is evaluated as functional, original, unique and adequate by a professional group and discerning persons (Guntern, 1991).

Most commonly, people like to use creative solutions to solve problems. As every problem constitutes the difference between the actual and desired status, creativity only functions if this difference can be recognised and formulated. Therefore, communication plays a huge role in the phenomenon of creativity.

The ideation processes are based on the phenomenon that new ideas can only form when we swap ideas. Similar to cross-breeding roses, crossing ideas allows new ideas to develop (Guntern, 1991). Thus, it is important to gather a large number of ideas. A study by the consultancy company Kienbaum (1991) showed that from around 1900 fixed initial ideas, 75 % of all ideas were immediately discarded during the first evaluation stage. In either larger or smaller projects, the teams pursued a good 520 ideas. Of these, the companies created 180 products that they presented to the market. Approximately 50 products existed longer on the market; however, only 11 products were really successful. The rest was only partly successful or even generated a loss (Berth, 1990, p. 4).

If this study is taken as a rule of thumb, this means that a company has to generate around 170 initial ideas for every successful product or service.

9.2 The creative problem solving process

In the early 1950s, the American scientists Sidney Parnes and Alex Osborn, who invented traditional brainstorming were the first to develop and formalise creative problem solving as a process (Parnes/Harding 1962). Ever since, creative problem solving is a well-defined process that can help companies as well as individuals from problem definition to implementing solutions. As Jeffrey Baumgartner states in an article: "Creative Problem Solving (CPS) is a simple process that involves breaking down a problem to understand it, generating ideas to solve the problem and evaluating those ideas to find the

most effective solutions. Highly creative people tend to follow this process in their heads, without thinking about it." (Baumgartner, 2013)

Creative problem-solving usually begins with defining the problem. Depending on the problem statement this may lead to a simple non-creative solution or finding a ‚textbook solution'. The creative problem-solving process may also lead to the discovery of creative solutions by others (Parnes/Harding 1962).

However, there are numerous approaches to CPS. Based on Osborne´s CPS-process model in his book, a 6-step CPS approach is used to develop sustainable innovations including following steps:

- Identifying the problem
- Defining the problem
- Understanding the problem
- Generating ideas
- Evaluating ideas and decision-making
- Implementing the solution

Identifying the Problem

Before being able to deal with a problem, companies or individuals have to become aware of its existence. Relatively often, problems have had an impact for some time before they are recognised or brought to the attention of someone who can do something about them. When a person faces a problem, the natural tendency is to immediately propose possible solutions. Consequently, the thought and discussion focuses on merits and problems of proposed solution(s), rather than an in-depth discussion of possible causes of the problem itself. Thus, if a company or person wants to resolve the root problem, they have to treat the cause, not the symptom. Persistent and recurrent problems are often symptoms of deeper-lying is-

sues. A ‚quick fix' may seem convenient, but it is really just a temporary solution and it may solve only part of the problem. Thus, the stakeholders may need to state the problem in broad terms since they may not recognize the exact problem:

- they may lack information to define it
- they can confuse symptoms with underlying causes

For example, if somebody takes an aspirin for a headache, he`s treating the symptom (the pain) and not treating the cause. He might experience temporary relief, but if the cause (e.g. a broken tooth) is left untreated, it's likely that the headache will return. Sometimes numerous negative symptoms are all outcomes of a single root problem – so solving the root problem will resolve many related problems.

Defining the problem

Once a company has identified the problem, the management needs to determine its exact nature: what is the job-to-be-done and what are the barriers to do so? Thus, the management can outline some of the main elements of the problem, and make a first attempt at defining the problem. This definition should be clear enough to be able to easily explain the nature of the problem to others.

Jobs-to-be-done	Barriers to do so
Get rid of a broken tooth.	I am afraid of the dentist.
Set up a new business.	The entrepreneurs do not know where to start.
Reduce the waste of food.	Customers buy attractive-looking food only.

Looking at the problem in terms of ‚jobs-to-be-done' and ‚barriers to do so' can offer an effective way of defining many problems and splitting bigger problems into more manageable sub-problems. By this means, sometimes it will become apparent that what seems to be a single problem, is more accurately a series of sub-problems.

In addition, the stakeholders can further clarify the problem by asking questions such as: "What do we really wish to accomplish?", "What is preventing us from solving this problem?", "How do we envision our company in one-year respectively five years as a result of solving this problem?" as well as "Are other companies dealing with similar problems? If so, how are they coping?" By the time a company has answered all these questions, they should have a clear idea of what their real problem is (Baumgartner, 2013).

During this stage of problem solving, it is important to get a first working definition of the problem. A well-stated problem is one that can be stated in a single sentence. Thus, the problem statement should be a concise description of issues that need to be addressed and should be agreed on by all stakeholders (or created by them) before they try to solve the problem.

Although it may need to be adapted at a later stage, a good working definition makes it possible to describe the problem to others who may become involved in the problem-solving process. One test for checking to see if somebody has identified the real problem, is to ask the question, "if the problem I've stated had been resolved from the beginning, would this current situation be happening?"

The final step of this stage is to decide what criteria a company wants to use to evaluate or judge the ideas. Are there any budget limitations, sustainability criteria or other restrictions given that will affect whether they go ahead with an idea? The management should set up a list of three to five evaluation criteria and then put the list aside until the ideation process is completed (Baumgartner, 2013).

Understanding the Problem

The third stage of the problem-solving process involves gaining a deeper understanding of the problem. After problem identification and identifying of the sub-problems, structuring the problem is all about gaining more information about the problem and increasing understanding. This phase focuses on finding and analysing facts, as well as building a more comprehensive picture of both job(s) and barrier(s). This stage may not be necessary for simple problems but it is essential for problems of a more complex nature. To structure the problem, first, facts need to be checked.

Initial situation	Checking Facts
"We have to increase our output	Do we really have to increase our output? Why?
but we don't have the production capacity	Do we really have no access to additional production capacity? Why?
and we don't have enough money to buy new manufacturing equipment."	Can we really not afford to buy new manufacturing equipment? Why?

These questions could be asked to make sure whether the stated *job-to-be-done* is the real goal? Are the barriers actual barriers and what other barriers are there? In this example, at first the problem seems to be that the company doesn't have the production capacity to increase its output. But, if the problem gets investigated it turns out that the lack of money is the main problem.

This is a good opportunity to look at the relationships between the key elements of the problem. For example, in the 'output-production-money' problem, there are strong connections between all the elements. By looking at all the relationships between the key ele-

ments, it appears that the problem is more about how to find investors, because solving this sub-problem will, in turn, solve the others.

Doing research is another way to get a better understanding of the problem. The best place to start these days is with one's favourite search engine. But one should not neglect more traditional sources of information and opinions such as libraries or polls (Baumgartner, 2013).

Generating ideas to solve the problem (ideation)

Based on information gathered in the first three phases of the problem-solving framework it is now time to start thinking about possible solutions to the identified problem (e.g. by ideation). In a group situation, this stage is often carried out as a brain-storming session, letting each person in the group express their views on possible solutions (or part solutions). In organisations, different people will have different expertise in different areas and it is useful, therefore, to hear the views of each party concerned. This step will be deepened in the following chapter 12 "Ideation".

Evaluating the ideas and decision-making

This step is perhaps the most complex part of the problem-solving process. Following the ideation process, it is now time to look at each potential solution and carefully analyse it. Using the criteria that the stakeholders have devised earlier, they can choose all the ideas that broadly meet these criteria. Baumgartner points out that this is not always sufficient: "With complex ideas, a simple evaluation may not be enough. You may need to do a SWOT-analysis (strengths, weaknesses, opportunities and threats) or discuss the idea with others who will be affected by it. If the idea is business related, you may need to do a business case, market research, build a prototype or a combination of all of these." (Baumgartner, 2013)

On the other hand, some solutions may not be feasible, due to other problems, such as time- or budget constraints. Sometimes trying to solve a problem that leads to many more problems requires very creative thinking and innovative ideas.

Implementing the solution

Implementation means acting on the chosen solution. During the implementation process more problems may arise especially if identification or defining of the original problem was not carried out fully. Furthermore, the final stage of problem solving is also concerned with checking if the process was successful. This can be achieved by monitoring and getting feedback from people affected by any changes that occurred. It is good practice to keep a record of outcomes and any additional problems that occurred.

To solve problems properly, the stakeholders need to drill through the symptoms to the underlying cause. There are different techniques, which help them to find the underlying cause and to define the problem as exact as possible.

9.3 Questioning techniques to identify a problem

Purposing

Purposing is a simple technique to create an effective focus for creative problem solving. Companies can use it

- when they are starting out, to define the problem which they are seeking to solve.
- when they are stuck, to think again about what they are trying to achieve.

- to discover the purpose of the person to whom they are selling the idea.

Procedure

- Ask 'What is it for?' The basic principle of purposing is to return to asking about the real purpose. Hence, ask 'What is it for?' Seek the reason behind what you are trying to do.
- Ask the person or people for whom you are creating why they want it. Ask what they are going to do with it. Observe them to learn more.
- Now do it again: And when you think you know, ask the question again. Take another viewpoint. Ask 'Who else is interested in this? What do *they* want?' Look deeper. Ask the same question again and again.
- Think about different technical or other aspects of the problem. Ask questions such as 'Am I trying to achieve this, or trying to do that?' Look at it in as many different ways as possible. (Straker, 2015)

5 Why's technique

The 5 Why's technique is a simple tool for quickly uncovering the root of a problem. Sakichi Toyoda, one of the fathers of the Japanese industrial revolution, developed the technique in the 1930s. He was an industrialist, inventor and founder of Toyota Industries. His technique became popular in the 1970s and Toyota still uses it to solve problems today.

The 5 Whys technique is easy to use: when a problem occurs, you uncover its nature and source by asking "why" at least five times. You can use the 5 Whys in troubleshooting, quality improvement and problem solving. It is best for simple or moderately difficult problems. For more complex or critical problems, it can lead you to pursue a single track of enquiry when there could be multiple causes.

This simple technique, however, can quickly direct you to the root of the problem (Ohno, 2006).

Procedure

The 5 Why's is a simple tool that is easy to use. When a problem arises, simply keep asking the question "why" until you reach the underlying source of the problem, and until a robust counter-measure becomes apparent. Keep asking "why" until you feel confident that you have identified the root cause and can go no further. At this point, an appropriate counter-measure should become clear (Ohno, 2006).

9.4 Analytical techniques to identify a problem

Positives, Negatives

Sometimes individuals or companies have to look at the other side of the coin to find the cause of a problem.

Procedure

- Explore negatives
  Seek to understand the *negative* things that are happening. Think of what you are doing as 'problem-solving'. Ask questions such as: What kind of problems are we trying to solve? What is going wrong that we want to fix? Who is affected? What other problems do they have? What would we like to leave behind? What do we want to go away from?

  Write the answers down as coherent problem statements, where the problem to be resolved is clearly identified.
- Explore positives
  Take a break to clear your mind of negative things, then start

looking at the other side of the coin. Look for the *positive* things to be gained. Think of what you are doing as 'adding value'. Ask questions such as: What new benefits can we introduce? What is going well that we want to improve? Who is involved? What are they trying to achieve? What does 'value' mean to them? What would we like to gain? What do we want to move towards?

- Write the answers down again as clear benefits statements, where the value to create is clear. Review the statements you have created and decide whether you want to work solving a negative problem or creating positive value. Both are equally valid.

CATWOE-Technique

CATWOE stands for **C**ustomers, **a**ctors, **t**ransformation process, **w**orld view, **o**wner and **e**nvironmental constraints. Peter Checkland and other academics at the University of Lancaster Systems Department developed the CATWOE technique through a ten-year action research program. It is a simple checklist for thinking (Checkland, 2001).

Procedure

Use the areas below to stimulate thinking about the problem and/or implementing the solution.

- **C = Customers**
  Who is on the receiving end? What problem do they have now? How will they react to what you are proposing? Who are the winners and losers?
- **A = Actors**
  Who are the actors who will 'do the doing', carrying out your solution? What is the impact on them? How might they react?

- **T = Transformation process**
  What is the process for transforming inputs into outputs? What are the inputs? Where do they come from? What are the outputs? Where do they go to? What are all the steps in between?
- **W = World View**
  What is the bigger picture into which the situation fits? What is the real problem you are working on? What is the wider impact of any solution?
- **O = Owner**
  Who is the real owner or owners of the process or situation you are changing? Can they help you or stop you? What would cause them to get in your way? What would lead them to help you?
- **E = Environmental constraints**
  What are the broader constraints that act on the situation and your ideas? What are the ethical limits, the laws, financial constraints, limited resources, regulations, and so on? How might these constrain your solution? How can you get around them?
  (Checkland, 2001)

The Nine Windows Creativity Technique (TRIZ)

The nine-windows creativity technique, or the system operator, can help cut through the complexity so that the problem that needs to be solved becomes clear. One of the challenges individuals or companies face in creative problem solving is to mentally change their thinking pattern. They tend to be so trapped in their own perspective that it limits their ability to see other possibilities. What they need is a structured way to look at a problem through different "lenses". The nine-windows creativity technique enables them to look at innovation opportunities across the dimensions of time (past, present, future) and level (super system, system, subsystem). In other words, it gives them a set of tools that they can use to consider a problem by

breaking it into smaller pieces as well as considering the larger context into which it fits (Silverstein et al., 2012, p. 57-58).

Table 9.1: Nine Windows Creativity Technique (TRIZ)

	Past	**Present**	**Future**
Super system (Environment)	(Step **4**)	System environment-present (Step **3**)	(Step **5**)
System	(Step **4**)	Product/ Problem (Step **1**)	(Step **5**)
Subsystem (Subarea)	(Step **4**)	Subsystem-present (Step **2**)	(Step **5**)

Source: Silverstein et al., 2012, p. 58.

The super system relates to how the product or problem interacts with the surrounding environment: "What larger system encompasses the product or problem?" Conversely, the subsystem breaks the present product or problem down into the components and characteristics that constitute it: "What makes up the object in its present form?"

Procedure

- Draw nine boxes arranged in a 3 x 3 matrix on a blank sheet of paper. Label the bottom row of boxes (from left to right) past, present and future. Label the far-left boxes (from top to bottom) super system, system, subsystem.
- Put your problem in the middle square: Use whatever makes sense to describe your problem.
- Identify the system environment (super system) and subsystem: Fill in the boxes above and below the centre box in the present dimension (the middle column).
- Determine the past: Fill in the past boxes to the left. What did the product or solution look like in the past? What happened to the product from its creation to its present form or function? Before the present product or solution existed, what was the previous solution for the job-to-be-done?
- Complete the grid: Fill in the future boxes to the right. Don't limit yourself to just the immediate future. Instead, experiment with defining this temporal dimension in more than one way by asking questions such as these: What will the product or solution look like in the future? What will happen to the product or solution after it ceases to work in the present? What future solution could be developed to address the same job-to-be-done? How can the system inputs be modified to eliminate, reduce or prevent a harmful? (Silverstein et al., 2012, p. 58-61).

The nine windows technique is taken from the problem-solving approach of TRIZ.[22] The Soviet inventors and scientists Genrich Altshuller and Rafael Shapiro developed it between 1954-1956. An important part of the theory has been devoted to revealing patterns

22 TRIZ is the Russian acronym for "the theory of inventive problem solving.

of evolution. Overall, there are three primary findings of this research:

- Problems and solutions are repeated across industries and sciences;
- Patterns of technical evolution are also repeated across industries and sciences;
- Innovations used scientific effects outside the field in which they were developed.

TRIZ applies all these findings to create and to improve products, services, and systems. Based on extensive research covering hundreds of thousands of inventions across many different fields, the theory defines generalizable patterns in the nature of inventive solutions and the distinguishing characteristics of the problems that these inventions have overcome.

Jobs to done

A completely different approach was developed by the American scientists Clayton Christensen and Tony Ulwick. They describe the Job-to-be-done concept as follows: '[…] the consumer has a different view of the marketplace. He simply has a job-to-be-done and is seeking to 'hire' the best product or service to do it." (Christensen et al., 2007, p. 2) If a company is able to understand the jobs their customers want done, they gain new market insights and create viable growth strategies. Sometimes a good solution for a *job-to-be-done* does not exist yet at all. When this is the case, they have a great opportunity to innovate. In general, there are two different types of **jobs-to-be-done**:

- *Main jobs-to-be-done*, which describe the task that customers want to achieve.
- *Related jobs-to-be-done*, which customers want to accomplish in conjunction with the main jobs-to-be-done.

Jobs-to-be-done are completely neutral of the solutions a company creates (their products and services). While the jobs, a customer wants to be done remain fairly stable over time, their products and services should change at strategic intervals as they strive to provide ever increasing value (Silverstein et al., 2012, p. 3-4).

Procedure

- Identify a focus market.
- Next, identify jobs customers are trying to get done:
  Study your customers and find out what they are trying to accomplish. What jobs have ad hoc solutions or no good solutions? When you see customers piecing together solutions themselves, these are great clues for innovation.
- Categorize the jobs-to-be-done: Jobs can be main jobs or related jobs.
- Create job statements: The *job statement* describes exactly the job-to-be-done. Key components of a job statement are an action verb, the object of the action, and clarification of the context in which the job is performed.
- Prioritize the opportunities: There are hundreds of jobs that customers are trying to get done in every market. Which one of these offers the best opportunities for you? Which ones offer opportunities to create uncontested market space? In most situations, the jobs that customers want to get done for which no good solutions exist are the ones that provide the greatest opportunity for innovation.
- Look for the "struggling moment". By means of an interview ask your customer why he switched solutions from the previous product to yours. Alternatively, ask customers that no longer "hire" your products and who switched to a new solution, what they struggled with and how that made them look for a new and better solution.
  (Silverstein et al., 2012, p. 7-11)

9.5 Techniques to visualize a problem

A visual representation and a working definition together make it far easier to describe a problem to others. Thus, we are introducing several techniques how to visualize a problem.

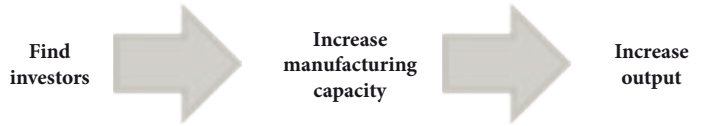
Listing

Listing the elements of a problem can also help to represent priorities, order and sequences in the problem. Goals can be listed in order of importance and barriers in order of difficulty. Separate lists could be made of related goals or barriers. The barriers could be listed in the order in which they need to be solved, or elements of the problem classified in a number of different ways. There are many possibilities, but the aim is to provide a clearer picture of the problem.

Chain Diagrams

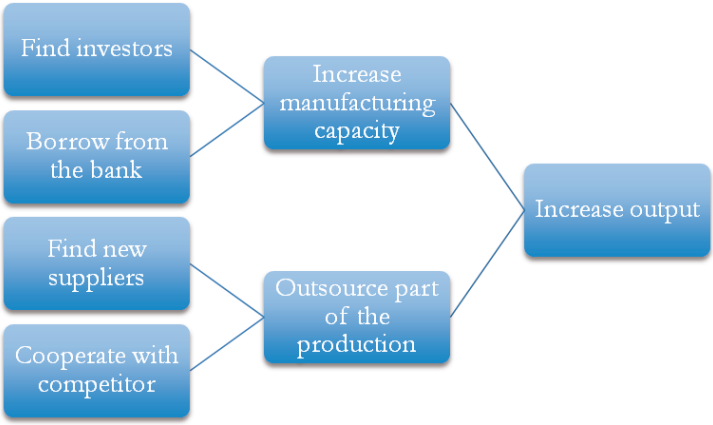
Chain diagrams are simple ways of representing problems combing diagrams and words. The elements of the problem are set out in writing, usually placed in boxes, and positioned in different places on a sheet of paper, using lines to represent the relationship between them.

Chain Diagrams are the simplest type, where all the elements are presented in an ordered list, each element being connected only with the elements immediately before and after it. Chain diagrams usually represent a *sequence* of events needed for a solution. A simple example of a chain diagram illustrates the output-production-money problem as follows:



Flow Charts

Flow charts allow for inclusion of branches, folds, loops, decision points and many other relationships between the elements. In practice, flow charts can be quite complicated. There are many conventions as to how the flow charts have to be drawn, but generally, simple diagrams are easier to understand and aid in ‚seeing' the problem more readily.



Tree Diagrams

Tree diagrams and their close relative, the Decision Tree, are ways of representing situations where a number of choices have to be considered. These types of diagram are particularly useful for considering all the possible consequences of solutions.

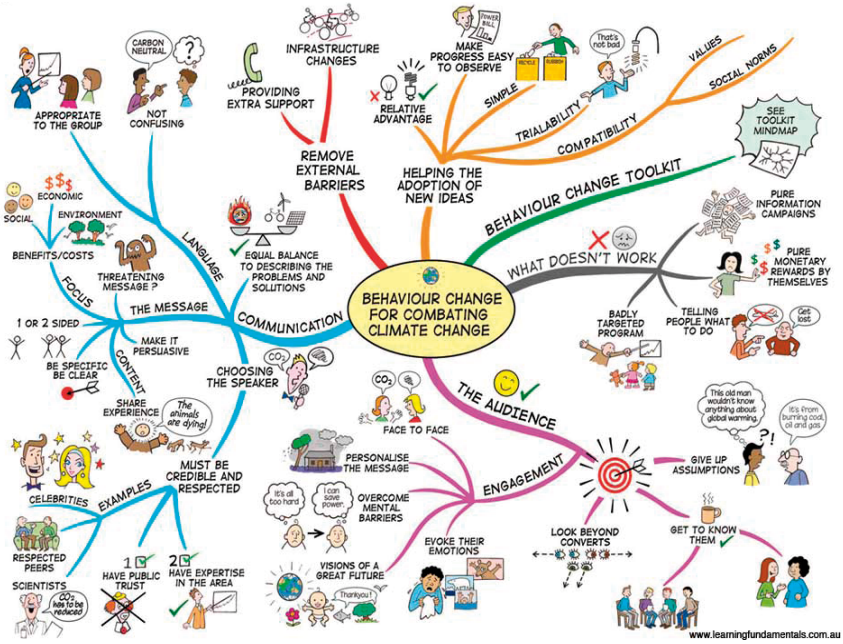
Remember that the aim of a visualisation is to make the problem clearer. Over-complicated diagrams will just confuse and make the problem harder to understand.

Mind mapping

A picture is worth a thousand words. It opens up associations, focuses the thoughts, is fun and results in better recall:

- Colours stimulate the right cortical activity of imagination as well as capturing and holding attention.
- The unique shape makes it more memorable and enjoyable. A frame makes the centre a monotony of shape and disconnects the branches.

Figure 9.1: Mind map for Behaviour Change for combating climate change



Source: Rea 2013.

Procedure

0. Take a blank piece of paper, A4 size or larger. Use the paper in landscape orientation and start in the centre. Make a central image that represents the topic about which you are writing/thinking.

1. The main themes around the central image are like the chapter headings of a book:
   - Print this word or phrase in CAPITALS or draw an image.
   - Connect directly to the central image.

2. Start to add a second level of thought. These words or images are linked to the main branch that triggered them. Your initial words and images stimulate associations. Attach whatever word or image is triggered. Allow the random movement of your thought; you do not have to ‚finish' one branch before moving on.

3. Add a third or fourth level of data as thoughts come to you:
   - Use images as much as you can, instead of, or in addition to the words.
   - Allow your thoughts to come freely, meaning you ‚jump about' the Mind Map as the links and associations occur to you.

4. Sometimes enclose branches of a Mind Map with outlines in colour. Enclose the shape of the branch, hug the shape tightly and use different colours and styles.

5. Add a little humour, exaggeration or absurdity wherever you can. Your brain will delight in getting enjoyment from this process and you will therefore learn faster, recall more effectively and think more clearly.

Training questions:

1. **Explain Guntern's understanding of the term creativity.**
2. **How does the "job-to-be-done" framework facilitate the innovation process?**

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CHAPTER 10:
INTRODUCTION TO CUSTOMER INSIGHT

Ulrich Scholz

Summary

Customer Insight will allow business professionals to develop successful products as well as effective marketing strategies, by gaining deeper insights into the perceptions, needs, motivations and preferences of their target customers. Companies that implement these strategies can expect to attract and retain more customers, grow their market share, increase the productivity of their marketing efforts, and increase their profitability.

Customer insight is assigned to primary research. Primary research, as all qualitative research methods, is often connected to very high expenses. But the data is current and exactly reflects the question. In contrast, secondary research is easily accessible and thus relatively inexpensive. However, the data is often not up-to-date and the individual companies do not necessarily receive a firm answer to their questions. Secondary research is used to build on the background knowledge of the customer groups in the framework of customer insight.

The research of customer insight is based on a phase concept, which must be continuously designed within a company. At the end of the phase concept is the concrete implementation of the customer insight through marketing activities. However, these phases must be continuously evaluated and adjusted every once in a while, as the customer's attitude changes over time. The process of customer insight consists of 5 phases:

1. Clarity of target
2. Creating a multi-dimensional customer scenario
3. The actual customer insight process
4. Adjusting customer frequency
5. Implementation of the customer insight

Customer Insights need to be the language that breaks down functional silos and allows companies to make good decisions in sustainable innovation and to create customer value. So Customer Insight must be at the forefront of all employees` minds as they make decisions that will have an impact on the sustainability of the organization.

10.1 Customer insight

The identification and definition of the customers' needs and wishes is one important step within the innovation process. This is normally done in the context of a company's marketing. In doing so, the focus of marketing lies on the consumers. However, marketing is often aligned with improvement of processes rather than the needs of the customer. But actual marketing strategies must not concentrate on processes. The understanding of the customer should be the focus of

the consideration. Generally, a differentiation is made between customer, consumer and shopper insights (Riekhof, 2010, p. 9):

- The customer can be regarded both as a B2C- (Business to Consumer) and B2B- (Business to Business) customer.
- The term ‚consumer' refers to the end-customer.
- In contrast, the ‚shopper' is the customer at the POS (point of sale).[23]

Thus, the term customer insight can be defined as follows: "***Customer insight*** is the collection, analysis and interpretation of customer information, making it possible for the companies to:

- Recognise trends
- Know what the customer wants
- Know what the customer believes
- Recognise what the own company can contribute towards solving the customer's problem." (Bruhn, 2004, p. 24)

"Customer insight" is therefore a way of thinking, which should be rooted throughout the entire company. In addition to knowledge about preferences, the research field "customer insight" is also occupied with data mining and customer relationship management. This way, attractive product bundles can be determined, promising new customer groups identified, and existing customers bound. In the data mining area, customer data is empirically associated through the use of methods and algorithms, with the aim of improving sales pitches. Customer relationship management is therefore characterised as a management philosophy, which stipulates complete alignment of the company with existing and potential customer relations (Raab, 2009, p. 11).

23 In the following chapter, both the consumer and the shopper will be classified under the term ‚customer'.

10.2 Incorporation of Customer Insight in the Market Research Process

Market research is an important tool for the systematic collection, processing, analysis and interpretation of market and customer data.

> "*Know already today, what will be asked for tomorrow and taken for granted the day after.*" (Stefan Hitz, Managing Director of JEKO AG)
>
> "Increasing numbers of providers are rushing onto the markets with increasingly similar products. The competition becomes stronger; the price pressure rises. Companies that want to confront this intensive competition must constantly look for new, innovative and market-appropriate problem-solving methods. For a long time, it has no longer been enough to simply offer high-quality products or services. Additional value is becoming increasingly important. Today, no market participant can allow himself not to satisfy the expectations of his customers. But what do these expectations look like? What does the customer really want? With the aid of market research, the companies try to answer these questions, draw consequences from them, and introduce appropriate measures. Therefore, effective market research can increase customer satisfaction and improve the competitive position of the company."

Source: Beyer 2003.

Meffert et al. (2012) define market research as follows: "Market research is systematically-driven research (retrieval, preparation, interpretation) of the sales and resourcing markets of a company" (Meffert et al., 2012, p. 96). This definition of the term is the basis of further observations.

In literature, the entire market research process is generally divided into four main phases. During the first phase the aim of the analysis is recognised and defined; within the second phase the research plan is created and the data collected. In the third phase the collected data

is analysed and interpreted, and phase four the results are presented and communicated (cf. Raab et al., 2009, p. 14).

Differentiation is made on the one hand between primary and secondary research, and on the other hand between qualitative and quantitative methods in the framework of market research. Primary and secondary research methods differ in the extent to which information is already available in the research area. If none is available and data must initially be collected, then this is referred to as primary research. If already available data will be analysed, then this is known as secondary research. Secondary market research therefore covers the sourcing, collation and evaluation of the available material (desk research). Qualitative methods of market research include market research methods of which the results are content and non-numerical. The results of quantitative market research in contrast are expressed numerically.

Figure 10.1: overview of research methods

Qualitative Methods	**Quantitative Methods**
• Interviews with experts	• Standardised surveying forms
• Customer focus groups	• Personal questionnaires
• In-depth interviews	• Telephone interviews
• Psychological tests	• Online questionnaires
	• Desk research

Concluding, the type of data collection is decisive. The market researcher has to evaluate which method of data collection is most appropriate for the specific case. A differentiation is made between primary and secondary data collection.

The collection of primary data entails the information that is collected directly at the point of generation, and the following procedures are distinguished:

- Surveys
- Observations
- Experiments
- Interviews

Surveys
The survey is the most widespread and important data collection method. Companies use surveys to find out about the product knowledge of a target group, their views, preferences or satisfaction. This way the observable and non-observable behaviour is recorded. A survey can take place:

- in **written** form;
- **personally** or
- via **telephone**.

These three survey types are of equal value. The use of surveying methods depends on the framework conditions that exist for the individual market research. A written questionnaire is preferred if the influence of the interviewer on the answers to the questions is to be eliminated. The personal questionnaire is used particularly for roadside interviews, and the telephone survey when interview data must be collected as quickly as possible, and the analysis should take place immediately if possible (e.g. the opinion poll). Increasingly often, surveys are also performed over the Internet, as here the actuality of the data can be well assured. However, the researcher should take care when using this survey method that no clumps develop, especially on social networks (only test persons with a similar profile, or of similar age are questioned), as a very heterogeneous sample would yield non-generalizable results

The following diagram describes the advantages and disadvantages of the individual survey methods:

Figure 10.2: Advantages and disadvantages of the individual survey methods

	In writing	Personal	By telephone
Advantages	▸ No interviewer-bias ▸ Relatively cost-effective ▸ Large spatial area can be covered ▸ The interviewees are not under time pressure	▸ High success rate ▸ Retrieval of additional information (e.g. emotional reactions) ▸ Survey tactical instruments (questioning form, question order) are used to the full	▸ Can be used at short notice ▸ Lower costs than a verbal survey
Disadvantages	▸ Possibly lower rate of return ▸ Address data necessary ▸ Identity of the interviewee cannot be checked ▸ No control over the sequence and time of the survey	▸ High costs ▸ Interviewer-bias	▸ No optical aids when answering ▸ Interviewer-bias ▸ Telephone number necessary ▸ Can be annoying for the interviewee

Source: Own representation based on: Raab et al., 2009, p. 39ff

Observations

Through observation, valuable information about the behaviour of the interested party or customer is collected (e.g.: How does the customer walk through the shop? How does he or she react to loudspeaker announcements or consultation discussions? How does

he or she behave at the checkout?). Generally, the observation is performed by trained personnel or technical appliances such as counters or video cameras. Here it is advantageous that, in contrast to the survey, the observation is not dependent on the willingness to provide information of the observed person. Observation does however have its limits:

- Only the actual behaviour is determined
- Only behaviour at that particular time-point is recorded
- Observation effect: Changes in the behaviour of the person being observed (depending on the extent to which they know they are being observed)

Experiments

An experiment is a survey and/or observation within a controlled test setup with predetermined framework conditions. A laboratory experiment is one with artificial framework conditions; a field experiment has natural conditions. The best-known forms of field experiments are the market test and the panel survey. During the market test, all the marketing opportunities of the new products or services are tested in a limited market using all the possible marketing actions.

In the scope of a panel survey, persons (individuals) and households (household survey) are surveyed at regular intervals on the same subject (e.g. their consumer behaviour). A panel always delivers immediate and continuous data. Panel surveys are used predominantly to determine the permanent buying habits of consumers.

10.3 Taking advantage of the customer knowledge

An important component of the customer insight process is the activation of the knowledge of the customer gained in the framework of the "customer insight": "As the company's new products must meet its customers' requirements, binding the customer already at the start of the innovation process is both logical and shows commitment. They are the most important source for the identification of possible problem areas." (Vahs/Brem, 2013, p. 265). Important prerequisites for the activation of customer knowledge are among others a clearly formulated activation strategy, appropriate market demarcation and the definition of the customer segments.

"Customer Insight" – Asking the Correct Questions

During the activation process qualitative methods are used predominantly. Qualitative methods allow the company an important deeper insight into the wishes and needs of the customer. Because the company receives not only an answer to the question, what would the customer like, but also to the important question "How?". Furthermore, qualitative methods are considerably better when building a long-term relationship with the customer.

Customer insight is assigned to primary research. Primary research, as all qualitative methods, is often connected to very high costs. But the data is current and exactly reflects the question. In contrast, secondary research is relatively inexpensive. However, the data is often not up-to-date and the individual companies do not necessarily receive a firm answer to their questions. Secondary research is used to build on the background knowledge of the customer groups in the framework of customer insight.

The first step of the activation process is the definition of the research question. Here the aim is to initially identify and formulate

the core problem or main challenge. In doing so, a research question is raised, which can be answered with the aid of marketing research.

The second step is to develop the research design for the basic question. In doing so, the company can fall back on the findings from the "customer insight" process. The following framework conditions are generally clarified during the formulation of the research design:

- Demarcation of the market to be tested: This is achieved using, for example, time factors, geographic factors or market elements, such as demand groups or supplier groups.
- Definition of the object to be tested: In the framework of customer insight, this is generally the customer and his needs. At the same time, it is important to define the target group(s) as precisely as possible.
- Definition of the test variables that should be tested for the object.
- Selection of the research approach: The basic research approaches are cross-sectional studies and longitudinal studies. How strongly the experimental elements should be used is also of interest.
- Determination of the test location: Field research and the laboratory are available as the test location extremes.
- Selecting the collection procedure: Various methods from the two groups of survey and observation techniques can be used as collection procedures. When selecting the test object, the wide range of random sampling procedures is suitable: e.g. spot tests or panel tests.

If possible, a company should therefore choose a combination of primary and secondary research as both quantitative and qualitative methods for customer insight. Therefore, companies should use the instruments of secondary research during the first data collection stage, and then round off their results with the aid of primary research. Only then can the correct conclusions be drawn. Further-

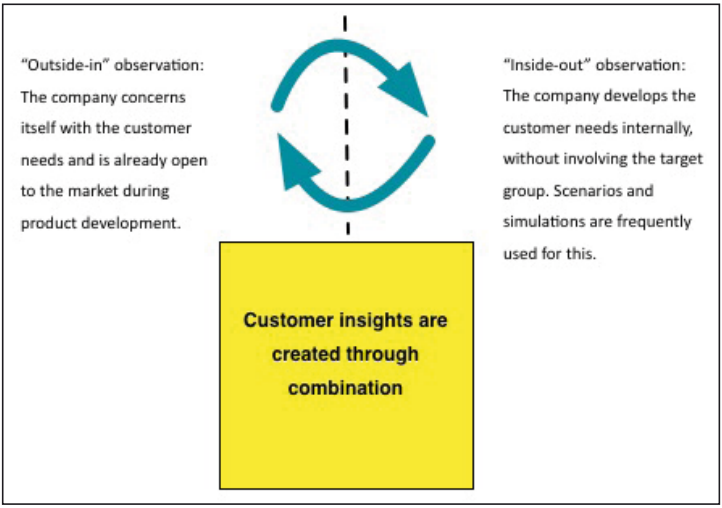
more, the collaboration and commitment of the entire company is required in order for customer insight to be successful: Interdisciplinary teams, supported by management and above all a shift in the company structure, ultimately decide the success. The customer knowledge can only be used for the own targets, and a long-term relationship can only be built with the customer if all the members of the company are involved.

Customer insight is a key asset for successful companies. Customer insight indicates which motives move the customer to buy a certain product. Using the customer insight approach, the company gains knowledge on the customers´ buying behaviour that leads them to make purchase decisions. Thus, customer insight is used in communication with the customer in order to address the needs of the customer. Gains in customer orientation and efficiency are possible, if the benefit of a product and the anticipated willingness of the customer to pay can already be taken into consideration during the development of the product. Therefore, in-depth knowledge of customer insight is of major importance in order to find out whether a new product or service idea, a business model innovation or even a new business area actually corresponds to a customer need and marketplace potential. The development of customer insight includes the identification, description and understanding of customer needs and customer requirements. Therefore, understanding "customer insight" plays an important role in the understanding of motives and attitudes, and their influence on the use and purchase of products. If the "applicable" insights are communicated, the willingness of the customer to identify with the product increases and thus, his interest in buying the product.

The customer insight approach can be integrated into communication concepts that are planned, for example as the basis of copy strategy. With the copy-strategy the appropriate needs of the target group are defined in the advertising content. During the development and monitoring of such concepts the companies work with a series of

complementary methods for qualitative market research. Intensive work with customer insight also gives the company input for communication and promotion of the product (and therefore, for the used marketing mix). Communication based on the customer insight can be tailored to the implicit and explicit requirements of the target group.

Figure 10.3: Using "outside in" and "inside out" observation of customer insights



Source: Own presentation (© Christian Streichan 2014) based on Lenz 2014.

As presented in Figure 10.3, companies may use two approaches in order to gain customer insight. On the one hand, they can include the customer in the product development at a very early stage – e.g. as lead-user or through the use of customer focus groups[24]. In this

24 Customer focus groups: Discussion groups with selected customers. The discussion groups are arranged using previously determined criteria and are stimulated to discussion on a particular topic using information input. (Gabler Wirtschaftslexikon)

case, they ask selected customers about their desired product requirements. The information gained already flows into the product development at an early stage. On the other hand, ‚inside out' observation is also possible. Here, work is performed with the creation of scenarios and features that are important to customers are identified in a development process.

The combination of ‚outside in' and ‚inside out' is particularly promising as the needs and requirements of the customer are already taken into consideration at a very early stage.
As the starting point for the observation, three questions can be asked in the area of market research:

1. What information has already been collected by other market researchers?
2. What information has the customer already provided?
3. What behaviour by the customer has been observed?

These three questions include quantitative and qualitative market research:

- The question "What information has already been collected by other market researchers?" covers the reviewing of secondary sources. This includes both already published research studies and also quantitative data collection.
- The question "What information has the customer given?" involves qualitative market research and with it personal contact with the customer through interviews, or through work with customer focus groups.
- The third question involves observation of the customer in his environment.

If the information gained from these three areas is pooled, a company has gained enough "insight" into the customer to be able to estimate his needs and requirements. In practice, however, this procedure is rarely so concentrated and used by companies to draw clear

conclusions for product development (Riekhof, 2010, p. 17). In doing this, the knowledge of the customer can be very conclusive for companies.

10.4 The phase concept of customer insight

The research of customer insight is based on a phase concept, which should be continuously designed within a company. At the end of the phase concept is the concrete implementation of the customer insight through marketing activities. However, these phases should be continuously questioned and adjusted as time goes on, as the attitude of the customer changes over time.

The process of customer insight consists of 5 phases:

1. Clarity of target
   Who or what should be identified with which target?
2. Creating a multi-dimensional customer scenario
   Gathering hypotheses, knowledge, speculations about the customers and their wishes
3. The actual customer insight process
   Putting hypotheses on the test bench
4. Adjusting customer frequency
   Developing good ideas for new products, improvement of existing products and future projects together with the customer
5. Implementation of the customer insight
   Concrete and optimised handling of the customer and target markets (Wenzlau et al., 2003, p. 106ff)

Phase 1: Clarity of target

In the first phase, it is not merely about defining the customer insight target, but rather to design it as operational, scheduled, clear-

ly and realistically. Furthermore, it must be defined how the definite target should be achieved. This obsession with details in the insight process highly irritates companies at first. In a world that is becoming increasingly complex, companies have learned to work with a permanent reduction in complexity in order to remain able to operate. In other words: Companies have become arranged so that they remain simple, in order to get along. Accuracy and precision are often neglected. Without clarity of the target, a customer insight process often remains at the stage of a conventions needs analysis.

A needs analysis analyses the customer requirements from the company's point of view only – and this exactly is the challenge: the company recognises the customer from his specific point of view, with his specific experiences and with respect to his concrete range of offers. This restricted recognition and the lacking consequence of following the customer targets and wishes always leads to the same result, that the companies firmly believe that they know what is good for the customer, being surprised that the customer does not act and buy as expected.

The customer insight approach takes the decisive steps further, so that the company can anticipates the customers' thoughts. They move within the customer perception and in doing so, leave – consciously – their own one. Working with customer insight means actively expanding into the customers´ perception.

Phase 2: Multi-dimensional customer scenario

In this phase, the company hypothesizes what really touches and moves the customers, and what they desire. Hypotheses in this sense are images, ideas and assumptions, which are formed about the needs and requirements of the customer. For this, information about all the areas of life of the customer group is compiled and initial hypotheses are constructed.

After all the available information has been compiled, the change of perception starts with the process of hypothesizing. In doing so, companies form the hypotheses based on the customer reality. The multi-dimensional customer scenario starts with the questions "What have I read?", "What have I heard?" and "What have I seen?". Based on the answers to these initial questions, the existing hypotheses and the core hypotheses formed. For the final formulation of the existing hypothesis, a comparison is made by questioning, to check which statements really take the perspective of the customer, and which statements are of purely hypothetical nature. Thus, the existing hypotheses form the basis for the further process of customer insight.

Phase 3: The real customer insight process

The available existing hypotheses are presented to a control group, which was not involved in the hypothesizing process yet. This can be an additional employee from other areas of the company but also customer groups, which are invited to the discussion in the company. Together with this control group, the core hypotheses are constructed. These core hypotheses form the basis for a "storyboard" to be created together with the customer, in which it will be elaborated how contact to the customer should be established.

Phase 4: Adjust customer frequency

The management plays through the "storyboard" with the company´s employees as well as the customers. In doing so, the customer takes the role of the company employee or the employee takes the role of the customer. All the possibilities and alternatives regarding the product, its use and disposal – the entire contact process – are presented to the customer group and discussed together with the cus-

tomer. An attempt is made to formulate the needs and requirements from the customer's point of view.

Phase 5: Implementation of the customer insight

Finally, all the findings from the questions are linked together so that an image of the customer needs and requirements is created. Furthermore, the findings from the customer insight process are tested in the customer contact. Therefore, the customer insight development team needs a clear perception of which properties must be assigned.

For instance, to a future customer of an electric car, these properties can be formulated as follows:

- Decisive and open to innovations
- Married, home-owner, approx. 40 years old
- BMW driver, second car owner
- Middle management, career-minded, middle to high income, commuter
- In touch with nature, sporty, success-oriented
- Authoritative, clear, concise, concentrated on important matters

Knowing this, a communication concept is created in order to address the now clearly defined target group in their language and emotional state.

Customer insight is therefore a surprising awareness of human behaviour. Thus, it includes an insight into what moves people in connection with products and markets. This insight into consumer behaviour and the comprehensive knowledge about the hidden motives, opinions and behavioural patterns of the customer are the basic prerequisites for a successful brand and communication strategy by companies, seeking sustainable innovations to achieve marketability. Finally, all the findings from the previously mentioned areas

1. "What have I read"
2. "What have I heard"
3. "What have I seen"

are linked together, so that an image of the customer's needs and requirements is formed and a real understanding can be built up from this.

Training questions:

1. **Why are customer insights so important for companies?**
2. **Name and explain the two approaches to gain customer insight.**
3. **Explain the three fundamental questions that contribute to the collection of customer information.**
4. **Name and explain the five phases of the customer insight process?**
5. **How can customer observation be executed?**
6. **Explain why social media can be regarded as a research instrument?**

Recommended literature

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CHAPTER 11: IDEATION

Joachim Becker

Summary

Ideation is the creative process of generating and developing new ideas, where an idea is understood as a basic element of thought. As such, it is an essential part of the problem-solving process as well as design process. However, the real great ideas usually arise unexpected in moments of inspiration. As it is not always possible to wait until those moments happen we can use creativity techniques instead.

Creativity techniques are cognitive tools that help the brain during work. They all work according to the same principle: creativity techniques allow chaotic thinking. The aim of creativity techniques is to find a new way of linking thoughts and to break out of the usual pattern of thinking. Develop creative ideas by combining and organising existing knowledge and experiences in a new, previously unknown way. Creativity techniques do not produce creativity; creativity techniques support creativity.

In order for creative teams or innovation workshops to be successful, the generation of wild ideas is not enough. In the early stag-

es of creativity workshops, ideas need to diverge, meaning to go in all sorts of wild directions. Later, however, ideas need to be collected and grouped in order to come to a solution to the problem. These teams and workshops strive to generate creative collisions, where very diverse ideas collide and create valuable answers to the problems at hand.

11.1 Ideation and creativity techniques

There are numerous opportunities to find solutions to a problem. Creativity techniques are cognitive tools that help the brain during work. They all work according to the same principle: creativity techniques allow chaotic thinking. And this is good, because if a solution could always be found in the usual way, i.e. through rational, structured thinking, we would not need creativity and therefore, no creative techniques.

Some people simply think chaotically; others can quickly swap between rational and chaotic thinking. However, the majority of people are used to rational and linear thinking. Problems are solved like mathematical equations. Although this procedure has many advantages, one thing is clear: this does not bring new ideas! Creativity unfolds more easily in a relaxed manner. However, it is important that there is no congestion so that the creativity does not become blocked again due to boredom, hustle and bustle, unnecessary noise, etc. For the majority of the creativity methods, it is worth following the given rules. Creativity is not exhausted in fantasies, but in the creation of new value. We carry the solution inside us during the ideation process, often without even knowing it.

The aim of creativity techniques is to find a new way of linking thoughts and to break out of the usual pattern of thinking. Develop creative ideas by combining and organising existing knowledge and experiences in a new, previously unknown way. Creativity tech-

niques do not produce creativity; creativity techniques support creativity.

In conclusion, creativity is of paramount importance to support new links between the desired and current situation. Purposeful innovation is similar to creating different solutions to existing problems. For those problems to be solved, new ways of thinking are necessary. As mentioned before, diversity (in terms of background, knowledge, experience and values) tends to create more creative solutions than very homogeneous groups, as they are less limited in terms of idea creation. However, in order for creative teams or innovation workshops to be successful, the generation of wild ideas is not enough. In the early stages of creativity workshops, ideas need to diverge, meaning to go in all sorts of wild directions. Later, however, ideas need to be collected and grouped in order to come to a solution to the problem, which is to converge. These teams and workshops strive to generate creative collisions, where very diverse ideas collide and create valuable answers to the problems at hand.

Groups of creativity techniques

Creative-intuitive methods	**Analytical-systematic methods**
Brainstorming methods	- Morphological boxes
- Classical brainstorming	- Morphological matrix
- Brain writing (pool)	- Problem-solving tree
- Method 635	- Sequential morphology
	- Osborn checklist
Methods of creative confrontation	- Function analysis
- Synectics	- TILMAG method
- Semantic intuition	- TRIZ (theory of inventive problem solving)
- Reversal technique	
- Bionics	

The analytical-systematic methods are only mentioned briefly here. As we focus on creative-intuitive methods, we are devoting our full attention to these.

11.2 Creative-Intuitive Methods

Association techniques
The idea of the association techniques[25] is to let the thoughts flow freely and to think in every direction. By linking thoughts and perceptions in new combinations, you get numerous ideas that can be processed into solution possibilities. A differentiation is made between brainstorming and brain writing.

Brainstorming
Brainstorming was developed by an American called Alex Osborn in the 1930s. It is the best known of all the creativity methods. It is easy to learn, simple to use and has a high good idea success rate (Alex Osborn 1939). Research since the 1950s suggests that brainstorming kills creativity due to social desirability, reinforcing ideas and people not willing to speak up. It can work, but only after people have INDIVIDUALLY thought about the problem before.

Brainstorming is primarily about generating as many new ideas as possible. The focus is on the quantity and not the quality. Brainstorming takes place in a group of maximum 12 people, optimally 7 people. There are various modifications of brainstorming.

25 Association: automatic thought process; a learnt relationship between two cognitive elements, usually an impulse of a rewarded (or punished) reaction (Gabler Wirtschaftslexikon).

Procedure

- Groups of between 6 and 8 participants with different previous knowledge or expertise
- The problem is clearly defined
- Participants have the task of generating and introducing as many ideas as possible, quickly and without restrictions.
- Every idea is voiced immediately
- Team leader or moderator ensures that all the ideas are written down
- Appraisal of any one of the ideas as strictly forbidden
- Duration about 20-30 minutes
- At the end, the ideas are inspected, sorted out and further processed

Advantage	Disadvantages
- is especially suitable for group processes and solutions of a clearly defined problem	- is not suitable for very shy participants - is less suitable for extensive problem statements.

Variations on classical brainstorming

Brainwriting for the individual:
Create a three-column table; write your basic ideas in the first row. In the next row, write all the possible modifications of the basic idea, in the last row, a modification possibility of the first alteration. Evaluate your ideas: which is new, which is unique, which is sensible, which is useful, which can be realised?

Anonymous brainstorming
Before the session, the moderator collects the first approaches, which the group participants prepared individually in advance. These are further developed in the subsequent group session. The advantages are the intensive preparation and its greater suitability for larg-

er groups, as well as its suitability if conflict is expected within the group. Disadvantages can occur if participants have already very closely identified themselves with their own approaches.

Crawford slip writing
All participants have a seat in a circle and get a certain number of sheets.

- The participants write each idea on a single sheet for several minutes.
- At the end of the first writing interval participants pass their pages with ideas to the next person in the group.
- Each person reads the ideas of the preceding person in silence and adds new ideas to the list without speaking to anyone else. After reading they pass the sheets with ideas to the next person in line.
- The process is repeated several more times until one of the participants gets one of his sheets. Then the ideas are handed in to the group leader.

Brainwriting pool
Brainwriting builds upon the idea of brainstorming. The brain writing pool was developed by the German Battelle-Institute in Frankfurt (1999). With this technique, every participant writes four ideas on a piece of paper, which he or she then places in the centre of the table. The participant is not required to show his paper to the others. Should a participant run out of ideas, there is the possibility to exchange ideas for concepts from the centre of the table. At the end, every participant should have exchanged his or her own paper at least once for one from the centre. Like with brainstorming, the duration of the session is expected to be around 30 minutes for 6 to 8 persons.

The purpose here is to see an exchange of ideas taking place between the participants if they cannot progress further with their own ideas and solution suggestions. Through stimulation from the centre, i.e. the ideas of the others, new suggestions or combination possibilities are produced. Thus, the own ideas can be extended quietly using the resources of the other participants.

Procedure

- Topic is specified
- A group is formed of between 4 and 8 participants
- Everyone writes six to ten ideas or proposals on the topic onto a blank A4 sheet and then places the sheet in the centre of the table
- Anyone can take from this pool and offer amendments and expansions
- Finally, all the ideas are transferred to a group poster and repetitions are removed

Method 6-3-5

Method 6-3-5 serves as a means of ideation. For this, the creativity potential of one group of specialists from a specific area is used. The brainstorming method 6-3-5 undoubtedly requires all the participants to function as a team. An attempt is made here to avoid the disadvantages of brainstorming (many digressive ideas) by setting the ideas in writing. Like brainstorming, time pressure is used with Method 6-3-5. The first three ideas are created in only three to four minutes. In the following rounds, one to two minutes are added on, as there is more to read and the ideas are often more detailed. Speed is a factor, which contributes to better use of the brain, particularly the short-term memory.

Procedure

At the start, 6 people define an exact problem and develop 3 ideas that are each passed on 5 times (duration approximately 30 minutes).

- Problem is defined by the participants
- 6 people write down 3 ideas for the problem in 3-5 minutes
- After a break of 3-5 minutes, the slips of paper are passed to the neighbour, e.g. moving clockwise
- The neighbour reads through the ideas of the previous person and supplements them, and stimulated by the previous ideas, adds 3 new proposals to the sheet
- This process continues until one round has been completed
- At the end, everyone has their original sheet of paper in front of them
- All the ideas are transferred as examples to a group poster, repetitions are removed

Advantage	**Disadvantages**
- No moderator is required - There are already 108 (6 x 3 x 6) solution proposals after approx. 30 minutes - Proposals are usually more useful than with brainstorming - Systematic supplementation and extrapolation - Initiator recognisable (e.g. for patents)	- Everyone's ideas follow the ideas of the previous persons - No group work, in contrast to brainstorming - The stimulus and spontaneous reactions are missing - Results are generally less original

Methods of systematic confrontation (Analogy techniques)

The methods of systematic confrontation are based on the observation that original ideas do not always arise from conscious problem solving, but rather as a reaction to the confrontation by elements remote to the problem (events, structures, etc.). In this way, for example, Newton recognised the theory of gravitation when observing the falling apple. The method of creative confrontation aims to imitate this natural creative process.

For this purpose, those methods try to create analogies to solve even complex problems. Analogies are similarities. Even things that at first glance perhaps do not fit to the problem could contain a solution.

Synectics
Synectics belongs to the most difficult of the creativity techniques and is suitable primarily for complex problems – due to the level of complexity and involvement, if nothing else. The important element of synectics is the disassociation, i.e. analogies are made, in order to reach the solution approaches.

Procedure

Synectics is performed in the form of a group session. This may last between 2 to 3 hours, to several days.

- Goal definition and problem presentation by the client (analysis and explanation of the problem through discussion by the participant with the client).
- The problem is newly defined and visually presented for everybody.
- Search for an initial direct analogy using brainstorming: If the problem is technical, then an analogy is made, for example, from nature; it must be completely disassociated.

- Formation of personal analogies: The most promising of the direct analogies found in Step 4 are selected and personal analogies to these are formed. 10-20 lines beginning with the words "I feel like..." are written down in order to unearth and understand the direct analogies.
- Formation of symbolic analogies with the aid of the most interesting personal analogies from Step 5: "Book titles" are formulated, which should be made up of a noun and an adjective (e.g. "moving limits" or "limited movement" are made from "entwined").
- Formation of a second, direct analogy: Proceed as in Step 4, but in a different area (e.g. instead of "nature", now "art") and taking into consideration the "book title".
- Every participant selects a second, direct analogy and describes it simply but in detail. The description must be made in a way a six-year old child would understand.
- From the presentation in Step 8, the participants should produce a thought association to Step 3. These thoughts are made public and thereby, new approaches are developed.
- Establishment and evaluation of the approaches.

Semantic intuition
Semantics teaches the importance of linguistic phrases. The operating principle is that, when listening to or reading a phrase, an image representation is formed intuitively and at the same time. Even if the terms are new; new meanings are formed from coincidental combinations of phrases from one or more subject areas, and these can be expanded to form concrete ideas.

Semantic intuition takes the process of thinking of an invention (**naming it**), and turns it around to be the process of taking a name (**identifying fields for invention**). In doing so, random names are collected, which then serve as springboard words for the intuition of the problem-solver leading to a possible invention. The names can be produced through a combination of typical elements "close to

the problem". For this, nouns, verbs and adjectives can be combined. The number of combined words can also be more than two.

For example, when looking for a new kitchen appliance, from a list of randomly itemised terms, such as pot, spoon, onion, stir, oven, ... the terms "pot" and "stir" are selected. From this, an idea is developed that could stir the contents of a pot automatically during cooking, e.g. using a motor-driven beater in the lid.

TILMAG method
The TILMAG method replaces the disassociation process of synectics through a "rational" procedure, which aims to provide fruitful structures as springboard words for the problem.

Procedure

TILMAG should be practised by a group, if possible, according to the following steps:

- Analysis and definition of the problem
- Determination of all the requirements, which should be sufficient for a solution. They are derived from the solution target.
- Consolidation of these requirements in the most concise terms
- Formation of associations from the paired connection of the different elements and presentation in matrix form.
- Deduction of solutions from the associated springboards.
- Paired confrontation of the associated springboards, determination of the common elements of the terms from each pairing, and presentation in matrix form.
- The identified similarities are springboards for a second ideation phase. Deduction of further solutions.

11.3 Analytical-Systematic Methods

Systematic idea generation concentrates on structure and systematisation, which means that the problem is highlighted from different points of view using various checklists.

The Osborn method

For this method, Osborn (1959) developed a **question catalogue for problem analysis**, which can be used both in the professional and private areas of life, and is made up of nine question complexes:

- What can I still use it for? Can I use it differently?
- Does the problem point towards different ideas? Is it similar to something else?
- What can be changed? Which properties can be redesigned?
- Can it be made larger, added to, duplicated?
- Can it be made smaller, taken from, reduced?
- What can be replaced? Which conditions can be changed?
- Can the sequence or structure be changed?
- Can the idea be reversed? Can the procedure be reversed?
- Can ideas be combined or people linked? (cf. worksheet.stangl-taller.at)

Morphological methods

Morphological methods are related to the systematic-analytical methods. Here, idea generation does not take place according to a random process, but rather one in which intuition is stimulated and supported through systematic creativity methodology.

Morphological methods can also be combined with phases of creativity-promoting methods. Concerning the type of problem, morphological methods are primarily suitable for analysis problems (examining existing structures).

Morphological boxes
The best-known morphological technique is the morphological box, developed by the Swiss Physicist F. Zwicky (1925). It can be either two- or three-dimensional. With morphological boxes, solutions are sought for every problem and combined in a matrix. Finally, the most suitable combination is sought.

The method can be performed either individually or in small groups. As better understanding of the problem area is required, particularly for the determination of the important parameters, the problem-solving group should predominantly be composed of experts. The method takes between several hours or several days.

Procedure

- Description, definition and, if necessary, appropriate generalisations of the problem (functions and expected solution properties).
- Breakdown of the problem to its important parameters, if possible independent from each other, and organisation of the parameters/characteristics in the initial column of the matrix.
- Determination of all the imaginable specifications for the individual parameters/characteristics and organisation of these to the row of the corresponding characteristic.
- Analysis of the alternatives that result from the combination of the individual characteristics: each possible combination for each specification from every row represents a solution in the morphological box.
- Connection of the alternative functions and selection of the most suitable solutions by marking using zigzag lines – result: solution proposal.

Table 11.1: Example – Packaging of detergent

Characteristic	Specification 1	Specification 2	Specification 3	Specification 4
Shape	Cube	Cylinder	Tetrahedron	Sphere
Material	Cardboard	Plastic	Foil	Wood
Paint	Colour	B/W	Gold	Rainbow
Carrying aid	Handle	Recessed grip	Strap	Belt
Closure	Lid	Cork	Pourer	Valve
Portioning	Beaker	Balance	Spoon	Tablets
Additional use	Toy	Treasure chest	Container	Bucket

Source: Zell 2014.

The procedure follows the heuristic principles of systematic breakdown of complex issues into limited parts (Steps 1 and 2), the systematic design variation of individual elements (Step 3), and the systematic combination of individual elements to new whole solutions (Steps 4 and 5).

Advantage	Disadvantages
- Treatment of very complex problems is possible - Incorporation of a lot of information in a compact form - Flexible adaptation to different problems - Clear and complete representation of the problem area - Method combines creativity and systematics.	- Very work- and time intensive (in parts several days) - Requires professional knowledge about the problem area - Determination of the correct parameters is both difficult and essential for success - Selection of the best solution from the almost unmanageable number of possible solutions, particularly with complex problems, is difficult.

11.4 What should be used when?

The following tables provide a guideline to which creativity techniques are most suitable, given the different areas of application.

Areas of application	New products	New services	Improvements
Brainstorming	++	++	+
Brainwriting/ 6-3-5	++	++	+
Semantic intuition	++	+	+
Osborn method	-	-	++

Areas of application	Naming	Technical construction	Organisational topics
Brainstorming	++	++	++
Brainwriting/ 6-3-5	++	++	++
Semantic intuition	-	-	-
Osborn method	-	++	++

11.5 Sustainable innovation workshops

Innovation workshops are a common tool to develop innovative solutions for sustainability problems and to foster sustainability within a company are. Within a limited time-frame the participants define their challenge and develop numerous ideas on how to deal with that problem or challenge. Innovation workshops help companies to channel and structure the knowledge of a group of experts so that new solutions can be created. Thus, innovation workshops function as a catalyst for the creative process of a company or an organisation. In doing so, sustainable innovation workshops are used in a group process to develop targeted ideas for sustainable products or services.

Possible aims of a sustainable innovation workshop are:

- Sustainable product vision
- Sustainable product ideas
- Create a more sustainable solution for a problem
- Saving resources
- Expansion of business areas
- Sustainable process optimisation

Course of a sustainable innovation workshop:

Step 1: Pre-organisation

- Determination of a moderator
- Invitation to participants

  The participants should be at least 6 persons, ideally 12 persons, with an upper limit of 20 persons. The participants of an innovation workshop should be selected so that there is very diverse point of view, expertise and experience. "Ensure that there is a homogeneous social but heterogeneous professional combination. The participants should be motivated in the topic and preferably generalists rather than

complete laypersons or specialised experts. It is advantageous if there is a balanced mix, e.g. active, imaginative persons combined with deliberate thinkers" (Geschka 1986, p. 49).

- Provision of information and the major goal of the workshop

  There is possibly need for preparation, which the participants must be informed about. Furthermore, the agenda should be available to the participants in advance, as well as additional information, which the participants need for completing the task.

Step 2: Opening

- Presentation of the participants and their tasks
- Presentation of the procedure and rules of the game

  Here there should be a short introduction to the workshop. It is equally important that the search fields are extremely limited (Meyer, 2010), and strategically predefined guidelines are provided. "Such specifications direct the thoughts in the desired direction; they encourage bold thoughts from which basic ideas and larger innovation projects will emerge" (Geschka 2010).
- Presentation of available techniques.

Step 3: Information phase (Awareness)

- General information level

  Here is the opportunity to formulate the priorities, such as the number vs. the quality of the ideas, short-term vs. long-term feasibility stepwise vs. radical, existing vs. new technology, low vs. high risk tolerance, etc. (Solid Creativity 2014).
- Expert presentations (if necessary)

Step 4: Target phase (Problem identification)

- Prepare participants for a target.
  Demand the impossible to achieve the possible. The participants should be stimulated (here stimulation methods are helpful) and not perceive the impossible as pressure. "Great ideas have never been achieved with average targets. (…) When President John F. Kennedy declared that NASA wanted to fly to the moon, the target was considered technically impossible. (…), however, Kennedy demanded the impossible …" (Meyer 2010).
- Define the problem.
- The results documentation should also be named here. Should it be a result or experience protocol, which media can be used, flipcharts, objects, models, photo protocols, audio protocols, written protocols (Solid Creativity 2014).

Step 5: Ideation phase

- Using creativity techniques
  Depending on the question, the moderator can use the appropriate creativity technique. Typically, this begins with brainstorming.
- Gathering of ideas and affinity grouping
- Thinning out of the presented ideas to a controllable amount.

Step 6: Post-workshop planning

- Are more decisions needed?
- Is more information needed?
- What are the next steps?

The most important success factors for a successful innovation workshop are:

- **Sense of urgency!**
- **A common vision**
- **Joy! Motivation! Engagement!**

Ideation must be fun. Thus, the innovation workshop should be an experience in itself.

Training questions:

1. **Name advantages and disadvantages of Brainstorming.**
2. **What is the aim of the method "Brainwriting pool"?**
3. **Name three questions of the question catalogue for problem analysis (Osborn method).**
4. **What are the different methods for Ideation?**

Recommended literature

Diehl, Michael/Stroebe, Wolfgang (1991): Productivity loss in idea-generating groups : Tracking down the blocking effect. In: Journal of Personality and Social Psychology, 1991, Nr. 61, S. 392-403.

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CHAPTER 12: IDEA EVALUATION

Joachim Becker

Summary

After the ideation process is finished, ideas need to be collected and grouped in order to come to a solution to the problem. The direction of thought must be changed in the scope of idea selection. Creative activities are no longer in the foreground, but rather the ideas must be considered critically. For that purpose, several evaluation and decision-making techniques will be introduced in this chapter.

When the creative team decided on one or two possible solutions, its members should write them down as detailed as possible. In this context, the team should discuss the strengths and weaknesses of the ideas and which problems it is going to solve (resp. which value it is creating for the customer). Furthermore, similar solutions of the competitors should be evaluated. It is important for the company to understand which other companies and solutions are already on the market as well as what potentially could be developed. By determining the relative level of threat from competitors, the manage-

ment team will be able to recognize whether they should go forward with an idea or not.

For important decisions it is worth keeping a record of the steps the creative team followed in the decision-making process. That way, it can justify its ideas based on the information and processes it used later on. Furthermore, by keeping a record and engaging with the decision-making process, the creative team will improve their own as well as the management´s understanding of how it works, which can make future decisions easier to manage.

12.1 Pre-Selection of ideas

When the ideation process is completed, the direction of thought must be changed in the scope of idea selection. Creative activities are no longer in the foreground, but rather the ideas must be considered critically. Schedule enough time to elaborate your ideas. Time pressure constitutes an obstacle to precise elaboration. "If you work under the pressure of deadlines, you should plan in enough time for the elaboration. Presumably, you will convince your client more with an only half-genius but cleanly elaborated proposal than with a half-genius stroke of genius." (Nöllke 2002, p. 38)

There are different techniques that may help a team selecting the best ideas to solve a problem. In the following chapter we will introduce you to some of them.

Affinity Grouping

Affinity Grouping is an evaluation method in which participants organize their ideas and identify common themes.

Procedure

- Randomly place the cards that contain the individual ideas on a table (or place notes on flip chart paper taped to the wall).

- Without talking, each person looks for two cards or notes that seem to be related and places these together, off to one side. Others can add additional cards or notes to a group as it forms or reform existing groups. Set aside any cards or notes that become contentious.
- Continue until all items have been grouped (or set aside). There should be fewer than 10 groupings.
- Now discuss the groupings as a team. Generate short, descriptive sentences that describe each group and use these as title cards or notes. Avoid one- or two-word titles.
- Items can be moved from one group to another if a consensus emerges during the discussion.

Point scores

For the first rough idea selection, it is recommended that the ideas are visualised, by displaying them on a pin board, flipchart or on the wall.

Procedure

- In the first step, double entries are sorted out.
- For the second step, new ideas are separated out and presented separately. This prevents the ideas to be overlooked and lost during the points score. New ideas, in particular, have a high potential.
- In the third step, every participant receives a certain number of points, which they have to distribute between the ideas to be scored. Hartschen (2009) recommended for a group of 8-12 people that each person awards 4 points. Using previously defined selection criteria, the points can be distributed as, for example: Feasibility, market size, cost, etc. (Hartschen et al., 2009)
- In the next step, the ideas can be separated into three groups. The groups could be labelled TOP, GOOD, POOR. The aim is

to find the 15 top ideas. The work can proceed more efficiently with these ideas.

- The fifth step is now the formulation of the TOP ideas. By doing this, it can be estimated, whether the ideas can be implemented at all. Every TOP idea is noted on an A4 sheet of paper.
- If it is sensible, sketches or a simple prototype can also be added. The idea description can be for both qualitative and quantitative criteria, which enable an evaluation of the idea.

Classification

TOP: Ideas with three or more points. These ideas will be refined and documented (approximately 5-15 % of all ideas).

GOOD: These ideas have only received one or two points. Depending on the requirements, these ideas can be combined with others. They can also be saved for later use (30-40 % of all ideas).

POOR: No points, no use. These ideas are usually discarded (over 50-60 % of all ideas).

Sticking dots

Sticking dots is a quick method for determining priorities by voting. This is not a deeply analytic method, but a short, sharp measure of the current thinking about the idea. It is a group method, based on opinions. However, it has many application possibilities in different areas and is useful for the collection of opinions in early phases in idea selection processes.

Procedure:

- Ideas are itemised clearly on a flip chart (or similar aid).
- The group thinks of three relevant criteria (e.g. use for the customer, degree of innovativeness, personal favourite etc.) to evaluate the ideas.
- Each participant receives a certain colour set of dots, (e.g.

5 red dots for the first criteria, 3 green dots for the second criteria and 2 yellow dots for the last one).

- The participants decide on a criterion to start with (e.g. degree of innovativeness)
- Now the participants may stick their dots by their preferred top ideas. Each participant may stick as many dots for ideas as he/she wants to. Nameless voting tends to work best.
- All ideas that didn't get a dot have to be stroked out. Afterwards the process starts again using the second criteria.
- After the third turn all dots are summed up. The innovation process proceeds with the ideas which got the most dots.
- At the end a short-list of the top 5 is made.

12.2 Decision-making methods

To put it simply, decision-making is the act of choosing between two or more courses of action. Decisions need to be capable of being implemented, whether on a personal or organisational level. Therefore, everyone who wants to implement new ideas successfully need to be committed to the decision personally, and be able to persuade others of its merits. However, sometimes, the idea collectors are not the decision-makers, in other words, those who decide which ideas attain marketability. In the following, some decision-making methods are presented.

Plus-Minus-List

The simplest means of deciding which idea to implement is the plus-minus method: a simple list of the advantages and disadvantages of an idea.

Table 12.1: Simple plus-minus list

Advantages	Disadvantages
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Depending on which side there are more arguments, the idea is kept or discarded.

A huge disadvantage of this method is that the advantages and disadvantages are not weighted.

PMI – Plus minus interesting

With the PMI method he developed, Edward de Bono offered a possibility of carrying out weighting. This method weights all the advantages and disadvantages, and helps to estimate the consequences of the alternatives. Furthermore, it shows whether additional information needs to be collected (Lorenz, 2010).

Procedure:

- Define the question for which the decision must be made.
- List all the advantages of one alternative (2-3 minutes), then write down all the disadvantages (2-3 minutes). Don't jump, always keep the focus on the advantages or disadvantages.
- Points, both positive and negative, are written in the positive and negative columns.
- All the points that still need to be clarified or require

additional information, are assigned to interesting. As soon as these points are clarified, they can be moved to the positive or negative column as appropriate.

- With the aid of the following, the unweighted PMI helps to make the decision obvious; but primarily, it closes gaps in the information and brings to light the points that still need to be clarified.

Table 12.2: PMI method

Positive	W	Negative	W	Interesting
Weight (W): 1- Less important 6-Especially important				

Source: Own presentation according to Lorenz, 2010.

Principally, the PMI weighting enables a clear Yes-No decision, but also a clear decision between several alternatives. All the aspects and ideas listed in the table are evaluated. For this, the weighting ranges from 1: unimportant to 6: particularly important.

The table is evaluated through the simple addition of all the values in the plus and minus columns. Finally, the minus value is subtracted from the plus value. If the result is positive, the answer is yes. If the result is negative, the answer is No.

When evaluating several alternative ideas, each idea is evaluated separately. The decision is made for the variant with the highest final point score.

Some organisations may have a formal process that is required at this stage, including a financial assessment, so check beforehand. A good way to do this is to use a ‚balance sheet', weighing up the pros and cons (benefits and costs) associated with a specific solution.

Decision matrix

The decision matrix method supports the decision made between two or more alternatives using rational criteria. Evaluation of the individual alternatives is made using predefined criteria. The alternative with the most points is taken (Lorenz, 2010).

Procedure:

- Define the alternatives.
- The criteria must be defined, and the evaluation is made according to this definition.
- It is important that the criteria are formulated positively.
- The alternative points are allocated for all the criteria. (6 = optimum fulfilment, 1= marginal fulfilment of the criterion)
- The points are added together for each alternative.
- The alternative with the most points is selected.

Table 12.3: Decision matrix Sample 1

	Alternative A	Alternative B	Alternative C
Criterion 1			
Criterion 2			
Criterion 3			
Criterion 4			
Criterion 5			
Criterion 6			
Total			

Source: Own presentation according to Lorenz, 2010.

The criteria are not evaluated in this method. However, if the criteria are not equally important, the weighted decision matrix should be used. When doing this, the criteria are either allocated a weighting using ranking or a percentage. With this weighting, the individual evaluations are multiplied so that the influence of the important criteria are increased and are taken into consideration when making the decision (Lorenz, 2010).

Table 12.4: Decision matrix Sample 2

	Weighting of the criteria	Alternative A		Alternative B		Alternative C	
		Evaluation	Weighted value	Evaluation	Weighted value	Evaluation	Weighted value
Criterion 1							
Criterion 2							
Criterion 3							
Criterion 4							
Criterion 5							
Total							

Source: Own presentation according to Lorenz, 2010.

Decision tree

To begin with, the simple decision tree method is designed for a simple Yes-No classification of the individual decision aspects. The user systematically comes to a decision using its strict hierarchical structure. At the same time, a tree includes the rules for answering precisely one question.

Procedure:

- Define the question
- The tree is completed bit by bit.
- A criterion is asked for at every fork and a decision is made regarding the selection of the following fork. This process continues until the end of the branch is reached.

12.3 Evaluation of ideas

When the creative team decided on one or two possible solutions its members should spend a few more minutes to write them down as detailed as possible. In this context, the team should discuss the strengths and weaknesses of the ideas and which problems it is going to solve (resp. which value it is creating). Furthermore, similar solutions of the competitors should be evaluated. By determining the relative level of threat from competitors, the management team will be able to recognize whether they should go forward with an idea or not.

For important decisions it is worth keeping a record of the steps the creative team followed in the decision-making process. That way, it can later on justify its ideas based on the information and processes it used. Furthermore, by keeping a record and engaging with the decision-making process, the creative team will improve their own as well as the management´s understanding of how it works, which can make future decisions easier to manage.

Companies may get to this stage, and have a clear favourite, but still feel uncomfortable with it. If that is the case, they should revisit the process. They may not have listed all the pros and cons, or they may have placed an unsuitable weighting on one criterion. In general, one´s intuition is a strong indicator of whether the product idea is right for company and fits with its values. No technique can substitute for good judgement and clear thinking. If possible, it is best to allow time to reflect on a decision once it has been reached. It is preferable to sleep on it before announcing it to the rest of the company. Once a decision is made public, it is very difficult to change.

Product definition and analysis

Once an idea passes the evaluation phase, the next phase is the testing phase which starts with the development of the business model. This phase includes five main steps:

- Define the value proposition: One of the first steps is to identify user needs and wants and to determine the customer value. This addresses questions about the product such as what is the job to be done, what benefits does the product provide and what features should the product have. During this time the company should conduct surveys and interviews with existing and potential customers (customer insight).
- Analyse the market: When this is done, the company should conduct a market analysis. They have to determine the market size and segmentation, rate of growth, customer trends and behaviour, and what channels they should use to reach these customers. Once the company completed the market analysis it should conduct a competitive analysis. It is important to know how their competitors operate. This will not only help them to build a great product, but will also help in determining how and where to launch the new product.
- Develop prototypes: Finally, the company can begin to test the concept they have developed. This is when the company may start to develop early prototypes and to present them to staff and consumers to gain feedback and measure customer reaction. Based on this, it can make the necessary changes and figure out the sales potential of the product. This feedback will also help the company build a solid product definition.
- Test the feasibility: Based on the product definition, the company can start to draw up a technically feasible product concept, which includes the substances and methods needed to produce the new product (life-cycle-assessment). Once this is completed the company can carry out a production and operations cost analysis along with a market and launch costs analysis.

- Improve and enrich the product idea: At the end of this process the company once again further develops the product idea using the knowledge it gained in the other four steps. From now on the idea will constantly be improved (e.g. again by means of customer insight, life cycle assessment, or cradle to cradle) until the product is finally launched to the market.

Training question:

1. Please name the five main steps of the testing phase.

Recommended literature

Diehl, Michael/Stroebe, Wolfgang (1991): Productivity loss in idea-generating groups: Tracking down the blocking effect. In: Journal of Personality and Social Psychology, 1991/61, p. 392-403.

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CHAPTER 13: SOCIAL AND ENVIRONMENTAL MANAGEMENT

Ulrich Scholz

Summary

In this chapter three different management systems to check a company´s sustainability are introduced: the quality management (QM), social responsibility management (CSR) and environmental management (EMAS). Environmental Management is accomplished principally in response to requirements stipulated in environmental laws and regulations. Its objective is ensuring the protection of human health and well-being and the protection of life forms and their habits.

Quality management (QM) and Environmental Management have the tasks of formulating aims and achieving these through structural and procedural organisational rules. Ecological problems and a shortage of resources have led to the waste-disposal problem that has found its way into the environmental considerations of companies. In this context, economic targets should be brought in line with social and ecological targets. In doing so, companies save costs by e.g. sparing the use of water in production. Careful handling of lim-

ited resources can also contribute to the image and sustainability improvement of the company.

Life cycle assessment (LCA) is a tool for Environmental Management, which companies may use to assess the possible impacts of a product, procedure or activity on the environment during the course of its life (life cycle). In doing so, companies measure quantitatively the use of particular resources ("inputs"), such as energy, raw materials and water and the emissions ("outputs"), which end up in the air, water and soil, are assessed. Thus, these are those resources to be associated with the tested system (extraction of raw materials, product manufacturing, use, disposal). The results of the life cycle assessment form the basis to create a company's Eco balance. Therefore, the LCA includes the widest possible collection of environmental impacts of products, processes and services with regard to the entire life cycle of one of the products manufactured by the company.

So, in conclusion the concept of LCA is to evaluate the environmental effects associated with any given activity, from the initial gathering of raw materials from the earth until the point at which all residuals are returned to the earth.

13.1 Quality management: Product and process aspects

If a company wants to act sustainable it needs a common set of policies, processes and procedures to ensure that it can fulfil all the tasks required to achieve its objectives. This common framework is also termed a management system. According to the International Organisation for Standardization (ISO) a management system "describes the set of procedures an organization needs to follow in order to meet its objectives. [...] the larger the organization, the more likely that procedures need to be recorded to ensure everyone is clear on who does what. This process of systemizing how things are done is known as a management system" (ISO, 2016).

The ISO offers a wide ranch of different management systems, depending on the field of activity (Production, Finances, QM, HR etc.) a company wants to improve in. According to the ISO an effective management system provides companies:

- "more efficient use of resources,
- improved risk management, and
- increased customer satisfaction as services and products consistently deliver what they promise" (ISO, 2016).

In this chapter three different management systems to review a company´s sustainability are introduced: the quality management (QM), social responsibility management (CSR) and environmental management (EMAS). Before discussing the certification possibilities of environmental management, the quality management of a company is briefly presented along with its certification possibilities.

Quality management (QM) has the task of formulating aims and organising these through structural and procedural organisational rules (Oeldorf/Olfert, 2004), p. 67). Since a uniform, internationally recognised and harmonised assessment of quality capability of companies was lacking, with the aid of the International Organization for Standardization (ISO), the series of standards ISO 9000 to 9004 were established in 1994. Introducing the standard series EN ISO 9000, standards were created for documenting the basic measures of quality management.

Today, the ISO standard includes the sub-areas:

- ISO 9000: Quality management systems: Fundamentals and vocabulary
- ISO 9001: Quality management systems: Requirements
  In this system products are offered with the aim of fulfilling the customer's requirements and increasing customer satisfac-

tion. ISO 9001:2000, Quality management systems, defines the requirements placed on a quality management system. This standard is the basis to certify QM systems. It describes the requirements that a QM system needs to fulfil.

- ISO 9004: Guideline for orienting the company in the direction of Total Quality Management (TQM).
  TQM describes the general process of introducing a company's quality and sustainability as the company's system target. Since this standard is not the basis for certification, it receives less attention than ISO 9001. However, the European Framework for Quality Management (EfQM)-Model defines the concrete implementation of this standard. Here, quality refers not to the product, but rather to the relationship between the company and the customer.

13.2 Social Responsibility

The social and corporate responsibility of a company is defined as the core of corporate social responsibility (CSR) (Schneider/Steiner, 2004). The topic at hand revolves around the company's obligations to society. The field of corporate social responsibility focuses on corporate norms, values and actions and their results. It examines the norms and values used for orientation by the people working in business (Küpper/Picot, 1999). Thus, the ISO standard 26000 defines and describes social aspects and social responsibility. It serves as a guideline for companies and organisations to demonstrate *Corporate Social Responsibility.*

"The international standard ISO 26000 […] is a guideline, which when used voluntarily, supports organisations to realise social responsibility. It was developed by the International Organization for Standardization (ISO) involving all the interested parties, including the industry, trade unions, consumers, authorities, non-governmental organisations (NGOs), and in cooperation with 450 experts from

almost 100 countries in about six years." (BMAS, 2013) It is important to mention that emerging and developing countries were involved in preparing this guideline as well as the consumer organisations for the design of the standard in the starting phase. Important impulses were given from these countries. The standard ISO 26000, which has been in force since the end of 2010 deals with the social responsibility of organisations, an area that would normally be defined as soft factors by the company. Activities of companies and organisations, like poor factory working conditions in developing countries, child labour, over-exploitation of raw materials, sometimes have dramatic consequences for the image of the company.

All the aspects of ISO 26000 are equally important. There is no predetermined order of implementation for the individual topic areas. Thus, the company realises fields of action for all the areas by the end of the implementation.

However, as it is not possible to measure responsibility, the standard is of a guiding nature. ISO 26000 sets no requirements for how organisations and companies have to behave, but the standard is aimed at a common understanding of the term *social responsibility*. For this reason, companies and organisations cannot be certified according to ISO 26000. In contrast to *corporate social responsibility*, the ISO standard incorporates not only companies, but also all forms of independent organisation. Thus, institutions such as high schools, administrative departments and hospitals should align themselves to this standard.

The guideline begins with a series of definitions and trends to be observed. It defines the seven basic principles and seven core topics of social responsibility. The seven basic principles determine the basis and prerequisites for a credible discussion on social responsibility, whereas the core topics represent the seven main areas of social responsibility.

Basic principles of social responsibility:

1. Accountability: The actions of organisations have implications for the environment and society. Hence, it should be accountable.
2. Transparency: How an organisation acts, decides, etc. should be exposed in a proper extent and at the same time traceable.
3. Ethical conduct: Concern for humans, other forms of life and the environment.
4. Regard for the interests of the stakeholders
5. Regard for the rule of law
6. Regard for international standards of conduct (e.g. those of the International Labour Organization – ILO)
7. Regard for human rights

Besides these principles, ISO 26000 names seven core areas of social responsibility of companies/organisations. These core areas are important for all organisations, but can result in different fields of action for different companies/organisations. Thus, for example, in the core area "environment", efficient resource usage can be more important for one company/organisation than for another. Therefore, the respective companies/organisations have to decide for themselves what they perceive to be important.

Fig. 13.1: ISO 26000 – The core topics of social responsibility of companies

Source: Vitt et. al., 2011, p. 34.

Many appraisals of ISO 26000 consider it positive that an internationally shared understanding of social responsibility is achieved. There is hope for this internationally shared understanding to gain acceptance based on the cooperation of different interest groups.

13.3 Ecological Management

Ecological problems and a shortage of resources have led to the waste-disposal problem that has found its way into the environmental considerations of companies. In this context, economic targets should be brought in line with social and ecological targets. In doing

so, companies save costs by e.g. reducing the use of water in production. Careful handling of limited resources can also contribute to the image and sustainability improvement of the company. A company that operates high-quality disposal and prevention management improves its competitive advantage, becoming interesting for investors and analysts.

Generally, objects in the disposal area include everyday rubbish, exhaust gases, wastewater and empty containers. These objects are combined under the term waste. The ecological targets, which are to be pursued in this area, are prevention before recycling, and recycling before disposal. Schulte summarises waste disposal strategies, which are particularly relevant for environmental management, as follows (Schulte, 2005, p. 419):

- Prevention: The generation of waste is generally avoided
- Reduction: Use of resource-conserving alternatives
- Utilisation: Retention of the form of the material
- Recovery: Break-up of the form of the material
- Elimination: Final waste disposal from an economic point of view

These waste disposal strategies allow companies plenty of scope for action. Companies may us them, for instance, in the area of resourcing pre-products. Important consequences are recycling strategies, which contribute to the acquisition of raw and auxiliary substances, but also pre-products from recycled end-products, which in return contribute to sourcing optimisation. Important approaches for raw material recycling include:

- New use: Here, in the area of new use, materials are re-processed, so that they can be introduced to a new, original use.
- Continued use: The material can be applied for continuous use with or without further preparation.

- Multiple use: Multiple use allows the multiple use of residual materials.
- Re-use: Multiple use materials can be added in the framework of re-use.

Furthermore, companies may generate an individual disposal concept through observing the following steps:

1. Analysis of the present situation with consideration of the company objective,
2. Development of an alternative disposal concept,
3. Introduction of a supply concept,
4. Controlling and steering of the introduced supply concept.

The recyclability of the sourced and processed products is very important for companies, as high recycling costs can retrospectively lead to an increase of the purchasing prices. In the B2B sector, the sourcing company expects a clear recycling concept from suppliers in order to give its own customers disposal guarantee.

Companies that place emphasis on the management of their ecological responsibility and want to increase the respective activities, can introduce an environmental management system. In doing so, a distinction must be drawn between the "Eco-Management and Audit Schemes" (EMAS), also known as the EU-Eco-Audit, and the international counterpart ISO 14001. The EMAS Standard was developed by the European Commission. It allows companies to obtain certification for their environmental management system as a whole or for individual operating facilities separately. They contain a series of specifications on the environmental effects of the core operation. Companies with activities at several locations and in several countries set themselves multiple targets regarding when particular percentages of the location or the turnover should be certified according to one of the two standards. However, both systems are recognised.

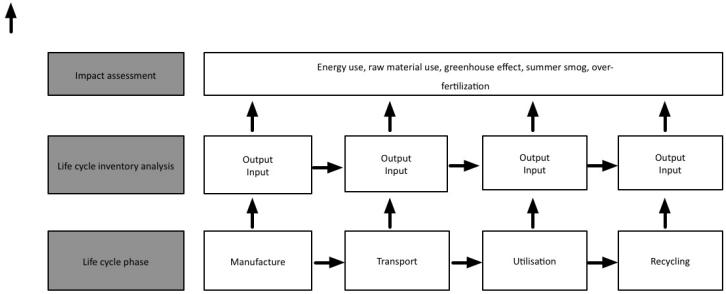
Literature criticises the focus of EMAS to still be placed on the optimisation of the management system, which in practice often results in production optimisation and waste avoidance alone. Thus, the core business and product design are often not affected. Due to the fact that the system is developed too statically and not sufficiently future-oriented towards development possibilities, the strategic success potentials remain unrecognised. In contrast, EMAS organisations are committed to continuously improve their environmental performance beyond the legal requirements. For this reason, with ISO 14001, the strategic components are strengthened from the beginning. Thus, a technical control board (like e.g. TÜV) rejects a recertification if it is not obvious how environmental and social aspects are anchored in the strategies of the business areas.

Surveys of the stakeholder are intended in the framework of the creation of the EMAS process. An example for the creation of processes is the definition of core topics and indicators for success measurement. In doing so, the business areas can align the activities to expand and further develop a sustainable strategy. Experts recommend implementation of, for example, "life cycle assessment" for dynamic companies focussing on holistic and even stronger strategy-oriented procedures.

13.4 Life cycle assessment

The life cycle assessment (LCA) is a tool to assess the possible impacts of a product, procedure or activity on the environment during the course of its life (life cycle). In doing so, companies measure quantitatively the use of particular resources ("inputs"), such as energy, raw materials, water, and the emissions ("outputs"), which end up in the air, water and soil. Thus, these are those resources to be associated with the tested system (extraction of raw materials, product manufacture, utilisation, disposal).

Fig. 13.2: General procedure for the development of a life cycle assessment



Source: fit-umwelttechnik, 2014.

The results of the life cycle assessment form the basis for the creation of a company's Eco balance. Therefore, the LCA includes the widest possible collection of environmental impacts of products, processes and services with regard to the entire life cycle of one of the products manufactured by the company. Furthermore, it demonstrates the potential for improvement, the environmental properties of products, procedure and services. At the same time, it is important to create transparency and objectification using a modular approach and an overall analysis. Its aim is to provide decision-making assistance for industry, politics and non-profit organisations to optimise the production process of a product from an environmental perspective.

In a life cycle assessment (LCA), the environmental impact of a product is calculated. Furthermore, the companies may consider the amount of raw materials required for the manufacture a product. Also, the production of semi-finished products, the production itself, including packaging and transport of raw materials, the use of the product and its disposal after use is taken into consideration.

Figure 13.3: Life cycle assessment of a car

Source: Daimler, 2015.

The two types of systems that are of particular interest for companies are the life-span of a product (e.g. a car) and the activity triggered by the product (e.g. driving). The examinations of the life-span are performed in order to answer the questions about the duration/extent of the pollution load, which the product releases during use. For this reason, this question is decisive for the structure of the LCA study. A similar question could be: which direct impacts does a new product have on the environmental load in comparison to the impact of a present product?

The life cycle assessment is performed in 4 steps (Herrmann, Ch., 2010, S. 153):

1. Definition of target and scope

   Starting with the target and the scope, first the decision-making criteria and the functional units for further investigations are determined. Furthermore, the system restrictions are defined.

The products are analysed from the view of a cross-system functional unit. The analysis takes place in a consistent, transparent and reproducible manner. The aim of the first step is to select raw materials and the product innovations in such a way that products and packaging may be developed that have a lower impact on the environment.

2. Status analysis

   The second step analyses the consumption of energy resources and resources in the sourcing process, production and product-use. A treatment diagram is created to classify the process of the product life cycle. Finally, the investigation parts and the energy input and output are determined. By means of this, a company collects all the relevant data to assess the product and, if necessary, presumptions about the missing data are made. Thus, the correct material and the energy proportions for each phase of the product life can be presented.

3. Impact assessment

   In the third step, the emissions, wastes and used resources are analysed, taking environmental topics into consideration. That means, the effects of materials and the matter of the contaminant appraisal of a product are described in impact categories. Thus, during this step, criteria are determined that are influenced by the impact categories. In consequence, the indicators of the respective impact categories and the corresponding weightings given to the categories are determined.

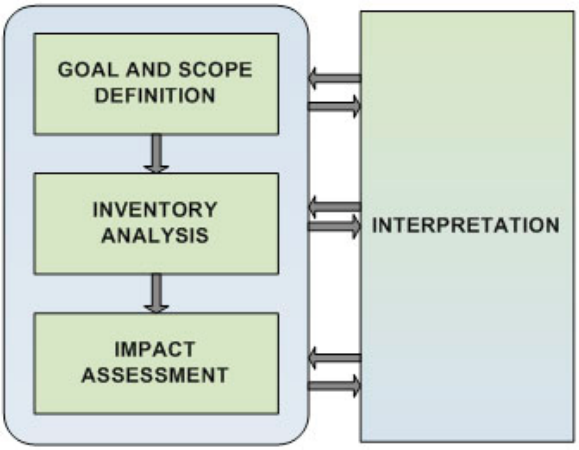
4. Improvement/appraisal and interpretation of the results

   At step four, the company identifies the parameters that are most important during the monitoring and control of sourcing, production and logistics. Furthermore, it defines improvement areas, and assesses the effect-categories using the original target

definition, so that it can realise the improvement process. A main question in this step is which resources are necessary for the improvement and, in return, which risks are involved with the use of these resources. Finally, the results of the analysis are evaluated and the progress is publically reported. However, LCA is not a risk assessment, considering that the LCA does not take exposition into consideration. This is, however, a parameter of utmost importance for a risk assessment. For example, with LCA emissions are determined quantitatively. The actual impacts of these emissions are, however, dependent on where and when they were released into the environment.

As already determined, the entire life cycle of a product is analysed in the framework of the life cycle assessment. Not only the production, but the entire product life cycle is taken into consideration. The main steps of the LCA are described in the standards (ISO 14040-14043). All the difficulties of stock taking and restrictions of the impact of the calculation process must be documented for every step of the LCA. Even during a very meticulous implementation of the life cycle assessment, not all aspects can be taken into consideration. This is considered to be a problem of the tool. However, despite numerous limitations, the LCA leads towards the right direction to the identification and reduction of environmental loads and helps companies to produce sustainably and save on costs. Finally, the properties are summarised once more in Figure 13.4:

Fig. 13.4: The four steps of LCA



Source: Stages of an LCA. Data from ISO 14040, 2006.

Training questions:

1. **Name the principle and core areas of "social responsibility".**
2. **Please explain the five waste disposal strategies shortly.**
3. **Please explain the four approaches for raw material recycling.**
4. **What is the basic idea behind LCA?**
5. **Explain the tasks and implementation of the life cycle assessment.**
6. **Name the four life-cycle stages and explain them.**
7. **Explain the LCA approach with the car industry as practical example:**
8. **How does it affect internal processes?**
9. **How does it affect communication with the consumers?**
10. **How does it affect supply chain management?**

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CHAPTER 14:
CRADLE TO CRADLE

Joachim Becker

Summary

The Cradle-to-Cradle (C2C) principle is based on the concept 'waste is food'. All used materials should, after their use in one product, be applied usefully in the next product. While doing so there should be no loss of quality and all remains should either be re-used or environmentally neutral by design. Then the cycle is complete: waste is food. The *Cradle-to-Cradle* principle continues and would like to foresee in our needs, but also foresee future generation in more possibilities. Thus, *Cradle-to-Cradle* focuses on the development of ecologically effective products. These products are than a significant part of a sustainable recycling system. Therefore, the materials provided for the production of the goods must be recyclable or biologically compostable.

In doing so, the *Cradle to Cradle* framework takes the following four areas, also known as the "four golden rules", into consideration:

1. Waste equals food
2. The sun is our income
3. Air, water and soil resources must not be harmful
4. Celebrate diversity

Companies can be granted certification in the framework of the *Cradle-to-Cradle* principle. *Cradle-to-Cradle* products must contain environmentally safe, healthy and recyclable (or compostable) materials. Further requirements are the use of renewable energy, the responsible handling of water and social aspects during the production and distribution of products. The certificate is valid for two years. In the subsequent recertification, the product quality is confirmed or there is the possibility of achieving a higher certification grade through advancements.

The *Cradle-to-Cradle* certification gives companies the opportunity to present their success and progress of their sustainable involvement with respect to *Cradle-to-Cradle* design of their products. From the customer's point of view, products can be specifically requested that fulfil a higher-quality standard.

14.1 Cradle to Cradle as the new philosophy of sustainable innovation

Cradle-to-Cradle (C2C) is an innovative and integral approach to sustainability, which is not based on reduction, but rather on unlimited reuse of raw materials. "With the aid of the Cradle-to-Cradle concept the intelligence of natural systems should be used to develop new products, and a peaceful coexistence of economy and nature should be possible." (Günther, 2014) This definition should be the basis of further explanations.

The term C2C philosophy was first coined by Michael Braungart and William McDonough (1989-1991). In the book "Cradle-to-Cradle: Remaking the Way We Make Things" (Braungart/McDonough, 2002, p. 15) they describe the C2C vision used in the production of all products. According to *Cradle-to-Cradle*, ecologically effective products should be developed. These products are part of a sustainable recycling system. The materials provided for the production of the goods must be recyclable or compostable. All production processes should be completely harmless for both humans and nature. Braungart says that people should act in a way that is beneficial for other material cycles. Thus, all products should function in the material cycle in a way that "there is no useless waste, but rather only useful raw materials." (Braungart, 2014) For this, the building blocks of the C2C design are the use of renewable energy, the maintenance of the recycling economy, and the 100 % recyclability of the biological and technical materials. There is only up-cycling, no down-cycling. This could lead, for example, to the following products:

- Fully compostable t-shirts.
- Office chair that can be disassembled into its initial materials, which can then serve as raw materials for a new product without reduction in quality.
- Buildings that produce energy, improve the climate and after demolition can be returned to the technical and biological cycles.

The global population is growing "according to UN estimations from the current seven billion to nine billion people in the year 2050" (Friedrich, 2013, p. 13). One result of this growth is that raw materials are becoming scarcer and more expensive. According to Friedrich, 58.5 % of the entire turnover of a manufacturing company is used for the material inventory in the production. From this number, the extent of savings for the company can be assessed easily, if the materials can be used more effectively and repeatedly (Friedrich, 2013, p. 13).

A natural utilisation cycle is created in the scope of the *Cradle-to-Cradle* concept. There is no waste in the traditional sense of the word, as waste is seen as "food" for new products. At the core of this concept is the idea that all materials can be useful. Materials and material flows are designed in a way that recycling is either biologically or technically possible. According to Braungart, the principle "quality before quantity" can be applied to every industrial system. In order to achieve this, it is necessary that the production uses renewable energies. Moreover, natural resources, such as air, water and soil should be used very carefully. Furthermore, social-ethical components have an effect in the framework of the Cradle-to-Cradle approach.

14.2 The four golden rules of Cradle to Cradle

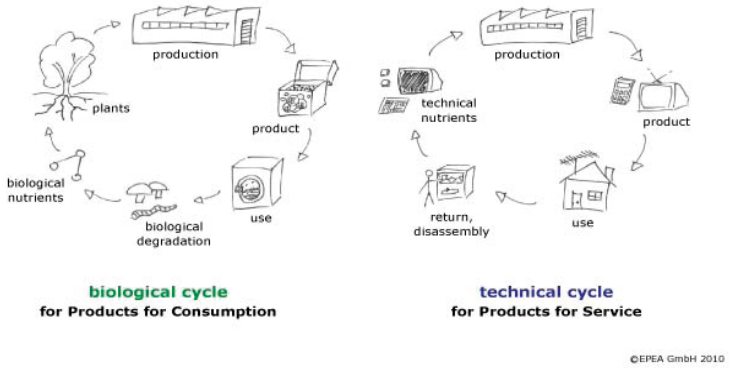
The *Cradle to Cradle* framework takes the following four areas, also known as the "four golden rules", into consideration:

1. Waste equals food
2. The sun is our income
3. Air, water and soil resources must not be harmful
4. Celebrate diversity

Waste equals food

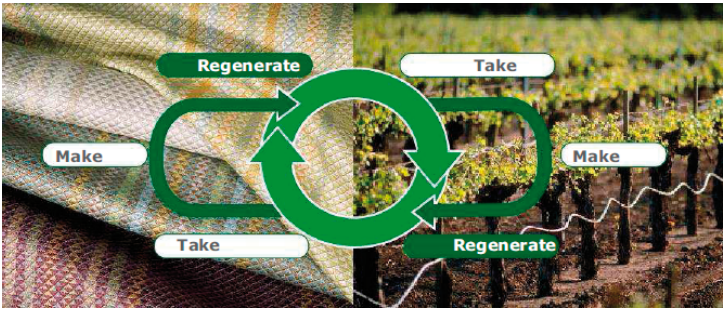
Everything should be produced in such a way that large parts and a high proportion of the processed resources can be recycled. This applies to foodstuffs, textiles and technological products. In doing so, two important material cycles are analysed: the biological cycles for biological nutrients, and the technological cycle for technical nutrients.

Fig.14.1: Comparison of the biological and technical cycles



The resulting cycles are an important element of the core rule that "waste equals food". In the framework of the biological cycle, it has to be observed that plant-based resources can be industrially processed in order to be returned to the organic cycle after use: e.g. textiles are composed of 100% natural fibres that can be composted after use. The resulting compost is then used for growing more plants again. A natural perpetual motion is created in which the respective resources are available without limitation.

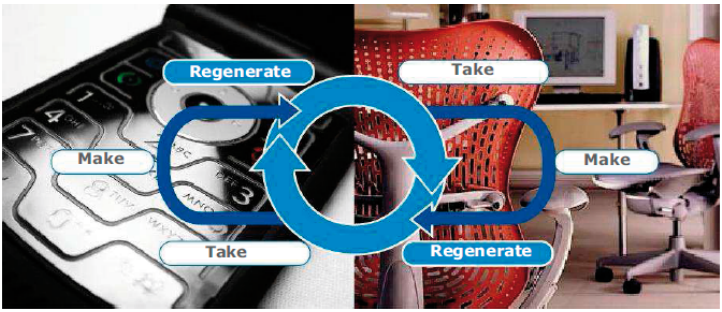
Fig. 14.2: Biological system in the Cradle to Cradle Model



Source: EPEA 2014.

The same approach can also be extended to technological products. The technological cycle is constructed in a similar way to the biological cycle:

Fig. 14.3: Technical system in the Cradle-to-Cradle Model



Source: EPEA 2014.

The aim of this approach is to develop products in such a way that products can be produced modularly, and the individual components can be exchanged when required. An example of this approach is the Herman Miller chair, which is produced with up to 96 % from recycled materials. With help of the presented cycle, the production

develops from a linear "take-make-waste-system" to a circular system in which materials and resources are always re-used. Products are no longer made to be disposed of after a relatively short life-span. After their use, they are further developed to create new products. For this approach to succeed, a feasible and effective recycling system is necessary.

"Replenish: "Creating a win-win-win-win for consumers, manufacturers, retailers and our environment"
While ironing his shirts one day, Jason Foster was struck by a bolt of creativity. He imagined designing a new kind of bottle, with a reusable upper bottle attached to a replaceable concentrate refill pod. The intent of this radical design? To usher in a new era of "easy to mix with water" cleaning concentrates that are affordable, convenient and dramatically less wasteful.
According to Replenish, "The single-use mind-set costs consumers hundreds of millions of dollars in wasted energy and plastic spent on transporting and packaging water that could easily be added at home instead of in the factory." However, consumers historically have avoided concentrates because they aren't that easy to use.
To create the Replenish Refillable Bottle System, Foster worked with experts to develop a new manufacturing approach and to find materials durable enough for many cycles of reuse. With help from the originators of the certification program, McDonough Braungart Design Chemistry (MBDC), Foster created and branded a 99 percent plant-derived, nontoxic and pH-neutral multi-surface cleaner and sold it using Replenish's Refillable Bottle system. The strategy was successful and Replenish announced its award of C2C gold certification in 2011." Source: Lumsden, 2014.

The sun is our income

A further important rule of the *Cradle-to-Cradle* approach is the use of natural energy. This means that the energy used has to be from renewable sources as much as possible. In this regard, Braungart pro-

poses an increased use of an almost inexhaustible energy source like the sun. This does not only include solar energy (photovoltaic), but also wind power – which arises from thermals resulting from sunlight – and biomass – which is solar energy saved in plants. However, it must be ensured that this energy production is not "bought" using heavy metals in the production of these systems (e.g. solar panels, wind turbines et cetera.). According to the *Cradle-to-Cradle* approach, all the energy reserves used at present are saved on earth as oil and gas. In the future, it will be about using natural energy sources directly in the form of solar, wind and water energy.

Air, water and soil resources must not be harmful

According to these specifications, companies are not allowed to use raw materials (and production technologies) for production that might contribute to the pollution of air, water and soil. Therefore, companies have to ensure that ecologically problematic raw materials are replaced by safe and ecological alternatives. The natural and ecological balance must be protected. Production technologies have to be adapted to these requirements. The aim is to reduce the ecological footprint in every area of the company's activities. This begins with the selection of raw materials and energy resources that the companies use in the value-adding process. This equally involves production and logistics, as well as the disposal of residual wastes.

"Designtex: A fabric that helps strawberries grow, with production methods that clean water
There is more concern lately about fashion and its impact on human health, the environment and workers. Susan Lyons of the New York-based design firm Designtex was ahead of the curve. In 1993, she decided to develop a collection of ecological fabrics. At that time, no one knew exactly what a "green" fabric should be.

A partnership then emerged among Designtex; William McDonough and his colleague, Michael Braungart; and the Swiss textile mill Rohner to develop upholstery with remnants that would not be considered hazardous waste. Braungart analysed more than 8,000 chemical formulations commonly used in textile production, then selected a mere 38 that he deemed safe for human and environmental health.
These were the dyes and process chemicals allowed to be used in the production of Climatex upholstery. According to Designtex, optimizing this chemistry changed the mill's water release, which became cleaner than the incoming water. By producing new fabrics designed to decompose safely, the mill saved scraps and turned them into felt, avoiding costly disposal fees. Local strawberry farmers used this felt as ground cover for their crops. Designtex has expanded its Climatex offering to some 20 styles and Climatex was awarded Gold level C2C certification." Source: Lumsden, 2014.

Celebrate diversity

This aspect of the *Cradle-to-Cradle* approach focuses on both the care of flora and fauna, and cultural diversity. From this perspective, cultural diversity creates a rich and varied world, where more options are available for humans, and different human abilities and values are to be respected. For this reason, the focus on diversity is a major driving force for the sustainable development of communities, populations and nations. Cultural diversity unfolds in a framework of democracy, tolerance, social justice and mutual respect for people and cultures. It is a prerequisite for peace and security on a local, national and international level. The respect of cultural diversity is a prerequisite for full realisation of the "general declaration of human rights" and other generally recognised agreements.

14.3 Certification of the Cradle-to-Cradle principle

Companies can receive certification in the framework of the *Cradle-to-Cradle* principle. With the *Cradle-to-Cradle* certificate, the non-profit Cradle-to-Cradle Products Innovation Institute (C2CPII) in California/USA labels the products. These products must contain environmentally safe, healthy and recyclable (or compostable) materials. Further prerequisites are the use of renewable energy, the responsible handling of water and social aspects during the production and distribution of products. The criteria for certification are:

- Material evaluation
- Recyclability in technical or biological cycles.
- Energy management during production
- Water management during production
- Maintenance of social standards at the production location

The certificate is valid for two years. In the subsequent recertification the product quality is confirmed or there is the possibility of achieving a higher certification grade through further advancements. The *C2C certificate* provides companies with the opportunity to present their success and progress of their sustainable involvement with respect to *Cradle-to-Cradle* design of their products. From the customer's point of view, products can be specifically requested that fulfil a higher-quality standard.

According to Braungart, the *Cradle-to-Cradle* approach is inspired by natural utilisation cycles in which there are no problems with "waste" or wastage. The term "waste" is newly defined here and understood as "food" for something new. The *Cradle-to-Cradle* approach transfers the principle according to Braungart of "quality before quantity" to industrial systems. Materials and material flows should be designed in a way that they are useful for the regeneration and maintenance of their biological and technical sources.

Training questions:

1. **Define and explain the Cradle-to-Cradle approach.**
2. **Name and explain the basic components of the Cradle-to-Cradle approach.**
3. **Name the "four golden rules" which are taken into account in the C2C framework.**
4. **Explain the "four golden rules" of the C2C framework in detail.**
5. **The sun is our income. Name three exploitation possibilities of this energy source.**
6. **Define Cradle 2 Cradle with the car industry as practical example.**

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CHAPTER 15:
INTRODUCTION TO GREEN MARKETING

Ulrich Scholz

Summary

Green marketing is a marketing strategy that focusses on the marketing of environmentally-friendly products and services. Green marketing, as understood here, is based on the concepts of eco-marketing and environmental marketing. These concepts are closely related to sustainability marketing and aim to achieve integration of ecological aspects in marketing. Green marketing can involve a number of different things, such as creating an eco-friendly product, using eco-friendly packaging, adopting sustainable business practices, or focusing marketing efforts on messages that communicate a product's green benefits.

Strategic sustainability marketing entails the links between the normative objectives (also including the vision) and the operative measures – the strategies. Strategic green marketing can be developed under various strategic options. A practically oriented possibility for developing a sustainable green marketing strategy is the use of the STP strategy. STP (Segmentation, Targeting, Positioning) is a famil-

iar strategic approach in modern marketing. It is one of the most commonly applied marketing models in practise.

The primary aim of market segmentation is the creation of a high degree of conformity between the offered market services and the needs of the target groups. The segmenting level identifies the relevant market segments. Targeting selects specific market segments, and these selected market segments are successfully processed during positioning.

Consumers who prefer to purchase green products even though they might be more expensive fall into the 'LOHAS' category. LOHAS stands for Lifestyles of Health and Sustainability. The LOHAS target group wants to consciously and actively participate as a customer in the market for sustainable products and change the market offer. The aim of LOHAS is to enjoy their lives as long as possible and with a clear conscience. This includes a healthy lifestyle as well as creating a better world for subsequent generations. These consumers are active supporters of environmental health and are the biggest purchasers of green and socially responsible products. They also have the power to influence other consumers.

15.1 Generation of the term green marketing

Concepts for ecological marketing and environmental marketing were already developed at the end of the 1960s. However, these concepts were not pursued for a while, until emphasis was placed on consumers and consumption, particularly in the 1970s and 1980s. Nowadays, for innovative and successful companies, it is necessity to achieve social acceptance. Thus, companies must demonstrate, among other things, that they conserve natural resources and raw materials. Companies must show recycling concepts for their products and must evidently establish ecological disposal concepts in their own operating facilities. In particular, companies must dem-

onstrate an ecological product policy. According to Jung (2006), it is essential for companies to be able to provide evidence of these points to consumers, providing they want to achieve acceptance within their corresponding target group (Jung, 2006, p. 707). Additionally, the company should also make the ecological alignment of the company clear for its employees. In doing so a sustainability strategy can be realised and plausibly lived out in the company (Meyer, 2011, p. 98).

The early conflict between marketing and ecological problems can be traced back to public criticism regarding the commercial form of marketing, because in the eyes of many consumers, marketing manipulates consumer behaviour and thus leads to new needs and over proportional consumption (Henion/Kinnear, 1976, p. 67). Based on this criticism, marketing can be seen as the partial cause of ecological problems. The scientific answer to this was "advancement of marketing". In doing this, companies incorporate the natural and social environment into their considerations (Belz, 1999, p. 56).

Thus, the American Marketing Association (AMA) defines green marketing as follows: "The study of the positive and negative aspects of marketing activities on pollution, energy depletion and non-energy depletion." (Henion/Kinnear, 1976, p. 87).

In this first definition, the following three core statements were taken into consideration:

- Green marketing is a part of the entire marketing activities
- Green marketing examines the positive and negative activities on the environment
- Green marketing examines environmentally-relevant topics

15.2 Sustainable marketing and Green marketing

Green marketing, as understood here, is based on the concepts of eco-marketing and environmental marketing. These concepts are closely related to sustainability marketing. The concepts were developed in the 1990s and aims to achieve integration of ecological aspects in marketing.

The terms green marketing and "sustainable marketing" are often used synonymously. However, this is not correct, as the two terms differ from one another. According to Schmied (2009), this particularly applies to the targets aimed for. The basis of "ecological green marketing" is a strategic alignment of the entire company according to the ecological principle and the principles of "corporate social responsibility" (CSR). At the same time, CSR covers responsible acting by the company in respect to the market, environment and workplace (Schmied, 2009, p. 54).

From this point of view, ecological green marketing is a part of environmental management. According to Balderjahn (2004), all the company's activities must be regarded from ecological aspects. From supplier selection, to the production process and to delivery at the customer. All the measures in the framework of the value chain should be designed in such a way that environmental damage is limited or avoided. Naturally, this includes adherence to social aspects (Balderjahn, 2004, p. 39 seq.). In contrast, sustainable marketing refers primarily to the marketing area. Here, permanent customer relationship is the focus point of the efforts. Thus, the term sustainable marketing, used in English literature, is not the same as sustainability marketing. (Murphy, 2007, p. 1).

Polonsky (2008) expands this definition based on traditional marketing definitions and includes protection of the environment. He takes the minimisation of the negative consequences of human consumption into consideration. According to Polonski, human consumption is generally burdening the environment, and the consequences

can only be minimised and not excluded: "Green or environmental marketing consists of all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment." (Polonski, 2008).

Today, the AMA (2014) defines green marketing using the following activity focal points:

- Retail
  "The marketing of products that are presumed to be environmentally safe."
- Social dimension
  "The development and marketing of products designed to minimize negative effects on the physical environment or to improve its quality."
- Environment
  "The efforts by organizations to produce, promote, package, and reclaim products in a manner that is sensitive or responsive to ecological concerns."

Although companies are largely responsible for the environmental damage caused by their products, production methods, services, etc., customers are also jointly responsible. Without the interest and corresponding demand for more ecological products, sustainable products and services are not marketable. Moreover, it is an important task of green marketing "to generate the desire of the user and end-customer for ecological products and services and if necessary to influence the individual lifestyle and politics (Hackel, 2009, p. 37).

Green marketing integrates social and ecological aspects in the marketing process. It includes the previously outlined task of eco-marketing. In other words, to generate the desire of the user for ecological products and services, and if necessary to influence the individual lifestyle and politics. In doing so, the aspect of social responsibility

in social marketing must also be taken into consideration. The other principles of relationship marketing, which are customer orientation, innovation, creating value and maintaining value, are used as the strategic bases of green marketing.

Green marketing is, therefore, in comparison with a broader concept with a "triple bottom line" target. In the process, sustainable solutions are created and communicated to the customer with a higher sustainability value. While the customer's wishes are satisfied, also the needs of all the other relevant stakeholders are taken into consideration (Charter et al., 2002, p. 32ff). This definition of green marketing allows the deduction that the aim is social and environmental-friendly acting of a company's management. This includes its employees, suppliers and also the customers (as stipulated in the framework of corporate social responsibility).

Successful green marketing is an important part of the new company strategy. According to Belz (2001), "green sustainability marketing" is for this reason defined as follows: "Green sustainable marketing [...] is at the same time constructive marketing and brings about long-term above-average success of companies [...] is effective and sustainable [...] supports chronology of measures and their effects so that new measures can be built upon earlier activities, and strengthen and expand them ... promotes clear positions of companies, develops relationships to the customer and other partners in the market. New solutions grow out of existing ones. Important are reliability, continuity, care and trust" (Belz, 2001, p. 3).

15.3 Strategic green marketing

There are a multitude of arguments for companies to introduce green marketing. An important reason is the differentiation from competitors, responsibility for corporate social responsibility, the respective production and target country's laws, and the development of com-

petitive advantages. Strategic sustainability marketing deals with the links between the normative objectives (also including the vision) and the operative measures – the strategies. Therefore, the strategies have a long-term horizon (Hummel, 2000, p. 29f). Here a distinction is made between market decision and the market participant strategies. "With the aid of market selection strategies, the "market and competitive arena" and the shape of the market cultivation are presented in such a way that the relevant market participants can be determined" (Meffert/Burmann/Kirchgeorg, 2012, p. 293f). Through market selection strategies, the product-market combination is defined, as well as the geographic extent and the degree of differentiation in the handling in the market. The market participant strategies help to develop adequate action plans in the face of the relevant market participants, such as customers, retail, competitors and important stakeholders (Meffert/Burmann/Kirchgeorg, 2012, p. 293f). For sustainability marketing, the strategies aligned to the relevant stakeholder groups are of particular importance.

Strategic marketing must not limit the analysis to the conditions of the market. Business activities on society, ecology and general social impacts should also be considered. Altogether, this leads to a company policy, which embraces the strategic challenges of these aspects, and accepts sustainability as a strategic framework for action.

Strategic green marketing can be developed under various strategic options. A practically oriented possibility for developing a sustainable green marketing strategy is the use of the STP strategy. The aim of the STP strategy is the satisfaction of customer needs in the target market. The model covers the three levels of segmenting, targeting and positioning. These levels are necessary for strategic development. The splitting of a large heterogeneous market into smaller sub-markets is known as market segmentation. The primary aim of market segmentation is the creation of a high degree of conformity between the offered market services and the target groups' needs. The segmenting level identifies the relevant market segments. Tar-

geting selects specific market segments that are particularly attractive, and these selected market segments are successfully processed during positioning.

According to the STP approach a strategy can be developed using the following steps:

- **1st step: Segmenting**

The whole market is split into sub-markets. Here, it must be ensured that the markets are internally homogenous, but are heterogeneous among each other.

- **2nd step: Targeting**

Firstly, identification of the relevant target groups and secondly definition of the target market and the requirements for the respective targeting.

- **3rd step: Positioning**

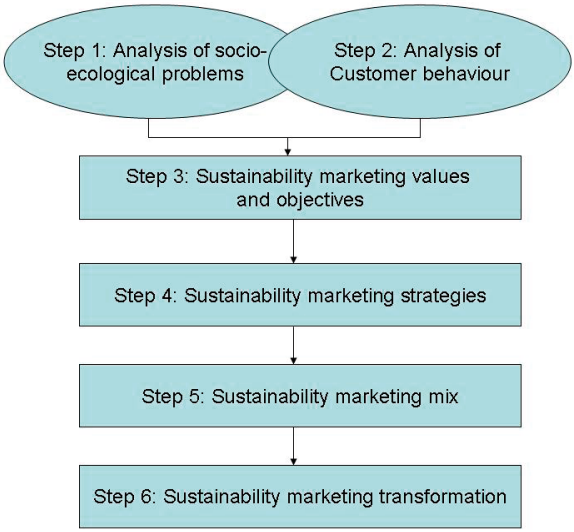
The company is considered from the customer's perspective. companies must define what is specific about them in the eyes of the customer. Positioning aims to actively design a market within the relevant market. In doing so, the challenge for the company is the creation of unique benefits for the addressed target segment. There, a distinction must be made between inside out perspective (unique sustainability selling proposition[26]) and outside in perspective (unique sustainability buying reason[27]).

26 Unique sustainability selling proposition (USSP): Through USSP, the reason why customers should demand products from a particular company, and what is special about these products is communicated from the company's point of view. The more evidence the company can provide with regard to its environmental strategy, the more it is perceived and acknowledged to be credible. This can be demonstrated equally well by adherence to ISO standards as by the publication of the environmental performance.

27 Unique sustainability buying reason (USBR): Through USBR, reasons for buying a product from a specific company are sought from the customer's point of view. Obviously, this can be the ecological view of the customer, but also the ambition of the customer to belong to an elite group.

As soon as the STP strategy is developed, the strategy is further adjusted to the customer's needs and also to the development status of the company. At the same time, differentiation is made in particular between normative, strategic, operative and transformative green marketing.

Fig. 15.1: Development of a green marketing strategy



Source: Belz/Peattie, 2009, p. 32.

Here, the first step for the company deals with explaining the social and ecological problems within the company's environment. The scope of this problem ranges from the working conditions for the employees (e.g. suppliers in developing countries) to the ecological consequences of extracting raw materials for its own products (e.g.

(e.g. wealthy Americans buy electric cars in order to demonstrate that they can afford them).

raw material extraction in the Arctic and Antarctic). When these problems are identified from the company's perspective, a comparison is made with the customer requirements. When the problem area is identified, the improvements for the company's aim, vision and mission are documented (Step 3: normative green marketing). In the fourth step, the normative target levels are split into smaller strategic targets and are optimised in the framework of Step 5. In the 6th step (transformative green marketing), the company seeks to find a means to contribute to social change?

Thus, companies can develop in three directions, which are decisive for the public credibility of the company. If companies try to present themselves as sustainable through only small changes, they must be assigned to the area of "tactical greening" and run the risk of being associated with "green washing". "Quasi-strategic activities" indicate that companies are on the right track for sustainable management, but have not yet converted in every single area. In contrast "strategic green marketing" is, a sign that the company follows a holistic approach to sustainability and thus, attains the highest credibility in marketing.

Fig. 15.2: The three steps of green marketing activities in companies

3 steps of green marketing activities:
• Tactical greening Covers the implementation of minor changes.
• Quasi-strategic activities Extensive changes, also in marketing campaigns.
• Strategic green marketing Holistic approach, all environmental aspects integrated into every operating area of a company in coordination with all the measures.

Source: Own presentation.

According to Belz and Peattie (2009), these three company groups of sustainable companies attract three different customer groups. These three customer groups can be split into customers described as socio-ecologically active, reactive or passive.

Fig. 15.3: The different groups of customer for green marketing

Three different customer groups for green marketing:
• Socio-ecologically active customer
• Socio-ecologically reactive customer
• Socio-ecologically passive customer

Source: Sinus Markt- und Sozialforschung, 4/2011, p. 16.

A customer described as a socio-ecologically active customer is one who actively and intensively seeks information about the origin, production conditions and environmental impact of the products he or she buys. These customers refuse companies and their products if these are classified as environmentally problematic. The active customers are very active and communicative in social media, and take on the role of the opinion leader. The socio-ecologically reactive customers are different. While this group also pays attention to how environmental-friendly products are, the buying behaviour of this customer group is not so fundamentally ecological as the group of active customers. This group is also more price-sensitive, and makes purchasing decisions based on the price. Socio-ecologically passive customers, in contrast, neither actively nor passively seek information about sustainability. Their purchasing decision regarding sustainable products is dependent on the price and situation.

With regard to the customer reaction, it is problematic for companies, when those company types listed in Figure 15.2 are confronted with the customer groups listed in Figure 15.3. Figure 15.4 shows the customer reactions that can be triggered. The negative effects on the customers are clearly visible if a company is only tactically green.

In comparison, those companies that present themselves as sustainable and that can also provide appropriate evidence of their actions receive positive reactions.

Fig. 15.4: Comparison of the company's strategic orientation and customer approach

Customer approach / Company's Strategic orientation	Socio-ecologically Active customer	Socio-ecologically reactive customer	Socio-ecologically passive customer
Tactically green	Active negative word of mouth propaganda via customers in every media	Negative approach of the customer towards the company	Mid-term negative approach of the customer towards the company
Quasi-strategically green	Critical approach towards the company	Neutral approach towards the company. Company is in the evoked set of the customer	Neutral approach towards the company
Strategically green	Positive word of mouth propaganda via customers	Positive approach towards company. Company is in the evoked set of the company	Neutral approach towards the company

Source: Own presentation.

15.4 The "LOHAS" segment

Since the end of the 1990s, two Swiss companies in the food industry have been pursuing the goal of winning over a new ecological target group. Retailers Coop and Migros have carried out the new target group. In addition to their usual programme, both offer a comprehensive range of controlled ecological cultivation (Belz, 2003, p. 45) for an ecologically savvy target group. What was still revolutionary at the end of the 1990s, belongs to fundamental company strategy in every sector today. Meanwhile, ecological strategies are even pursued in the automotive sector, which is showcased by the development electric cars and hybrid or hydrogen motors. However, the customer only recognises the appeal if the individual benefits are made sufficiently transparent. Additionally, the success of ecological products is strongly dependent on the credibility of the company and their ecological products (Hansen/Bode, 1999, p. 426). Simultaneously, the evidence of ecological quality often represents a costly and problematic undertaking (Schaltegger et al. 2002, p. 73). It is increasingly important to realise precise targeting and to define the target group in advance.

Nowadays, the customers want to assume responsibility. Responsibility does not only mean that customers recognise the causes of erroneous trends. It also means that customers assume the responsibility for the consequences of their actions and actively look to eliminate misunderstandings. Therefore, in the face of the global complexity of economic processes, not only companies and governments, but also customers (consumers) are committed to deal with tasks of responsibility. Last but not least, increased sales of sustainable products demonstrate that things have changed in recent years. To illustrate, despite the economic crisis, the sales of fair-trade products rose by 21 % in 2009, (Kögel 2011).

However, what does the target group look like that primarily demands these products? Is it a small social minority or can a trend already be recognised? Considering the extremely rapidly grow-

ing market, a new trend can be confirmed. The market potential of "LOHAS"[28], that covers consumer groups that follow a "lifestyle of health und sustainability", is estimated to be almost 200 billion Euro in Germany alone (Schulz, 2008, p. 57). The LOHAS target group wants to consciously and actively participate as a customer in the market for sustainable products and change the market offerings of companies. The aim of these consumers is to enjoy their lives as long as possible and with a clear conscience. This includes a healthy lifestyle as well as creating a better world for subsequent generations. The conscious demand and purchasing of sustainable products should result in companies acting in a fair and environmental-friendly manner. It describes a lifestyle – or rather consumer types, that want to promote health and sustainability through its consumption behaviour and targeted product selection. For these target group, it is not about denial, but about pleasure with a clear conscience. The LOHAS target group wants to remain physically and mentally fit for as long as possible and only cause as little damage to the environment as possible while doing so. An important characteristic of the group is that it does not want to forgo fun.

Fig. 15.5: Characteristics of the "LOHAS" target group

Characteristics of LOHAS
• Values: Authenticity, truthfulness, naturalness, responsibility, commitment, activism, holistic approach, harmony, autonomy • Aims: Fair trade, justice, healthy environment, self-realisation, cooperation, community, physically, mentally and spiritually in tune, personal further development • Properties: Critical, examining, questioning, social, curious, creative, self-assured, demanding, harmonious, integrated, idealistic

Source: Own presentation.

28 The paraphrasing of the group as "LOHAS" was used for the first time in the book "The Cultural Creatives: How 50 Million are changing the World" by the American sociologist Paul Ray in the year 2000.

LOHAS consumer are especially influenced and characterised by the topics sustainability, humans, technology and health. They are strongly integrated within their social group, allow themselves to be influenced by the social group and, due to their strong technological affinity, communicate with each other using social networks.

In the future, LOHAS-relevant topics will expand greatly and become relevant for economic and social development. With it, ethical, social and ecological responsibility is gaining in importance for companies and becoming the basis for their economic success. The increasing number of companies also reaching this insight proves the increased number of members in the Global Compact of the United Nations. According to the United Nations, over 10,000 companies and interest groups from 145 countries were represented in Global Impact in 2012 (United Nations, 2012). Global Impact is the largest international initiative in the area of corporate social responsibility in which companies commit to adhering to the principles within human rights, industrial relations, environmental protection and the fight against corruption.

15.5 Green marketing and sustainable innovation

From an economic point of view, green marketing entails the communication of sustainable, environmentally friendly products and ecological business models to respective target groups and motivates them to buy those products. However, green marketing should also explain to customers that there is an environmentally friendly alternative for their demand. But from an economic point of view, innovations also represent the development of new products, the shaping of new business models and the development of new and future-proof value chains (Unternehmer, 2014, p. 17). Sustainable products and green marketing of these products do not necessarily involve revolutionary approaches. Often, optimisation of the existing processes is productive, or makes products more environmentally friend-

ly and convinces customers of this with facts – be they B2C or B2B customers. A good, well-designed environmental balance can therefore form a good approach for green marketing. But there is a creative thought at the start of every innovation, a new angle to a known problem or unusual handling of challenges that apparently cannot be solved. The customer, at whom those innovations are targeted, decides whether a new idea turns out to be a self-supporting sustainable innovation. The acceptance by society and the market defines the success of the innovation. Green marketing thus supports the company's efforts in convincing the customer that the offered products or services contribute to solving the problem. In doing so, the tasks of green marketing are to incorporate the trends for digitalisation and individualisation, to respond to changing customer requirements and to integrate technological solutions into marketing. Green marketing therefore changes from being one-way communication to becoming a dialogue with the customer. Thus, connectivity is of key importance in green marketing. In this context, connectivity means collaboration between several companies in order to resolve a customer requirement. This can have technical reasons (e.g. the collaboration of Google and Novartis for the realisation of a smart contact lens to monitor blood sugar levels) or communicative (e.g. the collaboration between car manufacturer Opel and energy provider RWE in the area of electro mobility).

The "eMobility lounge" in the NH-Hotel Berlin Friedrichstrasse

An additional example of this connectivity in green marketing is a recent project by the NH-Hotel Group for the promotion of electric vehicles. Since 2012, NH Berlin's lobby has enabled interested guests and visitors extensively experience electro mobility, intelligent energy, and exactly how easy it is to charge an E-vehicle. Those who are interested can then immediately rent an e-bike, Segway, electric moped or e-car for an environmentally friendly trip through Berlin. An e-taxi has been available for all hotel guests and visitors from outside Berlin since 2013.

The "eMobility lounge" in NH Berlin Friedrichstrasse was brought to life together with energy provider RWE. It supplements the hotel's general concierge service and aims to make both all the inhabitants of Berlin and international visitors familiar with electro mobility. Based on the positive resonance of this initiative, the Berlin agency for electro mobility ‚eMO' has been the official co-operator of the Lounge since 2014. (cf. Wewoda 2014, p. 18ff).

Sustainable innovation, however, does not always need to be revolutionary; it also moves in small steps. Green marketing is not necessarily limited to the marketing of a single company; it can also be performed very well in cooperation with other companies.

At the same time, it is certain that the consumer cannot comprehend a sudden green image transformation of the company. The effort to position companies and products positively by means of green marketing can be counterproductive if the company and its products are not sustainable and environmentally friendly. Companies must realise that especially environmentally- and socially conscience consumers are avid Internet users with big networks. Diverse on-line media, social media networks, NGOs, communities, bloggers and twitter users communicate with one another – openly and with constantly growing coverage – about companies, their products and messages.

Hence, false or confusing advertising claims have been discovered more than once and have led to a real communication meltdown for companies. Ultimately, "green washing" damages not only the company involved, but also those who honestly and truly introduce green and sustainable products. Green marketing means inducing positive environmentally and socially acceptable changes in all business areas. From purchasing to production, from sales to marketing. In addition to these areas, all individuals involved in the company also play an important role. Companies should not only communicate these changes to their customers, but also to their employees, suppliers and shareholders.

Training questions:

1. **Define the term green marketing.**
2. **Name and explain the steps for the development of a green marketing strategy.**
3. **Explain the different customer groups in green marketing.**
4. **Explain the concept of LOHAS. Give particular detail here about the definitions of the target groups and their characteristics.**

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GLOSSARY

Accountability: "Being answerable, or responsible, to stakeholders. In Sustainable Management, this goes beyond financial stakeholders to include any natural or social systems affected by a business, including customers, employees, and communities." (Sustainable Management, 2016)

Activation process (customer knowledge): An important component of the customer insight process is the activation of the knowledge of the customer gained in the framework of the "customer insight": "As the company's new products must meet its customers' requirements, binding the customer already at the start of the innovation process is both logical and shows commitment. They are the most important source for the identification of possible problem areas." (Vahs/Brem, 2013, p. 265).

Analogies: Analogies are similarities, equivalences.

Analytical approach: Use of an appropriate process to break a problem down into the smaller pieces necessary to solve it.

Association: Automatic thought process; a learnt relationship between two cognitive elements, usually an impulse of a rewarded (or punished) reaction.

Audit: an official inspection of an organization's accounts, typically by an independent body.

Austerity measures: All official actions taken by the government, during a period of adverse economic conditions, to reduce its budget deficit using a combination of spending cuts or tax rises.

Awareness: (Collective) Awareness is a shared sense of urgency combined with a set of shared beliefs, ideas and moral attitudes within an organization or a society.

Bio-capacity: The planet's biologically productive land areas including our forests, pastures, cropland and fisheries.

Bio-diversity: The variety of life on earth and its processes. This it includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. "As human influence spreads, there is concern over the reduction of the total number of species and its effect on economics, medicine, and the ability of ecosystems to remain viable. […]" (Sustainable Management, 2016)

Biological cycle (Cradle-to-Cradle): In the framework of the biological cycle, it has to be observed that plant-based resources can be industrially processed in order to be returned to the organic cycle after use: e.g. textiles are composed of 100% natural fibres that can be composted after use. The resulting compost is then used for growing more plants again. A natural perpetual motion is created in which the respective resources are available without limitation.

Biological nutrients: Biological nutrients and materials are organic materials that can decompose into the natural environment, soil, water, etc. without affecting it in a negative way, providing food for bacteria and microbiological life.

Biomass: "Organic, non-fossil material that is available on a renewable basis. Biomass includes all biological organisms, dead or alive, and their metabolic by products, that have not been transformed by geological processes into substances such as coal or petroleum. […]" (Sustainable Management, 2016)

Biosphere: "Part of a planet's outer shell – including air, land, and water – within which life occurs, and which biotic processes alter or transform. From the broadest geo-physiological point of view, the biosphere is the global ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere (rocks), hydrosphere (water), and atmosphere (air)." (Sustainable Management, 2016)

Brainstorming: Brainstorming is primarily about generating as many new ideas as possible. The focus is on the quantity and not the quality. Participants have the task of generating and introducing as many ideas as possible, quickly and without restrictions.

Business Model Canvas: A strategic management and lean start-up template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's or product's value proposition, infrastructure, customers, and finances.

Business model: "A business model describes the rationale of how an organization creates, delivers, and captures value" (Osterwalder/Pigneur 2010, p. 14).

Carbon footprint: The total sets of greenhouse gas emissions caused by an organization, event, product or person.

Carrying capacity: Maximum number of people that can be supported indefinitely in a given environment resp. on earth.

CEO (Chief Executive Officer): The most senior corporate officer, executive, or administrator in charge of managing an organization

CERN: The European *Organization for Nuclear Research*: a European research organization that operates the largest particle physics laboratory in the world.

Challenge: "A problem, unmet need or opportunity to innovate around." (Dabscheck, 2016)

Change (organisational): Process in which a company or organization is going through a transformation. Organization change occurs when business strategies or major sections of an organization are altered. (Business Dictionary, 2016)

Change management: "Minimizing resistance to organizational change through involvement of key players and stakeholders." (Business Dictionary, 2016)

Climate Change: "The global climate has changed as human activity has released more and new substances and gases into the atmosphere. This has many results, including global warming, the effect of consistently increased average global temperature, particularly in the oceans. […] There is overwhelming, credible support from scientists and scientific research around the world that confirm that increased carbon released into the atmosphere from manufacturing and oil-burning or the decrease of the ozone layer due to specific gasses and other human activities are having real (and alarming) effects on the global climate." (Sustainable Management, 2016)

Climate Neutral: "The process of offsetting carbon-producing activities with those that either reduce or capture carbon, thus credibly

neutralizing the net amount of carbon released in the atmosphere from a particular activity." (Sustainable Management, 2016)

Closed innovation: Paradigm, that successful innovation requires control and ownership of the intellectual property generated during the innovation process. Thus, an organisation only uses internal ideas for the development of new products.

Clustering: Process of grouping objects in such a way that objects in the same group (cluster) are more similar to each other than to those in other groups (clusters).

Consumer: A purchaser of a good or service in retail. The term ‚consumer' refers to the end customer.

Contamination: Process of making something dangerous, dirty, or impure by polluting it or adding something harmful to it.

Continuous improvement process (CIP): Continuous improvement, is a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality which is realized under a scheme such as Kaizan, lean production, or total quality management (TQM).

Continuous improvement process: Within the frame of the market research it is investigated whether and how the existing customer requirements and problems can be solved better, easier or less expensively with the aid of new approaches.

Copy-strategy: Determination of the commercial content adjusted to the needs of the target group and the aspired positioning. The planning of the advertising objective is a prerequisite.

Copycat: a competitor that copies a product or technology.

Corporate Social Responsibility (CSR): A company's sense of responsibility towards the community and environment (both ecological and social) in which it operates.

Cost Benefit Analysis: "Cost Benefit Analysis is a financial method of evaluating the feasibility of a project or program by systematically summing its benefits and deducting its costs. […]" (Sustainable Management, 2016)

Cradle-to-Cradle design: an innovative, positive and integral approach to sustainability, which is not based on reduction, but rather on unlimited reuse of raw materials.

Creative collisions: The collision of two of more creative ideas that will develop in a new, more creative or valuable idea.

Creative Problem Solving: Creative Problem Solving (CPS) is a simple process that involves breaking down a problem to understand it, generating ideas to solve the problem and evaluating those ideas to find the most effective solutions.

Creativity technique: Creativity techniques are cognitive tools that help the brain during work to find new solutions for an existing problem

Creativity: The ability to develop a product, a service or an idea, which is evaluated as functional, original, unique and adequate

Crop failure: A failure of crops (fruits, cereals etc.) to yield sufficient food, to maintain a community or to provide a surplus to sell

Crowdsourcing: Practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional stakeholders.

Customer Insight: Customer insight indicates which motives move the customer to buy a certain product.

Customer: A party that receives or consumes products (goods or services) and has the ability to choose between different products and suppliers. The customer can be regarded both as a B2C (Business to Customer) and B2B (Business to Business) customer.

Decision making: "The thought process of selecting a logical choice from the available options." (Business Dictionary, 2016)

Decision matrix: "Table used in evaluating possible alternatives to a course of action." (Business Dictionary, 2016)

Decision tree: "Type of tree-diagram used in determining the optimum course of action, in situations having several possible alternatives with uncertain outcomes." (Business Dictionary, 2016)

Deforestation: Clearing of virgin forests, or intentional destruction or removal of trees and other vegetation for agricultural, commercial, housing, or firewood use without replanting (reforesting) and without allowing time for the forest to regenerate itself.

Desertification: the process by which green space or agricultural area becomes a desert.

Design thinking: "A method of problem-solving strategy wherein the data collected is expressed visually in order to create new strategies, ways and methods to solve problems, create opportunities or strengthen weaknesses." (Business Dictionary, 2016)

Disruptive Innovation: Process of developing new products or services which create a new market and value network, and eventually disrupt an existing market and value network, displacing established market leaders and alliances.

Dissemination: The act to cause something (such as an idea or an information) to go to many people.

Diversity: "In nature, diversity is a source of ecosystem strength since failures are unlikely to eliminate all species. Therefore, the ecosystem will recover in some form and continue. […] When applied to a human context, diversity refers to a wide variety of cultures, ethnic groups, physical features (and race), socio-economic backgrounds, opinions, religious beliefs, sexuality, and gender identity. (Sustainable Management, 2016)

Down cycling: Process of converting waste materials or useless products into new materials or products of lesser quality and reduced functionality.

Eco-balance: "A description of an industrial process in terms of the materials and energy inputs and the outputs of solid, liquid and gaseous wastes." (Science Dictionary, 2016)

Eco-effectiveness: Eco-effectiveness proposes the transformation of products and their material flows such that they form a supportive relationship with ecological systems and future economic growth. The goal is to generate cyclical, cradle-to-cradle ‚systems' that enable materials to maintain their status as resources over time.

Eco-efficiency: Eco-efficiency is based on the assumption of a linear flow of materials (cradle to grave). Thus, eco-efficient techniques seek to minimise the volume, velocity, and toxicity of the material flow system and by this the harm done to environment.

Eco-Management and Audit Scheme (EMAS): Voluntary environmental management instrument, which was developed in 1993 by the European Commission. It enables organizations to assess, manage and continuously improve their environmental performance.

Ecological footprint: The term ecological footprint stands for an accounting system for bio capacity. It tracks the amount of bio capacity and how much of it is used by people.

Ecological Marketing: Among other things, companies demonstrate, that they conserve natural resources and raw materials to maintain this social acceptance. The companies show recycling concepts for their products and evidently establish ecological disposal concepts in their own operating facilities.

Ecological sustainability: A way of producing and living, which only stresses the natural resources to a limited extent so that they can regenerate, is considered ecologically sustainable.

Economic cycle: "Recurring, fairly predictable, general pattern of periodic fluctuations (as measured by gross national product) in national economies." (Business Dictionary, 2016)

Economical sustainability: Economic actions are considered sustainable if the business model can be permanently practised.

Ecosystem: A system that includes all living organisms in an area as well as its physical environment functioning together as a unit.

Embedment: The integration of sustainability considerations in the processes and structures of an organisation. The prerequisite for embedment is a change in awareness of all the parties involved.

End-of-the-pipeline solutions: Occurring or active at the end of a process stream, such as the catalytic converters installed near the end of engine exhaust pipe to reduce emission of pollutants that have already formed in the engine. These solutions do not target the actual process, but the outcome of those processes.

Entrepreneur: "A person who assumes a lot of personal, financial, or business risk to pursue a market opportunity that does not yet exist." (Sustainable Management, 2016)

Entrepreneurial management: The specific management behaviours which entrepreneurs must engage in, in order to drive the market process and produce innovation.

European Foundation for Quality Management (EFQM): The EFQM Excellence Model is a non-prescriptive framework for organizational management systems, promoted by EFQM and designed for helping organizations in their drive towards being more competitive.

Evaluation: Systematic determination of an object's merit, worth and significance, using given criteria.

Experiments (market research): An experiment is a survey and/or observation within a controlled test setup with predetermined framework conditions. A laboratory experiment is one with artificial framework conditions; a field experiment has natural conditions.

External effects: "External effects (shifting of costs and usage without payment): If people economise, this can have a positive or negative on society. Positive external effects raise the quality of life of other members of society, without them paying for the additional benefits. With negative effects, costs are generated, which the society members rather than the perpetrator must pay." (Rogall 2012, p. 67)

Externalities: "Externalities are effects of services, products, or production on third parties who were not involved in the buyer/seller relationship. Externalities occur when a third party incurs unintended consequences from the market behaviours of others. […]" (Sustainable Management, 2016)

Failure: "An often valuable and necessary step in the process of learning what works about a creative idea to transform it into a useful innovation." (Dabscheck, 2016)

Fair Trade (Fairtrade): "A system of trade in which workers receive living wages and employment opportunities for the goods they produce. This system serves as an alternative approach to conventional international trade for producers who are typically economically disadvantaged artisans and farmers from developing countries. […]" (Sustainable Management, 2016)

Feasibility: The fact that a product can be used or dealt with successfully.

Fostering innovation: To foster innovation is to nurture, promote the development or to cherish innovation within the business environment.

Free rider: As individual society members cannot be partly or fully excluded based on economic, political or technical grounds from the use of goods provided once, there is often a free-rider problem with public goods. Individual users conceal their real purposes during the decision about the financing of public projects in order to not be drawn into their financing. They reckon that the goods will be provided without their contribution.

Garbage: "Anything that costs less to dispose of than it's worth commercially. […]" (Sustainable Management, 2016)

Green marketing: Green marketing aims to generate the desire of the user and end-customer for ecological products and services and if necessary to influence the individual lifestyle and politics. Companies involved in green marketing make decisions relating to the entire process of the company's products, such as methods of processing, packaging and distribution.

Green washing: Green washing is the practice of making an unsubstantiated or misleading claim about the environmental benefits of a product, service, and technology or company practice. Green washing makes a company appear to be more environmentally friendly than it really is.

Greening initiatives: The sustainable approach focusing on risk reduction, reengineering or cost reduction. Greening as such does not include strategy or technology development, and as a result, most companies that pursue those initiatives fail to recognize opportunities to innovate (Hart, 2010).

Habitat: An ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. The natural (or artificial) environment in which an animal or plant usually lives: a place where a person or thing is usually found.

Heuristic approach: Experience-based technique for problem solving, learning, and discovery that find a solution, which is not guaranteed to be optimal, but good enough for a given set of goals.

Holistic approach: An approach relating to or concerned with complete systems rather than with individual parts.

Idea evaluation: "A process used to evaluate innovative product ideas, strategies and marketing trends." (Business Dictionary, 2016)

Ideation: The process of generating ideas or concepts.

Incongruities: Incongruity means out of place – something that doesn't fit in its location or situation.

Incubation: the incubation period is the time needed for any particular process of development to take place. In the context of the in-

novation process incubation describes the period from the first idea for a new product to its realization.

Industrialization: The large-scale introduction of manufacturing, advanced technical enterprises, and other productive economic activity into an area, society, country, etc.

Innovation funnel: The funnel illustrates how innovation goals, innovation actions and innovation results interact with each other to create change in any organization. Actions enter the wide mouth of the funnel and represent among other things, alternative ideas for change. These actions flow towards to the neck of the funnel where many will be eliminated.

Innovation strategy: "A plan made by an organization to encourage advancements in technology or services, usually by investing in research and development activities. For example, an innovation strategy developed by a high technology business might entail the use of new management or production procedures and the invention of technology not previously used by competitors." (Business Dictionary, 2016)

Innovation: An innovation is something original, new, and important – in whatever field – that breaks in to (or obtains a foothold in) a market or society.

Innovative opportunity: Opportunities that arise due to changes in the internal or external environment of a firm. Innovative opportunities refer to a set of different elements within the processes whereby actors identify, act upon and realize new combinations of resources and market needs to try to benefit from their future economic potential.

Inside-out research: With this approach, companies develop new products and customer needs internally, without involving the tar-

get group. For this purpose, the companies frequently use scenarios and simulations.

Interdisciplinary: combining or involving two or more professions, technologies, departments, or the like, as in business or industry.

International Organization for Standardization (ISO): The International Organization for Standardization, known as ISO, is an international standard-setting body composed of representatives from various national standards organizations.

Intrapreneurship: The act of behaving like an entrepreneur while working within a large organization. Intrapreneurship is known as the practice of a corporate management style that integrates risk-taking and innovation approaches, as well as the reward and motivational.

Job-to-be-done: The job customers want a company to be done by a specific product.

Key Performance Indicators: A type of performance measurement. KPIs evaluate the success of an organization or of a particular activity in which it engages.

Knowledge-based innovation: Innovations or innovation attempts that are based on the emergence of new knowledge or technology.

Landfills: An area where waste is buried under the ground:

Lead time: The amount of time that elapses between the start of a process and its completion.

Lead user: Leading buyers who are the early adopters of new methods, products, and technologies. Their needs and choices usually

portend the needs and choices of the general market, and provide significant opportunities for introduction of innovative products.

Lean start up (six sigma): "Lean Start-up provides a scientific approach to creating and managing start-ups and get a desired product to customers' hands faster. The Lean Start-up method teaches you how to drive a start-up, – how to steer, when to turn, and when to persevere – and grow a business with maximum acceleration. It is a principled approach to new product development." (Lean Startup, 2016)

Learning-effects: The effect that learning has on a firm's productivity, leading to lower costs per unit produced due to labour efficiency, product redesign, standardization, specialization, better use of equipment et cetera.

Life Cycle Analysis: "An examination, like an audit, of the total impact of a product or service's manufacturing, use, and disposal in terms of material and energy. […] This includes an analysis and inventory of all parts, materials, and energy, and their impacts in the manufacturing of a product but usually doesn't include social impacts." (Sustainable Management, 2016)

Life-cycle assessment (LCA): A technique to assess environmental impacts associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

Livelihood: A way of earning money in order to live and survive.

LOHAS (‚Lifestyle of Health and Sustainability'): Consumer groups, which follow a "lifestyle of health and sustainability". This term defines a target group following a particular life style, where they place particular value on health awareness and care, and development in accordance with the principles of sustainability. The

members of this target group want to consciously and actively participate as a customer in the market for sustainable products and change the market offer.

Malnutrition: The unhealthy condition that results from not eating enough food or not eating enough healthy food.

Management system: A management system is the framework of processes and procedures used to ensure that an organization can fulfil all tasks required to achieve its objectives.

Managerial inertia: The commonly observed phenomenon whereby managers fail to update and revise their understanding of a situation when that situation changes, a phenomenon that acts as a psychological barrier to organizational change.

Market research: "Market research is systematically-driven research (retrieval, preparation, interpretation) of the sales and resourcing markets of a company" (Meffert et al., 2012, p. 96).

Marketing: The action or business of promoting and selling products or services, including market research and advertising.

Mega trend: Mega trends are global, sustained and macro-economic processes of development which impact business, economy, society, cultures and personal lives thereby defining our future world and its increasing pace of change.

Mission (corporate): A written declaration of an organization's core purpose and focus that normally remains unchanged over time. A mission is different from a vision in that the former is the cause and the latter is the effect; a mission is something to be accomplished whereas a vision is something to be pursued for that accomplishment. (Business Dictionary, 2016)

Morphology: The form and structure of an organism or product considered as a whole.

Needs analysis: A technique that businesses use to determine what steps need to be taken in order to move from its current state to its desired, future state.

Niche market: A niche market is the subset of the market on which a specific product is focused, with its own rules for success.

NIMBY (Not in my backyard)-effect: The NIMBY-effect refers to organized opposition by residents to a proposal for a new development because it is close to their homes. These residents often believe that though the developments are needed in society in general, they should be realized somewhere else. Opposing residents themselves are called ‚Nimbies'. The NIMBY effect may also apply more generally to people who advocate some change or proposal, but oppose implementing it in a way that would require sacrificing on their part: they support progress but they are not willing to change themselves.

Non-Governmental Organization (NGO): "A non-profit group or organization that is run neither by business or government created to realize particular social or economic pursuits, through research, activism, training, promotion, advocacy, lobbying, or community service." (Sustainable Management, 2016)

Normative approach: Observation-based technique that make normative statements about how things should or ought to be

Novelty: The state of being original or new, and probably unknown before.

Nurturing: To feed and protect, to support and encourage, as during the period of training or development.

Nutrition: The process of eating the right kind of food so you can grow properly and be healthy.

Observation (observational research): "An extensive array of research methods used with the intention of observing consumer interactions with products and services in their natural surroundings. The main advantage to conducting observational research in business is that the consumer is often unaware they are being monitored allowing the researcher to make an objective analysis." (Business Dictionary, 2016)

OECD: The Organization for Economic Cooperation and Development (OECD) is a unique forum where the governments of 34 democracies with market economies work with each other to promote economic growth, prosperity, and sustainable development.

Open innovation: Paradigm to use external as well as internal ideas to accelerate internal innovation, and expand the markets for external use of innovation.

Original equipment manufacturers (OEMs): An OEM is a company that makes a part or subsystem that is used in another company's end product.

Outside-in research: With this approach, companies include the customer in the product development at a very early stage – e.g. as lead-user or through the use of customer focus groups.

Perception: The organization, identification, and interpretation of sensory information in order to represent and understand the environment. In essence how we see/perceive things.

Phase concept (customer insight): The research of customer insight is based on a phase concept, which should be continuously designed within a company. At the end of the phase concept is the con-

crete implementation of the customer insight through marketing activities. The process of customer insight consists of 5 phases: 1) Clarity of target, 2) creating a multi-dimensional customer scenario, 3) the actual customer insight process, 4) adjusting customer frequency, and 5) implementation of the customer insight. (Wenzlau et al., 2003, p. 106ff)

Pivot: "A structured course correction designed to test a new fundamental hypothesis about the product, strategy, and engine of growth." (Ries, 2014, p. 103)

Premium prices: Premium pricing is the practice of keeping the price of a product or service artificially high in order to encourage favourable perceptions among buyers, based solely on the price. The practice is intended to exploit the tendency for buyers to assume that expensive items enjoy an exceptional reputation or represent exceptional quality and distinction.

Problem identification: Process of identifying the causes for defect or disruption within a company or organisation.

Problem solving: The term problem solving describes the process of working through details of a problem in order to reach a solution for each kind of problem including sustainability issues.

Problem statement: A problem statement is a concise description of the issues that need to be addressed and should be agreed on by all stakeholders (or created by them) before they try to solve the problem.

Problem: A problem expresses the difference between the desired and the actual situation.

Product: Possibility (good or service) to satisfy a need.

Profit creaming: A metaphor for the perceived business practice of a company providing a product or a service to only the high-value or low-cost customers, while disregarding clients that are less profitable for the company.

Prototype: An original or first model of something from which other forms are copied or developed.

Public goods: Public goods are freely available for all the potential consumers. Furthermore, no one can be excluded from their benefit. They are made available both by the state (e.g. roads, internal security) and by private providers (e.g. Google or Wikipedia).

Quality management (QM): Quality management (QM) has the task of formulating aims and organising these through structural and procedural organisational rules (Oeldorf/Olfert, 2004, p. 67).

R&D (research and development): The term R&D describes the systematic activity combining both basic and applied research to discover solutions to existing problems or to create new goods and knowledge. Thus, R&D may result in ownership of intellectual property such as patents. The term is also used as name for the department where this process takes place.

Real innovation: A new solution and a new customer benefit. There is no alternative available on the market: the market might have no need, but there possibly is a desire.

Recycling: Process of converting waste materials or useless products into reusable material.

Renewable energy: Energy resource that is replaced rapidly by a natural process such as power generated from the sun or from the wind.

Renewable: "Any material or energy that can be replenished in full without loss or degradation in quality." (Sustainable Management, 2016)

Risk-aversion: The behaviour of humans (especially consumers and investors), when exposed to uncertainty, to attempt to reduce that uncertainty. When innovating, a risk-averse culture is detrimental.

Scoping phase: Initial step in the project development process where the most important details of a project (project purpose, financial parameters, customer needs etc.) are defined.

Sense of urgency: State of realizing that change is going to be needed.

Social Entrepreneurship: "The act of creating, organizing and managing an income-earning venture to serve an explicit social purpose. […]" (Sustainable Management, 2016)

Social sustainability: Social sustainability describes responsible handling of all the people involved in a process. The aim is to keep social tensions limited and to settle conflicts in a peaceful and civil manner.

Soil sealing: Covering of the ground by an impermeable material.

Story telling: Sharing messages by telling a story that engages the audience and drives it to take a desired action.

STP strategy: A marketing strategy is based on expected customer behaviour in a certain market. In order to know the customer and its expected buying process of **s**egmenting, **t**argeting and **p**ositioning is needed.

Sunk Costs: "Used in business decision-making, costs which have already been incurred and which cannot be recovered to any sig-

nificant degree and, thus, should be ignored." (Sustainable Management, 2016)

Supply Chain: "A network of individuals or organizations that performs the functions of procurement of materials; transformation of these material into intermediate and finished products; and distribution of these finished products to customers." (Sustainable Management, 2016)

Survey (market research): A detailed study of a market or geographical area to gather data on attitudes, impressions, opinions, satisfaction level, etc., by polling a section of the population. (Business Dictionary, 2016)

Sustainability marketing: Sustainable marketing is constructive marketing and promotes clear sustainability positions of companies, develops relationships to the customer and other partners in the market.

Sustainability: Capacity to endure.

Sustainable Development: "An approach to developing anything that recognizes the need to meet the challenges of the present without compromising the ability of future generations to meet their own needs." (Sustainable Management, 2016)

Sustainable innovation: "Creation of new market space, products and services or processes driven by social, environmental or sustainability issues" (Arthur D. Little, 2004). Accordingly, sustainable innovation couples the notion of business innovation with the protection of natural systems while delivering essential goods and services that serve social goals of human health, equity, and environmental justice.

Systematic Innovation: The process of methodically analysing and solving problems with a primary focus on identifying the correct problem to be solved and then generating innovative solution concepts free from mental inertia.

Technical nutrients: Technical nutrients are basically inorganic or synthetic materials manufactured by humans – such as plastics and metals – that can be used many times over without any loss in quality, staying in a continuous cycle.

Technology: Possibility to create a product.

The chasm: a gap between the early adopters of the product (the technology enthusiasts and visionaries) and the early majority (the pragmatists).

Theory of inventive problem solving (TRIZ): TRIZ is the Russian acronym for "the theory of inventive problem solving".

Tragedy of the Commons: "A term used to illustrate the conflict between individual interests and the common good, based on the assumption that when individuals use a public good, they do not consider the impact – or externalities – of their use on the good itself; as a result, public resources become overexploited. […]" (Sustainable Management, 2016)

Triple Bottom Line: "An addition of social and environmental values to the traditional economic measures of a corporation or organization's success. Triple Bottom Line accounting attempts to describe the social and environmental impact of an organization's activities, in a measurable way, to its economic performance in order to show improvement or to make evaluation more in-depth. […]" (Sustainable Management, 2016)

Unique sustainability buying reason (USBR): Through USBR, reasons for buying a product from a specific company are sought from the point of view of the customer. Obviously, on the one hand, this can be the ecological view of the customer, but it can equally be the ambition of the customer to belong to an elite group.

Unique sustainability selling proposition (USSP): By means of the USSP, the reason why customers should demand products from a particular company and what is special about the products is communicated from the company's point of view. The more evidence the company can bring with regard to its environmental strategy, the more it is perceived/acknowledged as credible. This can be equally demonstrated by adherence to ISO standards as by the publication of the environmental performance.

Up cycling: Process of converting waste materials or useless products into new materials or products of higher quality or value than the original.

Value proposition: A companies promise to solve customer problems and satisfy customer needs with a specific product.

Value: "The concept of general economic or financial worth of a product or service. Also, a customer's assessment of the ability of a product or service to meet their needs and desires. […]" (Sustainable Management, 2016)

Values: "Human beliefs and ideals that affect someone's perspective of themselves and others. Values are a socially-constructed phenomenon and relate both to identity and the establishment of behaviour. They represent a level of significance between emotion and meaning." (Sustainable Management, 2016)

Vision (Corporate): "[…] Whereas a mission defines an organization's direction and priorities, its vision is the description of the

destination this direction is heading. A vision is often a description of an organization, market, or world that is different than current and embodies its values and objectives." (Sustainable Management, 2016)

Visualization: Process of representing abstract business or scientific data as images that can help in understanding the meaning of the data.

Waste disposal: Destruction, transformation or recycling of garbage.