

CREATING AND SUSTAINING HEALTHY HABITS

TREND REPORT 2017



Creating and Sustaining Healthy Habits

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adidas

Kindly supported by adidas anticipation

Sport is central to every culture and society and is core to an individual's health and happiness. At adidas, everything we do is rooted in sports. We believe that, through sport, we have the power to change lives.

The aim of adidas anticipation is the development and implementation of new products and business models which are suitable to promote the above core belief of adidas.

The collaboration with the students participating in the Trend Seminar 2017 was one of the CDTM initiatives selected and supported by adidas anticipation.



A project of the Center for Digital Technology and Management (CDTM)

The Center for Digital Technology and Management (CDTM) is a joint, interdisciplinary institution for education, research, and entrepreneurship of the Ludwig-Maximilians-Universität (LMU) and the Technische Universität München (TUM).

It offers the add-on study program „Technology Management“ for students from various backgrounds, which provides students with tools and knowledge at the intersection of business and digital technologies.

The entire trend report was written by CDTM students under the close guidance of research assistants. For more information about the CDTM and its related projects, please visit www.cdtm.de.

PREFACE OF THE EDITORS

As Herman Kahn, one of the founding fathers of modern scenario planning, nicely states, it is tremendously important for strategy and policy makers to get a deep understanding of possible future developments in order to be prepared for them. The Center for Digital Technology and Management (CDTM) aims at empowering innovators of tomorrow. It is our mission to equip our students with the tools and knowledge they will need to become responsible leaders who actively shape their future environment, rather than only reacting to changes.

This trend report is the result of the course Trend Seminar, which is part of the interdisciplinary add-on study program in Technology Management at CDTM. About 26 selected students of various disciplines, such as Business Administration, Economics, Psychology, Computer Science, Electrical Engi-

In addition, we kindly thank all our lecturers for sharing their knowledge and largely contributing to this project's success:

Prof. Dr. Jürgen Beckmann (TUM)
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neering, and more work together on a relevant topic related to ICT. Over seven intense weeks of fulltime work, the participating students dive deeply into the topic of the Trend Seminar. Working in several interdisciplinary sub-teams, students apply the knowledge from their main studies and learn new perspectives from their team members. They conduct trend research, develop scenarios of the future, generate ideas for innovative products or services and detail them out to concrete business concepts.

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 Dr. Felix Werle (IICM)

“ **Everybody can learn from the past.
 Today it is important to learn from the future.** ”

Herman Kahn

We would like to take the chance to thank everyone who contributed and made this CDTM Trend Report possible:

We want to thank adidas for supporting this trend seminar. Particularly, we want to thank Dino, Kolja, and Thanos from adidas anticipation for their great interest in the topic, the valuable insights and feedback throughout the whole project, and the collaborative organization and topic definition of this project.

Last but not least, we would like to thank the CDTM students of the class of Spring 2017. They put great energy and enthusiasm into this project, which made it a pleasure for us to supervise the course and coach the individual teams.

Gesa Biermann and Florian Lachner
 Center for Digital Technology and
 Management

PREFACE OF THE PROJECT PARTNER

Sport is central to every culture and society and is core to an individual's health and happiness. The importance of sport at adidas, however, goes far beyond that: we believe that, through sport, we have the power to change lives. We work every day to inspire and enable people to harness the power of sport in their lives.

With an increasing urbanization it is becoming more and more difficult for people from any age group to implement and sustain a healthy lifestyle through outdoor leisure and sports activities. Furthermore, through an increasing digitization of our daily life and an increasingly connected world, the border between work and spare time is becoming more and more indistinguishable. Work-life balance is giving way to work-life flow. Consequently, people who do not develop sustainable exercising routines early on, quickly struggle to incorporate healthy activities into their daily rhythm.

How can digital technologies enable people to develop and sustain effective healthy habits? How can the increasing availability of data in digital formats foster transparency and new ways of data collection for healthy habits? What may be emerging business models in that regard?

By reading this report the passionate (adidas) reader will encounter some natural answers why health and wellbeing are on the rise, and also learn why data-driven solutions need to incorporate more common sense when it comes to people's powerful routines.

“ **Never stand still and always be willing to learn.** ”

Adi Dassler

The enclosed research findings from our collaboration with the Center for Digital Technology and Management (CDTM) provided us at adidas anticipation with a boost of confidence that we can build upon our competence in sports to generate growth from new business models. Our aim is to explore and scale business models with disruptive potential. It is our mission to create new growth opportunities for the best sports company in the world.

We would like to take the chance to thank everyone who contributes to the mostly-awesome-spirit that emanates from the Center. Thanks to its interdisciplinary approach, the CDTM proved once more to be a vibrant hub for the vital exchange between academia, entrepreneurs, and corporate practitioners. It was a pleasure to experience the energy surrounding the CDTM throughout seven intense weeks. While our joint focus was to create a good understanding

of possible future developments, and to develop a handful of future-proof business model concepts, we soon grasped the significance of the CDTM culture as a key enabler for creativity – and its relevance for the entire startup ecosystem in Bavaria.

Our thanks go to all students whose complementary skills, energy, and drive fueled an adventurous learning journey and who inspired us to anticipate the next horizon of growth. Our heartfelt thanks also go to Gesa Biermann and Florian Lachner for their enduring enthusiasm around the topic of healthy habits, and for their continuous support and crucial advice.

Dino Dario Monopoli, Kolja Orzeszko, and Thanos Petalotis adidas anticipation GmbH, Munich

TABLE OF CONTENTS

Editorial	3	List of Contributors.....	102
Methodology	7	Sources	106

TRENDS

Technology Trends	10
Societal & Environmental Trends	17
Legal & Political Trends.....	26
Economic Trends.....	33
Business Model Trends.....	42

SCENARIOS

Scenario Overview Driver & Scenario Matrix	50
Scenario 1 Literate. Flexible. Free?	54
Scenario 2 Get fit, or Die Tryin'	57
Scenario 3 Total Reset	60
Scenario 4 Careless Flexibility	63

IDEATION

Team 1 simplant	67
Team 2 Co-Engage	74
Team 3 Travelfit.....	81
Team 4 made it.....	88
Team 5 VRena	95

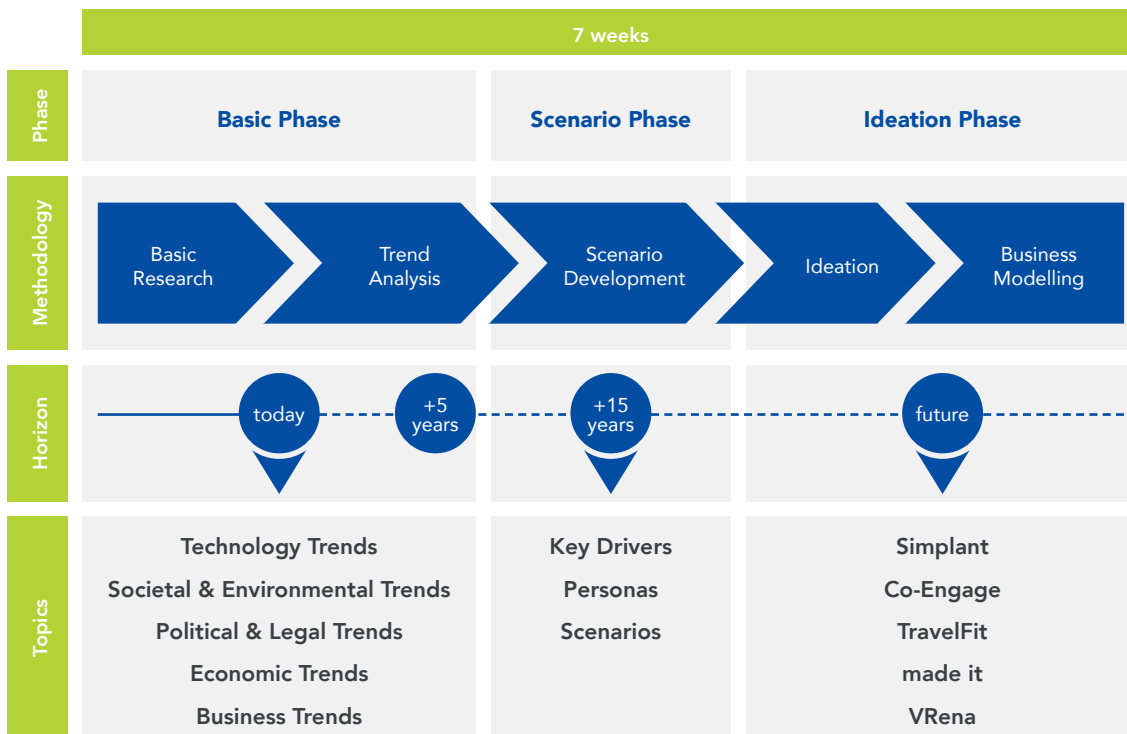
METHODOLOGY

For a given topic that is highly impacted by digital technologies, the Trend Seminar pursues three main goals:

- To analyze the status quo, recent developments and identify important trends
- To develop extreme scenarios of the future, in order to be prepared for upcoming challenges
- To develop future-proof product and service ideas and detail them out into business concepts.

These goals are represented by the three phases of the trend seminar: The Basic Phase, the Scenario Phase and the Ideation Phase.

Twenty-six students, supervised by two doctoral candidates, pursue the Trend Seminar in seven weeks of intensive full-time work alongside with their project partner. In each phase, interdisciplinary subteams are formed including students from technology, business, and various other backgrounds to combine versatile ways of thinking.



The **Basic Phase** yields a holistic overview on recent developments and trends in the environment of the overall topic. Based on the commonly used STEP approach (Social-Technological-Economic-Political), the status quo and trends in the fields society & environment, technology, economics, politics & legal, as well as emerging business models are analyzed. Knowledge is gathered by literature research, preceded by a series of input presentations by experts on the topic.

The class is split into five teams, each working on one of the thematic scopes. At the end of the Basic Phase, the teams present their key findings to each other in order for everyone to get a holistic view on the topic to build upon in the following phases.

The **Scenario Phase** builds upon the analyzed trends in order to create four extreme scenarios of different futures in twenty years ahead. Driving forces behind developments are identified and specified as drivers with bipolar extreme outcomes. Once specified, all drivers are ranked according to their respective impact on the overall topic and the perceived degree of uncertainty regarding their outcome. Two key drivers that are independent from one another and have both a high impact and a high degree of uncertainty are chosen and, with their bipolar outcomes, used to create a scenario matrix of four extreme scenarios. A timeline for each of the scenarios is created and the scenarios are sketched out using persona descriptions and visualizations. The Scenario Phase starts with a two-day workshop followed by group work in four teams. Teams are newly formed in order to include experts from each subtopic of the Basic Phase in each new Scenario Team.

In the third phase, the **Ideation Phase**, the goal is to develop innovative business concepts, which are then tested against the previously developed scenarios. Within a two-day workshop on structured ideation following the SIT approach (systematic inventive thinking), a large number of business ideas are developed.

Out of these, the most promising five ideas are selected and further developed into detailed business concepts. The business model canvas by Alexander Osterwalder and Yves Pigneur serves as the base structure.

At the end of the seminar, the business model concepts are presented to the project partner and guests.

LIST OF ABBREVIATIONS

AI

Artificial Intelligence

API

Application Programming Interface

B2B

Business-to-Business

B2C

Business-to-Consumer

BCI

Brain Computer Interface

BLE

Bluetooth Low Energy

bn

billion

CAGR

Compound Annual Growth Rate

CBDs

Cellphone-Based Devices

EU

European Union

EEG

Electroencephalography

EHR

Electronic Health Record

EMR

Electronic Medical Record

FTC

Federal Trade Commission

HCI

Human-Computer Interaction

IPv6

Internet Protocol Version 6

ILO

International Labour Organization

INQA

Initiative Neue Qualität der Arbeit

IoT

Internet of Things

m

Million

MVP

Minimum Viable Product

NLP

Natural Language Processing

OSH

Occupational Safety and Health

PHM

Population Health Management

RFID

Radio-frequency identification

SDK

Software Development Kit

SIT

Systematic Inventive Thinking

STEP

Social-Technological-Economic-Political

tn

trillion

U.S.

United States

USD

U.S. Dollars

VR

Virtual Reality

WHO

World Health Organization

5G

5th generation mobile networks

TRENDS

The following chapter lists current trends that have a strong impact on creating and sustaining healthy habits. In accordance with the Basic Phase methodology, trends and related driving forces are structured in five areas: technological trends, societal and environmental trends, political and legal trends, economic trends and business model trends.

TECHNOLOGY TRENDS	10	ECONOMIC TRENDS.....	33
SOCIETAL & ENVIRONMENTAL TRENDS	17	BUSINESS MODEL TRENDS	42
LEGAL & POLITICAL TRENDS	26		

A man and a child are sitting on large, dark rocks. Both are wearing VR headsets. The man is on the left, wearing a white t-shirt and shorts, with his right hand raised as if interacting with a virtual environment. The child is on the right, wearing a dark t-shirt and shorts. The background is a dark blue sky with a glowing network diagram of white lines and nodes, suggesting a digital or virtual world. The overall mood is futuristic and immersive.

TECHNOLOGY TRENDS

IN CREATING AND SUSTAINING HEALTHY HABITS

Pervasive Computing

Touchless Interaction

Augmented and Virtual Reality

Big Data Analytics

Bioanalytics and Personalized Nutrition

TECHNOLOGY TRENDS

in Creating and Sustaining Healthy Habits

The benefits of adopting and sustaining healthy habits range from improved physical and mental health to financial well-being. Healthy individuals are not only better at managing themselves, but are also more active members of society. In spite of increasing efforts by public and private entities to broadly foster a healthier lifestyle, the results have not been as fruitful as anticipated. This is also attributed to the accelerating growth of technology integration into human life. The aim now is to reap the benefits of technology and use it to bring healthy habits into the daily routine.

To start with, a key technological trend that supports the other identified trends is the phenomenon of an increase in computation everywhere, also known as pervasive computing. Whether this computation happens in devices carried by humans or in surrounding environments, pervasive computing plays a critical role in the increased understanding and improvement of daily activities. To unlock its full potential, however, providers and lawmakers must manage to clear the still present challenges explained later in this section.

A human's interaction with his or her environment is not limited to touch and neither should the interaction with techno-

logical devices be. This is the reason for the rising adoption of touchless interaction. A natural interaction with technologies will make it easier to integrate such devices seamlessly into one's lifestyle. This allows for a more intuitive way to receive feedback on health status and therefore, provides motivation to sustain healthy habits.

The development of these new means of interaction will accelerate the broad adoption of Augmented and Virtual Reality (AR and VR) technologies. With the increasing availability of related products, the consumer demand for high quality and suitable applications of AR and VR will rise. This is particularly relevant for sports and fitness, as such experiences allow for immediate feedback and thereby the opportunity for focused, personal performance improvements. Furthermore, they leverage information accessibility and user engagement. The result is higher motivation which can in turn support the achievement of long-term objectives.

While the human environment and interaction with it plays an important role in shaping healthy behaviors, the significance of insights obtained through user related information cannot be overlooked. Big Data analysis helps to leverage this op-

portunity by processing user specific data and comparing it with data from millions of other users. Acquired knowledge can then, for example, be applied to provide personalized and user-centric coaching and workouts. This approach of providing valuable insights and tailored plans helps foster motivation towards healthy living among the users. In addition, Big Data allows the study of human behaviors at a macro level, which can prove beneficial on many fronts – from policy making to city planning – to create and sustain healthy habits.

Finally, standard diets and physical activity plans do not fit all people the same. They need to be optimized for the user's unique physical circumstances in order to bring about a habitual change towards healthier activities. Bioanalytics powered by Big Data can provide personalized nutrition plans as well as physical activity suggestions by taking the user's biology into account. This will lead to lower dropout rates and an overall more streamlined approach towards short-term and long-term health goals.



PERVASIVE COMPUTING

Increasing computational abilities in peoples' environment to incentivize healthy habits

Pervasive Computing denotes the widespread embedding of computational capabilities into objects of all kinds and sizes, such as a refrigerator or a heater [1]. The connection of such devices results in a network of smart actors, enabling them to collectively gather, process, and send data to each other or to a central server [2].

The term Internet of Things (IoT) is a subset of and necessary step to pervasive computing and signifies the interconnection of everyday objects, that have computing abilities, over the Internet [3].

The use cases range from fitness wearables communicating with each other to smart homes. The advantages are manifold: cost savings, possible increases of energy efficiency as well as increased comfort and security [4].

A variety of networking technologies, such as Bluetooth Low Energy (BLE) and Radio-frequency identification (RFID) enable the underlying communication itself [5].

Facts

- By 2022, predictions estimate that there will be a billion (bn) connected devices, 596bn Euros (EUR) of projected IoT revenue, and 4 million (m) terabytes of IoT-based traffic worldwide [6].
- Organizations, such as the Industrial Internet Consortium, founded in 2014, are making efforts to define IoT standards [7].
- Major tech companies already offer IoT solutions: operating systems, such as Windows 10 for IoT [8] and platforms, such as Amazon Web Services for IoT [9].
- Companies employing IoT technologies are witnessing significant reductions in annual energy costs [7].

Key Drivers

- Increasing adoption of more capable network architectures, such as 5th generation mobile networks (5G) and Internet Protocol version 6 (IPv6), allows to accommodate billions of online devices at fast transfer rates [10], [7].
- By 2021, the average selling price of low-cost sensors will drop to 0.29 U.S. Dollars (USD) [11], further driving industry adoption.
- Self-powered sensors harvesting their working power from other sources such as radio waves are on the rise [12], which will allow to handle significantly more data at lower prices [13].
- Computation and storage will move away from the cloud and toward the actual data sources [14], enabling decentralized data processing.

Challenges

- Providers and governments must tackle the issues of privacy, confidentiality, and integrity of the gathered data. They must explain the benefits and usages of the data to users [15], [16].
- Interoperability of IoT systems from different manufacturers is critical because it is required in 40% to 60% of IoT applications [15], [17].
- Governments and telecommunication providers must make investments in increasing bandwidth and other infrastructure [16].

Impact on Creating and Sustaining Healthy Habits

The idea of pervasive computing is to convert the computation into a co-operative system. This not only increases the user touch-points but also allows for better activity tracking [18].

Through sensors incorporated into the IoT devices it is possible to capture relevant data, ranging from information about food in the fridge to biometrics like body temperature. By converting the gathered data into useful insights, smart environments allow immediate feedback to motivate people for fitness activities.

TOUCHLESS INTERACTION

Toward a seamless integration of technology into the user's lifestyle

Despite the fast development of technologies, the interaction techniques are developing comparatively slowly [19]. Especially for the interaction in smart environments, new interaction techniques are needed, which are not limited to touch [20]. Some of the most popular techniques are gesture recognition [21] (used in the BMW i8), Brain-Computer-Interaction (BCI) [22] (developed by companies such as Mindmaze), gaze-based interaction [22] or natural language interaction. The latter includes not only controlling a device with one's voice, but also the device's (e.g. Amazon Echo or Google Home) reaction, resulting in a bidirectional flow of information that resembles a conversation. In addition to usability reasons, the touchless approach helps to avoid unwanted side effects of excessive technology usage such as addiction and constant distraction. Especially distraction prevents the user from mindfulness [23], which is an important part of a healthy lifestyle.

Facts

- Recent reports predict that the gesture recognition and touchless sensing market size will surpass 30bn USD in 2023 [24].
- The Chinese intelligent voice market will reach an estimated volume of 19.17bn USD in 2020 [25].
- Major companies integrate language interaction in more and more of their systems, e.g. Apple's Siri and Microsoft's Cortana are extended from phones to PCs [26], [27].
- Significant recent investments in companies such as Mindmaze [28] lead to a forecast of 1.47bn USD in market size for BCIs in 2020 [29].

Key Drivers

- Devices are becoming smaller and an integral part of our life, requiring new forms of interaction [30].
- The development of advanced sensors, which are an integral part of touchless interaction (e.g. Electroencephalography (EEG) sensors for BCI) is progressing [21].
- Other technical drivers are: Improvements in Artificial Intelligence (AI), especially in Natural Language Processing (NLP), and developments in telecommunication, such as better cellular networks [31].

Challenges

- To encourage a user to adopt a certain habit, the interaction with a device must feel natural [32].
- The perception of humans is limited, which makes interaction with multiple devices challenging [33].
- Unhealthy side effects through excessive digital technology use, such as a shortened attention span, should be taken into consideration [34].

Impact on Creating and Sustaining Healthy Habits

High quality Human-Computer Interaction (HCI) concepts, such as touchless interaction, are key to achieve engagement of users with a system. For example, insights on the current health status or motivational reminders from a coach could be delivered by a system without demanding much effort from the user. A seamless and constantly occurring interaction with a system drives the formation of habits [35]. Additionally, it amplifies and helps to sustain the motivation [23].





AUGMENTED AND VIRTUAL REALITY

Increasing availability of technologies enabling enhanced experiences of reality

The first annotations on the concepts of AR and VR date back to the 1960s [36], yet only now, related products are becoming accessible and affordable to a broad mass of users. With AR, computer-generated sensory-input – such as imagery, video, and sound – blend into the human perception of reality. VR technologies allow fully immersive experiences by replacing reality with a simulated alternative. All added layers aim to be interactive in order to present a realistic alteration of reality [36]. When comparing the two approaches, AR stands out for being mobile and thereby integrating more easily into the users' lives. VR however can show the user completely different worlds [37]. Both technologies enable direct visualization of content. This results in a presentation of information which is more intuitive than previous solutions, as it requires additional mental effort for users to understand 3D concepts which were forced into 2D representations, as is the case in traditional forms of information technologies [38]. Generally, the complete human field of vision can be used for information display. This is enabled through AR and VR as both remove the restrictions of showing digital content on small screens [39]. For this reason, both will fundamentally change the way humans interact with digital content in the future [40].

Facts

- The big players take on AR and VR: Google with Project Tango and Daydream, Microsoft with HoloLens, Facebook by acquiring Oculus, and Apple by acquiring metaio [41] – [45].
- The AR and VR market potentials are predicted to reach 108bn USD by 2021 [46].
- Public interest in AR concepts is rising, e.g. with Pokémon Go being the most successful mobile game in history so far [47].

Key Drivers

- The competition between market players in winning mainstream customers' favor drives innovation in hard- and software development related to AR and VR [48], [49].
- Technical drivers for the success of AR and VR related product offerings are, amongst others, advances in resolution and processing power [37].
- User friendly interaction concepts, wearability, and fashionability as well as affordable prices of AR and VR products will promote broad adoption in society [37], [50].
- With emerging fields of application in various industries, AR and VR technologies will find their way into the everyday life [51].

Challenges

- Immersive experiences currently require head-up displays that are still heavy and bulky. Therefore, research efforts focus on reducing these inconveniences through e.g. special contact lenses [52].
- The latest VR devices are still causing motion sickness. This happens when a user sees visual changes, but all other senses do not receive the equivalent of these changes accordingly [38].
- Some limitations arise from hardware and software, e.g. high quality 3D rendering is computationally intensive and the display resolution is still unsatisfactory [53].

Impact on Creating and Sustaining Healthy Habits

Academia and the free economy show efforts in using AR and VR concepts in supporting health and fitness. Examples range from augmented training mirrors [54], nature simulators [55], to combining education and fitness in augmented experiences [56]. It was found that such experiences result in higher motivation, satisfaction, and information accessibility. This can be particularly relevant for targeting change resistance or increasing engagement with products [57]. Furthermore, the immediate feedback in AR or VR scenarios facilitates higher self-awareness, motivation, and effectivity when trying to reach health-related goals [54]. Furthermore, in more urban environments, where direct interaction with nature is often hardly possible, VR experiences can simulate similar effects and thereby contribute to overall well-being [55].

BIG DATA ANALYTICS

Developing customized solutions and improving fitness monitoring through Big Data

Big Data analytics involves analyzing large amounts of data – both structured and unstructured – to yield meaningful patterns, trends, and associations related to user behavior and processes. The combination of this knowledge with AI, through user modeling techniques and predictive analysis, enables personalized solutions and insights into the future [58].

User modeling involves explicitly provided and implicitly acquired knowledge about users to identify preferences and interests [59]. Predictive analysis provides forecasts by running complex statistical algorithms on related Big Data [60]. Major companies, such as Amazon, Facebook, Google, and Netflix combine these techniques to attract, retain, and offer tailored content to their customers.

Patient-generated data, electronic health records (EHR), and data from wearable technologies, are the major contributors to Big Data in health and fitness domains [61]. This data is used for disease diagnosis, personal coaching, and customized workout plans.

Facts

- By the end of 2015, approximately 75% of the 437 companies in the Gartner Research Circle were investing or planning to invest in Big Data [62].
- By 2020 the worldwide revenues for Big Data will surpass 200bn USD with a CAGR of 11.7% [63].
- Since 2011, over 1.9bn USD of capital has been raised to fund companies which use predictive analytics [64].
- The price of storing data on a public cloud service is falling rapidly. Currently, it costs less than 0.024 USD cents per gigabyte [15].

Key Drivers

- Decreasing prices in hardware, increasing processing power, and developments in AI are making Big Data more effective.
- Self-quantification is becoming mainstream due to increases in user-related data coming from wearable technology or IoT [15].
- Arising scalable cloud solutions such as AWS and Hadoop allow for real-time data processing and reduced storage costs [65].
- The strong interest in Big Data leads to growing investments by healthcare providers in machine learning technologies, such as deep learning [66].
- High demand by digital natives makes Big Data more relevant, as they are used to personalized information delivery [67].

Challenges

- Insights obtained from Big Data analytics are not proportional to the underlying amounts of data [68].
- Currently, there is a lack of clear regulations for data encryption, protection, privacy, and security [69].
- More than half of organizations lack the resources they need, in order to do predictive analytics [70].
- User modelling raises ethical questions, e.g. about the predictions of intentions or goals [59].
- Machine learning algorithms struggle to process medical data because it is unstructured, complex, and noisy [69].

Impact on Creating and Sustaining Healthy Habits

Studies show that fitness apps and solutions are more effective when they are personalized [71]. By combining user modeling and predictive analysis, it is possible to offer users customized plans and insights into health or fitness benefits. Fitness companies, including MyFitnessPal and Freeletics, are beginning to use Big Data to give more informed recommendations [72]. Furthermore, fitness and technology companies are partnering to provide cognitive coaching that will process tracked user data and compare it to data from millions of others, in order to offer smarter advice on how to exercise, eat, and rest [73]. Additionally, platforms such as Strava are sharing Big Data with city planners to help them plan new projects, such as cycling and running routes [74].



BIOANALYTICS AND PERSONALIZED NUTRITION

Shift in the industry towards deep health analytics and biologically suitable nutrition

Bioanalytics deals with the analysis of biological parameters in humans and enables insights into different facets of human health and activity. The data for these analyses can be gathered through biosensors. In recent years there has been a trend toward the use of wearables and Cellphone-Based Devices (CBDs) in bioanalytical applications [75]. Examples of these devices include the Omron blood pressure wrist-band and Hexoskin smart shirts [76], [77].

Human nutritional requirements vary greatly depending on individual genetics and physical status. Personalized nutrition, enabled through bioanalysis and Big Data, offers optimal diet strategies by analyzing an individual's nutritional status [78]. This has great potential in enhancing the quality of nutrition and hence facilitating adoption of a healthier lifestyle.

Furthermore, wearable electrochemical biosensors provide in-time analysis e.g. of heart or brain activity [79]. This is not only useful for the aforementioned applications but can also prove to be critical in emergency situations.

Facts

- The market value for biosensors is projected to reach 20bn USD by 2020, with an estimated CAGR of 10% between 2014 to 2020 [80].
- 70m wearable fitness and activity trackers were shipped in 2016 [81]. The worldwide spending on wearable technology is expected to reach 19bn USD by 2018 [80].

- Habit, a personalized nutrition startup, received an investment of 32m USD in 2016, indicating an increasing industry interest in the concept [82], [83].
- Research predicts that health and fitness monitoring solutions can save up to 197bn USD in medical costs over the next 25 years [80].

Key Drivers

- Genetic differences influence nutritional requirements, thereby providing a market opportunity for individualized nutrition [84].
- Proof-of-concept designs and prototypes of bioanalytical CBDs are developed and demonstrate their promising capabilities [75].
- Cheaper bioanalysis techniques and better Big Data analysis are on the horizon [79].
- Low cost and easy to use lab-on-a-chip biosensors have great potential for medical applications [85].

Challenges

- Hardware in current smartphones and fitness wearables is not capable of the full range of bioanalytical diagnostics feasible in laboratories [75].
- Large scale applicability of Big Data in personalized nutrition requires extensive datasets and suitable analysis algorithms to be developed [78].
- The field of Nutrigenomics has yet to catch-up to a price point that will allow for it to be incorporated into bioanalysis [84].
- Inaccuracy of biosensors, inherent from the miniaturization, needs to be minimized [86].

Impact on Creating and Sustaining Healthy Habits

Personalized nutrition will provide biologically backed recommendations, not only capable of motivating adoption of a healthy diet but also increasing effectivity of the user's actions. Deep integration of Bioanalysis into human lives will lead to higher health awareness. Personalized physical activity plans can also be recommended, if an individual's health, nutrition, and past activity records are available, leading to lower dropout rates as they lead to faster and better results. The ability to monitor health on-the-go will also prove useful in the early diagnosis of diseases.

SOCIETAL & ENVIRONMENTAL TRENDS

IN CREATING AND SUSTAINING HEALTHY HABITS

The Urban Paradox
Holistic Health Concept
Individualization
Work-life Flow
Conscious Consumption
Elderlies in Sports
Access to Digital Technology

SOCIETAL AND ENVIRONMENTAL TRENDS

in Creating and Sustaining Healthy Habits

Being healthy is determined by multiple aspects - nutrition, exercise, and the surrounding environment. While people feel that most actions they take are free decisions, almost half of them are a result of habit [87]. Consequently, routines heavily influence living a healthy lifestyle. However, the definition of a healthy lifestyle highly depends on societal standards and norms as well as the environment in which a person lives.

Many diverse trends in society, of which the seven most important ones are elaborated on in detail, impact a healthy lifestyle on the basis of daily habits and routines – from a changing image of health to an increased access to technology of today's society.

Urbanization exposes a growing number of people to the urban environment, which impacts multiple areas of their lives. In spite of better access to healthcare and educational infrastructure, urban environments negatively affect the physical and mental health of the city dwellers.

Moreover, products and services are becoming more individually tailored towards the customer, especially in health and fitness applications. The tech-savvy generation drives this development by demanding the same level of customization

from established services as on the modern web. This leads to a more integrated user, who is no longer a sole recipient of value but a co-creator of it, which has a range of implications on the health and fitness sector.

Another growing societal trend is conscious consumption. It emphasizes an action of individuals who choose products based on principles of sustainability, social justice, and corporate responsibility. Due to this shift in consumer behavior, such individuals tend to eat organic food, monitor the health state of their bodies, and integrate physical exercise in their lifestyle.

Nowadays, health specialists and society recognize that not only physiological but also psychological aspects contribute to living a healthy life. As a consequence, behavioral health care and other interventions focusing on mental well-being gain importance.

In addition, the number of people connected to the internet is rapidly growing worldwide. As a result, digital literacy is becoming prevalent, particularly among younger generations, which provides opportunities to potentially sustain a healthy lifestyle. However, it can also increase stress and lead to negative consequences on overall well-being.

Work-life boundaries are dissolving, while the modern workforce aims to improve its overall quality of life through the workplace. Employees are increasingly interested in non-financial gains from their place of work, including the availability of sports facilities and health promotion programs. Furthermore, increased interaction with sports at work accelerates the formation of healthy habits and contributes to their retainment.

Lastly, life expectancy and the fraction of elderly people in the population are steadily growing. The elderly are increasingly interested in taking part in sports activities and living healthier lives. However, most sports organizations currently adapt their facilities and programs to include this new target group at only a slow pace. This results in a lack of inclusion of older people in the sporting activities.

THE URBAN PARADOX

Urban lifestyle is challenging an increasing number of people

Globally, a growing number of people are moving to cities, which has a significant impact on their lifestyle [88]. People in urban areas tend to have a more convenience-based dietary pattern (i.e. increased intake of carbohydrates and fat) than people living in rural areas. Moreover, they tend to shift from self-supply to a higher consumption of convenience foods [2]. Additionally, moving to the city results in changes in physical activity - away from high-energy expenditure activities such as farming to service-oriented and mostly sedentary occupations [3]. Impacted environmental conditions, such as less green spaces and higher air pollution, make exercising outside potentially harmful to health, particularly for people with respiratory diseases [4], [5]. Increased exposure to stressors, such as overcrowded environments, higher levels of noise, and social stress, results in a higher prevalence of mental health disorders [6], [94]. At the same time, urban areas offer advantages such as an increased access to infrastructure (i.e. education, healthcare, social communities, sports clubs, and sports activities) [95]. Increasing urbanization thus impacts more and more people in various areas of life: physical health, eating routines, and mental health.

Facts

- Today, 54% of the world's population and 74% of Europeans already live in cities [9]. Globally, the number is expected to rise to 70% by 2020 [10].
- The prevalence of mental disorders increases by 38% when living in the city compared to living in rural areas [94].
- Children in the countryside show significantly better fitness performance than children from urban areas and are more likely to keep these habits [11].
- The fast food market is projected to reach a global volume of 617.6bn USD in 2019, steadily growing with a CAGR of 4.4% from 477.1bn USD in 2013. In particular, the Asia-Pacific region drives this development [99].

Key Drivers

- Rural income is significantly lower than urban income, which attracts people to move to the city [13].
- The WHO and the EU have started initiatives to improve the quality of life in urban areas, by promoting physical, mental, environmental, and social well-being e.g. through smart city projects [14], [15].
- The number of sports facilities in cities is increasing globally [16].

Challenges

- Integrating people into urban communities and educating them about fitness, nutrition, and local engagement opportunities, are crucial factors for a healthier lifestyle.
- Educating children from an early age is vital to form sustainable healthy habits.
- Both increasing the number of publicly available green spaces, parks, and exercise facilities as well as reducing environmental stressors are necessary to facilitate more outdoor physical activities.
- Expanding the number of sports opportunities and urban engagement programs on offer is crucial for strengthening the cohesion of local communities.

Impact on Creating and Sustaining Healthy Habits

Living in cities exposes citizens to different external factors: more opportunities for unhealthy food, a more convenience-based lifestyle, environmental pollution, stress, and less green space for exercise. Also, mental health is negatively affected by environmental factors. Urbanization, therefore, poses a major health risk for fast urbanizing countries. However, increasing health education, a growing importance and focus on local communities, and the smart city movement offer opportunities for a healthier lifestyle. Nevertheless, developing and sustaining healthy routines remains a major challenge for people living in urban areas.



HOLISTIC HEALTH CONCEPT

Society is increasingly recognizing behavioral health care as an essential component of well-being

In the 1970s, the term “behavioral health” was used to describe behaviors that prevent illness or promote health [104]. Nowadays, the terms “behavioral health” and “mental health” are often used interchangeably [105]. This change in terminology reflects the adoption of a more holistic health concept by the healthcare industry and society as a whole. The industry’s stakeholders – from employers to insurers – recognize mental health as important to their employees’ and customers’ well-being and productivity [106]. Federal state parity laws, enforced in the U.S., require insurance companies to cover behavioral health services equally to other medical treatments [106]. Moreover, behavioral health in the U.S. becomes integrated within primary care through an interconnection of primary care clinicians and behavioral health specialists [106]. The rapidly growing demand for behavioral care opens doors for new start-ups (e.g. “Lyra Health” and “Doctor on Demand”) who provide telehealth services for mental health issues [106]. However, these changes not only address coping with illness, but also enriching the lives of healthy people through the promotion of concepts focusing on psychological well-being (e.g. mindfulness-based interventions and meditation) [107].

Facts

- One in five American adults suffer from a mental illness every year. These conditions cost U.S. businesses more than 440bn USD annually [108].
- Mental illness is the primary reason for incapacity for work, making up 38% of all permanent sick leaves. In comparison, diseases of the skeletal and locomotor system, comprising the second most common reason for incapacity for work, make up only 15% of all permanent sick leaves [109].

- The spending on mental and substance use disorder treatments from all public and private sources is expected to total 280.5bn USD in 2020 in the U.S., which is an increase from 171.7bn USD in 2009 by 63% [110].

Key Drivers

- Mental illness causes rising economic costs [109], [110].
- There is an increasing amount of awareness in the population regarding behavioral health [111].
- The consequences of urbanization result in a higher prevalence of mental health disorders and the need to respond to this issue [94].

Challenges

- Society still stigmatizes people who experience mental diseases, which is the biggest obstacle for them to confront the problem and seek help in time [112].
- Behavioral health care is a strained resource in many geographical areas, which makes it difficult to access for certain population groups. For example, more than half of U.S. counties – all rural – have no practicing mental health clinicians [106].
- Legal restrictions hinder the progress in psychopharmacology [113].
- The limited financial resources within the health care system are not sufficient to appropriately deal with the increasing costs caused by mental illness.

Impact on Creating and Sustaining Healthy Habits

Collaborative models, linking primary care with behavioral healthcare specialists, have yielded improvements in the value and quality of care [114], thereby having a positive impact on the overall well-being of patients. Furthermore, an increasing number of people are including practices such as meditation in their daily routines in order to create a happier and healthier life [115]. These practices also enable people to better cope with the current biggest health problem – stress [116], [117]. Moreover, mindfulness-based interventions beneficially impact a range of self-regulatory abilities [118], which is a requirement for long-term determination and hence sustaining healthy habits.



INDIVIDUALIZATION

Increasing level of health and fitness service personalization

The shift towards more personalized products and services has persisted for several years. The change manifests itself for example through smartphones, customizable via apps, individually tailored features of web services such as Netflix's view recommendations, or the Spotify discover weekly playlist. The young digital natives drive this development by expecting the same level of personalization for more traditional products [119].

This results in an overall shift from seeing the user as the sole recipient of value, to him being the co-creator of it [120]. The ever-increasing level of personalization is thus shaping expectations of health and fitness services. As a consequence, the providers have to adapt to the fast-moving world of digital technologies and the society's increasing focus on individuality [119].

Facts

- The majority of online customers aged 16 and above from Great Britain are willing to pay for the personalization of services [121].
- Over 36% of these customers have expressed more interest in personalized products and services than generic ones [121].
- Personalization increases loyalty towards the offered service and a stronger identification with it [122], [123].
- People demand a high level of personalization of health and fitness products without having to play an overly active role in the personalization process [121].
- Personal fitness coaches increased by 44% to 231,500 in the U.S. between 2001 and 2011 [124].

Key Drivers

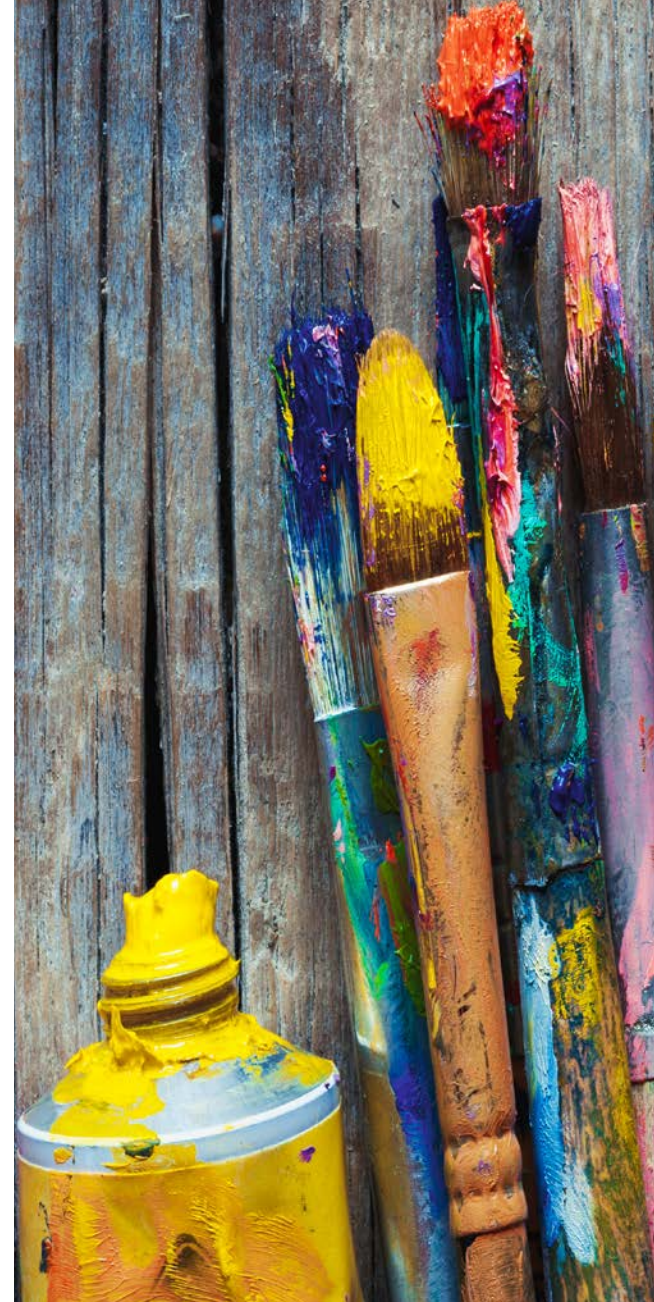
- An increasingly health-literate population demands individualized health solutions [125].
- Digital natives drive the demand for personalization of features, services, and products [126].
- Advances in technology, especially wearables, enable extremely customized health services and products [127].

Challenges

- Benefits of personalized features need to outweigh privacy concerns to be accepted and effective [128], [129].
- Obtaining the users' consent is crucial to be able to use the information necessary for personalized features [130].
- Implementing individualization according to this constraint is essential, since otherwise, it could drive users away by creating mistrust [122].

Impact on Creating and Sustaining Healthy Habits

The increasing individualization of products and services influences the health and fitness market, thereby impacting health-related habits in several ways. An ever more increasing granularity of personalization starts from personal training and goes as far as individually tailored programs based on the users' DNA [124], [131]. This change derives from the facts that tailored health education and training are proven to have longer lasting results in forming physical activity habits than generic ones [132], [133]. As a result, the fitness market extends its targeting to more specific groups, including previously change resistant people [134].





WORK-LIFE FLOW

Increasing dissolution of work-life boundaries

Both companies and employees are becoming increasingly more interested in the integration of a work-life flow mindset, where work assimilates with other aspects of everyday life. The work-life boundaries are gradually disintegrating, and employees want to spend more time focusing on their family and private lives as well as doing more sports. Furthermore, modern employees expect their work to be a place to improve their quality of life rather than the source of stress [135]. The workforce is increasingly interested in workplace culture and the facilities the company provides, and less influenced by the salary, when choosing an employer [136]. Simply having a gym in a company building is not enough, however. Adequate engagement programs and creative workspaces are also required to satisfy the modern workforce [136]. The WHO recognizes the promotion of health and sports activities through the workplace as one of the most efficient ways to keep the population healthy [137]. Benefits include a decrease in sick leaves, lower stress levels, better work engagement, and prolonged retention of healthier habits [137], [138].

Facts

- An average person spends 54% of their waking hours and 30% of their lifetime working [139], [140].
- If an organization is actively promoting health and well-being, employees are eight times more likely to feel engaged [141].
- Experts expect mental health disorders, cardiovascular diseases, and increased risks of cancer to become the most common work-related illnesses [142], [143].
- Lost productivity and medical expenses related to work account for 10% of global economic spending [144].

Key Drivers

- The number of companies open to flexible work hours and remote work is increasing [145], [146].
- Improved living standards through technological advances and economic progress put personal well-being in the foreground [147].
- Longer life expectancy contributes to the consideration of non-financial factors when choosing a new workplace [148].
- Insurance companies and employers show greater interest in cutting health care costs through the promotion of health at work [144].

Challenges

- Flexible work hours can cause increased levels of stress, if not managed properly [149].
- Due to increased globalization and urbanization, the amount of time spent commuting is rising and is negatively affecting the modern workforce [150].
- Many workplaces are slow to adapt to the demands of the workforce and fail to provide comprehensive health programs [137].
- There is a lack of unified policies and financial incentive programs on the administrative level that support health promotion in the workspace [151], [152].

Impact on Creating and Sustaining Healthy Habits

The boundaries between work and private life are vanishing. This development allows the workforce to integrate their personal needs into the workday. Active promotion of a healthy lifestyle by the workplace setting builds upon this idea and allows employees to spend more time doing sports. Consequently, the prolonged exposure to health programs contributes to the formation of healthy habits. The employees who work in companies that promote health and well-being are expected to retain this positive attitude towards health and sustain healthy habits also in their private lives.

CONSCIOUS CONSUMPTION

Environmental and societal issues lead to the rise of a socially conscious consumer

Conscious consumption emphasizes the selection of products and services based on the values of sustainability, social justice, or corporate responsibility [153]. Today's consumers choose goods that produce less pollution, are eco-friendly, and ideally not produced from scarce resources. Thus, they decide on products and activities based on the impact these produce on the environment as well as their social sustainability level [154]. Since an increasing number of consumers desires to lead a life of a responsible citizen, one's personal health is becoming a crucial aspect in peoples' lifestyles [154]. In addition, mindful consumption suggests the consideration of how one's activities could affect the welfare and health state of others [153], [155]. Due to the increased media influence and political attentiveness to environmental and workers' rights issues, the concern about responsible consumption is turning into an accepted standard and forming new health habits globally [156].

Facts

- Globally, 43% of respondents have purchased products from socially responsible companies, which is 7% fewer than those who claim to be willing to do so [157].
- 74% of individuals would agree to pay 5% more for clothing, if they had a guarantee that workers receive appropriate wages and work in safe conditions [158].
- While young individuals easily become conscious consumers, more conscious attitudes of older individuals has been arising more rapidly, i.e. from 38% in 2011 to 50% in 2013 [157].
- The number of individuals who stated they would prefer goods from socially responsible companies has been increasing among both males and females as well as between all age groups [157].

Key Drivers

- Environmental and sustainability issues are gaining more awareness globally, making consumers more conscious of their consumption [159].
- Higher education levels are creating greater consumption awareness [160].
- Unethical corporate activities have a negative image in society, thus leading to the rise of a more conscious producer [161].

Challenges

- It is unclear if all who claim to be willing to support socially responsible products will actually do so [157].
- Millennials in developed countries gradually claim to be minimalists and show a reduced desire to buy or own things, which could harm economies as businesses would deal with demand shortage [162].
- There is an uprising negative image of the impact of digital technologies on individuals' ability to stay focused, which results in lower usage of these [163]. This could serve as a barrier to promoting health habits e.g. via mobile apps.
- Though the environmental friendliness of goods is an advantage, other aspects e.g. durability or accessibility need to stay competitive, since consumers are not likely to ignore these [164].

Impact on Creating and Sustaining Healthy Habits

Conscious consumers decide for sustainable and socially responsible products, which often leads to the creation of healthy habits. Due to the awareness of global issues, they are likely to consume organic food or so-called superfoods, limiting their diets to healthy nutrition. Since consciousness highlights increasing awareness of human nutrition, consumers are likely to care about the health state of their bodies and sustain physical exercise in their schedule. In response, companies would provide higher transparency of the product content and promote themselves as socially responsible, thus driving the trend and its healthy impact even further [158].





ELDERLIES IN SPORTS

Increase in lifespans calls for novel forms of sports activities

Society is aging globally, as older people (above 65) are the fastest growing population group. Moreover, people are expected to have longer and healthier lives [165]. As a consequence, the interest in sports activities is growing among people of different ages. This effect is mostly due to the increasing belief that nobody is ever too old to learn and try novel activities [165]. The elderly expect to be included in sports activities, since they recognize an active way of life as a source of greater well-being, lower probability of suffering from diseases and an improvement of mental health. Additionally, through participating in sports activities, they feel more socially integrated [166].

Despite their interests in, and potential benefits of, an active lifestyle, older people often have difficulties finding suitable sports programs. Furthermore, sporting facilities are not meeting the demands of older adults in physical activities [166].

Facts

- The number of individuals over 65 years old is projected to rise from around 520m in 2010 to 1.5bn in 2050 [165].
- The proportion of the older generation in less developed countries is expected to increase by more than 250%, compared with a 71% increase in developed countries until 2050 [165].
- In Germany, 56% of young people participate in sports activities at least once a week. After the age of 35, the rate declines to 26%. It continues to stagnate until rising again to 35% around the age of 65 [167].

Key Drivers

- Life expectancy increased significantly during the 20th century, rising from 50 years in 1900 to 83 years today [165].
- An aging society demands medical services and sporting activities to facilitate healthy and active senior years [135].
- The engagement of older adults in sports activities continues to grow [168].

Challenges

- Novel sports activities need to be enjoyable and motivational for older citizens by providing a friendly and safe environment [166].
- Psychological and physical barriers prevent many older adults from participating in sporting activities [168].
- It is difficult to encourage inactive older people to engage in health activities [169].
- Investments in establishing secure facilities and retraining personnel are essential to incorporate the elderly into the sports programs safely.

Impact on Creating and Sustaining Healthy Habits

People are likely to take up physical activities that fit their life stage, which is described by their health status and lifestyle. Since life stage is a more important factor than the actual age when selecting physical activities, this provides a new framework to target population clusters correspondingly [165]. New sports developments, such as community sports, functional training, and high-intensity interval training, will become widespread among a more diverse target group. Since older adults (above 65) possess a high purchasing power and more free time than younger generations, they can spend these on health.

Moreover, active living reduces the risk of age-related diseases, which will encourage adults to engage in newly transformed sports activities [165]. Thus, sport becomes a community-based movement that unites individuals of different ages.

ACCESS TO DIGITAL TECHNOLOGY

Progressing digitalization of health and fitness sectors due to increasing technology affinity

The number of internet and smartphone users is continually rising [170], [171]. Moreover, leading tech companies are setting up sophisticated infrastructures to bring lower latency and greater bandwidth to its customers [172]. These changes in access to digital technology are revolutionizing the health and fitness sectors, enabling a new experience of healthcare anywhere and anytime. In 2016, millions of American consumers had video consultations, were prescribed health apps, and used their smartphones as diagnostic tools for the first time [106]. Connected otoscopes, activity trackers, scales, health apps, algorithm-based symptom checkers, and on-demand e-visits are offered directly to consumers [106], [173]. In particular, younger generations support this trend. Millennials even prefer virtual communication for health interactions [174]. Apart from changes in the healthcare sector, digitalization opens doors to companies revolutionizing the fitness industry by creating customized, social, and unprecedented workouts for their customers (e.g. Freeletics, eGym). Moreover, the increasing interconnectivity between people all over the globe leads to the blurring of national identities and the emergence of global communities.

Facts

- Around 40% of the world's population has an internet connection today. In 1995, it was less than 1% [175].
- In the U.S., 60% of consumers are willing to have a video visit with a physician through a mobile device [106].
- The percentage of U.S. consumers with at least one medical, health, or fitness app on their mobile devices doubled from 16% to 32% between 2013 and 2015 [176], [177].
- 74% of clinicians say non-traditional venues (e.g. retail clinics) improve access to care [106].

Key Driver

- Technology is constantly improving regarding reliability, costs, and accessibility [106].
- There is a great increase in digital literacy and acceptance of technology among younger generations [106].
- Big tech companies such as Google or Facebook facilitate the access to technology [172].
- Providing face-to-face consulting to each patient is problematic and costly, as the demand for behavioral health care services is steadily increasing [110].

Challenges

- Improving digital literacy among older generations is difficult since they are more skeptical towards digital technologies than younger people [106].
- In many regions of the world, people still lack proper access to the internet [175].
- Due to the constant exposure to an idealized body image in the (social) media, there is an increasing pressure on people to try to adapt to it. These expectations cause stress and appear to be a risk factor in the development of certain mental diseases (e.g. eating disorders) [178], [179].
- Healthcare technologies can not be applied to all population groups, in particular among the elderly, since their acceptance varies [180].

Impact on Creating and Sustaining Healthy Habits

The increasing access to digital technologies enables a global availability of healthcare services [106]. Moreover, it reduces the costs for the healthcare industry and facilitates a better interconnectivity between the industry stakeholders [106]. Internet access provides people with health-related knowledge and enables them to interact with others to exchange this knowledge. Being informed about health-related issues and how to address them is the first step to change habits towards a healthier lifestyle [181]. Apart from the educational aspect, many applications enable users to sustain the acquired habits by increasing long-term motivation (e.g. through gamification).



The background of the slide features a blurred image of a courtroom. On the left, a scale of justice is visible, with its pans hanging from a chain. On the right, a wooden gavel with a gold band is resting on a dark wooden surface. The overall lighting is warm and focused on the central text.

LEGAL & POLITICAL TRENDS

IN CREATING AND SUSTAINING HEALTHY HABITS

**Fostering Preventive Health
Influencing Consumers' Nutrition Choices
Green and Healthy Urban Living
Privacy Concerns and Data Security
Promotion of Sustainable Work**

LEGAL & POLITICAL TRENDS

in Creating and Sustaining Healthy Habits

With demographic change, metabolic diseases, and health-care costs on the rise, governments, companies, and health initiatives increasingly aim to encourage citizens to live a healthier life. Governments and organizations around the globe employ a wide range of political and regulatory tools to influence citizens' health awareness, nutrition choices and exercise habits. They target either the consumer directly or the companies the consumer interacts with.

Politics and law can enable and incentivize citizens to develop healthy habits and prevent corporations from negatively impacting the health of workers and consumers. The provision of information and facilities, for instance in the form of education, food labelling, or green spaces, can equip consumers with the necessary knowledge and environment to continuously readjust their behavior. Incentives provided to consumers and companies, such as individualized insurance schemes and taxation, encourage individuals to make health-conscious choices and companies to invest in corporate wellness programs. Preventive corporate regulation, with the objective to protect workers and consumers, can be found for instance in laws governing working time and data security. Along these lines, five key political and legal trends have been identified.

In healthcare, a stronger focus on disease prevention rather than disease treatment can be observed. Given an increasing evidence base from studies on the effectiveness of preventive interventions, such as health education in schools, policymakers and governments recognize preventive initiatives as a powerful tool to foster the development of healthy habits and counteract rising healthcare costs.

Alongside general prevention programs, a rising amount of regulations and initiatives concerns consumers' nutrition, focusing on food choices and drug abuse. Policies either aim to incentivize consumers extrinsically via taxation or provide them with the necessary information to make better choices.

Political institutions and governments increasingly set up initiatives to bring more green space to urban areas, thereby enabling citizens to engage in physical activities outdoors and providing them with recreational areas to relax and alleviate stress. However, such initiatives primarily benefit citizens who are already physically active and often fail to address people who lack intrinsic motivation to do physical exercise in the first place. To influence habits of change resistant groups, governments initiate programs which aim to engage citizens in more physical activity.

Technological aids aiming to help users adopt and maintain healthy habits are subject to a multitude of regulations. Due to the fast development of new technologies, rules are constantly changing and evolving. Over the past few years, political and judicial bodies have been steadily strengthening laws related to privacy and the protection of user data against abuse and theft.

With work life boundaries blurring, retirement age increasing and new forms of employment emerging, the world of work is changing rapidly. To counter the adverse effects of these developments on the workforce, policymakers increasingly promote sustainable work practices which support workers in engaging and remaining in work throughout an extended working life. Working time as well as spatial and temporal flexibility (e.g. home office, flextime) must be regulated carefully to meet the demands of a workforce on the quest for more autonomy in the workplace.



FOSTERING PREVENTIVE HEALTH

Stronger focus on health promotion and prevention programs

The Ottawa Charter of 1986 marks the foundation for health promotion in public policy, environment, community, health education, and health care services [182]. With increasing evidence from studies on the effectiveness of health promotion and prevention [183], political initiatives progressively targeted the integration of health considerations into policy-making over the past years, aiming to improve population health [184].

Prevention can be differentiated into three stages: Primary prevention refers to preventing diseases, secondary prevention focuses on detecting diseases in their earliest stages, while tertiary prevention is concerned with interventions to reduce the progress of diseases [185].

The World Health Organization (WHO), the European Union (EU) and individual countries increasingly recognize the significance of health promotion and prevention in all its stages – for both public health as well as the reduction of health care costs [182]. The EU alone agreed to spend 500m EUR on developing a healthcare program until 2020 to foster preventive health [186].

Facts

- About 9% of the annual health care spending in the United States (U.S.) is attributed to smoking [187].
- Healthy nutrition contributes to the prevention of cardiovascular and metabolic diseases [188].
- Medical spending increases with the prevalence of metabolic diseases such as obesity [189] and its concomitant diseases [190].

- An increasing amount of governmental initiatives promote health education and literacy [191].
- Governmental programs promote health education in school environments with a substantial effect on the reduction of healthcare costs [191]–[193].

Key Drivers

- Non-infectious diseases and an aging society are key drivers of medical costs in the EU [194].
- Preventive interventions targeting children have the highest potential to be both health-beneficial as well as cost-effective [183].
- New interventions focus on broader segments of society such as socioeconomic factors because of their higher effectiveness and reach [195].
- Chronic diseases emerge as major drivers of health care costs in industrialized countries [196].

Challenges

- While some preventive interventions will be cost-saving, others may generate additional costs [183].
- Countries' public health budgets are constrained [197].
- Studies suggest that only about 50% of patients are willing to participate in lifestyle intervention programs [198].

Impact on Creating and Sustaining Healthy Habits

Health promotion and prevention have an enormous influence on public health. Established programs show the possibility of a significant reduction of the incidence and prevalence of tobacco smoking during the last decades and fewer alcohol intoxications within younger people aged 14 to 17 years [199]. Furthermore, prevention could reduce cardiovascular diseases significantly [191] and result in an increase in quality-adjusted life years concerning obesity [200]. Thus, preventive interventions lead to overall health benefits and economic value [196]. When implemented at an early stage, primary prevention leads to a greater impact on health [196] and will therefore shape future decisions in public health policy.

INFLUENCING CONSUMERS' NUTRITION CHOICES

Rising amount of regulations concerning the healthiness of food and drug environments

Over the past years, there has been an increasing effort by political stakeholders to guide the population towards a healthier diet and a more responsible use of drugs [201]. The new regulations particularly address the steady increase of deaths caused by non-infectious diseases that are significantly aggravated by obesity, as well as alcohol and tobacco abuse. The government aims to tackle these diseases in order to increase the overall living standard of the population and save on healthcare costs [202]. There are two main movements within regulation that cover consumers' nutrition choices: The policies either aim to incentivize consumers extrinsically via taxation [203] or provide them with all necessary information, thereby enabling them to choose the healthier option based on intrinsic reasons [204]. The latter is asserted by forcing producers to disclose correct and relevant product information. That is, regulations here either enforce the labelling of foodstuffs with nutritional information or restrict the advertisement of unhealthy products, particularly towards children [5].

Facts

- The EU introduced stricter regulations on labelling, presentation, and advertising of foodstuffs in December 2014 [206].
- The U.S. has not only developed labelling regulations for groceries, but is also currently introducing calorie indication in restaurant menus [207].

- Packaging of tobacco products with photographs displaying potential negative health consequences were first introduced in Australia in 2012 [208], with many countries later following suit, e.g. Germany in 2016 and France in 2017 [209].
- Mexico implemented a tax that increased the price of sugar-sweetened beverages by 9% in January 2014, aiming to tackle the country's growing obesity issue [210].

Key Drivers

- Non-infectious diseases that are highly influenced by dietary risk factors get more and more prevalent [211].
- The lack of transparency on nutrition markets forces the government to protect citizens by offsetting information asymmetry [212].
- Rising globalization demands international standards of initiatives, laws, and regulations [213].
- Commercial food marketing highly influences consumers' buying behaviors and focuses on products high in fats, sugars, and salt [214].

Challenges

- Interventions in a liberal market structure cause conflicts with big players in food, tobacco, alcohol, and media industries [215].
- The steadily widening scope and increasing speed of global food trade forces regulations to be adapted repeatedly [198].
- Implementing and aligning supranational and national regulations can be difficult [215].
- Extrinsic influence on consumer nutrition negatively affects personal autonomy and freedom of choice [216].

Impact on Creating and Sustaining Healthy Habits

Evidence has shown that the above mentioned governmental regulations in fact not only guide consumers towards making healthier nutrition choices, but also towards refraining from alcohol and drug abuse [217], [218]. This effect can be attributed to a rise in health awareness as well as level of education among the population [219]. When put into a broader context, the regulations primarily aim at changing the eating behaviors of the consumers. These behaviors might accordingly have a positive impact on physical activity, mindfulness and therefore the overall state of health.





GREEN AND HEALTHY URBAN LIVING

Rising number of initiatives enable physical activities through building urban green space

Urbanization drives more and more people into densely populated cities and allows them to enjoy a vast cultural variety (Societal Trends, p. 19). However, cities also entail limited room for green spaces [220], [221], high levels of air pollution [222], and heightened levels of stress (Societal Trends, p. 19). These factors negatively affect the quality of life by limiting the opportunities for outdoor activities [223] and lowering the mental health level [224]. To mitigate this negative impact, many initiatives aim to build green urban infrastructures [221], [225], such as urban parks and greened streets. These infrastructures not only benefit the citizens' mental health [224], but they also enable and encourage physical activities [223], [226], [227]. In addition to these efforts in the past and the present, future city planning also incorporates principles to embed green infrastructure and to create a pleasant urban climate [228]. Besides these environmental factors, many cities adapt their infrastructure for a better and safer cycling experience [229] – [231] and increasingly initiate programs to incentivize their citizens to do more physical activity [232] – [235].

Facts

- Singapore's green spaces promote not only the image of the country as "City in the Garden" but also secure the health of its population [236].
- The U.S. and China discovered innovative ways to establish urban green spaces in the form of greened bridges through urban regions [220].
- Recreational areas [237], [238] and public fitness equipment [239] foster health and lead to stress relief [240].
- The availability of urban parks has a positive impact on the time spent on physical activity [241], [242].

Legal and Political Trends

- Various initiatives encourage citizens to do more physical activities [234], targeting both commuting [243], [244] and leisure time [232], [233].

Key Drivers

- The ongoing trend of urbanization drives the importance of healthy urban environments (Societal Trends, p. 19).
- Society is moving towards a conscious lifestyle, regarding physical activity [245], [246], and needs the proper means to do so.
- Both the public interest and research on positive effects of healthy urban planning steadily increases [238].
- Global initiatives raise awareness for environmental sustainability, thus driving the sub-trend of building green cities [247].
- Governments recognize a trend towards a non-active society, which led to a rising spread of chronic diseases, such as diabetes and obesity [189].

Challenges

- The increasing population density in urban core areas and the accompanying shortage of housing does not allow for wide-ranging green space [221].
- Rising carbon emissions and deteriorating air quality in urban areas inhibit the willingness for and healthiness of outdoor physical activity [222], [223].
- Green space initiatives increase housing costs and property values in nearby regions, thereby making green space a luxury reserved for the upper class [220].
- Providing citizens with a proper infrastructure for a healthier lifestyle is only the enabler but does not evoke change in itself.

Impact on Creating and Sustaining Healthy Habits

Green space initiatives not only have the power to improve citizens' mental health by re-connecting them with nature [248] and providing means to alleviate stress [240]. They also encourage more physical activity among citizens [237], [249] and provide the necessary environment to make outside activities joyful. This joy enables the transition from a one-time physical activity to a long-term habit. However, there might also be citizens for whom green space on its own is insufficient as an incentive for physical activity. To address this target group, additional incentive programs provide an impulse to start healthy habits and thereby overcome the resistance to change [233], [235].

PRIVACY CONCERNS AND DATA SECURITY

Stricter regulations on privacy protection and data security

Concerns about privacy and data security are key obstacles in the adoption of modern technology in health-related sectors [250] and significantly impact the willingness of consumers to use the services in question [251], [252]. With “Big Data” on the rise (Technology Trends, p. 15) and more and more everyday objects being equipped with sensors and computational abilities (Technology Trends, p. 12), privacy laws have shifted into the focus of regulators. User concern about privacy remains high [251], and regulatory agencies are steadily tightening laws and rules regulating the processing of user data. This development is most prominent within the EU, but other countries, such as the U.S., are following suit.

Facts

- The General Data Protection Regulation will significantly increase penalties for non-compliance across the entire EU to up to 4% of annual global turnover in 2018 [253].
- International agreements force organizations in other countries to adopt stricter rules [254], despite significant differences between countries [255].
- Stricter local regulations cause international agreements to become outdated, and force them to be strengthened to remain compatible with local laws [254], [256].
- The Federal Trade Commission (FTC) is slowly but steadily updating U.S. privacy regulations, and enforces privacy policies on behalf of consumers [257], [258].
- New regulations mandate the protection of acquired data against intrusion [253], [257], [259] and the notification of customers affected by breaches [260], [261].

Key Drivers

- Users are uneasy about the collection of their data. In Europe, 72% of internet users say they are “concerned” [251].
- Users wish to have complete control over the information they provide. 67% of European internet users feel they should be in charge of their data [262].
- Distrust in companies causes an aversion to sharing data—only 22% of Europeans trust internet companies with their data [263].
- Regulators are pressured to respond to recent technological developments such as Big Data and Pervasive Computing, which have increased both the amount of data collected and processed, and the value drawn from it [253].

Challenges

- The FTC and U.S. privacy law are often seen as inefficient and toothless due to limited resources and the low fines imposed in relation to the violator’s profits [257].
- Effective privacy protection and compliance with standards comes with high costs, especially for start-ups and small businesses (222 USD per employee for large U.S. companies according to a 2011 industry report [264], with significantly higher costs expected for smaller companies and compliance with the stricter EU regulations).
- Scientific research may be impeded by further restrictions on the use of data, despite some regulations providing specific exemptions [253].

Impact on Creating and Sustaining Healthy Habits

Respect for user privacy and choice is important to potential users, especially when data is personally identifiable or health-related [252], [263]. Inversely, stringent privacy protection leads to user trust [252], [263]. Overall, protection of user privacy therefore increases the users’ readiness to adopt and trust in technological aids to help establish healthy habits. For companies offering these services, compliance is imperative; penalties for violating privacy regulations can be devastating [253], [264].



PROMOTION OF SUSTAINABLE WORK

Growing political and regulatory effort to improve workers' health and well-being

The world of work is changing. Boundaries between work and life are blurring, retirement age is increasing and new forms of work such as employee and job sharing, crowd sourcing, and machine augmented intelligence are emerging [265], [266]. To counter the adverse effects of these developments on the workforce, policymakers increasingly promote the concept of sustainable work which provides workers with living and working conditions that support them in engaging and remaining in work throughout an extended working life [151]. In order to maintain and promote the health and well-being of workers, policymakers utilize a wide range of regulatory and political tools (e.g. legislation, social protection systems, public services, incentives for companies, training, and information networks or campaigns), specifically focusing on job quality (i.e. the physical and social working environment as well as autonomy on the job) and working time (i.e. duration and flexibility) [151].

Facts

- In Germany “Initiative New Quality of Work” (INQA) and “Work 4.0” were initiated in 2002 and 2015, respectively, to stimulate the social dialogue and support projects that enhance the engagement, competence, and health of employees [151], [267].
- As a major component of the “Europe 2020 Strategy” the “Occupational Safety and Health (OSH) Strategic Framework 2014-2020” was set up to prevent work-related diseases, tackle the problem of Europe’s ageing workforce, and better coordinate existing health and safety rules [268].

- Under the United States “Patient Protection and Affordable Care Act” of 2010 companies are financially incentivized to introduce wellness programs [269], [270].

Key Drivers

- Demand for more workplace flexibility from employers and employees, especially from Generation Y, increases the pressure on governments to react to blurring work-life boundaries (Societal Trends, p. 22).
- Weak economic growth since the financial crisis, demographic change, and the prevalence of non-infectious diseases force policymakers to address the growing strain on healthcare and social systems [151], [271], [272].
- Measures that promote sustainable work boost the productivity of workers and thereby positively impact the economy [271], [272].

Challenges

- Policy gaps and contradictions caused by a lack of common definitions, guidelines, and recommendations increase the need for comprehensive frameworks across various institutions and countries [151].
- Accounting for the individual professional and personal background of employees and understanding the combined effect of policy measures remains challenging [151].
- Despite growing awareness, funding of agencies supervising compliance in the OSH field has fallen since the financial crisis (e.g. in Germany, Netherlands, Greece, and the United Kingdom) [151].
- Multiple attempts to revise the German and EU working time regulation in recent years have failed [151], [273], [274].

Impact on Creating and Sustaining Healthy Habits

Despite the ever-growing number of company and government initiatives in support of sustainable work (Economic Trends, p. 41), regulation is only changing slowly to fit the requirements of a more mobile and flexible workforce [151], [273], [274]. This has positive and negative effects on the formation of healthy habits. While increased flexibility of working time regimes would be well-received, especially among members of Generation Y, who look for more engagement and autonomy in the workplace [151], a higher variability in working time has also been linked to the development of psychosocial stress and cardiovascular diseases [149], [275].



ECONOMIC TRENDS

IN CREATING AND SUSTAINING HEALTHY HABITS

- Worldwide Rise in Personal Incomes
- Increasing Global Internet Access
- Increasing Trade of Health Data
- Changing Health Insurance Market
- Shift in Food Consumption Patterns
- Increasing Demand for Fitness Products
- Rising Focus on Employees' Needs

ECONOMIC TRENDS

in Creating and Sustaining Healthy Habits

On a large scale, economic interests and trends impact the way individuals live their lives. The following section focuses on economic trends that have an impact on the creation and sustainability of healthy habits in the upcoming years. The identified seven economic trends can be divided into three key areas: macroeconomics, industries, and workplace.

From a macroeconomic perspective, there is a positive correlation between income and healthy habits. The current rise in personal income enables people to live a healthier lifestyle, as they can afford more health-related products. This results in higher life expectancies and lower self-reported unhappiness. People in higher income groups tend to more actively sustain their health. Further, the percentage of the world population with access to internet is steadily increasing. This is partly driven by the large adoption of broadband-enabled smartphones. Global governing bodies are supported by private companies to connect unconnected parts of the world. In combination with decreasing overall price levels, this means that the rate of new internet adoption will accelerate.

Additionally, recent developments in digital technologies are transforming and disrupting markets. The increasing use of fitness wearables means that more fitness data is collected. This data, along with health records such as pharmacy purchases, is often available to be obtained on the market. More fitness data enables companies to adopt and personalize their product and marketing efforts. Furthermore, data regarding the movement patterns of individuals can help improve city planning.

Recent technological developments are also leading to a transformation of the health insurance industry. Non-traditional firms enter the insurance market and foster competition. Consequently, insurers focus more on their customers. Particularly, Generation Y expects the insurers to get in touch with them on a regular basis and to offer more engaging products.

Further relevant to create and sustain healthy habits are the food and fitness industries. A consumption shift towards

healthier food is observable in the global food market, which is driven by a continuous increase in health consciousness of consumers. Food and beverage companies are responding by offering a larger portfolio of healthy food and increasingly positioning themselves in connection with sports to acquire new consumers. A quickly growing sports nutrition and fitness market complement this trend. Fitness companies are addressing the growing need for an active lifestyle by offering a wide range of products in the fields of training, lifestyle, health, and wellness. Thereby, customers often become highly engaged.

Finally, at the workplace, interest in employee wellbeing is becoming more central. The primary goals of these programs are to increase employee retention and satisfaction, reduce absence, and consequently improve productivity. This trend is mainly driven by dissolving work-life boundaries.

WORLDWIDE RISE IN PERSONAL INCOMES

Peoples' health heavily depends on their financial status

Along with the world economy, there is a continuous rise in peoples' personal incomes over the past years [276], [277]. This is due to mutually re-enforcing factors such as increasing access to education and technology [278], [279]. Personal health and healthy habits are closely linked to income levels. Studies have shown that a rise in income leads to better health and that reverse causality can be neglected [280], [281].

An income increase enables people to live a healthier lifestyle as they can afford health-related products including better food, access to sports activities, and healthcare. Additionally, especially in some countries people with a higher income tend to be surrounded by health supporting infrastructure such as schools as well as hospitals and actively do more to sustain their health [282]. This results in a higher life expectancy and lower self-reported unhappiness [280], [281]. Obesity rates and chronic disease rates are rising quickly [282]. This is due to increasing inequality [283] as well as urbanization (Societal Trends, p. 19) and leads to increasing cost for the public sector. Therefore, society needs to create a level of awareness among consumers to trigger healthier active choices in daily life.

Facts

- From 2010 to 2015 the global GDP per capita has risen by a total of 10% [284] – [286].
- Compared to unhealthier nutrition options, healthier diet-patterns cost 1.54 USD more per 2,000 kcal [287].

- Life expectancy heavily depends on personal income. For instance, in the U.S., life expectancy differs by up to six years between different income levels [281].
- People with lower income tend to have less healthy habits. They smoke three times more and meet the recommended level of aerobic exercise 25% less often [281].

Key Drivers

- Rising global education levels lead to higher income levels [288]–[290].
- Digital technologies enable people to get cheaper and easier access to education [279], [291].
- Globalization triggers not only higher incomes of states, but also of individuals [292].
- With better health, people have less sick days. Thus, they are more valuable for the company, which will eventually have a positive impact on personal income [293].

Challenges

- Overall healthcare costs continue to rise [294], [295].
- Rising inequality leads to selective health benefits for the already privileged [283].
- The prevalence of chronic diseases grows strongly due to rising levels of obesity, also increasingly in developing countries [282].
- Most education systems do not sufficiently inform people about healthy lifestyle decisions.

Impact on Creating and Sustaining Healthy Habits

Rising global incomes have a positive impact on people's health. People with more money at their disposal have access to better education, nutrition, and healthcare, and actively do more to live a healthy lifestyle. Consequently, people with higher incomes report less negative feelings such as sadness, hopelessness, and worthlessness as well as decreasingly self-report on poor health [281], [286], [293].

However, the relationship between income and health shows a diminishing marginal utility. An increase in income for someone in a lower income group would have a larger positive effect on health, than an equal increase would have for a wealthier person [280].



INCREASING GLOBAL INTERNET ACCESS

Political and private players continuously make the internet more accessible

The number of people enjoying the mobility and freedom of easy access to information is increasing at a global scale. The percentage of the global population that uses the internet is continuously rising and every year more people gain access [170], [171], [296]. With investments in infrastructure and political focus, internet access is also continuously getting cheaper [170], [171]. The ownership of mobile phones is rapidly expanding, further increasing flexibility [291], [170], [296]. The number of those mobile phones being broadband enabled is just short of 50% and increasing [171]. This trend holds true dating back several years [170], [291], [171]. However, with new key players on the market, the rate of unconnected parts of the world becoming connected, may speed up. Besides global organs including the UN and World Bank Group, players such as Facebook and Google are now joining the mission to connect as many people as possible and as fast as possible to the internet [171], [297], [298].

Facts

- The percentage of the total world population using the internet increases by roughly three percentage points every year, reaching 47% in 2016 [171].
- Mobile broadband penetration is at 40.9% globally in 2017 [171].
- In developed countries, a monthly fixed broadband package costs 1.7% of the average income in 2017. For mobile broadband, the cost equals 1% to 2%. The numbers for developing countries are 31%, and 11% to 25%, respectively [171].

Key Drivers

- UN, the World Bank, and additional global organs push for an increased share of the global population connected to the internet [171], [291], [299].
- Lowering the cost of internet access is considered a key target by those same organizations [171], [291], [299].
- Private companies such as Facebook and Google are helping in the effort to connect previously unconnected parts of the world to the internet [171], [297], [298].

Challenges

- There is still a relatively large part of the population without internet access, particularly in developing countries [170], [291], [296].
- Developing countries experience a slower pace in improvement of internet infrastructure and broadband speeds [170].
- Vested business interest could lead to harmful concentration and infringe on net neutrality [291], [300].
- More information makes it difficult for the user to identify what information is reliable. With access to more information, one also has access to more misleading information [301].

Impact on Creating and Sustaining Healthy Habits

Gaining access to the internet is a door opener to the world of easily accessible information. Affordable, fast internet is essential to gather information in order to establish a healthy life [301], [302]. There are various facets to this: First, research shows that the internet is a key source for individuals to gain knowledge on illnesses and diseases [302]. It is also a tool to access information regarding healthcare providers and to compare and judge different providers [301], [302]. Additionally, the internet is an important access point to get knowledge that helps to create healthy habits in everyday life. [301], [302].

INCREASING TRADE OF HEALTH DATA

Increasing usage of fitness wearables feeds the health data trade

On the open market, more data regarding the health and fitness of the population is available. First, the global purchase of fitness wearables is rapidly increasing, and the trend is likely to continue [303]. These wearables produce data ranging from heartrate to workout frequency and locations. This data is helpful for companies in order to improve their product design and marketing. However, it is also available to third parties on the open market [304], [305]. Moreover, some markets offer digital health data for sale such as pharmacy records [304]. On an aggregated level, this increasing amount of data is a key driving force for the healthcare analytics market, which will grow substantially in the coming years [306]. The availability of data further leads to implications for different stakeholders ranging from marketers to city planners, who may make use of this kind of data in their respective fields [307] – [309].

Facts

- The market for basic wearables is experiencing annual double digit growth and is projected to hit 14.9bn USD by 2021 [303], [310], [311].
- In 2013, the top 20 fitness apps, including MapMyFitness and WebMD, were in total transmitting data to up to 70 different third party companies [305].
- Today, three out of four U.S. retail pharmacies provide data to QuintilesIMS which is the biggest American health data aggregator [304].
- The healthcare analytics market is expected to grow substantially from 7.39bn USD in 2016 to roughly 25bn USD in 2021, representing a CAGR of 27.1% [306].

Key Drivers

- There is an increase in the acceptance and adoption rates of digital technologies in everyday life .
- Amongst healthcare executives, 89% believe that big data analytics will be the key to market shares in the coming future [312].
- A recent survey concludes that 63% of insurers believe that adoption of wearable technologies will significantly impact their industry [313].

Challenges

- Incomplete and outdated legislation regarding the usage of personal health data could lead to abuse of sensitive data and trust-issues among the public [314].
- Lacking security measures leave data from fitness trackers vulnerable to hacking [315], [316].
- With modern data mining, aggregated and supposedly anonymous data can be linked to specific individuals, and thus undermine the idea of anonymous data [304].

Impact on Creating and Sustaining Healthy Habits

Large health related datasets improve predictions of illnesses and lead to a better understanding of habits and health implications [317], [318]. Moreover, datasets from basic fitness wearables give companies insights into how people move and consume, thereby providing the opportunity to adapt and improve products [307]. Additionally, city planners buy aggregated movement- and workout-data of individuals with the aim of improving, for example, running paths and parks [308], [309], [319]. Finally, health data leads to more accurately targeted marketing and sales activities, potentially improving the utility of marketed products and services [307].



CHANGING HEALTH INSURANCE MARKET

Growing markets, new market entrants, and a rising focus on customer experience

A lot of financially strong, non-traditional firms establish partnerships and enter the insurance market which leads to an increase in competition and forces insurance companies to become more customer-oriented [320]. For instance, Google and Walmart have been providing car insurances since 2014 and want to offer health insurance [321]. Furthermore, IKEA already sells health insurance for children and pregnant women. The furniture company has rolled out trial products at selected stores and plans to target 2.5m members of its loyalty club in Sweden [322]. These new market entrants make use of new technologies and thereby disrupt the connection between insurers and customers [323]. Today, insurers need to provide more engaging products, adapt to their customers' needs and get in touch with them regularly. For example, Generation Y customers interact 2.5 times more with their insurer on social media compared to older customers [324]. Traditional insurers still underestimate the potential of new technologies, while non-traditional firms already use these technologies for better customer interaction [325]. The resulting development of individualized consumer products and services will lead to an improved customer experience [320], [326].

Facts

- In 2015, the global health insurance market reached 4.55tn USD and is forecasted to grow at a CAGR of 11% between 2016 and 2020 [327], [328].
- Globally, the share of customers having positive experiences with their health insurers decreased from 47% to 34% for Generation Y compared to all customers [324].
- In comparison to older customers, Generation Y is more likely to purchase insurance products from technology

firms. In the emerging markets, this trend is even stronger [324].

- 643,000 Americans go bankrupt every year due to medical bills. Almost 80% of these people had health insurance and went bankrupt because of co-payments, deductibles, and uncovered services [329].

Key Driver

- Health insurance companies try to further reduce information asymmetry as insurers cannot exactly determine the health condition of customers yet [330].
- The emergence of wearable technology and their rising adoption enables insurers to develop new customized products [331].
- Non-traditional companies leverage their data mining power and their capital to enter the health insurance market [332].
- A higher life expectancy leads to a growing demand for health insurances [333], [334].

Challenges

- Insurance companies are not allowed to discriminate customers who are not willing to adopt new products [335].
- Non-traditional firms may experience difficulties in bringing new products to market due to strict regulations in the insurance industry [336], [337].
- The uncertain global economy can greatly impact the insurance business, as insurance companies' business models are based on investing premium payments [338].
- An increasing number of health insurance suppliers and a growing number of product offerings make it more difficult for customers to find the appropriate product [339].

Impact on Creating and Sustaining Healthy Habits

With the emergence of non-traditional firms in the health insurance market, there is a rising level of competition which forces insurers to focus more on their customers [340]. Particularly, Generation Y customers inform themselves about insurance products online and want to connect with insurers on a regular basis. Insurers have to address their new customers' needs with customized products, better value propositions, and services to foster customer experience. Due to a shift in insurers' behaviors, customers become more health aware and increasingly adopt healthy habits in order to save personal costs [324].

SHIFT IN FOOD CONSUMPTION PATTERNS

Global consumption shift towards more fresh and healthy food

The global food industry is continually changing, as food suppliers adjust to meet the needs of consumers [341]. The biggest overarching trend relevant to creating and sustaining healthy habits is a shift from unhealthy fatty and sugary food to fresh and healthy food [342]. Growing consumer expenditure on these types of products affirm this trend [343], [344]. Food and beverage companies reformulate their products to reduce sugar and fat contents and introduce desirable attributes, such as plant based food, fiber, and protein [342]. A strongly growing global sports nutrition market further intensifies this transition to healthier food [345], [346]. This market mainly consists of supplements and protein based products. Traditionally, these were consumed only by athletes. However, with the increasing awareness about sports nutrition products, the demand is rising among non-traditional consumers who are seeking a healthier lifestyle. Traditional food companies answer to this development and position their products in a sports-related context [347]. This market positioning approach is called sportification. Furthermore, the rise of digital technologies has enabled consumers to do their own research on food and has thus led to diverse consumer beliefs [347]. As a result, the market becomes more fragmented and is responding by offering more personalized food products [347].

Facts

- The global sports nutrition market is projected to grow from 28bn USD in 2015 to more than 50bn USD in 2022 with a CAGR of 8% until 2020 [348].
- Foods with natural ingredients are regarded as highly relevant to purchasing decisions for 43% of global respondents [342].

- The number of new global food and beverage launches increased with a CAGR of 72% for environmentally friendly products and 45% for animal welfare products from 2011 to 2016 [349].

Key Drivers

- An increase in the population's health consciousness is driving the shift towards healthier food products [350].
- The growth of the fitness industry has fueled an increasing demand of sports nutrition and healthy food in general [351].
- Increased internet usage allows consumers to do their own research on food. This leads to diverse consumer beliefs, in turn causing a higher market fragmentation [347].

Challenges

- The willingness to pay a premium for healthy products declines with increasing consumer age [342].
- Companies need to consider the big spread in consumer beliefs about the true meaning of healthy food.
- The possibility of differentiation becomes more difficult for organizations with an increasing number of niche companies.
- Changes in food consumption behavior due to a rising awareness about sugar as an unhealthy nutrient are difficult to predict.

Impact on Creating and Sustaining Healthy Habits

A market shift towards healthier food has positive implications for the health of people. Consumers different beliefs on what constitutes healthy food is becoming a defining force for the food and beverage industries' strategy [347]. More healthy product offerings and the trend of sportification reduce barriers for people to create and sustain healthy habits. Despite rising spendings on healthy food, it needs to be critically assessed if people with low intrinsic motivation to live a healthy lifestyle must be addressed differently. Here, personalized nutrition presents a strong tool to support peoples' healthy habits [347].





INCREASING DEMAND FOR FITNESS PRODUCTS

Growing market for fitness clubs, applications, wearables, and fitness food

A high-pressure lifestyle and rising level of stress lead to a growing health awareness and need for an active lifestyle. The demand for health and fitness clubs is increasing and there is a simultaneous rise in demand for wireless technology devices and fitness foods [352].

While health and fitness clubs did not focus on specific segments for years, product differentiation is increasing in the fields of training, lifestyle, health, and wellness [353]. Therefore, fitness companies better address individual customer needs.

Current fitness trends include wearable technology, training with professionals, and high intensity training [354]. In response to these developments, revenues in the field of fitness applications and wearables are rising. These two product segments are forecasted to reach global revenues of 8.6bn EUR in 2021. The U.S., China, and India will become the biggest markets in this respect [355].

Facts

- In 2015, the global fitness and health club market generated over 80bn USD in revenue [355].
- Worldwide, more than 150m people have a membership at a health or fitness club [355].
- The primary reason for 90% of people aged 66 years or older, who go to the gym, is to stay healthy [353].
- The global wearable tech industry is expected to triple from 2015 to 2019 with nearly 250m devices to be sold in 2019 [356].

Key Drivers

- The fast development of technologies leads to more specialized product offerings [357].
- The global population is getting more health conscious [350].
- An overall rise in global GDP per capita and the trend of people moving to cities is driving the increasing percentage of population who exercises or does sport [357].

Challenges

- Customers require guidance regarding which product offerings suit them best [358].
- The price of a membership is the main criterion as to why people do not join a health or fitness club [353].
- The growth in fitness and health clubs leads to an increasing need of skilled staff in order to maintain quality in training support and to avoid risk of health damages [359].
- Rising healthcare costs and additional fitness club membership fees can be a tradeoff for some consumers who do not have an income high enough to cover both expenses.

Impact on Creating and Sustaining Healthy Habits

Due to an increasing level of stress and rising health awareness, the demand for fitness clubs, applications, and fitness food increases and people become more health aware. The rising number of new players in the fitness industry leads to lower fitness membership fees and thus, attracts more customers [357]. Additionally, customers can choose from a wide range of products that address their personal health issues [353]. With the increase and differentiation of products, fitness and health clubs have the opportunity to better address customers' individual needs, which in turn will lead to a higher level of motivation.

RISING FOCUS ON EMPLOYEES' NEEDS

Flexible work and other work-life initiatives affect employees' productivity and companies' bottom line

Generation Y and the following generations are bringing a new set of values into the workplace [360] (Societal Trends, p. 22). These new employees are demanding more flexibility within the work environment [361], [362]. They are also less willing to sacrifice their personal life and health for work-related activities, when compared to previous generations [360]. Furthermore, they are changing jobs at a higher rate [363]. With the goal of retaining them, companies are focusing more on employees' needs [362]. Organizations are implementing more initiatives such as flexible work schedules, wellness programs, and on-site day care in order to better accommodate the employees' desire to better balance work and personal goals [362], [364].

By offering today's workers more engaging jobs, the companies' bottom line and their innovation output improve. Additionally, implementing work-life initiatives and other policies that promote flexibility within the organization, contribute to better health as well as performance and more commitment from employees [364], [365]. Companies therefore benefit from savings in the form of increased productivity due to less absenteeism, more engagement, and less insurance premiums due to better health [366], [367]. Companies that adapt benefits and business practices to their employees' needs are also more likely to attract and retain a better workforce [362].

Facts

- 55% of employers offer some type of work-life initiative [368], [369].
- For every US dollar a company invests in wellness programs, medical costs fall by approximately 3.27 USD and absenteeism costs fall by approximately 2.73 USD [272].
- Flexible workers report higher levels of job satisfaction, organizational commitment, job quality, and therefore also job retention [360], [370].
- Lack of job engagement cost 300bn USD a year in lost productivity in the U.S. already in 2005 [367].

Key Drivers

- Employees of Generation Y have a high drop-out rate, which is forcing employers to put higher emphasis on job satisfaction and employee commitment [371].
- Employees' demands of the workplace change and work-life boundaries dissolve (Societal Trends, p. 22).
- Healthcare costs for companies caused by lifestyle-induced chronic diseases are rising [372].
- New technologies increase productivity and reduce overhead and fixed costs, such as people and property [373].

Challenges

- Managers are not always in favor of flexibility and need to learn how to manage a flexible team [14].
- The needs of Generation Y differ from the needs of older employees [361], [364], [374].
- Reduced face-to-face contact due to a flexible work set-up might lead to perceived disadvantages in performance reviews and development opportunities [370].
- Less synergies might occur because of reduced interaction of coworkers [375].

Impact on Creating and Sustaining Healthy Habits

Due to an increasing level of stress and rising health awareness, the demand for fitness clubs, applications, and fitness food increases and people become more health aware. The rising number of new players in the fitness industry leads to lower fitness membership fees and thus, attracts more customers [357]. Additionally, customers can choose from a wide range of products that address their personal health issues [353]. With the increase and differentiation of products, fitness and health clubs have the opportunity to better address customers' individual needs, which in turn will lead to a higher level of motivation.



BUSINESS MODEL TRENDS

IN CREATING AND SUSTAINING HEALTHY HABITS

Incentive Systems
Economy of Convenience
Automated Personalization
Platform Economy
Digitized Communities

BUSINESS MODEL TRENDS

in Creating and Sustaining Healthy Habits

A business model is comparable to the plans of an architect. Similar to architects, business creators need to carefully choose and combine certain components to create a stable construct. When setting up a new venture, the management needs to evaluate the following aspects: the value proposition, key partners, key activities, key resources, customers segments and relationships, distribution channels, cost structure, and revenue streams [377].

The subsequent section covers five carefully chosen business model trends that can create and sustain healthy habits. A specially designed framework that made a distinction between extrinsic and intrinsic motivators to pursue healthy habits yielded the selected models. Extrinsic motivators help to trigger healthy behavior in change-resistant individuals, but might not succeed in creating long-term intrinsic motivation. Consequently, there is a need for business models that intrinsically motivate individuals to establish long-term behavioral changes.

First, Incentive Systems try to act as an initial extrinsic trigger to form healthy habits. Healthcare companies do not

only focus on treatment anymore, but also on promoting preventative measures, as they can significantly reduce costs. Providing conditional incentives, such as exclusive offers and services (e.g. gift cards and premium deductions) for regular exercise as well as access to certain services for free (e.g. gym memberships), encourages healthy habits.

Second, the Economy of Convenience leverages a significant change in customer behavior due to the rise of millennial consumers. Business models in this segment lower the barriers to a healthy lifestyle by making clean nutrition and sports easily accessible to young professionals with a full schedule. Thereby, these models are fostering intrinsic motivation, as they fulfill the consumer's desire to integrate sports and a healthy diet into an increasingly blended work-life setting.

Third, Personalized Services are gaining in presence and are shifting from traditional to automated services. Both the rising demand for individualization and the growing cost-saving potential have fueled this trend. Advances in technology enable this change in cost structure. Big data and predictive analysis automate the process of personalization, which leads

to higher scaling and lower costs. Individualizing healthy activities makes them more challenging and effective, thus creating intrinsic motivation.

Fourth, the Platform Economy redefines the way corporates create value and pursue financial success. In this context, executives move away from the traditional organic growth strategy towards engaging in open collaborations with organizations, partners, and competitors in so called business ecosystems. Such collective initiatives will help foster a better understanding of the problems of unhealthy nutrition as well as physical inactivity and how to counteract them.

Fifth, the rise of Digitized Communities opens up new business opportunities and has a sustainable impact on the healthy habits of individuals, by motivating them intrinsically. These community-based models change the way individuals design and arrange their physical activities using social platforms. By providing their users with the tools to share their progress or even exercise together, for example, these community-based models will play a considerable role in the future of health.



INCENTIVE SYSTEMS

Cost reduction by incentivizing customers to form healthy habits

Within the framework of incentive-based business models, healthcare companies not only focus on treatment. They also emphasize the promotion of preventive measures, the development of healthy habits, and reinforcing the long-term motivation to sustain them [378].

By providing incentives, such as exclusive offers and services (e.g. gift cards, premium deductions, and discounts) in reward for regular exercise routines and healthy diets, health insurances fuel the customers' extrinsic motivation for an active lifestyle [379].

Incentive-based business models are particularly lucrative, as they help to target change-resistant customers. Having free access to otherwise expensive sports activities (e.g. gym memberships), in combination with incentives is very attractive for individuals [380], [381].

This not only increases the customer's satisfaction and stimulates healthy habits, but also benefits the company, as it reduces treatment costs in the long run [382].

In the increasingly digital and connected world, the rising popularity of wearables and fitness applications further strengthens the benefits of incentive-based models. Such technologies allow users to easily track their progress and enable insurance companies to provide highly personalized and performance-oriented incentives, also called conditional incentives [383]. These conditional incentives are necessary to have a long term impact on motivation [384].

Facts

- The percentage of individuals exercising more than 3 times a week has increased from 27% to 52% within 3 months due to incentive systems [385].
- Welltok and Oscar Health, for example, are platforms offering highly personalized preventive care and conditional incentives [379], [383].

- 50% of respondents explain their lack of physical activity due to missing motivation [380].
- 41% of individuals in the age group of 18-39 years consider becoming more active in their free time, if they were incentivized by their health insurance [380].

Key Drivers

- Steadily rising health costs result in higher insurance fees [386] – [388].
- Personalized preventive care can significantly reduce treatment costs [382].
- With the rise of automated personalized services healthcare companies can better provide highly personalized incentives (Business Model Trends, p. 46).
- Gamification increases motivation to keep participating in such programs [389].

Challenges

- Change-resistant individuals are least likely to join an incentivized program, but have the largest increase in exercise activity compared to non-participants [390].
- Conditional incentives will require deep integration with new and existing technologies as well as the development of a central platform [383].
- Security and transparency of customers' data collection is central [391].

Impact on Creating and Sustaining Healthy Habits

Incentive-based business models will act as a first trigger, especially for change-resistant individuals, to spark the development of healthy habits. The long-term motivation can be sustained by providing certain services (e.g. free gym memberships). In addition, the user greatly benefits from detailed insights into his own health and capabilities and furthermore gains motivation to reach and improve his personal goals. This results in a healthier customer base and less treatment costs [382].

ECONOMY OF CONVENIENCE

Shift in customer interfaces adapting to newly arising consumption behavior

Convenience-oriented business models help to overcome existing barriers to a healthy life. When it comes to engaging in sports and maintaining a healthy diet, high levels of intrinsic motivation or volition are necessary [392]. In the process of consuming healthy food, for example, the stages of planning, purchasing, preparing, and disposing are considered as highly time and energy intensive [393].

Key business activities include delivering healthy nutrition (e.g. ingredients and meals) and making sports activities accessible in an increasingly blended work-life setting (e.g. corporate sports). In the space of corporate wellness and nutrition, companies target the employers and charge them directly via long-term contracts in a B2B model [394]. For employees, corporate sports and nutrition programs are free of charge. In the B2C sales channel, the major target group are customers in urban areas with low intrinsic motivation and high perceived barriers for doing sports or eating healthily. This includes young professionals with limited free time, who still want to have a sufficient work-life balance and also stay fit [395]. Within this context, convenience-oriented business models predominantly do not charge on a per-product-basis, but rather try to bind customers with steadily recurring subscription fees [396].

Facts

- Millennial customers are prepared to pay on average a premium of 11% for each level of added convenience (e.g. delivery) in the food supply-chain [397].
- The convenience-oriented business HelloFresh successfully grew from 3m USD revenue in 2012 to 290m USD in 2015 [398].
- In the U.S., 52% of all employees have access to corporate wellness programs, in Europe and Asia 23% and 5% respectively [399].
- Fitbit is one of the market leaders in corporate wellness programs, serving large corporations such as Target and its 340,000 employees [400].

Key Drivers

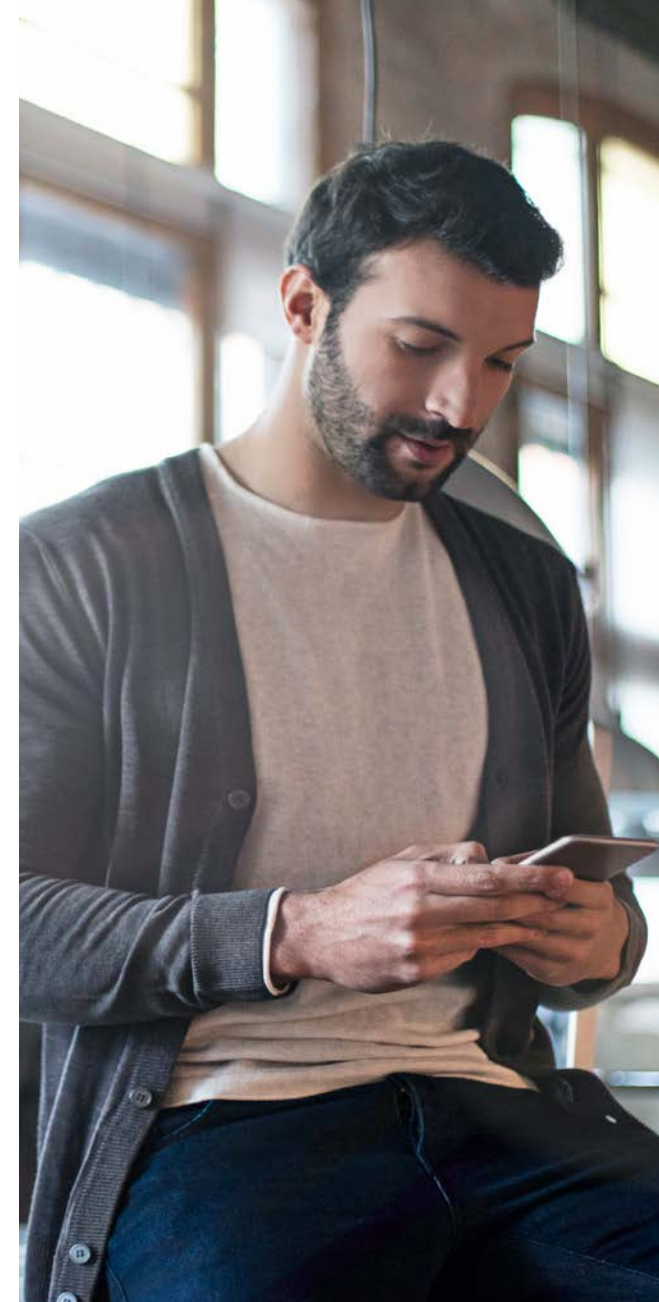
- Millennials show a substantial shift of interest from monetary-benefit packages to additional fringe benefits offered for their convenience [401].
- Millennials' desire for more flexibility and self-determination at work leads to increased work-life-blending (Societal Trends, p. 22) [402].
- 35% of non-active individuals link their lack of physical activity to their full work schedules [380].
- While Millennials are highly interested in fresh and minimally processed foods, they still show a preference for convenient dinner and lunch options [403].

Challenges

- Small to medium enterprises refuse to recognize the return on investment of corporate wellness programs [404].
- Convenience-oriented business models rather act as an enabler than a motivator, as they only attract healthy people and fail to address people with lacking motivation [405].
- The supply-chain for fresh product delivery is still highly complex due to the perishable characteristic of the goods [406].

Impact on Creating and Sustaining Healthy Habits

Convenience-oriented business models enable customers to integrate healthy habits into their daily life. Such models diminish the substantial barriers created by the lack of time and motivation. Customer interfaces shift towards delivery to home or work. Because of the increased convenience, consumers will increase their exercise time and adapt their eating behavior towards clean nutrition, leading to a generally healthier lifestyle. Furthermore, subscriptions are the predominantly applied monetization strategy. This leads to a continuous repetition of the desired behavior ultimately creating habits [407].





AUTOMATED PERSONALIZATION

Increasing cost reduction potential due to the rise of big data analytics

Automated personalized health services attempt to simulate the advice of professionals. They offer a range of services, such as a virtual fitness coach or a meal plan tailored to the customer's individual needs. Key activities include, first, the collection of data. Users either enter the data manually or sensors log it digitally. Second, the system analyzes the collected data and displays suitable advice for the user. Third, the customers receive explanations on the correct execution of exercises and their performance (see Endomondo [408]). Freeletics, for example, offers the function of an intelligent coach, which creates value from the data of over 15m user [409], [410]. The basis for the monetization strategy of digital personalized services is predominantly the freemium model. An application grants free access to tracking functions but requests a fee for additional features, such as a virtual personal coach [411]. After setting up the system, an unlimited number of customers are able to use the service. Hence, the technology employed here minimizes the marginal cost per customer by automating the creation of the specific training or meal plan (Technology Trends, p. 15).

Facts

- In 2016, 61% of German users working with a digital coach wished to individually train on-demand [380].
- By offering an exclusive service, personalization increases customer satisfaction and loyalty [391].
- Big players in the health sector are acquiring fitness apps. Asics bought Runkeeper and Under Armour took over Endomondo, with both acquirers paying 85m USD [412].
- Digital personalized services are growing a solid customer base. For example, Runkeeper had over 45m user in 2015 and Endomondo had over 20m in 2015 [412].

Key Drivers

- Personal trainers are an increasingly popular training method and are predicted to be one of the top 10 fitness trends for 2017 [354].
- In general, individuals are expecting and demanding more personalized products and services [391], [121] (Societal Trends, p. 21).
- Big data, automated data streamlining, and predictive analytics enable the realization of personalized services on a large scale [391],[413].
- Individuals can feel more comfortable with a virtual personal trainer than with a physical one (e.g. no potential for humiliation) [414].

Challenges

- Management of data security and customer privacy is crucial since individuals perceive the collected data in the health sector as especially sensitive [391].
- The Generation Z is increasingly pursuing the "Digital Detox" trend, trying to minimize the use of technology in certain areas of life [415].
- Manual customer input is not fully reliable, since the user's self-perception can differ from reality [416].
- The trend of peer-to-peer collaboration threatens the existence of sport experts, as individuals increasingly rely on the advice of their peers [413].

Impact on Creating and Sustaining Healthy Habits

Automated personalized services tailor exercises and meal plans to the specific needs of individuals. This has a significant impact on motivational levels of customers. Personalized training, for example, results in elevated motivation, perseverance, and quality of fitness exercises compared to standard training [414]. The systems create workouts compatible to the user's performance level. Hence, it designs the training in a permanently challenging, but not frustrating, manner. Thus, the user enters a state of "flow". This is a state, where the individual is deeply concentrated, loses perception of time and enjoys the experience [417].

PLATFORM ECONOMY

Shifting companies' performance from a centralized perspective to a collective-impact approach

Platform-based business models redefine productivity and innovation in the value chain. They drive a shift from asset-heavy entities to decentralized asset-light networks [418]. In this context, stakeholders engage openly in collaborations with external entities in so called business ecosystems [419]. By providing suppliers, creatives, and makers of related products with access to internal tools (e.g. materials, factories, services, and data), companies can gain new perspectives and capture the economic benefits of growth, without the risks of organic expansion [420]. Platform-based business models do not only benefit the keystone players that manage the ecosystem, they also serve the goals of all partners and enable a more efficient usage of underutilized assets [421]. Under Armour, for example, has joined forces with IBM Analytics to create value from the terabytes of data their fitness trackers collect and thus provide athletes with insights to enhance their performance [422]. Such collective initiatives will play a crucial role in shaping the future of nutrition and sports culture [423]. Fostering complex interdependencies among players of the sport and food ecosystems will help attain a deeper understanding of the problems of physical inactivity as well as poor nutrition and will help spot new opportunities to solve them [424].

Facts

- By 2018, it is predicted that more than 80% of enterprises with advanced digital transformation strategies will create and/or partner with industry platforms [425].
- 40% of executives believe that adopting a platform-based business model and engaging in ecosystems of digital partners are very critical to their business success [426].
- In 2017, the total value of platform-based companies was estimated at 181bn USD in Europe [427].
- Worldwide platform companies have a market value of over 4.3tn USD and employ millions directly and indirectly [427].

Key Drivers

- No company can, on its own, deliver the full spectrum of technology solutions that customers need at the pace the market is changing [428].
- Organic expansion and acquisitions are risky strategies as they usually imply up-front investments [421].
- Managers are realizing that a collective-impact approach can help their company uncover new opportunities that their competitors may miss [418].

Challenges

- The focus within the entrepreneurial scene needs to shift from the company's performance itself to the success of the business ecosystem [429].
- Managers are required to recognize the importance of a broader market ecosystem and governments are asked to learn how to regulate in ways that promote asset-sharing [430].
- Corporate executives often lack the courage to engage openly with others for fear of losing their grip on the market [418].

Impact on Creating and Sustaining Healthy Habits

Establishing a broad cross-sector coordination between all players within the sport ecosystem will be a strong catalyst for correcting poor exercise habits. The combined efforts of businesses and governmental organizations will contribute to identifying the interventions necessary to promote and sustain physical activity. This will help develop community-based strategies that are relevant to the community members [423]. In the sectors of nutrition, the collaborative economy will drive the next wave of innovation and productivity growth. Partnerships between health organizations and the food industry will help foster a better understanding of the problem of unhealthy nutrition and how to solve it [424].





DIGITIZED COMMUNITIES

Emerging revenue streams through the rise of digital communities

The basis for digital communities are interest-based networks. They act as platforms to connect users with similar interests [431]. The potential user base of digital communities is expected to grow by nearly 40% from 2015 to 2020, hitting 2.95bn users worldwide [432]. Digital communities help to develop healthy habits for individuals and intrinsically motivate them to be physically more active in two different ways. First, they ensure that users can share, connect, compete, and achieve results within the community online. Second, these social networks help to make new social connections and also enable users to meet with like-minded peers offline to do sports together [413]. Community-based business models mainly build on the freemium monetization approach [433]. Successful companies, such as Strava, connect millions of athletes via a mobile application and offer a premium model to unlock extra features [434]. Additionally, digital communities have the opportunity to generate revenues from target-oriented advertising [435].

Facts

- Nearly 70% of physically active individuals are more likely to join online communities if they can connect and interact with peers that share the same training expectations [413].
- Being part of a community can increase motivation and result in positive competitions (e.g. to beat a friend or to challenge another user) [414].
- Groups are able to reach a higher motivation level than individuals acting alone [436].
- Freeletics, for example, is one of the biggest and most motivating fitness communities in the world, with over 15m users in 2017 [411].

Key Drivers

- Network effects leverage the popularity of digital communities and are the base for the success and growth of social platforms [433].
- The growing desire for social and technical connectivity leads to increased willingness to participate and feasibility of digital communities [437].
- Gamification fosters social connectedness and enables virtual competition through an engaging user experience, thereby acting as a catalyst for continual usage [438].

Challenges

- User activity highly depends on the required critical mass and is an essential factor for the popularity of digital communities [433].
- User loyalty determines the viability and long-term success of community models [435].
- Lack of data security and data confidentiality can hinder the acceptance of digital services in the health sector [439].
- Communities can reach a powerful level of opinion leadership and therefore achieve critical influence on the products and identity of a brand [440].

Impact on Creating and Sustaining Healthy Habits

Digital communities can enhance healthy behavior in several ways. Primarily, social connections can have a lasting effect on long-term motivation through permanent joint incitement and participation [414]. Nearly 70% of active individuals rate group sports as an important motivator. In addition, working out in a group transports more fun, promotes a higher energy level, and intensifies the effort individuals put into their sport activities. Besides that, sharing progress and common goals within the community further encourages the sustainment of healthy habits [413], [441]. These factors result in steady activities and considerably reduced drop-out rates [442].

SCENARIOS

The following chapter describes four scenarios of different futures. The chosen scenarios are plausible, relevant, and of consequence for the user's decision, challenging, internally consistent, and recognizable from the signals of the present and near future. All four scenarios described below are equally plausible, extreme visions of how creating and sustaining habits might look like in the year 2037 with regards to two key drivers. Stories of personas experiencing a day in 2037 are used to envision the scenarios. Signposts (often described as weak signals) that indicate a development towards each scenario are identified in order to describe a possible path from the present to each of the four extreme futures.

SCENARIO OVERVIEW

DRIVER & SCENARIO MATRIX 50

SCENARIO 1
LITERATE. FLEXIBLE. FREE? 54

SCENARIO 3
TOTAL RESET 60

SCENARIO 2
GET FIT, OR DIE TRYIN' 57

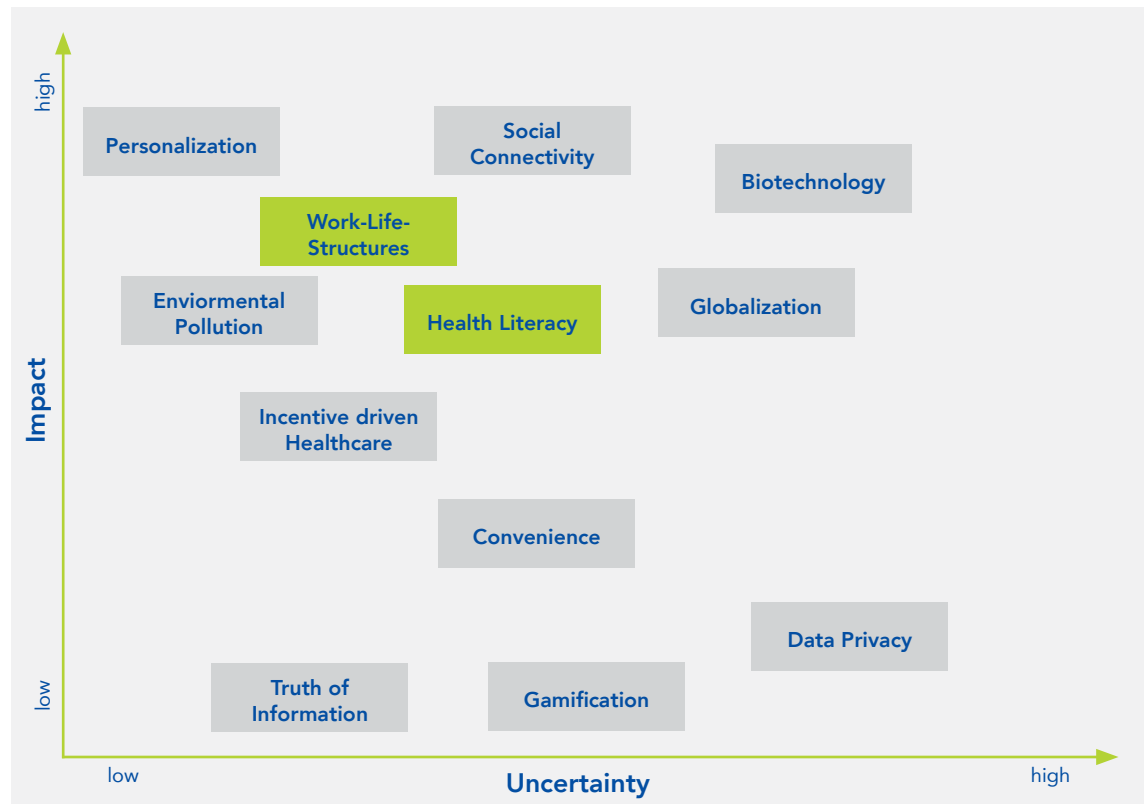
SCENARIO 4
CARELESS FLEXIBILITY 63

DRIVER MATRIX

The scenario building phase follows a structured approach. Based on the research from the basic phase of the Trend Seminar, current challenges and drivers for the future development of diabetes care are identified.

Drivers are forces that shape the future of creating and sustaining healthy habits. All identified drivers are modeled with bipolar extreme outcomes. In order to create four equally plausible scenarios, two key drivers are combined in a scenario matrix (see page page 53). The key drivers are characterized by a high impact on creating und sustaining healthy habits and a high degree of uncertainty (i.e. it is impossible to assign probabilities to their respective outcomes). Furthermore, the key drivers are independent from each other and do not overlap.

In order to select the most suitable key drivers, all drivers are ranked in a matrix according to their respective impact and degree of uncertainty. Different combinations of potential key drivers are then compared and the best combination of key drivers is chosen.



KEY DRIVERS

Fixed Structures

In a society based on fixed structures, all aspects of life are rigidly regimented. People follow a strict schedule determined by others. There is a high level of outside control exerted by employers, governments, or other actors, which may themselves be subject to similar structures. Individual autonomy exists only in minor decisions, overall life structure is controlled heteronomously. In such a system, people are generally reluctant to change their accustomed ways, or are prevented from doing so by external influences. Frequently, people develop specific patterns and habits from repeatedly following the same structure for long times.

No one is Health Literate

In this extreme outcome, no one in society is health literate. There has been no public or private drive towards increasing health awareness. This means that there are no health education programs, the media does not focus on health related topics, and companies do not see any advantage in raising health awareness. Convenience has become the way of life, and technological advancements enable people to achieve almost everything without much effort. People cannot differentiate between healthy and unhealthy behaviors. Furthermore, they are also completely ignorant about the consequences of these behaviors. Medicinal advancements allow people to avoid diseases, hence further removing the need to be health literate. However, some people still live healthy lives, irrespective of them having no health awareness.

Work-Life-Structures

How people spend their lives ultimately determines the way healthy habits can be created and sustained across the broader population. The structure of their daily routines will decide how to approach the problem of an unhealthy society, and affect any solution that wishes to influence healthy habits. The traditional “nine-to-five” worker will require a different approach from those determining their own schedules. This spectrum, from the most rigid structures to full flexibility, pervades all aspects of life. It influences not only the events that take place in our day-to-day lives, but also where and how they occur – in areas as diverse as meal options, sports activities, and work contracts.

Health Literacy

The term “health literacy” takes into account all forms of education and experiences which lead to higher health awareness. This includes not only the ability to discern the difference between healthy and unhealthy behavior but also the knowledge of how to implement the former and avoid the latter. Although health literacy does not directly guarantee the adoption of healthy habits, it removes the first and biggest hurdle in establishing healthy habits i.e. health awareness. Furthermore, health literacy also includes the knowledge of short and long term consequences of healthy and unhealthy habits. This is an important enabler and motivator to pursue a healthy lifestyle. Many stakeholders can contribute to making the public health literate. These not only include governments and educational institutions, but also private organizations, such as news outlets, social media, and sports giants.

Flexible Structures

A flexible work-life structure inherently requires that every element of life can be determined by individual decisions. There are no fixed or mandatory structures. The lifestyle of artists and freelancers is the modern embodiment of a flexible life. Trends such as telecommuting increasingly allow the spread of flexibility into more traditional professions. Outside the workplace, a flexible life structure allows incorporating healthy habits into the daily schedule without much difficulty. These scheduling decisions are generally made autonomously. People with a flexible life structure are open to change and often adapt if they see a benefit. However, frequently changing environments can also impede the formation of habits, and lead to an increased stress level, even when these changes are autonomously controlled [148].

Everyone is Health Literate

In this extreme outcome, the entire society is health literate. People have a precise understanding of healthy living due to widespread health education and awareness through initiatives taken by both public and private sectors. They know the value of healthy habits and enthusiastically proliferate this knowledge to the next generation. People are aware of the benefits of a balanced diet, regular exercise, and the significance of sustaining these habits. Furthermore, they understand that staying active plays an important role and that they should proactively pursue such a lifestyle. However, this understanding does not necessarily translate into actions.

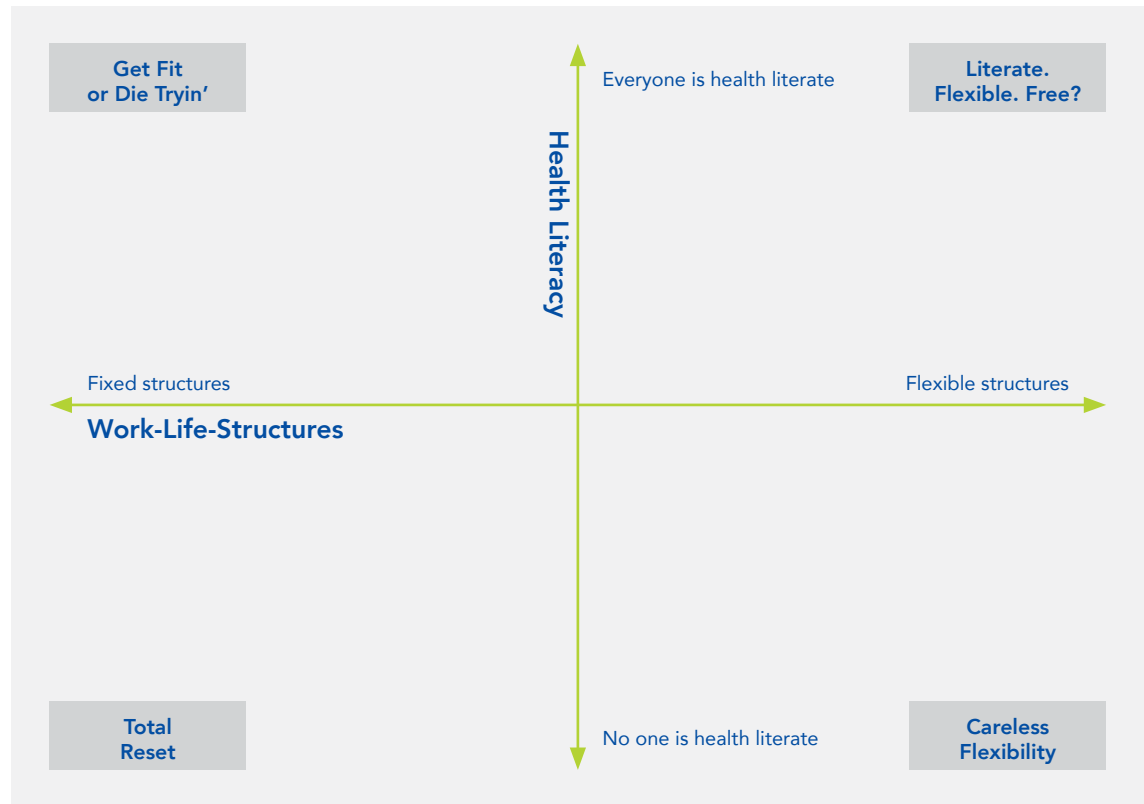
OTHER DRIVERS WITH HIGH IMPACT AND A HIGH DEGREE OF UNCERTAINTY



SCENARIO MATRIX

The two key drivers and their outcomes create the scenario matrix. Each key driver represents one of the axes, with the bipolar outcomes on both ends. All four scenarios are based on extreme outcomes of both key drivers. Plausible and consistent outcomes of other important drivers are included in each of the scenarios, but not taken to an extreme.

“Literate. Flexible. Free?” describes a world in which everybody has a fully flexible lifestyle, while being very health literate. In the second scenario “Get Fit, or Die Tryin’”, people are also completely aware how to live healthy, yet they adhere to a very fixed schedule which determines the way they spend both their working hours and their spare time. “Total Reset” illustrates a world with an extremely low health literacy and a very fixed lifestyle of people. This is directly reflected in their everyday routine activities, which do not include health-related topics as important issues. The last scenario, “Careless Flexibility” describes a world in which people are as well not health literate but have a high personal flexibility, which leads to greatly varying lifestyles.



that still satisfies his daily nutrient requirements. After analyzing Mark through the nano-robots circulating in his blood, Ava tells him to go for McPaleo, a dish introduced six years earlier consisting of various vegetables, nuts, and fruits. As Mark still feels fairly sleepy from staying up until 02:00 a.m., he decides to complement McPaleo with a frozen yogurt. Alfred informs him that a frozen yogurt will give Mark five minus points at his insurance company, which is part of an international healthy living alliance program with McDonald's. Mark quickly confirms and takes his meal slightly annoyed. After all, he dislikes being ordered around and is quite nostalgic about the past, when no one cared about his nutrition.

After the meal he notices that it is still raining outside, Mark asks Ava about the current weather situation in Nice, one of his favorite cities in Europe. Getting a birds-eye livestream

from the overcrowded beach in Nice, he swipes right to Barcelona where the beach is less busy. Notifying his girlfriend that he will stay in Barcelona for the night, he rents an apartment and takes a shared autonomous vehicle to the Hyperloop station just outside the city center.

Entering his sealed off cabin inside the Hyperloop pod, Mark longs for a conversation. He asks Ava to talk with him about Winston Churchill. Mark appreciates Ava's effort to adapt to his style of conversation, even though she already knows everything about the topic.

He is amazed by the fact that Winston Churchill managed to stay in a relationship with the same woman for more than 56 years. Mark got to know his girlfriend Lua on the "better2gether" online platform two years ago. He enjoys having



someone to rely on, but from time to time Mark is stressed by the feeling of being tied down. Suddenly Ava starts to speak: "Mark, your heart rate and body temperature are rising. Are you thinking of Lua again? You have to get off the Hyperloop."

After his arrival, he heads towards Sagrada Família. The church was completed in 2026, on the 100th anniversary of Gaudí's death. Luckily Mark's insurance company rewarded him with a free ticket since he lived healthier than the average German the year before. One of his friends even got tickets for the Soccer Elite League final between Guangzhou Evergrande and iTech New York. To get such incentives, Mark would for example need to stop eating his Nutella sandwich in the morning, something he cannot imagine yet.

As he leaves Sagrada Família, Mark feels like sunbathing and goes to the beach. Barcelona's beach became globally known when it had been closed off from 2030 till 2032 due to

pollution. Today, after a series of environmental restoration actions, the beach is clean again. People are running barefooted through the warm and yellow, shining sand, others are enjoying some fresh fruits or just watching the drones flying in the sky. Mark remains unaware of all this. He is deeply focused on his work again.

After several hours, Ava indicates a low blood sugar level and recommends the intake of a meal to counter a soon expected fall in productivity. Mark follows Ava's advice to walk to a nearby supermarket to get a meal consisting of avocado and quinoa. The supermarket is almost empty and all shoppers are in a conversation with their smart headsets. While he is passing the vegetable aisle, he notices a special offer for pizza. Mark has not had a chance to eat pizza for quite some time now. He grabs a Make-Your-Own-Pizza box in which the pre-made dough and all the other ingredients are packed separately. This allows him to still spend some time on preparing the dish himself. He notices the warning label on the package which reads "Excess consumption of this

product contributes to obesity and non-alcoholic fatty liver disease." However, this does not prevent Mark from buying the pizza, he pays in cash since he does not want the insurance company to notice. The supermarket chain is also part of the healthy living alliance program and shares the data on purchases made with Mark's insurance company.

The pizza was too large for him and almost half of it is still left. He opens the ShareFood application and takes a picture of the leftover food. The application analyzes the ingredients based on the image and lists them in an online marketplace together with the picture. Mark's post gets some views, but the app users tag the food as unhealthy rather quickly. After some time, his pizza is sold. Mark puts it on the small drone landing pod on the balcony and confirms the sale in the application.

All of a sudden, Mark remembers the heavy workload he still has to attend to. He feels stressed again and starts a collaborative virtual walk through his first design draft of the green

bridge project with his colleagues. He asks Ava to implement the necessary changes proposed by his partners. While integrating the new ideas, he loses all awareness of time and space around him.

Around 12:00 a.m., Mark is suddenly ripped out of the virtual world as a red notification appears in his field of vision. Lua reproaches him since he postponed their date again. She sends him upset video messages he does not respond to. Mark feels like she is intruding on his personal space. Seeking his lost sense of freedom and trying to relieve some stress, Mark gets ready to go out. He already made some acquaintances in Barcelona during his earlier trips, however, this night he wants to meet new people. After finding a suitable group on better2gether, he jumps into a self-driving taxi and meets them at a nearby club. He used to have much fun going out, but all the warnings about the dangers of alcohol crush his enthusiasm. After two glasses of hangover-free beer Mark can suppress the guilty conscience and starts enjoying the night. The music is so loud that he only exchanges a few words with his new acquaintances. At 4:00 a.m., Ava notifies him that he urgently needs to go to sleep. After a couple of minutes, Mark is home and falls numb into his bed.

Signposts

- A European-wide Hyperloop network is created.
- For the first time the price for the HoloLens undercuts 100 USD.
- Switzerland is the first state to introduce a universal basic income policy for all citizens.
- Nanotechnology enables targeted diagnosis through integration of smaller devices and nanobots into the human body.
- 100% of European health insurance policies are based on incentives.
- Germany spends 1% of annual state budget on health education.
- The World Health Organisation recommends a compulsory health education in primary and secondary schools, as well as in corporations.
- Due to an obesity rate of 80% in Europe, public pressure forces McDonalds to take the BigMac off the menu.
- Globally, only 20% of employees in all industries still work in their offices.
- The EU abolishes its working time directive.



GET FIT, OR DIE TRYIN'

A day in 2037

In the suburbs of Munich, Germany, an alarm goes off at 7:00 a.m. sharp. However, Hans Xu is already awake. He always wakes up at the same time since he started working as a maintenance engineer at a large automobile manufacturer 10 years ago. Therefore, his sleep cycle is already adapted to his regular time schedule. "Good morning, Hans", Nina greets him. "Your wife just returned from her morning run." Hans has two personal assistants: Nina, his personal virtual assistant, is linked to his smart home, calendar, and medical records, while Jarvis, his work assistant, manages everything related to his job.

"Good morning, daddy!", Ling, his daughter welcomes him with a big smile in the kitchen. She is sitting at the kitchen table with his wife, eating her personalized cereal. Last week, Ling received her DNA sequencing results and her doctor told the family that she has a high risk of getting rheumatoid arthritis. However, the doctor also said that risk can be significantly reduced by eating a special personalized breakfast every day. "How was your run, Laura?", Hans asks his wife while kissing her on the cheek. She explains that she saw the city suburbs being rebuilt to be environmentally neutral and that her running group is excited for their first marathon next month. "You know Hans, ever since the government only allowed these electric automated cars, the air has gotten so much better and it is way more enjoyable to go for a run. You should really give it a shot!"



"That sounds great", Hans mumbles while finishing his breakfast. Embarrassed by the worried glance of Laura, he quickly rushes to the bathroom to get ready for work. While brushing his teeth, Nina tells him about the latest news. She pre-analyzes the news across the whole internet to verify its correctness.

When the clock hits 7:58 a.m., an alarm goes off reminding Hans to go to work. Hans sighs. He does not want to go to work, but reminds himself that he should. Brushing these thoughts away, Hans says goodbye to his wife, gets

his daughter and heads out to the car. Just as they close the door behind them, the automated car pulls up. Its punctuality still impresses him. On the way to work Ling talks a lot about her health class. Hans sighs again. He knows that his daughter brings it up because she is worried about him. After dropping off Ling at school, the car continues towards work. Suddenly a voice appears, "Hans, please remember your vitamin A deficiency. Your last analysis showed that Spanish carrots is the most suitable vitamin A source for your body. It is Nina speaking again. "Okay, thank you", Hans answers, slightly aggravated. He already knows everything about vitamin



deficiencies and getting reminded almost every morning is very annoying. As the car drives up to work, Nina says goodbye and Jarvis greets him at the door. A few minutes later Hans arrives to seat number 145. At his desk, Jarvis appears again reminding Hans of the 10:00 a.m. coffee break and the subsequent personal health briefing. Later, at the canteen at 12:30 p.m., Hans discovers that his personal food plate today includes carrots. The fact that Nina shares data to the work canteen is really stretching his personal data privacy, Hans thinks to himself.

After lunch, Hans continues his work on the optimization of an environmentally sustainable supply chain, when Jarvis appears: "Hans, please prepare to enter private mode in fifteen minutes." Of course, Hans has already started finalizing his work. Jarvis continues: "Moreover, you receive two points for not being on a sick leave for 9 months. You can decide whether you want these points to be donated to a health education charity or to be transferred to your health insurance for further discounts". Hans instantly de-

cides to transfer the points to his health insurance, as his insurance premium got relatively high during the last years, since he only works out after making new year's resolutions. At 4:00 p.m., Jarvis appears again: "Congratulations, work is done! I hand over to Nina." His hololens instantly switches from work to private mode, and so does his mindset. Nina appears: "Welcome back to life! How about improving your health and going to the company's gym. If you adhere to the training plan you established four months ago during the company's fitness workshop, you could improve your health parameters by 1.2%". He sighs. On the one hand, he knows about the benefits of sports, but on the other hand, he is also looking forward to his daily ice cream on his way home. However, motivated by his recent achievement and the daily appeals of his worried daughter, he decides to work out today. On his way downstairs to the gym, he realizes that it is actually a bad day to start exercising, as he has an important meeting with the CTO the next day and might not completely recover by then. He leaves the company building and enters his vehicle, when a strong

feeling of anxiety overwhelms him. "Not again", he thinks. "All those people with their perfect looks. They should get off their high horses and stop annoying me with their health conversations", he whispers desperately. During the ride to the ice cream store he tries to meditate for a few minutes, as he knows about the effectiveness of this technique to reduce anxiety. However, it does not work out well, as he is too agitated. After buying the double amount of ice cream, Nina reminds him that his daughter's classes just finished and he should take the next free car to pick her up.

"I have a car ready", says Nina. As he walks up to the car, he realizes it is not the same car he arrived with. The car starts driving to Ling's school. "Nina, what kind of car is this? I have never seen it before." "It is the new model from China, the car sharing company acquired a couple of weeks ago. They are replacing the current fleet within the next month". After picking up Ling at 4:30 p.m. sharp, Hans asks "How was your day, sweetie?". "It was really interesting! We learned a lot about vitamins in health class today. Did you know that you can get sick easier when you have a deficit of vitamin B?" Hans laughs distressed. "I know, I know." The rest of the ride Hans does not talk much. At 5:00 p.m. sharp the car arrives at their house. Laura greets him at the door and they walk to the selection panel of the automatic kitchen. It shows her favorite meals ranging from salads and soups to a variety of dishes with tofu. Barely any have meat in them. She selects a salad for her and Ling. As Hans walks up to the panel, his favorite meals are shown. They include a large variety of burgers, steaks, chicken wings, and pizza. "Actually, I think I should choose something for you Hans. You always tend to pick the unhealthy things." Hans sighs. "I know, go ahead and pick something for me, you always know what is best". Laura also picks him a healthy meal with lots of carrots and tofu. The kitchen then starts cooking by itself.

After dinner, Laura and Ling take their usual evening walk. "Hans, you want to join us? The weather is awesome today and we will meet Hannah and Adam. They just came back from their surfing vacation", Laura tells him. "Come on, dad!", Hans sighs. Every time they meet Adam and Hannah, it is all about how incredibly sporty they are - even on vacation. He takes a look at his wristband. Only 4,546 steps so far - nearly 1,500 below target. Hans remembers that he will not receive the bonus points for his insurance program if he does not reach his goal of 6,000 steps today. No, he cannot let that happen. "Yeah... okay. I will...", Nina interrupts him: "Hans, do not forget your meeting with Tian and Chi

at 9:00 p.m. at the Allianz Arena." "Oh, I got a football match. Sorry, maybe next time!" Happy with his excuse, Hans turns around. He knows that Laura and Ling will look concerned, but he cannot stand to see their worried faces. To distract himself, he puts on his VR glasses and calls his two friends in the US. "Hey Hans, how are Laura and Ling?", Chi asks. "Good!", Hans mumbles ashamed. "Hey, let's connect to the Allianz Arena. We'll run late!" The match is really fun. No judging glances, no health reminders - just him, his friends, and football.

After the match, Hans says: "Guys, I would love to stay a little longer, but it is almost 11:00 p.m. and I should go to bed. See you!", Hans says and puts down his VR glasses. While brushing his teeth, he checks his wristband again. 4,578 steps. A strong feeling of self-doubt overwhelms him. "I will never get healthier", he speaks to himself, looking in the mirror. Nina breaks the silence: "Hans, it is 10:55 p.m. The alarm is set to 7:00 a.m. Please go to bed soon." He fears that his thoughts will keep him up all night. Yet, he knows that eight hours are his minimum amount of sleep. "Whatever, it is just one pill", Hans whispers and takes a sleeping pill - as every night.

Signposts

- Smoking decreases by 50% in South America, Africa, and Asia.
- The EU issues an international directive for the integration of health education in primary schools.
- US government imposes strict regulations on advertisements for unhealthy foods and beverages to raise the attention for the negative effects of those.
- The number of gym subscriptions in Germany doubles to a share of 23.2% among the whole population.
- The number of people utilizing health tracking devices in everyday life quadruples.
- A major study reveals that an increased work-life blurring has serious negative impacts on health and productivity.
- The EU issues a directive to ban flexible working hours.
- Governments implement systems of surveillance to strictly control working hours.
- A leading technology company is hacked and leakage of classified information forces other companies to abandon remote work options.
- Big fast food companies pivot 50% of their product portfolio towards healthier food.



TOTAL RESET

A day in the year 2037

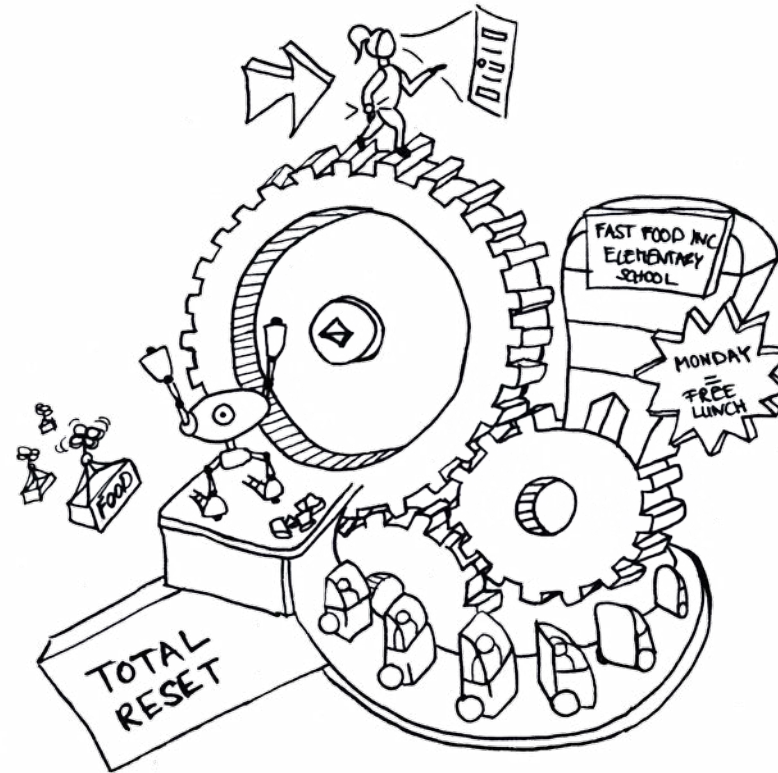
Viki, the intelligent, virtual personal assistant, raises its voice at exactly 7:30 a.m., waking Carol up. There used to be a time where all Viki could do was schedule reminders and appointments, and Carol could choose when to wake up, but since the 4.0 update Viki gets to choose everything, even that. The 38-year-old teacher opens her eyes while listening to Viki's warm greetings and today's schedule reminders. She lazily crawls out of her bed and heads into the bathroom. Like every morning, Carol gets into a shower that automatically detects her physical presence. The water splash is then turned on at a fixed temperature of 40.5 °C and lasts for exactly twelve minutes. Carol has never wondered why the shower functions this way, in fact, she never even regulated these values – it was all provided by her smart home. Viki reminds Carol to put her AR contact lenses in right after the shower ends, so she obediently follows the instructions without putting much thought into her actions. Once the lenses are in, various reminders start popping up, while Carol observes everything around her. She never had such lenses growing up, but since their introduction ten years ago at the private Fast Food Inc. Elementary School, where she teaches Computer Science and Robotics, it seems nearly impossible to live without them.

At 8:00 a.m. sharp, Viki welcomes Carol to help herself to her daily portion of breakfast, which consists only of a functional energy shake meant to get her started for the day.

She likes her morning routine, because she does not have to spend any time preparing breakfast. Additionally, her favorite blogger claims that it helps to keep the spark alive in a relationship. Her husband says that this is nonsense and you cannot believe anything on the internet anymore, but she trusts in everything the blogger says. At the table, Carol wishes a good morning to her husband Frank, 39, and her son Simon, 9. Simon keeps telling his mother all about his favorite VR game. At 8:45 a.m., Carol says goodbye to her family and gets into her autonomously driving car, which takes exactly eleven minutes to get her to her workplace. As the car turns around one of the street cor-

ners, a fitness studio catches Carol's eye. She wonders why people would even go there, the studio looks no fun.

As always, Carol is two minutes early for class and uses the spare time to check if her son has arrived safely at his school. The green light next to her son's avatar on her smart watch rests her assured. Class starts at 9:00 a.m. and ends at 12:00 p.m. As a computer science teacher, a position that was assigned to her based on her DNA, Carol is particularly excited about basics of artificial intelligence becoming a mandatory subject for first-year students. The three hours of lessons are complemented by a short five-minute break. On Mondays,



Carol uses this time to quickly check up on the news from the weekend. Skimming through the news, one particular headline catches her attention: "Further increases in health insurance costs expected". Her thoughts are disrupted by the ring of the school bell, and she has to continue teaching. Today, students are participating well. Carol gets interrupted only by her smart contact lenses, which remind her to drink a cup of water every 45 minutes to attain the optimal AI-determined hydration level for her. She is still irritated by this mechanism, which has been enforced since last year. Nevertheless, she enjoys collecting the reward points she receives for that.

At 12:00 pm, she meets up with her best friend Matthew, who is also a teacher at Fast Food Inc. Elementary School. Matthew used to teach French, but since learning other languages is no longer required with computers translating error-free in real-time, the school has forced Matthew to start

teaching Career and Life Management. Already being used to Matthew's complaints about not choosing his subject area autonomously, Carol only pretends to listen. While waiting for the elevator, she tries to remember the time when they still took the stairs to the canteen. This must have been long before she gained ten kilograms. Now, she starts losing her breath after walking for more than five minutes.

Monday is her favorite day in the canteen. On this day, the school sponsors lunch. She never puts any thought into what she eats, she just takes what she feels like eating. Today, it is a burger with fries. Walking to their assigned seating places, Matthew mentions that on his way to work his bicycle broke down and needs repair. Carol responds, "I still don't understand why you would take a bike to work, you can barely see the next turn because of the smog! I would not even take a bike if you gave me something for it. The pollution has been getting worse over the years."



At 1:30 pm, Carol leaves the school after lunch. Every first Monday of the month, she meets with her sister Marianne. They never had a close relationship growing up, but somehow these meetings have become more important for them both. It is the only contact they have to an adult outside their homes and workplaces.

They meet at the same café as usual and Carol notices that something is different right away. Her sister is not walking lethargically, in fact, on her way to the table they normally sit at, she appears to be skipping. "Hey Sis! How are you?", Marianne asks with a smile. Carol is taken back four weeks earlier in the same cafe - she had met a very tired, grumpy-looking Marianne. "I'm fine, thanks Marianne. You look so different! How are you doing?"

Marianne goes on to explain how the canteen at her workplace started serving kale salad about three weeks ago. Nobody had eaten it, so it was on sale. She has always been



eating whatever is on sale since the last insurance fee increase. Marianne fell in love with kale, and has only eaten green salads and vegetables from all over the world for lunch at work ever since. Looking at the recent economic shock in South America, prices will most likely decline even further. She is not sure, though, how or why these new foods have impacted her mood.

Carol is intrigued: "What else was changing in Marianne's life due to her eating salads?". They continue chatting, and from Marianne's stories, Carol also learns that she has more

patience with her sons, more energy the days she works the afternoon shift, and is also sleeping better.

On the way home, Carol reflects on her sister's changes. They could not have possibly happened because of the salads. She is really happy for her sister, but there is no way all these changes came from eating leafy greens that half the population detests. After meeting with her sister at 6:00 pm, Carol returns home. When she enters the apartment, her stomach already starts to rumble. Fortunately, she already gets to have dinner at 6:15 p.m – that is when it is scheduled to arrive every day.

Her husband and son are already sitting at the dinner table, waiting for her to arrive. "Good evening my dears, how was your day?", she greets them, already knowing what they did, because she gets updates about her family pushed to her watch throughout the day. Carol remembers a time when she did not always know Simon's location. She used to be afraid that something would happen to him. Since the government advised for children to stay inside and arranged safe transfers to school, she is much calmer.

Already hearing the familiar sound of the approaching drone, Simon enthusiastically screams: "Yay, finally dinner, I'm so hungry!" The windows open automatically, and the drone directly releases the plates in front of everyone.

At 7:30 p.m., Viki notifies the family that it is time for their evening routine now. Their personal robot brings VR glasses for all of them and they embark on their favorite game, Robot Combat. The whole apartment transforms into a huge arena. After an hour of playing, the game is automatically shut down.

"Carol, it is time for you to go to bed", she is reminded by Viki. She goes to the bathroom, quickly brushes her teeth, puts on her pajamas and lies down next to Frank, who is already waiting for her. "Your alarm will ring in 8 hours and 30 minutes. Have a good night", says Viki. And she slowly drifts off into dreamland...

Signpost

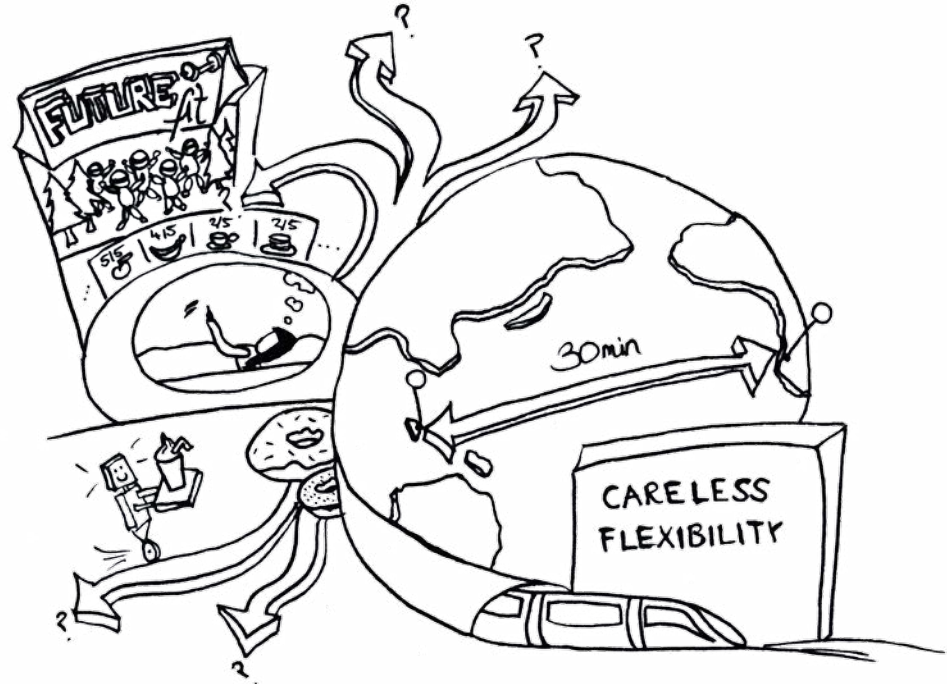
- Companies are enforcing structured and fixed working hours because of a startup bubble burst.
- Due to rising income inequality, only the top 10% of the population can afford education and healthcare in 2042.
- Centralized AI is taking over health management for humans.
- Fat is the new cool: A new body image is rising. Skinny fat is trending.
- The government now enforces career paths based on DNA
- Universities and research institutes no longer accept internet references as credible sources.
- Privatization of education: 95% of all schools are privatized by the end of 2029.
- Health insurance costs are increasing further and make up one third of an individual actual salary.

CARELESS FLEXIBILITY

A day in 2037

Quietly chirping birds, the sound of small waves hitting the shore while everything gets brighter. "Good morning Carla, have an awesome day in Santa Barbara!", whispers her personal assistant, Java. Java knows everything about Carla as she has been collecting data from her biosensors and her social behavior since three years now. She assists her in an optimal way to make her life more convenient and helps her to focus on what matters. Assistance starts in the morning when Java wakes her up at the optimal point in time.

When Carla opens her eyes, she sighs when checking the time. She was woken up rather late today. Staying in bed, Carla tells her hologram to pull up her 'Eatica' app. She knows that she should order products which are rated with 4 to 5 stars in order to get a free recreational trip sponsored by her healthcare insurance at the end of the month. However, she is just not feeling like eggs benedict, crispbread or fruits today. Instead, she orders some fancy sounding pancakes, prepared just some kilometers away from Carla's apartment by Henry at a kitchen in downtown Santa Barbara. Henry is a hobby chef and has fabulous reviews on Eatica for his pancakes, cheese fondue and burgers. Standing at the window awaiting her food, Carla remembers how she reacted when Eatica got launched twelve years ago. Back in the day, she wondered how people would ever trust others with their food. Nevertheless, more and more people started using Eatica for buying and selling food, and the security checks as well as the reviews seemed to work out well. Data privacy concerns also took the backseat once people realized the amount of convenience and personalisation that data processing and sharing services can enable. The implementation of drones into the transport system made it even more convenient to use the platform. Carla likes it, as she can enjoy all the foods she wants from wherever she wants and try out new things all the time.



As her food arrives at the window, Carla turns on her hologram to check her emails. She sees a message from her friend Tino, currently working in Singapore. Tino is asking Carla to meet him there as fast as possible. He strongly believes he has a big scoop for her. Carla works as a journalist and creates news for various famous channels. She is always looking for trending topics she could turn into a story. Seizing the opportunity, she books a seat on a supersonic jet to Singapore, which leaves in 30 minutes.

The booking includes a pick-up by AUBER, an autonomous car service that offers different interior options adapted to customers' needs. As regular cars are forbidden in California since 2030, it is now much easier and convenient to plan ahead and arrive on time.

On the plane, she is greeted by Saltie, a good looking and very friendly robot. Based on her publically available social media profile on the OneSocial app, Carla is assigned a new co-working space with like-minded people. While she installs her Google workplace, a big hot chocolate with cream is automatically delivered to her desk.

When it comes to ordering lunch later during the flight, Carla can choose between functional food and normal options. Her healthcare insurance reminds her that if she acts upon the biosensors recommendations, her expected lifespan would extend. However, Carla does not understand why the recommended choices would benefit her and others would not. So she does not feel bad about ordering burger and chips. For lunch, she meets another group of people that was assigned

to her by OneSocial. As everyone in the group shares common interests, it is easy to skip the usual small talk and speak about personal interests right away.

During the joint lunch, the flight captain makes an announcement: "Ladies and gentlemen, this is your captain speaking. We just got informed that we will not be able to land in Singapore due to severe smog. We will be landing shortly in Kuala Lumpur instead. Please return to your seats and keep your seat belts fastened. Thank you." This is no issue for Carla as she is already used to it. Such last-minute changes in flight schedules have become more common with the recent environmental crisis. She knows that she can simply book a Hyperloop ticket to Singapore once the plane lands.

Upon arriving in Singapore, she meets up with Tino at a Starbucks. Carla chose the location to complete the Doughnut Challenge, that comprises eating four doughnuts on four different continents within four weeks. Due to her frequent traveling she made it in only two weeks and Starbucks is rewarding her for her loyalty with a menu including two doughnuts and a big milkshake for free.



Tino is really excited to tell Carla about what he and a group of other researchers suspect. They believe to have discovered a massive scandal concerning incentive systems of big corporates. "They are advising people to consume more unhealthy food!", he claims. "These companies have means to incentivize people much better than healthcare companies or governments, which are trying to make people eat more healthy food". Carla is outraged: "Are you saying that the Doughnut Challenge is bad for me?" "Yes, exactly! They make use of the fact that health education failed decades ago and we have no clue what is healthy or unhealthy. This is also why we have been seeing obesity rising again in recent years!", Carla bursts out laughing. Tino could not seriously believe in that conspiracy theory and even if he did, the story would never sell to any news company. Their software, which automatically indicates the "truthfulness of information" of each story would rank this one very poorly.

Now, to make the best of her trip to Singapore, she still decides to write an article about Tino's story, only to point out how ridiculous it is. She pitches the story to her favorite news company. A few hours later it becomes a huge success. Satisfied with her work, Carla decides to use the rest of the day to

relax in Singapore and asks Java for options. Java suggests some sports activities nearby she should take part in. Carla sighs but decides to overcome her laziness in order to obtain the desperately needed bonus points for her retreat in Bali. She hops on an autonomous Tuk Tuk to go to Futurefit, the most trendy gym in Singapore. Futurefit has just finished the construction of a huge hall in the city center that has different areas with different simulated ecosystems. Today, she decides to sign up for the Canadian woods program with a pleasant training temperature of 15 degrees Celsius. Her group is already waiting for her on an artificial glade between a conglomeration of real trees. Carla takes a deep breath of the humid air and her lungs start to relax immediately, after being exposed to the almost unbearable smog in Singapore. Other programs try to simulate a remote location via virtual reality, but she actually likes the physical approach of Futurefit. Nevertheless, she has to overcome high internal barriers to motivate herself for this kind of physical activity.

When Carla's group arrives, she is surprised by the appearance of some of the other participants. Some have a generally slim and fit appearance. She approaches one of the

persons. "Wow, you must be a regular", she says, "How often are you joining this group?". "Well, around 4 times a week", he answers. "Why do you do that to yourself?", Carla asks. He tells her, that all his movements are being tracked by body sensors that send all his data to his health insurance constantly. Even if he does not like that the insurance company knows everything about his body, he needs the monetary rewards that his insurance company offers for working out. This is why he joins fitness classes so regularly and relies on the income. Later during the workout, Carla sighs: "Sometimes, I wish I would be forced to go to fitness classes as well. I really cannot keep up with the trainer in any of these exercises."

After finishing her workout at Futurefit, she is picked up by another Tuk Tuk that Java ordered to catch her flight back to Santa Barbara. While sitting on the plane, she starts thinking about what Tino told her and the conversation at Futurefit. She wonders, if Tino was actually not that wrong after all and if there could, in fact, be a difference of government and corporate recommendations concerning personal health. After a few minutes, she drops the thought and orders a huge pizza for dinner.

Signposts

- The mean BMI of the worlds' population rises to 30.
- All health education programs fail and get abandoned.
- An incentive-based health care system is rolled out by the government together with health insurances.
- Major corporates use electronic incentive systems to increase customer loyalty with huge success.
- 98% of people work remotely. Due to widespread adoption of Augmented Reality, physical presence is not needed anymore for the majority of jobs. For example Deutsche Bank sold it's entire real estate but provides memberships for remote co-working spaces.
- OneSocial becomes the leading social network and is used by 90% of the world population. This is promoted by ever more decreasing data privacy concerns of the population.
- Switzerland is the last country to ban manually driven cars
- Short- and long-distance transportation is simplified by autonomous Tuk Tuks and cars by AUBER, supersonic jets and, the Hyperloop.
- Global environmental pollution rises continuously and smog becomes a severe issue in every bigger city.



IDEATION

The following chapter describes five novel business models in the field. Each of the business models is described using the Osterwalder Business Model Canvas.

TEAM 1:
SIMPLANT67

TEAM 4:
MADE IT......88

TEAM 2:
CO-ENGAGE.....74

TEAM 5:
VRENA.....95

TEAM 3:
TRAVELFIT81



SIMPLANT

The body implant to drive healthy living through personalized real-time recommendations

Simplant offers a small device that is placed inside of the forearm. Measuring various body vitals and physiological markers, the device feeds this data into a recommendation service that gives real-time health related tips to the user.

Increasingly, people in major parts of the world move to urban areas in the pursuit of better opportunities. In most cases, this leads to a gradual disconnection from nature and more stressful daily lives. Especially this last factor is a major contributor to unhealthier nutrition, less exercise routines, and a more unbalanced state of mind. As people get accustomed to this lifestyle, they might not even be aware that something is wrong, or they lack sufficient motivation and knowledge to change their own habits.

Simplant offers a personalized recommendation service that is based on three components. First, a small device equipped with multiple sensors measures vitals, such as blood pressure and various chemicals, from inside the forearm. These data points give an objective insight into the well-being and health state of a person. Second, the complementary smartphone application, which receives data from the implant, gives real-time recommendations in the form of push notifications. Third, there is a closed loop recommendation engine running in the cloud. Powered by machine learning algorithms, this engine picks out the right advice based on a combination of user preferences, his state, and his current context.

The product market fit of the simplant service rests on the argument that it is truly personalized. For instance, people with a fixed working structure can synchronize simplant's rec-

ommendation-service with their calendar. Moreover, people who are not health literate will find the "fact, explanation, recommendation" structure of advised activities convincing due to the underlying rationale.

Lastly, simplant's revenue will come from three primary sources. First, the device itself will have a fixed price. As sensor prices decrease, the price for simplant's end-customers can be lowered gradually while at the same time increasing profit margins. Second, the freemium smartphone application offers comprehensive health reports to the user for a monthly surcharge. Finally, the plan is to establish a product and service ecosystem of the simplant platform. Third party service providers will pay a monthly fee based on the frequency of simplant API usage.

Business Model

Value Proposition

For end customers, simplant offers personalized eat, move, and mind recommendations in the form of smartphone push notifications. By partnering with leading sport psychologists and health practitioners, simplant builds up a large database of recommendations in the cloud. Algorithms filter out the right recommendations through real-time monitoring of the user's state and health. Furthermore, user calendar synchronization and usage of external weather and map APIs allow simplant to further offer a more personalized service for end customers.

Additionally, the push notification format of "fact, explanation, recommendation" allows users to always understand exactly why they should follow a certain health advice, thus gradually leading to increased health literacy. Through a monthly subscription, users can also see a monthly health report directly in the app. From this, customers derive additional motivation by seeing their personal progress.

Furthermore, users have ample opportunities to manually influence the machine learning algorithms, thereby controlling their own simplant experience. They can not only adjust settings, such as the frequency of recommendations, but also rate suggested activities and create new ones.

For third party application providers, simplant's API offers a great opportunity to provide own service offerings. To make it as easy as possible for developers of these additional services to get started, simplant aims to provide various software development kits (SDK) for platforms, such as iOS and Android.

Leveraging this ecosystem of services, simplant creates and sustains healthy habits for its users by continuously motivating them in a seamless, real-time and personalized manner.

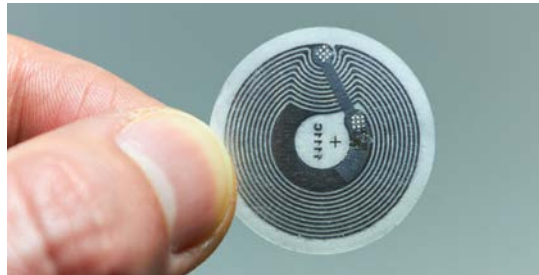
Key Partners

Our primary touch point with end customers is in the form of partner physicians. Hearing and reading about simplant in scientific publications and at medical conferences, they help to convince patients to buy the product. They also support simplant by informing the customer about the product and are responsible for implanting the sensor. To perform these activities, they go through a comprehensive onboarding process and are rewarded on a commission basis.

Further, it is important to continuously develop the sensors with the help of universities and research institutes. Recent advances in nano- and biotechnology promise the ability to not only miniaturize the sensors even more but also to improve their capabilities. To improve the complementary mobile app, simplant partners up with sports experts and psychologists to develop the recommendation engine and to study user behavior.

In order to supply the end customer with the final product, simplant outsources its manufacturing and distribution to external partners. The quality of these partners is very important to simplant: Simplant aims to work together with reliable and high quality manufacturers that are efficient in their processes, to maintain low costs.

Finally, to enter the market with simplant, it is a prerequisite to go through medical approval. Hence, simplant plans to cooperate with legal partners who facilitate this process. Upon expanding into more markets and countries, simplant will have to seek out the counsel and expertise of further legal partners local to those markets.



Customer Segments

Simplant offers value for two main customer segments. These are B2C and B2B customers.

B2C: Due to simplant's main objective of making lives healthier, the end users constitute the main customer segment. The offered service can be personalized extensively whilst still using a standardized implant. As a result, the theoretical customer group is very broad and diverse. To increase chances of a successful market entry, however simplant focuses on a more distinct target group in the short-term. This comprises technology-affine people with a strong change resistance towards adopting healthy habits. Young professionals are typical representatives of this target group. They are young, digitally savvy, and must cope with a busy schedule. In particular, Generation Y and Z are part of this customer segment as they are likely to be less reluctant towards technology enabled body implants. Given its current size and ongoing growth, this customer segment offers huge market potential with prospective future opportunities.



B2B: Third-party service providers compose simplant's secondary customer segment. They can utilize the API offered by simplant to access the collected data, tailor new services to end users and, hence, build up their own business models. This, in turn, creates additional value to the end users, since a wider range of services is provided to them. Besides, it generates additional revenue for simplant.



Customer Relationships

For B2C, the management of the customer relationships follows the customer journey – touching the adoption of the product, the retention of the customer, and the possibilities to engage. Concerning B2B customers, simplant ensures a continuous service and broad knowledge base for the integration of its API.

B2C: For the adoption of the product, it is essential to build up trust in the safety of the implant, its technology, and data privacy. Using physicians as intermediaries conveys medical safety. Further, clear communication ensures that the user is aware of the encryption of the data transfer and the security standards of the cloud. Simplant guarantees and transparently discloses that the data will not be used for other purposes. Further, physicians go through an onboarding program which provides them with all necessary information.

The customer base is maintained in two ways. First, the offered service will create intrinsic motivation. This is achieved by giving recommendations for small actions and incrementally increasing the actions' level of difficulty in order to create a constant, yet not frustrating challenge for the customer. By measuring physiological markers and analyzing the contextual data, the algorithm can predict which activity provides the most value and will advise these more often. Second, the end user is made aware of the experienced benefits and progress made, by health reports and statistics.

The physician acts as a contact person for the end user in case of emergencies, since he has inserted the implant. Simplant provides a support system for questions and improvement suggestions. For more engagement, the end users are able to co-create recommendations via a function in the app.

B2B: Lastly, simplant ensures the satisfaction of third-party service providers with the API option. It offers a software development kit and developer forum where they can exchange ideas and solutions to challenges. In case of technical problems or other emergencies, they can contact simplant's email and phone support.



Revenue Streams

Simplant is able to generate revenues from three different sources in the short term. In the future, an additional fourth revenue stream may emerge.

One-time payment: The end-user pays once for the implant when the physician inserts it. This is an upfront investment for a life-long usage of the implant.

Freemium subscription model: The freemium model of the complementary simplant app constitutes a monthly revenue stream. Customers can subscribe to a premium service which goes beyond the push-notification functionalities of the free version.

API licensing: Simplant generates revenues through the provision of an API. Third-party service providers can utilize processed data and pay monthly-fees depending on the frequency of API use.

Emerging business opportunities: Starting at market entry, simplant can build up a large database. From this dataset, new revenue opportunities may emerge in the future. These range from partnerships with research institutes to entirely new business models based on novel insights from the data.



Channels

Simplant is a combined hardware and software-solution, consisting of the implant itself and the associated smartphone app. Thus, simplant has two major channels on the B2C side, which target hardware sales on the one hand, and software sales on the other hand. In later stages, simplant will also serve the B2B market by offering an API for the utilization of the collected data in third-party services.

Simplant hardware: As most medical products, simplant is sold to end customers via physicians. Given their trusted position and their medical expertise, physicians not only serve as vendors of the hardware, but also help simplant to overcome the reluctance towards implantable sensors. To acquire physicians as business partners and to gain public trust, simplant plans to issue scientific publications and give presentations at medical conferences. Besides, simplant conducts very focused offline and online marketing activities, such as printed posters at pharmacies and posts on social media, to attract end-customers.

Simplant software: The simplant application is available at all major app-stores and provides the basic functions such as the action-recommendation system. In addition to these functions, simplant also offers subscription-based premium features and services. Customers can perform their premium upgrade within the basic version of the simplant app.

API access: After extensive data collection, the database will be a valuable source of information for third-party services like nutrition and sports apps. Thus, simplant can provide an API, which enables third parties to access simplant's cloud services.



Cost Structure

To drive the implant from theory to practice, three main types of costs arise. These consist of initial investment costs and remaining daily operational costs, which can be split into fixed and variable costs.

Initial investment costs: These include the set-up of a legal entity, the development of a minimum viable product (MVP), and the medical approval for legally inserting the implant into the human body. The development of a MVP will constitute the biggest share of initial costs. For the hardware, these costs, amongst others, arise from the miniaturization of sensors, the combinatorial placement of sensors in one implant, and multiple trial experiments to ensure product functionality and safety. In addition, a machine learning algorithm needs to be developed that interprets and converts the generated implant data into personalized recommendations for the customer on his smartphone.

Fixed costs: Fixed costs can be further disaggregated into two main areas. On the one hand, additional R&D investments need to be made to continuously improve the status quo of the implant. On the other hand, simplant needs to achieve a sufficient operational infrastructure. This entails investments in office space, work equipment, and IT infrastructure. Since simplant's manufacturing is outsourced, there will be little to no fixed costs regarding the hardware production.

Variable costs: Lastly, variable costs consist of four groups. First, flexible contracts with manufacturing and distributing partners need to be set up. Second, sales and marketing activities focus on forming an appropriate network of physicians, who function as the main distribution channel, and on creating awareness of simplant in the public. Third, physicians are rewarded with a share of the revenue generated from selling implants. Lastly, personnel costs represent comparably smaller variable costs.



Key Activities

To maximize market potential, four activities should be emphasized. These are especially critical to simplant's future success.

R&D: A high-quality R&D process is a prerequisite to ensure long-lasting success. Experimentation on the hardware product mostly focuses on measuring additional body vitals. In turn, the software R&D process uses the gathered data to come up with the most suitable recommendations for the customer. Recommendations are personalized based on user health, fitness, contextual data, and personal preferences.

Product ecosystem: A strong focus on setting up and maintaining the product's ecosystem is required. In this context, the product ecosystem consists of three areas. First, all generated data is stored in the cloud. Second, to maximize personal recommendation quality, simplant gathers as much data as possible from the surroundings of the person at any given time. This data ranges from local weather data, over GPS location, to the synchronization of a personal calendar. Third, to further enhance recommendation quality, third-party service offerings are integrated via an API in the form of new apps.

Safety: Next to a highly functional product, it is a basic requirement that simplant introduces strict quality standards to create high customer demand and trust. This includes upholding medical standards to guarantee safety when inserting an implant into the human body. Further, encrypted data transfer and secure data storage to eradicate any data privacy concerns need to be implemented. This also means that the API access will only be granted after prior authorization through the simplant customer and will be restricted to data which is related to this very individual.

Marketing and sales: Marketing channels need to be selected wisely to build up a strong brand reputation and customer trust. Therefore, releasing scientific publications or presenting the product at renowned technology conferences could be a suitable solution to communicate the product benefits to potential customers. In addition, physicians must undergo an onboarding process to be educated about the implant and its benefits and drawbacks so that they can convey these to their patients.



Key Resources

There are three main key resources for simplant: Human capital, the customer database, and the recommendation algorithm.

Human capital: As simplant offers a complex product combining a hardware and a software component, skilled human capital must turn the product vision into reality. Hence, the knowledge and expertise of its employees represent a key resource for the company. Hardware developers are required to create the implant with its multiple sensors. Software developers need to develop a comprehensive machine learning algorithm that converts collected data into personalized action-recommendations. Additionally, they need to establish a complementary smartphone application. In collaboration with the marketing team, a strong focus is placed on an intuitive user interface and easy to understand data visualization. Furthermore, access to physicians and key partners means that simplant can build up a comprehensive knowledge base about healthy habits in terms of nutrition, movement, and mindfulness.

Algorithm: The recommendation algorithm lies at the core of the value proposition to customers. Thus, continuous investments into additional improvements are important to manifest itself as a key resource.

Customer database: Over time, simplant can generate large amounts of data, opening up multiple opportunities for further growth. From the start, simplant plans to integrate third parties that capitalize on simplant's generated data to provide customers with additional quality service offerings. Once simplant has established itself as a key market player, it may also think about partnering up with research institutions by providing them with anonymized data. Continuous analysis of the generated data is useful for both improving the simplant app as well as identifying new business opportunities.

Scenario Fit

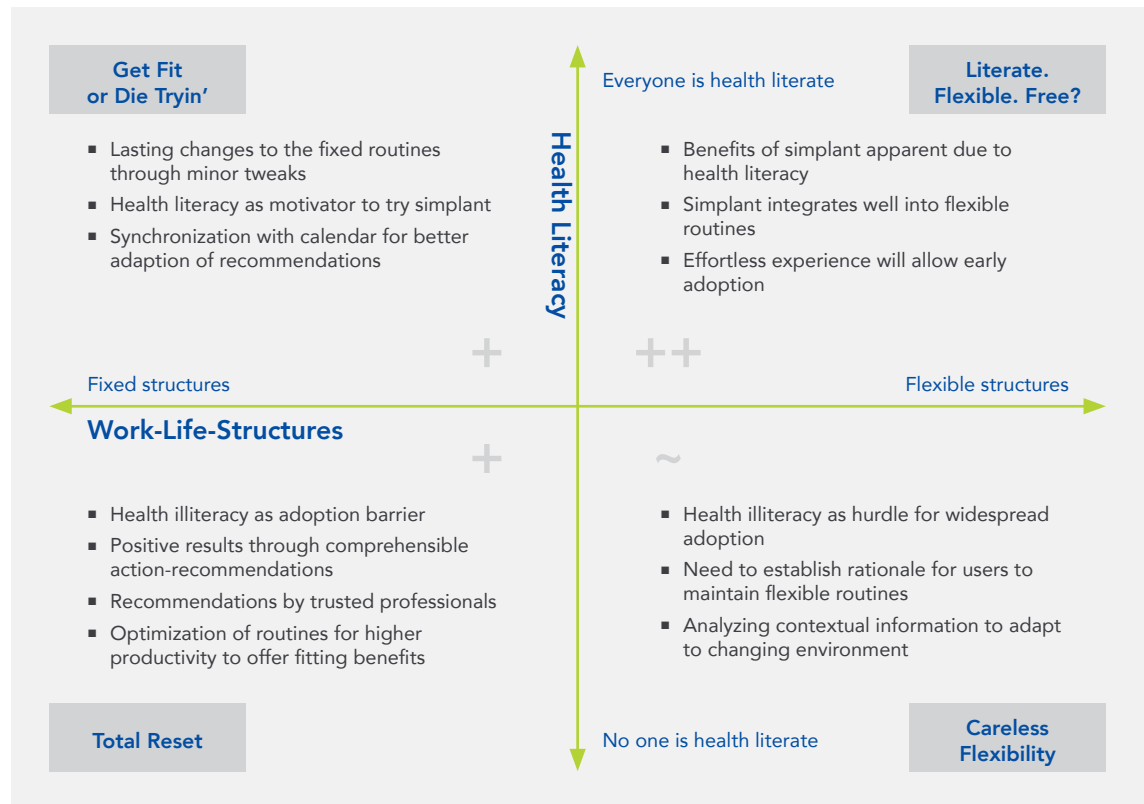
Literate. Flexible. Free? People living in a health literate society will be able to see the benefits of a health focused product like simplant. They will be interested in a product that can be integrated well into their flexible routines by automatically adapting to what they are doing. This will magnify simplant's impact in this scenario. Given people's high health literacy, perceived product benefits outweigh the reluctance to body implants. A personal circle of healthy friends and family and the minimal manual intervention required will make simplant an attractive product for change resistant people. Also, simplant's real-time integration with varying routines will allow them to keep on using it. Simplant will bridge the gap between knowledge and action, which will enable people to put their health literacy into effect.

Get Fit or Die Tryin'. Living in a health literate society with fixed routines, people will know the benefits of living healthy but will be reluctant towards a solution that effects their set routines. Therefore, simplant's ability to synchronize with the user's calendar and to take stress levels into account will enable it to have a rather positive impact in such an environment. Health literacy will drive people to try simplant. Moreover, simplant's ability to incrementally introduce healthy activities to the user's routine will attract change resistant people. Suited tweaks over longer time-spans will enable lasting changes to the fixed routines, ensuring that healthy habits are sustained. Therefore, a seamless introduction of healthy habits into customers' lives will allow simplant to be effective.

Total Reset. In this scenario, health illiteracy and fixed routines will offer a higher barrier for simplant to be widely adopted but will simultaneously open up new opportunities. People with a lack of health literacy might not be able to independently realize the consequences of and remedies for their unhealthy lifestyles. Therefore, simplant's focus on providing easily comprehensible action-recommendations will help yield positive results. Due to simplant's "fact, explanation, recommendation" push notification format, users will get increasingly health literate. In addition, change resistant people will be convinced to try simplant through recommendations from professionals they trust, such as doctors. Furthermore, simplant takes over the task of understanding users' own body state and enables them to incorporate new healthy habits into their fixed routines. This benefit will help in retaining new users of the product.

Careless Flexibility. In a society characterized by health illiteracy and flexible work life structures, simplant will face hurdles in having a vastly positive impact. Health illiteracy will prevent people from realizing the direct and long term benefits of such a product. Also, due to flexible routines, it will be relatively difficult to establish continuous touch points to motivate people to try the product. However, simplant will be able to use these challenges as opportunities to some extent.

Simplant's ability to incorporate various types of contextual information, such as weather and location, will help it to adapt recommendations so that they fit the unfamiliar and constantly changing environment. Therefore, instructions will be easily implementable in every flexible life situation. Furthermore, once the initial barrier is crossed, the product will serve to create health literacy, thereby ensuring that any developed habits are understood and sustained over time.

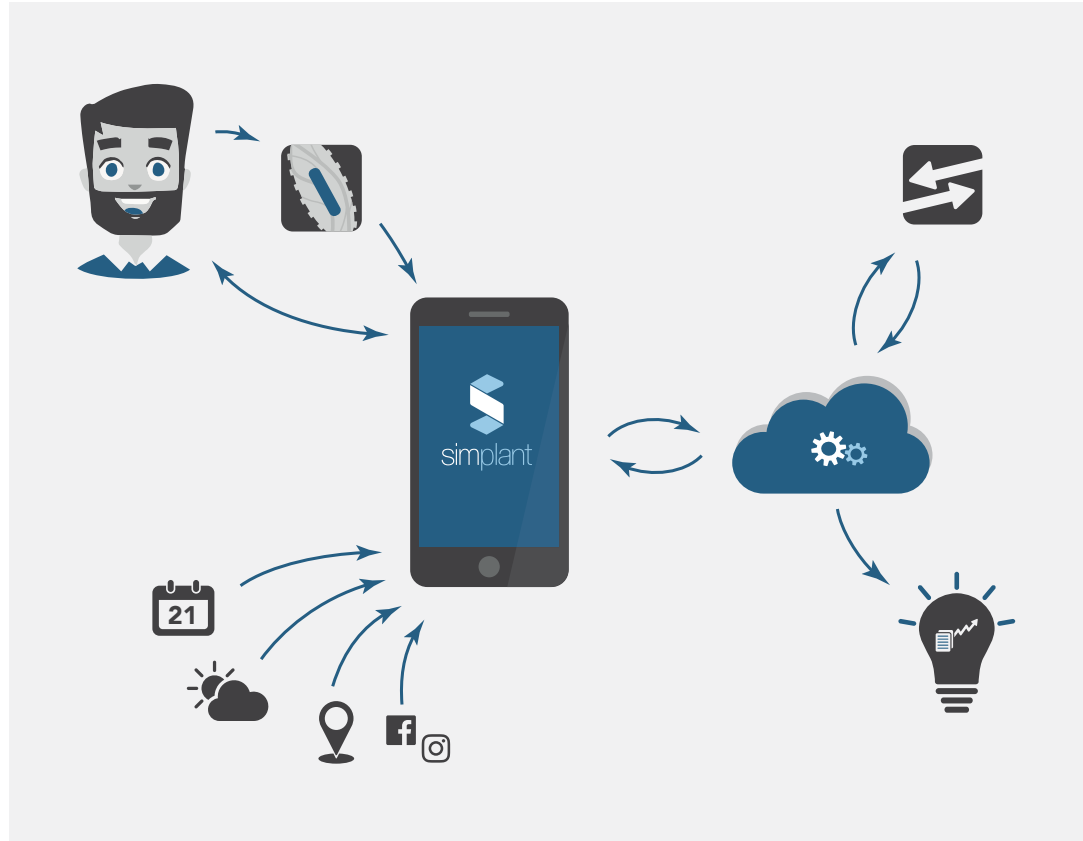


Challenges

- Overcoming the general reluctance towards technology-enabled body implants might be a major hurdle.
- Simplant will have to cope with relatively strict regulatory laws about healthcare.
- Customers might have data privacy concerns, hence it is crucial to implement secure encryption.
- Simplant might lead to increased digital immersion as opposed to digital detox. Ensuring interaction that focuses more on healthy living and less on the technology is important.
- It is critical to display the safety of implanting sensors in one's body.
- The solution relies heavily on hardware miniaturization of sensors, wireless modules, processors and batteries. Any stagnation of R&D in the field will have a direct effect on the product itself.
- Simplant will require a strong R&D focus to come up with smart algorithms, which not only detect the physical, mental, and dietary state of the user but also translate that knowledge into implementable healthy activities.
- An easy placement and removal technique will need to be developed to simplify the process for both the physicians and the users.

Outlook

In the future, simplant will see a steady transitional journey towards improved accuracy, increased personalization, and diversified monetization strategies revolving around the three core components: Implant, app, and cloud. In the short-term, simplant will use existing technologies to infer meta-level emotional states and body indicators, which will be used to offer personalized recommendations. Moreover, the implant will be placed in the subcutaneous layer. In the midterm, the miniaturization of hardware will allow simplant to place its implant in the bloodstream, thus allowing real-time measurements of hormones, thereby increasing the accuracy and ability to detect micro level emotions. At the same time, after hitting the critical mass, the cloud-based data and its processing will open major opportunities for data analytics and scalable monetization. Finally, on the hardware front, simplant will become a network of multiple nano-scale implants in the long run. Furthermore, the cloud/API will enable a whole ecosystem of personalized applications. To sum it up, simplant will adapt well to future developments instead of struggling with them.



CO-ENGAGE

Multi-sided booking platform for healthy activities including a buddy and reward system.

Time spent at work represents a significant part of people's lives and the workplace functions as a key determining factor in the sustainment of a healthy lifestyle. The core mission of Co-Engage is to help employees within companies to create and sustain healthy habits together. The solution is a platform where employees can create and book events, as well as invite colleagues to join them. These activities range from two-person activities such as tennis and squash to group activities such as yoga or running. On the platform, users can join existing activities or create new ones. Optionally, employees from different companies can collaborate or compete against each other.

As a core function of the platform, employees receive activity credits for joining various activities, inviting colleagues, and creating new events. To spur peer engagement and the cre-

ation of habits for sedentary employees, the fewer events an invited user has attended in the recent past, the more activity credits the inviter or the creator gets if he/she takes part. Further, the platform suggests new activities to users who tend to engage in one kind of activity predominantly. For example, the system might recommend a yoga session to a user who has only been running in the last weeks. An underlying algorithm assigns more activity credits to individuals who have variety in their sports engagement.

Users can trade the gathered credits for sponsored products from key external partners, coupons on sports apparel and gear or internal company incentives. The activity credits system inspires the creation of habits and offers an initial spark for action. Receiving points for encouraging others to take part in activities further incentivizes the creation and sustain-

ment of habits in a community setting. While most events, like running, are free, activities that require sports facilities are booked directly by the user using Co-Engage coins. The coins are available for purchase within the Co-Engage marketplace.

As an advanced functionality, users can also book coaching by personal trainers on the platform, for which they again receive activity credits. Furthermore, through a buddy system, users can be paired with other colleagues to increase motivation and provide a layer of responsibility and external oversight. Having the right sports buddy and efficient means of communication is essential in sustaining healthy habits. Therefore, the buddy matching is conducted via an algorithm taking into account gender, age, current fitness level, goals, and activity preferences.

Co-Engage

sports at work - for life.

Business Model

Value Proposition

Co-Engage's core mission is to motivate employees to do sports activities. Primarily, it offers a booking platform where users can easily book and schedule sports activities. They can join an activity that was set up on Co-Engage or create their own sports events and invite their co-workers. By introducing Co-Engage to their employees, companies can foster team spirit by creating own events and save money as they will face less employee sick days and better work engagement due to an overall better level of health.

Co-Engage targets people who already do sports as well as those that do not practice an active lifestyle yet. No matter whether users prefer to do sports alone or in a group, Co-Engage enables them to find a suitable sports buddy. Through a personalized matching algorithm, Co-Engage matches users based on their level of fitness, age, interests and overall lifestyle. Sports buddies are not forced to exclusively do activities together. The focus is to jointly set up individual goals and get information about what activities the other buddy is doing. Thereby they can motivate each other and give advice on how to perform better or what to do to reach their goals. The buddy system is meant to increase motivation and to create a layer of accountability.

An intelligent algorithm provides users with recommendations for activities based on their individual health status. With detailed information about performed activities, it will be easier to support them in making progress.

Co-Engage users receive activity credits for creating events, booking activities and inviting users to them. The credits can then be exchanged for vouchers on sponsored products or can be exchanged for Co-Engage coins.

Fitness coaches benefit from easy access to customers. By having a rating and recommendation system, Co-Engage ensures that users get a suitable coach.

Through cooperation with Co-Engage, sponsors obtain another valuable customer touch point where they can target their customers individually and offer coupons for which they will receive a high conversion rate.

Customer Segments

As Co-Engage is a multi-sided platform, it addresses a variety of clients. These are categorized into the following segments:

Platform users: Users get access to Co-Engage through their employer. This segment is crucial to Co-Engage since the users spend money on booking activities and coaches as well as interact with the sponsors by redeeming the activity credits they gather.

Private coaches: Coaches use Co-Engage to find new customers. Users can book coaches for single events or on an individual basis through the platform's virtual coin currency. In turn, coaches share a percentage of their revenue with Co-Engage.

Sponsors: Sponsors are critical to Co-Engage as they provide attractive incentives which are offered to the platform users. Vouchers on products such as apparel or sports gear are crucial to keeping the reward system interesting to the users.



Customer Relationships

Co-Engage aims to establish long-term relationships with all of the customers through various lock-in effects.

Users: Platform users are at the very heart of Co-Engage. They gain free access to the platform as part of a company-wide registration and thus can find all their colleagues on the platform from the start. By providing an easy tool to organize events, discounted access to sporting facilities, various incentives, as well as a buddy system and personal coaches through the platform, employees and their company will see a significant benefit in Co-Engage. By routing payment for activities and personal coaches through the platform as well as the ability to use gathered activity credits to get rewards, users get a unique user experience.

Partners: Partners engage with the platform to provide access to sporting facilities. Co-Engage provides them with free access to a large customer base and does not charge them, but negotiates deals for lower prices, encouraging users to book through the platform instead of going to the partners directly.

Private coaches: Private coaches use the platform to get access to a large user base of potential customers. They can be booked through the platform. For each booking through the platform, Co-Engage receives a small fee.

Sponsors: Sponsors provide appealing incentives for the users, such as price reductions for products and services, in exchange for credits gathered by attending activities. Sponsors in return gain access to a large potential customer base which is interested in sports and health related products and thus guarantees a high conversion rate on the offers made by the sponsors.



Channels

As Co-Engage needs to collaborate with businesses to get access to their employees, companies are the most central channel for reaching potential platform users. By establishing partnerships with businesses, Co-Engage benefits from the already existing communities of employees. Companies will be reached through marketing initiatives at conferences, trade shows, social media as well as direct mailing and company visits.

During the introduction of Co-Engage to the market, the focus will first be on large corporations as the aim is to build up the platform user base quickly. Later on, Co-Engage will also target smaller companies. Additionally, to enhance the awareness of Co-Engage and increase the use within a company, Co-Engage will support companies' internal marketing efforts. Companies are an important partner because they fulfill the function of a multiplier that leads to lower marketing and user acquisition cost. Businesses will benefit from the introduction of Co-Engage on various levels such as internal and external reputation or an increase in productivity and creativity of their employees. Therefore, it is likely that they will be open to promoting the platform internally.

In the beginning, it is also necessary to get into direct contact with sponsors and fitness coaches to make them aware of the benefits Co-Engage can offer to each sponsor and partner. Successful collaboration with companies and a large user base will lead to a decreasing need for initiatives to raise the awareness of enterprises, partners, and sponsors.



Key Partners

Among the key partners are the companies that are already looking into implementing effective health and wellness programs for their employees. Since the platform is provided on a free basis, the companies serve as the main facilitator between Co-Engage and their employees.

Another key partner of the Co-Engage platform are the sports facility providers. Gyms, tennis courts, and similar venues allow the events to take place on suitable premises. In return, the facility providers get access to their potential clients through the platform. The users can get free trials of the activities, book singular activities as well as memberships for a discounted price. The provided discounts and availability of free trial periods are negotiated with each partner separately.

Furthermore, certified personal coaches are imperative to Co-Engage. Users can book coaches for their chosen activities. The coaches, in turn, get exposure to new clients through the platform, while also sharing a percentage of their revenues with Co-Engage. To prevent the users from employing the coaches privately after they make the first contact, the users earn additional activity credits for conducting the booking through the Co-Engage platform.

Users can trade the earned credits for special offers and price reductions. Sponsors and partners such as sports apparel and equipment companies have the possibility to offer vouchers and promote their products through Co-Engage. Their partnership is essential to keep the reward system versatile and engaging for the users.



Key Activities

The product development roadmap aims at providing users with a smooth experience within the Co-Engage ecosystem. After the setup of the platform and the establishment of a broad partner network, Co-Engage can be marketed and offered to companies. With an increasing number of users, the platform will be continuously improved and extended. The focus in the first years is to grow the user base as fast as possible as the user experience on the platform will improve in quality with a rising number and variety of activity offers as well as more private coaches and potential sports buddies.

Setup and development of the Co-Engage platform, a web, and a mobile client: At the very beginning stands the development of the platform with its different core features. Among these are the booking functionality including sophisticated fraud prevention measures, user profiling, the buddy system and the Co-Engage activity credits system. Further, an integrated web shop is provided for redeeming incentives. The platform can be accessed through the web and mobile clients on the most common operating systems. Co-Engage will also integrate with the existing booking solutions of partnering sports facilities.

Establishing a network of partners: Choosing suitable local facility providers and developing close partnerships with them is key to offering a large variety of sports activities on the Co-Engage platform. It will be necessary to negotiate contracts and conditions that enable individual visits without long-term commitment and full memberships at a reduced price. Preferably, they should have an internal booking platform with which Co-Engage will integrate. Secondly, relationships with different companies ranging from sports apparel producers to insurance companies have to be formed to realize sponsorships and provide an attractive and broad set of incentives.

Outreach and marketing to companies: As soon as the Co-Engage platform is set up and a sufficient network of partners is established, outreach and marketing to companies can start. This can be done through different channels. Targeting the product to the work environment allows promoting adoption among a large number of potential users. In order to support the onboarded companies in internally raising awareness about Co-Engage among their employees, marketing material will be provided.

Continuous evolution and improvement of the platform: In the long run, apart from technical maintenance, Co-Engage will closely cooperate with the integrating companies in order to find the right feedback channels. A further aim is to continuously improve the experience as well as the customer service. The recommendation engine for activities and buddies will become more accurate with an increasing amount of underlying data that Co-Engage will collect.

Key Resources

To build the initial Co-Engage platform, as well as to support and extend it, skilled staff is the first resource to take into account. An experienced team of full stack and app developers to build and support the platform and the app, as well as data engineers to incorporate the buddy, coach, and activity recommendation systems are required. Marketing experts, as well as a dedicated sales department, will work on attracting new users and closing partnerships.

Another key resource is the platform user base. The main emphasis of Co-Engage as a product is on acquiring new users through companies that are interested in providing health and wellness programs to their employees. They introduce the users to the Co-Engage network.

The reward system and the partners and sponsors that enable it are valuable resources as well. To create the lock-in effect, the users receive activity credits for their active participation in sporting events and for encouraging others to take part in the events they create. The credits are then spent on rewards that include special deals and discounts.

The fraud prevention system is a valuable resource to keep the users from cheating in the activity credits acquisition. Available solutions that use GPS data, Bluetooth Low Energy, and Wi-Fi networks together with the sports facilities enable a reliable check-in functionality via the smartphone app to assure honest usage of the platform.



Cost Structure

For the development of the platform, and establishment of partnerships, Co-Engage has to front initial costs. After having set up the platform and the first partnerships, further fixed and variable costs will occur.

Initial costs: An initial budget is required to build the platform, develop underlying algorithms, and establish partnerships with companies, sports facilities as well as sponsors. To develop the basis for the intelligent algorithms, Co-Engage will need to work together with sports and health experts who also need to be paid up-front.

Fixed operating costs: The fixed costs consist mainly of personnel costs and IT administration costs. Staff will be required for marketing and user support. Additionally, to allow for scalability Co-Engage needs to make use of cloud hosting services. Maintenance costs will arise to incorporate user feedback and steadily improve the platform. Thereby users will experience an easy, user-friendly product.

Variable operating costs: The goal of Co-Engage is to deliver the best customer experience. In order to meet customers' high expectation, Co-Engage needs competent staff in the field of IT, user experience, sports, and psychology. Marketing activities focus on conferences and trade shows. Once the Co-Engage platform is running and with an increasing number of platform users, benefits from economies of scale will come into play.

Revenue Streams

Co-Engage relies on two sources of revenue, sponsorship deals and transaction fees from personal trainers on the platform. As the value of the platform rises with the number of active users, no charge is put on the companies that chose to participate or the employees within these companies. This ensures low hurdles and low external pressure while fostering the attraction of a large user base. With a critical mass of users on the platform, other revenue streams can be established.

Sponsorships: The first source of revenue is sponsorships. Sponsoring companies agree to offer users of the platform vouchers for their products. The discounts are given out to users in exchange for the activity credits they collect on the platform. In order to get access to the platform, sponsors will be charged a fee. In return, they get touch points with the customers on the platform.

Transaction fees from health professionals: Another source of revenue stems from the extra services offered on the platform. Co-Engage offers health professionals, such as nutritionists and personal trainers, access to the platform and its users. Just as other platform users, the health professionals will be able to access the platform for free. Thereby, coaches and users can interact and book sessions. When employees on the platform book these sessions using the Co-Engage coin system, a small percentage of the transaction will be taken as a fee.

Scenario Fit

Literate. Flexible. Free? Flexible working structures might present difficulties in regards to employees finding suitable colleagues with whom to do activities. This is particularly relevant if every employee works at home and perhaps even in different cities and countries. A problem for companies in this scenario is building a community when employees rarely see each other. In this case, Co-Engage fulfills a key function. Employees that live in close proximity to each other can use the app to do sports together. This, in turn, will help build team spirit. In this scenario, the high level of health literacy further drives that point. Because of that, employees know the value of working out, especially in groups. Therefore, they are more likely to use the platform, take active steps to meet their colleagues, and interact more with their buddy. This supports the creation of a community.

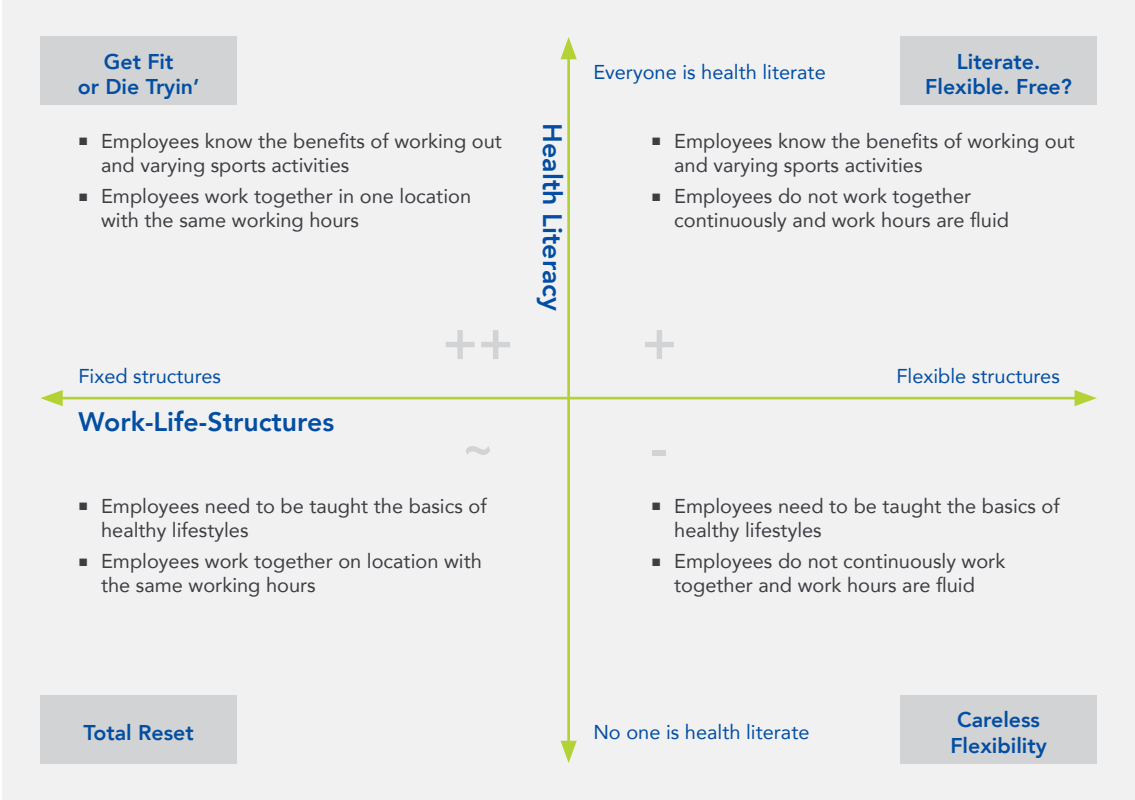
Get Fit or Die Tryin'. A situation in which everyone is health-literate and works in rigid work-life structures represents a good situation for Co-Engage. With everyone knowing about the benefits of an active lifestyle, more people would take an active part in the platform and motivate colleagues to stay active. With health literacy also comes knowledge about the benefits of different forms of healthy habits. With this knowledge, the platform's suggestions on varying activities will most likely be more followed. Finally, the buddy system will be most efficient in this scenario as buddies can focus on motivating their counterparts. On the one hand, fixed work-life structures make it generally harder to work out during office hours, although on the other hand, they make it easier to shut off work after the working day is over and focus on healthy activities. Likewise, fixed structures make it possible to find nearby colleagues with whom to routinely participate in activities.

Total Reset. If no one is health literate, the buddy functionality of Co-Engage loses some of its value. In this scenario, the buddy roles are taken over by other users of the platform who do not have health knowledge. Furthermore, there is a lack of intrinsic motivation. Therefore, the initial extrinsic motivation of receiving activity credits for booking coaches and working out is important. Users get credits for both taking part in activities and booking health coaches, which improves their health literacy. The employees who increase their health literacy receive further credits by inviting colleagues to activities and a snowball effect is started. The result is increasing health literacy and the sustainment of habits. Fixed work-life

structures support this effect, as colleagues who are working together in a habitual manner could more easily motivate each other to create fixed habits.

Careless Flexibility. With low levels of health literacy and no boundary between work and life, the creation and sustainment of healthy habits are tough. There will initially be less engagement on the platform to work out together with colleagues as well as no easy way to continuously interact with each other. Additionally, the buddy system will be unable to efficiently motivate other users. However, the activity credits for booking coaches and taking part in activities pro-

vide initial extrinsic motivation to employees. With increasing health literacy thanks to coaching, the system allows for a snowball effect of motivation as employees also get credits for inspiring others to become active. Likewise, in this scenario, Co-Engage fills an important function for companies. With poor health literacy and possible low team spirit due to flexible work structures, companies become very interested in both lowering high healthcare costs as well as increasing community engagement.



Challenges

- Reaching a critical mass of users to build an active community in the beginning.
- Getting access to as many sports facilities as possible to have a variety of sporting activities available on the platform.
- Fraud prevention: Block ways of cheating the system to receive more credits.
- High-quality recommendations of buddies to provide the users with a suitable partner.
- Scalability: Expansion to new cities which require new partner networks.
- Robust IT infrastructure.

Outlook

Co-Engage as a platform gives users of all fitness levels an easy and rewarding way to engage in sports activities. Due to workplace stress and chronic diseases, costs for health care are rising, and employers are increasingly interested in keeping their employees healthy. For this reason, the Co-Engage platform has much potential for growth. With a steadily increasing user base, Co-Engage will focus on improving the recommendation algorithms. Based on the gathered data, big data analytics will allow for advanced user models, leading to better suggestions of the buddy system as well as improved suggestions for activities and coaches.

Through future partnerships with insurance companies, Co-Engage users will have a choice of securely incorporating their private health data for better health analytics and the possibility of allowing their doctors to monitor the state of their health. The experience can be further improved through future partnerships with existing health analytics solutions, such as IBM Watson Health. Finally, integration of precise tracking technology, for example, existing fitness trackers, will make it possible to evaluate a user's level of activity and status of overall health more precisely.

In the future, Co-Engage can serve as the main booking platform of sports activities for many facility providers that do not have any digital booking solution. Co-Engage will play a crucial role in fostering healthy habits originating in the work environment and contribute to a healthy society.



TRAVELFIT

Helping people to discover healthy spots around the globe

People tend to engage in unhealthy behavior while traveling. Even those who manage to sustain healthy habits at home oftentimes cannot maintain a healthy lifestyle when they are away. For leisure travelers, this is often due to a lack of convenience. For business travelers, additional stress and a lack of time often do not allow for planning ahead and searching for healthy restaurants or sports facilities.

Travelfit solves this problem by enabling travelers and residents to live a healthier life without adding a single item to their to-do-lists. The app helps users discover healthy restaurants and fitness activities in urban environments. Thereby, it adds value for both the users as well as the restaurants and sports facilities they visit.

Travelfit has four main functionalities. Firstly, users are provided with two separate lists of nearby restaurants and fitness activities. Secondly, users can use the Travelfit map to look up the location of places around the city. Thirdly, based on users'

current location and time of the day, they get personalized push notifications that recommend venues in their proximity. Finally, Travelfit also allows for meetings with other users via the platform.

For higher transparency and credibility, the app offers user reviews and health verification of restaurants. Reviews are generated by the users of Travelfit. Since there will be no user base upon launch of the product, ratings and reviews will be obtained from third party application programming interfaces (APIs) and web scraping during the ramp-up phase. Health experts evaluate restaurants according to various criteria and in line with WHO guidelines, thereby providing users with a verified standard for the healthiness of restaurants. Sports facilities, such as gyms or swimming pools, are also reviewed

by users. Based on their preferences, users get suggestions for fitness activities in their surrounding and can sign up for mini-sports-memberships at the sports facilities of their choice.

The app is free for all users and revenue is generated from business customers. Revenue is generated from advertisements of verified restaurants and sports facilities, a customer loyalty program, and mini-sports-memberships. Looking forward, more features, such as a jet lag calculator and calendar integration, shall be added, thereby increasing convenience and providing business customers with an even smarter platform to target a growing user base.





Value Proposition

Travelfit's mission is to help users find the healthiest spots in the city effortlessly. Hence, the app provides value to both the users as well as the healthy restaurants and sports facilities they visit.

Users: Discovering healthy restaurants and possibilities to engage in physical activity has never been as easy as with Travelfit. Using algorithms and information about the users' goals and preferences, the app makes individualized suggestions. Thereby, the user saves time when searching for the best location to have the next meal or workout – whether abroad or just in an unknown part of town. Travelfit makes health-conscious decisions as convenient as a quick stop at the fast food restaurant next door. Independent of how familiar users are with a venue, Travelfit enables them to make trustable and healthy choices anywhere, anytime. Through special offers from Travelfit's business customers, users also get discounts on healthy food and sports activities, making a healthy lifestyle more affordable. Moreover, users receive information about how their nutritional decisions affect their overall health and personal goals. This increases health awareness and thereby reminds and empowers them to maintain healthy habits in the long term. Finally, users can decide to engage in health-related activities collectively, thus making the restaurant visit or the daily run a more fun and rewarding experience. Travelfit's algorithms match users based on their goals, preferences, and location. The common interest in becoming and staying healthy decreases the barrier between users to meet up.

Business customers: Business customers on the platform benefit from users who discover them through the app and then visit the restaurant or gym. As a user's data determines the recommendations he gets on restaurants and sports, conversion rates are expected to be higher than with existing solutions. Consequently, Travelfit enables business customers to generate higher revenues. Entries on the platform are trustworthy and thus, restaurants and sports facilities listed on Travelfit can profit from reputational benefits.



Key Partners

Travelfit cooperates with a multitude of external partners to accomplish its mission, including health experts, sports facilities, and corporate partners.

Health experts: To evaluate the healthiness of restaurants, Travelfit partners up with health experts. Experts are individuals who work or study in a health-related field such as medicine, nutritional science, or physical education. Travelfit provides them with guidelines to assess the healthiness of restaurants, including factors such as the ratio of healthy to unhealthy meals, the quality of ingredients, and use of fats and sugar. Thus, these health experts contribute immensely to the trustworthiness of the platform. As they are not direct employees of Travelfit, health experts do not receive a fixed salary. Instead, Travelfit rewards them with discounts on restaurants of their choice that are on the Travelfit platform.

Sports facilities: Sports facilities play an important role in generating value for Travelfit users who would like to engage in physical activities. Through partnerships with gyms, swimming pools, and squash courts, among others, an extensive network of sports facilities can be established. By negotiating flexible contracts with these providers and offering network-wide memberships, Travelfit enables users to stay physically active, independent of where they are.

Corporates: Corporate partners represent an important stakeholder group. Especially in industries where traveling is common (e.g. consulting, see also channels), they may find that company-internal adoption of Travelfit could positively impact employees' well-being and productivity. The acquisition of users through the collaboration with corporate partners poses an interesting opportunity for entering the market of frequent travelers.



Key Activities

As a modern-day guide to healthy food and activities, Travelfit has touchpoints with both the users as well as the restaurants and sports facilities on the platform.

Evaluation of restaurants and sports facilities: As a recommendation platform, the rating of restaurants and sports facilities constitutes an essential part of Travelfit's value proposition. Travelfit offers two types of ratings: User reviews of restaurants and sports facilities as well as health verifications of restaurants. User reviews tend to address the general likeability of a venue, based on factors such as atmosphere, quality of service, and value for money. Besides user reviews, restaurants additionally undergo verification from health experts to ensure that only those restaurants complying with the Travelfit health guidelines appear on the platform. The guidelines are based on WHO standards. There is no health verification for sport facilities since rating the healthiness of gyms and other sports facilities would not result in a useful measure. As there are no health evaluations or user reviews available in the beginning, the algorithm will use data from web scraping and third party APIs from services such as Yelp and TripAdvisor as a first indicator. It will gauge the healthiness of restaurants based on third party reviews and 'healthy' tags (terms appearing frequently in health context). Only restaurants that are rated healthy based on this preliminary assessment will be shown in the app. Later, health experts will verify the restaurants' healthiness.

Acquisition of business customers and partners: Businesses offering health-related services can advertise and get suggested to nearby users via the app. They can also promote special healthy offers exclusively through the platform, thereby creating a loyal user base. Partnerships with sport facilities allow customers to opt for short-term memberships. Acquisition of both types of business customers forms a key part of the business model.

Developing and maintaining recommendation algorithms: Improving and maintaining its algorithms qualifies as a key activity since creating suggestions tailored to the needs of the user is one of Travelfit's strongest selling points.

 **Customer Relationships**

Travelfit makes healthy choices convenient for users and helps business customers to increase their customer base. Both groups require different kinds of customer relationships.

Users: For Travelfit’s convenience-based model to work, the interaction of users with the app must be an intuitive and frictionless experience. In order to achieve this goal, Travelfit uses an automated system to provide users with personalized suggestions based on multiple factors such as user location and preferences. Additionally, as users can contribute reviews and ratings, they act as co-creators of the network. Thereby a platform is established that the user base can trust in. Finally, the Travelfit platform encourages the formation of user communities and thereby increases the long-term motivation to make health-conscious choices. Users can meet up to engage in health-related activities or simply have a good time together.

Business customers: The relationship with business customers is more personal. Health experts approach them in order to assess their suitability for Travelfit’s network. While business customers primarily use the website to inform themselves about Travelfit’s product proposition, the starting point of the relationship is often the conversation with the health expert. This way Travelfit can build greater trust and set itself apart from services, which solely rely on user reviews.



 **Customer Segments**

With users and businesses, Travelfit is addressing two major customer segments. Users can be subdivided into frequent travelers, urban nomads and permanent residents.

Users – frequent travelers: Among travelers, Travelfit primarily targets smartphone users who manage to sustain a healthy lifestyle at home, however, struggle to maintain these habits when traveling for work. Travelfit caters to multiple demographics and psychographics, including veteran travelers and high-performers, such as senior managers in their 40s and 50s or consultants, as well as career entrants, i.e. newcomers in their 20s and 30s who travel for training and development. As an additional user group, Travelfit also provides value for frequent leisure travelers who struggle with maintaining their health routine when going on vacation.

Users – urban nomads: Urban nomads engage in a diverse lifestyle and stay in cities, however not for prolonged amounts of time. Confronted with a constantly changing environment and a lack of fixation in their daily lives, they may find it difficult to sustain healthy habits. However, open, variety-seeking, and tech-savvy as they are, they will find good use of a convenience app that empowers them to engage in a healthier lifestyle, independently of where they go.

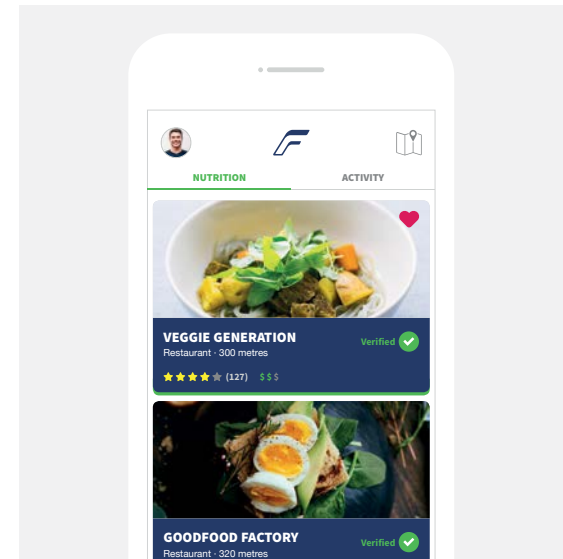
Users – permanent residents: Permanent residents are targeted as an additional customer group. While they tend to be more aware of healthy restaurants and sports facilities in their proximity, users may still benefit from a platform that provides them with personalized and trustable health guidance.

Business customers: Business customers can be subdivided into restaurants and sports facilities. Primary customers include restaurant franchises with a proven health record in major urban travel hubs (e.g. “dean & david” in Munich and Berlin) as well as single restaurants where good nutrition can be assumed (e.g. vegetarian, or vegan food). Sports facilities could benefit from increasing their customer base, especially when capacity utilization is low, for example during holidays and summer months.

 **Key Resources**

Infrastructure: The platform, which consists of the backend for the app and the user interface, is the basis of the application. Travelfit differentiates itself from existing solutions through its algorithms that allow for much more personalization of recommendations and offerings. Third party APIs provide the locations of restaurants and sports facilities. Data from third party APIs is also useful for assessing the healthiness of restaurants which have not been reviewed by health experts yet. It serves as a valuable resource for initially ramping up the business when there are no user reviews or expert verifications available.

Data: Location data and user reviews of businesses play a crucial role in the personalization of suggestions for users. The health verification data of restaurants is the key to the success of the business as it assures high reliability and credibility of the healthiness rating. User data is not only useful for suggestions but also allows for socializing, as it helps link up users with similar preferences and goals.



 Channels

Travelfit employs a series of measures to create awareness among customers. The aim is to positively influence the value perception of the restaurants that are listed on the platform and to enable a smooth delivery of the service to users and business customers alike.

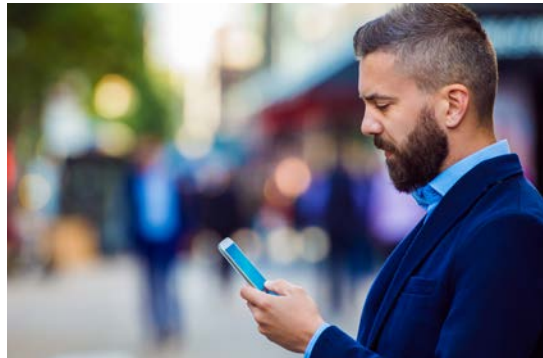
Acquisition of users: Awareness among frequent business travelers can be raised through partnering with their employers. Frequent traveling can result in stress and fatigue. Especially in industries where traveling is common (e.g. consulting), companies may find that adoption of Travelfit could mitigate the impact of frequent traveling on employees' well-being and productivity. Among urban nomads and residents, the cooperation with influencers and bloggers as well as repeated sharing of Travelfit content on social networks could provide an impulse for creating awareness and positively affect the value perception of listed restaurants. Targeted advertising on travel-related websites and social media, as well as app store optimization would increase the outreach of the service. The user's smartphone is the main tool for Travelfit's value delivery.

Acquisition of business customers: The value business customers can draw from advertising on Travelfit is highly dependent on the number of users the app attracts. The establishment of a sufficient user base is a precondition for raising awareness among business customers. Only this will make advertising on the platform an economically reasonable investment. Once a user base is established, Travelfit's health experts will also function as a sales force and engage in the acquisition of business customers. When evaluating the restaurants on site, the health expert will also promote Travelfit's advertising offerings to business customers and refer them to the website and Travelfit sales representatives.

 Cost Structure

Fixed costs: Personnel costs for developing the app and the website are a major cost driver. Qualified developers and AI specialists are required to build an app, which is able to respond to the individual needs of the users and learn from their usage patterns.

Variable costs: Travelfit is a multi-sided platform, with users on the one and business customers on the other side. A significant number of users and business customers is necessary to create value for both segments. Therefore, marketing and promotion through a variety of channels, such as partnering with corporations, targeted advertising on travel-related websites, and potentially influencer marketing, appear as expenses within the variable costs. Moreover, health experts have to make at least one personal visit to each restaurant to complete the health verification. This key aspect of the business model is also a key cost driver. Finally, the use of third party APIs from platforms such as Yelp is a cost point in the initial stage of the business. Travelfit can make use of the data provided on these platforms in order to build a minimum viable product. This will then be improved through user and health expert reviews in further stages of the business model.



 Revenue Streams

Travelfit is free for all users. Business customers are Travelfit's only source of revenue. Travelfit's revenue comes from advertising, loyalty programs, and mini-sports-memberships.

Advertising: Restaurants and sports facilities that want to advertise their business to users become business customers of Travelfit. They can promote their services in the rankings of the app. Through regular recommendations to users, business customers attract new customers and increase sales. Additionally, businesses that want to promote special offers pay for such short-term advertisements. Billing models of pay per view, click, and conversion can be chosen according to the individual needs of the customer.

Loyalty programs: Through the loyalty program, users can collect points by visiting and purchasing services from listed restaurants and sports facilities. Points can be converted into discounts for product offerings from Travelfit's business customers. As these kinds of loyalty programs are generally considered a strong incentive system, businesses have to pay a service and license fee to Travelfit for marketing and managing the program.

Mini-sports-memberships: In the medium term, mini-sports-memberships could provide an additional source of revenue. When users purchase these short-term memberships through Travelfit, the business customers, i.e. gyms and other sports facilities, are charged a commission fee.

Scenario Fit

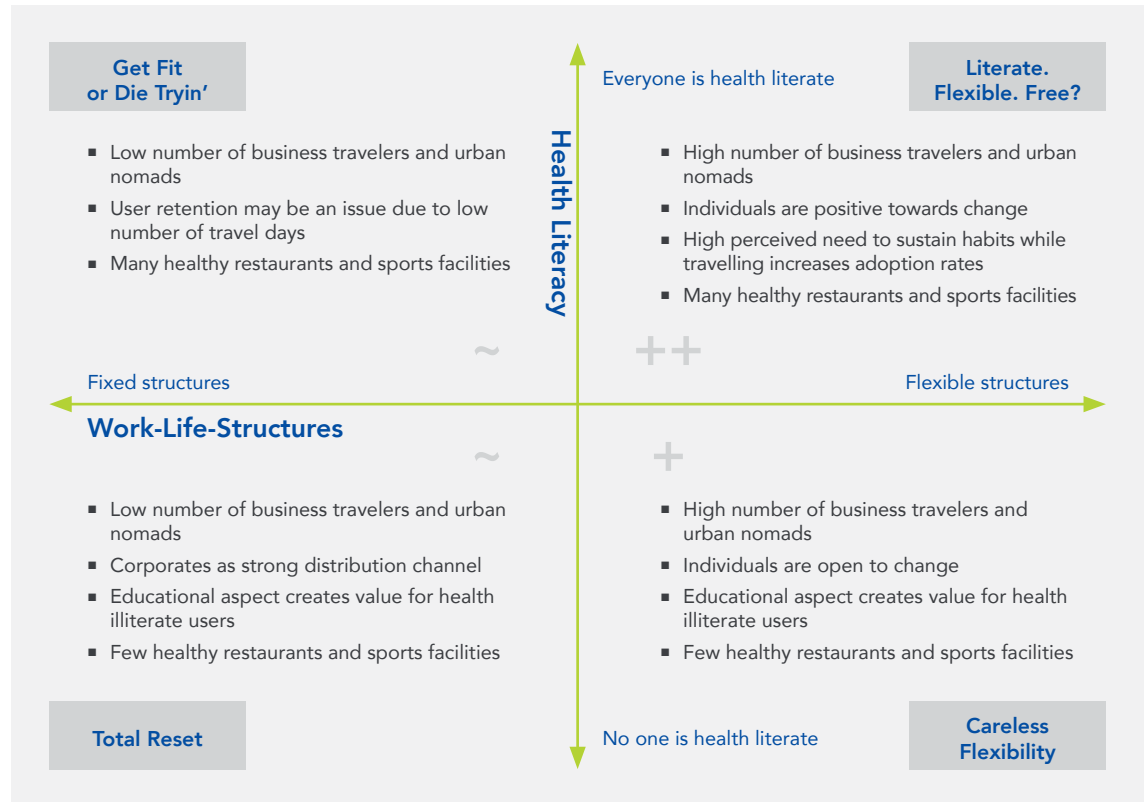
Literate. Flexible. Free? Travelfit works best in this scenario, where everyone is health literate and has flexible schedules. This is because individuals with flexible schedules are highly mobile and travel a lot, making it difficult to sustain healthy habits. They are aware of the importance of a healthy lifestyle, but find it harder to plan and pursue healthy activities because of their ever-changing environment. Travelfit facilitates these healthy activities by finding and suggesting healthy meals and workouts for the user. The convenience of getting guaranteed healthy food anywhere at any time leads to higher adoption rates and helps in sustaining healthy habits while traveling. This will enable better health and increased productivity, even in a highly flexible schedule.

Get Fit or Die Tryin’. In the scenario where work-life structures are fixed and health literacy is common, the weekly schedules of individuals will be more uniform. This will lead to lower mobility and higher chances of having a 9-to-5 work model. Individuals would know about the healthy options in their cities and can match them to their schedule individually. In this case, Travelfit is useful for moderately traveling professionals and individuals moving to new cities. It would help the users in getting to know the new city and finding healthy places in their locality. The impact in this scenario will be lower due to lower numbers of active users. Scalability would also be somewhat harder because of the reduced mobility.

Total Reset. In a scenario where everyone is health illiterate and works in fixed structures, the number of business travels and the flexibility for leisure activities of the working class decreases dramatically. Hence, urban nomads and business travelers will not be the main focus of Travelfit anymore. However, fixed structures might also enable Travelfit to leverage the full potential of companies as a marketing and distribution channel. Since companies in this scenario strongly influence the daily routines of their employees, they might introduce Travelfit as the standard solution in the healthy working context. Furthermore, health illiterate individuals might not fully recognize the benefits of Travelfit, making it more difficult to motivate them to download and start using the app. Additionally, the implementation could be difficult if there are not many healthy restaurants and sports facilities due to health illiteracy. However, health illiterate people will benefit greatly from Travelfit’s service, as the app will support them in making the right decisions in order to become and stay healthy.

Careless Flexibility. In the case of a health illiterate society with a maximum of flexibility in their work-life structure, Travelfit can have a positive impact on the habits of individuals. Flexible structures enable people to have a highly mobile lifestyle and hence increase the number of travellers. Therefore, Travelfit can help organize activities during journeys in a convenient and time-saving way and at the same time make them healthier. Even if individuals are not interested in healthy options, they can benefit from the service as it makes healthy choices convenient. As individuals are open for change, the likelihood that they try out new things is high. Through Travelfit, individuals can discover new activities. In

this way, Travelfit can play an educational role and create new habits. Another challenge is that health illiteracy probably reduces the number of health-oriented venues, which endangers the implementation of the business model. However, overall, the usage of Travelfit is very likely in this scenario.

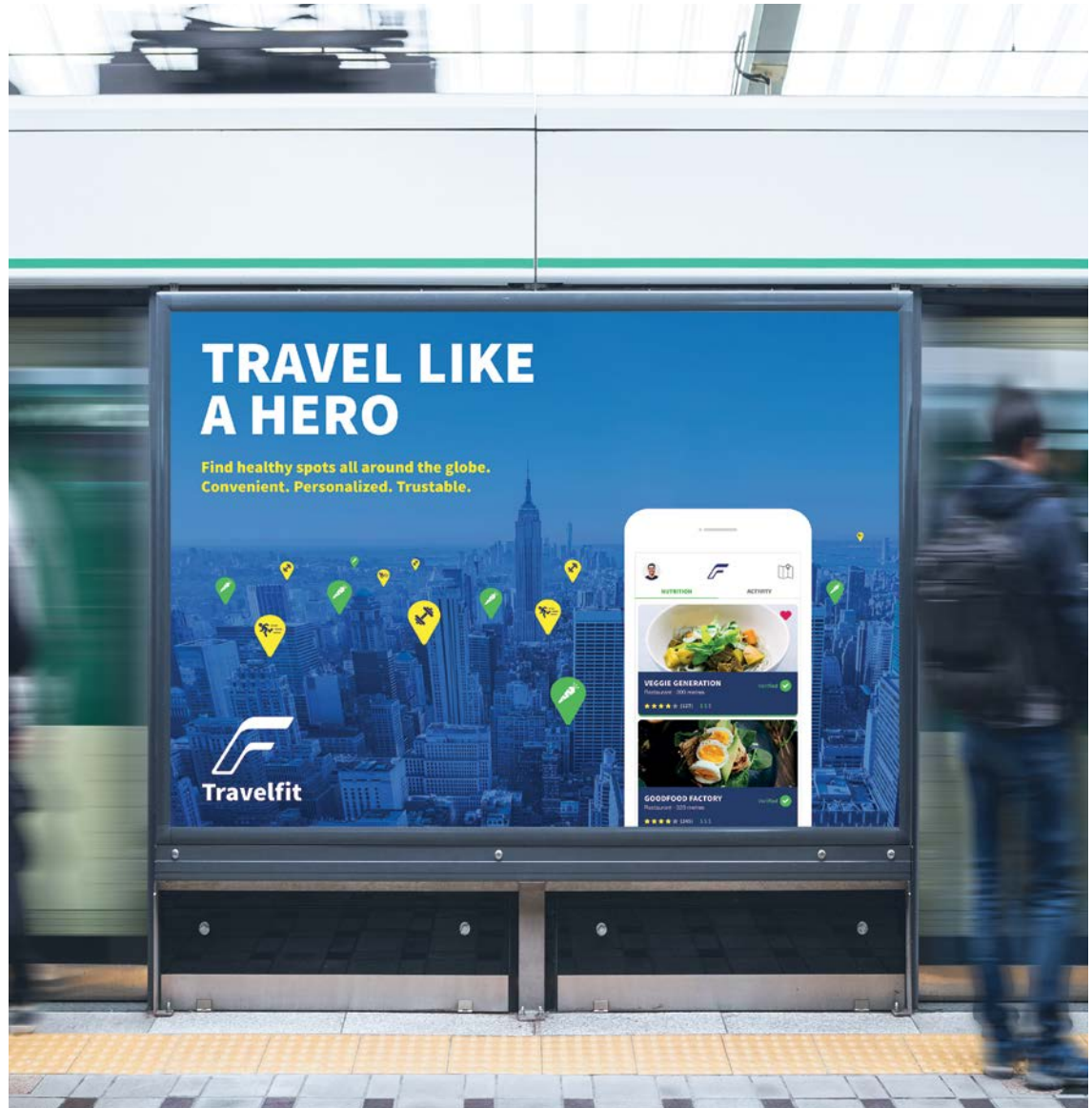


Challenges

- Sufficient numbers of restaurants and sports facilities have to be reviewed and rated to add real value for users.
- A large and active user base is necessary to make advertising on Travelfit an economically reasonable investment for business customers.
- Widespread acceptance of Travelfit's verification as credible and standard for measuring the healthiness of restaurants must be reached.
- The validity of data on the quality and origin of ingredients to assess the healthiness of restaurants needs to be assured.
- The scalability of using health experts to verify the healthiness of restaurants is a key challenge.
- People that are educated in the field of nutrition need to be employed as experts for examining the healthiness of restaurants.
- Data privacy and security must be assured.
- Retention of users and acquisition of business customers need to be assured.

Outlook

The outlook for Travelfit can be divided into a ramp-up, a transitional, and an expansion phase. During the ramp-up phase, Travelfit targets urban nomads and permanent residents. The app's focus lies on healthy restaurants in key cities such as Berlin, Munich, and London. These cities are relatively closely to each other and boast large populations of the target group, making them ideal initial markets. As the user base expands during the transitional phase, Travelfit increasingly targets frequent business travelers, who are acquired through corporate partnerships. More health experts will be employed to verify the healthiness of restaurants. Travelfit expands to other key cities and travel hubs and enters partnerships with gyms and other facilities to set up the sports network. The expansion phase will see a lineup of new product propositions, including a jet-lag calculator and the integration of smart calendars to allow for better scheduling of Travelfit activities. With globalization, digitalization, and health awareness on the rise, an ever-growing number of users may find good use of a convenience app that empowers them to engage in a healthier lifestyle, anywhere, anytime. In the long run, the vision is to establish widespread acceptance of Travelfit's verification process as a leading health standard and become the prime platform for offering flexible memberships of sports facilities on a global level.



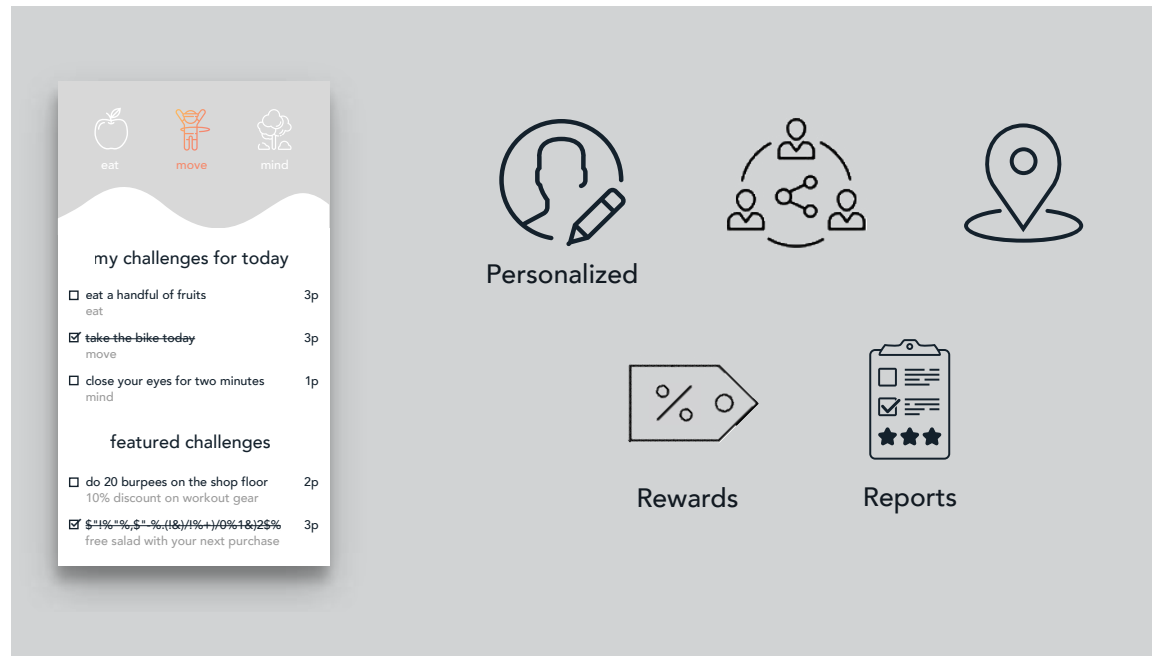
MADE IT.

Create healthy habits through daily challenges

"made it." is an application that supports the creation of healthy habits through a personalized list of challenges, which the user has to accomplish every day. Three challenges related to the topics of "eat", "move", and "mind" are assigned to the user every morning. When first starting the application, the user enters health-related information, which is needed to personalize the challenges.

Users are assigned pre-defined items. After completing a challenge the user can give feedback in order to better adapt the difficulty level to his capabilities. In addition, the user can join or create communities and challenge other members within these communities. Moreover, users have the possibility to create group challenges, which they can perform with their friends and use as an opportunity to meet others. All user-generated challenges are moderated and classified with reference to the three pre-defined topics. Users can prove the accomplishment of a challenge by sharing a selfie or a short video with the community. Other users can give credit and thus motivate each other. Weekly and monthly summaries show the user's progress and further fuel their motivation.

By locating the user, the system also suggests challenges in the current environment. Here, the user can choose additional challenges from a map and add them to his or her personal list of challenges. Companies and other partners can purchase branded and customized challenges that they can place on the map. These challenges contain additional perks such as coupons or discounts for users who complete the challenge. To maintain high levels of user engagement, a streak indicates for how many successive days users manage to complete all challenges. Taken together, "made it." provides daily challenges that help the user to create and sustain healthy habits by constant daily repetition of tiny habits and group motivation.



Value Proposition

“made it.” is an application that supports the long-lasting creation of tiny habits. Users get assigned easily accomplishable tasks in the beginning, to spark and sustain their motivation. The personalization of challenges, based on the user’s experience in the categories of “eat”, “move”, and “mind”, ensures the right level of difficulty to keep the user engaged. Exemplary challenges could be to eat a handful of fruits (“eat”), to go for a ten-minute walk (“move”), or to close the eyes for two minutes (“mind”). Additionally, users are motivated by being part of a community – they receive credits and based on their own progress they can create challenges for others to interact with the community. Users have full flexibility when doing their challenges and can easily integrate them into their daily routine. The possibility to give feedback on the difficulty level of assigned challenges gives the users the power to engage in their progress. Moreover, users can further personalize their tasks by voluntarily adding challenges. Tiny rewards can be obtained by completing branded partner challenges and can further strengthen healthy choices, for example by receiving coupons for healthy food. Through repetition and fun challenges, users are able to sustain their habits over a longer period of time.

On the other hand, collaboration partners such as fitness studios, restaurants, and other shops profit from an increased exposure of their offerings to the community. By proposing customized challenges, they can attract new customers, strengthen their image, and increase their customer base.



Key Partners

Key partners are split into multiple segments. First, partners which hold relevant data needed for the application itself. For example, location-based challenges in a supermarket would not only need information about the opening hours but also about the products they have in stock. Second, partners who contribute to the system with their challenges, which also makes them potential customers. The last group includes professionals from different health-related fields, who supply the expertise needed to come up with healthy challenges.

Most of the data for the application can be gathered through various open APIs (e.g. the already mentioned opening hours). Nevertheless, there are certain fields in which partners are needed to obtain the data.

The second segment incorporates partners such as aquatic centers, boulder halls, and sports shops. They can all be places for very different challenges, and as the application needs the information and participation of the partners, the aforementioned will benefit from the partnership. Other partners in the second segment are city administrators, which have an interest in healthy inhabitants. They can provide additional facilities especially in the context of “move” and “mind”, such as public workout places and nature spots, which can be used for meditation.

But even if there is a manifold source of challenges, their impact on the health of the user needs to be confirmed. To ensure this, partnerships with professionals from different fields, such as motivational coaches, nutrition experts, and fitness trainers, are mandatory. Their knowledge is also used to train an AI system, which will carry out the personalized selection of the challenges later on.

Key Activities

To fulfill its goal of creating healthy habits, “made it.” focuses on five distinct key activities.

New challenges and locations: Challenges lie at the heart of “made it.”. As the area in which the application is available expands, new challenges and locations must be added. Because the application relies a great deal on environmental features that cannot usually be found on a map, much of this work remains a manual effort.

Moderating user-created challenges: New challenges must be enjoyable, risk-free, and easily achievable. In order to allow “made it.” to spread faster, some challenges will be community-sourced, benefiting from the users’ knowledge of their local areas. However, user submissions must always be moderated to ensure that challenges fit the application’s purpose. Finally, they must be assigned to one of the three principal categories of “eat”, “move”, and “mind”, before they can be published.

Assignment of challenges: Every day each user is assigned three challenges. “made it.” should ensure that they fit the user’s level of health, that the user can reach specific locations he or she might require, and that users are not overburdened, which would harm participation greatly. To retain old users and obtain new members it is essential for “made it.” that the algorithm behind the challenge selection only assigns challenges that fit the user well.

Fostering user communities: User communities play a central part in motivating users to participate. Additionally, the content creation process relies on users to develop challenges for their local communities. Therefore, “made it.” must actively support the growth of these communities, e.g. by adding group challenges.

Partner network: Partnering with other companies is the key aspect of the application’s revenue strategy. Paid-for challenges are expected to provide a major part of the application’s revenue. Marketing them to potential partners, is therefore the key to success. Additionally, “made it.” must adapt to the needs of existing partners to conserve these partnerships.

Key Resources

In the application's operating context, the key resources can be divided into two core segments: Human resources and intellectual resources.

Given that users will actively contribute to the co-creation of challenges, the user base is critical to the success of "made it.". Building and consolidating a strong base will enable "made it." to progressively increase profitability and to gain ground in the market.

In order to attract public attention in the early stages of development, engaging in partnerships with high-profile individuals from the sport and entertainment industry will be an important factor. On the one hand, having Instagram influencers and Facebook celebrities promote the application will allow "made it." to maintain a strong presence on social media sites. On the other hand, joining forces with freelance photographers and sports enthusiasts will help to spot new sites for outdoor challenges. Such collaborations will allow for maximizing the reach of communication activities.

From an intellectual perspective, the proprietary knowledge about user performance, preferences, and usage patterns is crucial to sustaining and further developing the application. The data collected about the undertaken challenges will enable to learn what the user values, to allocate resources accordingly, and to build an interactive process that guides the users towards the right challenges. While the algorithm might take time to develop, in the long run, it will help to increase personalization of the proposed challenges and thereby raise customer-centricity and profitability.

Customer Segments

"made it." is a multi-sided platform, its customers can be divided into two distinct and clearly separated groups.

App users: "made it." focuses on customers who use the app because they wish to change their lifestyle for the better. They either do not know how to live a healthier life or do not wish to invest the time and effort they feel is required; indeed, for some, it may seem like an insurmountable task. For these customers, breaking down the core idea of living healthily into tiny, yet achievable tasks is highly attractive. Additionally, "made it." attracts those interested in challenging their friends as well as those that enjoy being challenged by others in their community.

Corporate partners: Even though the number of corporate partners is expected to be far lower than the number of individual app users, they are expected to provide the major share of the revenue. Partners can make use of the consumer base to attract new customers by using paid-for challenges and discount offers. Supermarkets and restaurants, for example, could offer challenges linked to healthy eating, while sports-related partners like gyms, swimming pools, and sports stores take on the movement aspects. Examples for potential affiliates that help improve mindfulness include meditation spaces, yoga studios, spas, and wellness resorts. Of course, no partner is limited to only a single category, and larger organizations (e.g. municipal or regional governments) could well offer challenges of all three types.



Customer Relationships

As described in the customer segments section, the customers are divided into the application users on one hand and corporate partners on the other.

"made it." operates in the context of co-creation. By making use of the internal challenge creation tools or rating systems the application offers, users can help to deliver relevant content, take part in the creation of new challenges but also organize and oversee group challenges. This will help, to enhance the user experience as well as maximize user satisfaction. It will also foster the community aspects of the application as users get to perform the assigned activities together and get to know one another.

On the partner level, the relationship will be based on dedicated assistance services. Each partner will be assigned a representative to ensure a proper and quick response to requests. Offering such personalized services will help to foster effective and open communication with all industry partners and thus help to build long-term business relationships which will benefit all players. In the long run, developing such a partner strategy will help "made it." meet corporate revenue and profitability targets. From a user perspective, endorsing such a strategy will be a central pillar in extending the number of users and expanding sales opportunities.

Channels

“made it.” uses a combination of online and offline channels to market the application. Social media plays an essential role in the promotional activities. Facebook advertising, influencer marketing, and content marketing are key drivers for building up and engaging with the community. Influencer marketing, in particular, is expected to have a tremendous impact on the virality and general prominence of “made it.”. Social media nutrition experts and sports enthusiasts will promote the application to their large follower base, thereby ensuring well-targeted advertising with high conversion rates.

Offline events in popular sports locations are hosted to demonstrate application functionalities. They provide an opportunity for users to sign up and learn more about healthy habits in general. This channel is also expected to yield a promising conversion rate. As “made it.” is rolled out city-by-city, local guerilla marketing initiatives will also be an essential part of the marketing mix. Activities include, for example, “Challenge here”-stickers indicating the location of challenges all over the city. Due to the community characteristics of the app, word-of-mouth can be a very powerful tool to increase the user base. Consequently, it should be used and specifically supported. Users can invite others and share their own achievements, on social media platforms to attract more users. Customers that recruit new customers are rewarded. Moreover, customers get a weekly or monthly overview of their achievements which are presented in a contextualized way. Customer support ensures that users can give feedback on their experience and progress.



Cost Structure

Three main blocks of costs exist. Initial costs cover all necessary expenses for the set-up of a legal entity and the creation of a minimum viable product. Later expenses that occur during daily operations consist of fixed and variable operating costs.

Initial costs: A small but non-negligible cost block deals with the company formation and includes notary and registration costs. Development costs for multi-platform applications and back-end solutions are expected to require a significant upfront investment. Furthermore, content creation is highly necessary to make the application usable. A significant number of pre-defined challenges must be created to vitalize usage. Additionally, first small steps towards the acquisition of initial partner companies will also require effort and investments.

Fixed operating costs: After successful initial testing of market acceptance, “made it.” will need to invest in sufficient operational infrastructure to achieve smooth and flawless operations early on. Investments include office space, server capacity, and work equipment.

Variable operating costs: In the setting of a two-sided marketplace, sales and marketing costs are substantial, as the company must deal with users and partners in parallel. On the one hand, marketing costs will be high to achieve a sufficient user base. On the other hand, convincing partners will consume substantial resources as user traction is only limited originally. User engagement will strongly depend on the variety and appropriateness of challenges, making considerable investments into content creation necessary. Content needs to be continuously updated in a fast-paced manner to keep the churn rate low.

Revenue Streams

“made it.” has three main sources of revenue: Partnership agreements, freemium pricing, and merchandise.

Partnership agreements are expected to contribute the major share of the revenue. This includes entering into agreements with local retailers, sports clubs, restaurants, and supermarkets. Partners can upload challenges via a designated back-end and are charged on a per-challenge basis. Willingness-to-pay originates from the desire to attract target group customers into local shops in order to stay competitive in an online-dominated environment. Large scale partners will eventually be able to enter into frame agreements. To increase the visibility of challenges, partners also have a variety of options at extra costs. Challenges can, for example, be highlighted for a certain timeframe or can be posted as the “Challenge of the Day” in a featured position.

On the user side, “made it.” uses a freemium pricing model. It is necessary that the basic functionalities are free of charge to accumulate a sufficient user base. Hence, “made it.” offers features as in-app purchases. However, these are targeted at power users and are not necessary for progress in general. Such features could include individual in-depth progress reports.

In the future, “made it.” will include a shop selling sports gear and merchandise. Merchandise will be on the company’s balance sheet, while other sports gear will be sold via an affiliate model.

Scenario Fit

Literate. Flexible. Free? In “Literate. Flexible. Free?” people live in a highly dynamic environment and are accustomed to moving frequently between and within countries. With regards to “made it.”, this represents an ideal environment for creating innovative challenges and diversifying the daily assignments. However, such flexibility can be an impediment to creating and sustaining habits, as individuals lack stability in their life. This can also be regarded as negative when implementing crowdsourcing challenges. Given that individuals are on the move constantly, it is hard to coordinate and meet with relatives and acquaintances to perform challenges together. The high levels of health education attained by communities are beneficial to the application. Users are well positioned to conceive challenges that are well suited to one’s fitness level and that fall within the context of healthy habits.

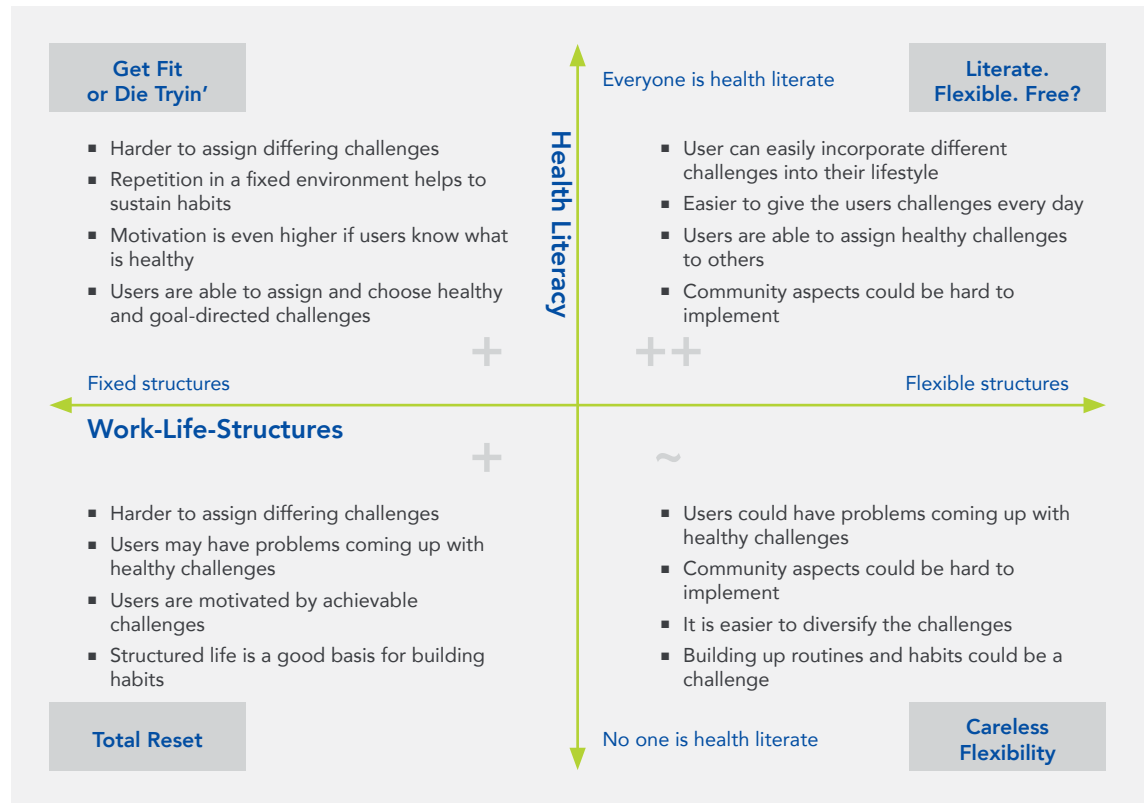
Get Fit or Die Tryin’. “Get Fit or Die Tryin’” describes a highly structured world, but here, health literacy is ubiquitous. Because of their structured lifestyle, users will spend every day in roughly the same locations, which limits the variety of different challenges “made it.” can assign to the user. However, the application can also utilize a user’s repetitive schedule to integrate the interaction with challenges into the user’s life, and can in that way easily create healthy habits. In this scenario, “made it.” appeals especially to users who are aware that they should improve their health, but do not see a viable path to do so, or are uncomfortable making large changes at once. With the application breaking down this process into achievable steps, these users will be among those most motivated to use “made it.”. Enthusiastic, health-literate users, in turn, will then allow the concept of crowd-sourced challenges to flourish, because they will generally suggest useful challenges that improve the user’s health.

Total Reset. In “Total Reset”, people live a highly structured life. For “made it.”, this makes it difficult to present the user with a high variety of challenges for the locations accessible to him or her. This results in the fact that the challenges tend to remain largely the same. Luckily, the repetitive nature of such a lifestyle allows “made it.” to create habits much faster than what would be possible with more flexible users. Because people are illiterate when it comes to health-related topics, there will also be significant impediments to crowd-sourcing challenges. Nevertheless, the underlying concept of creating simple, yet healthy habits by assigning the user small, achievable challenges every day will still be reasonably successful

in such a society. The underlying motivational concept still allows for integration into a structured lifestyle, for example by completing challenges at similar times every day.

Careless Flexibility. In the context of the flexible lifestyle that people lead in “Careless Flexibility”, individuals may find it difficult to build habits and maintain routines in their daily life. Within this framework, the application can help its users to adapt fast to new environments. “made it.” is independent of any geographical constraints, as it offers flexible challenges adapted to the local facilities. This is mostly beneficial for the user, as the potential to innovate and diversify the proposed

challenges is high. It is also of benefit to the application itself as it can help ignite and sustain users’ interest in completing the challenges. While flexibility might be beneficial for the user as an individual, it can be considered a negative element when it comes to creating and developing communities. On the one hand organizing group challenges with friends or relatives will be more complex. On the other hand, the challenges can be used as an opportunity to meet new people. Besides that, health illiteracy can be seen as an obstacle to health development and thus to creating relevant challenges. This results in a higher moderation effort.



Challenges

- A critical user mass is needed for group challenges.
- User engagement must be maintained over a long time.
- Tasks generated by users need to be moderated.
- Tasks need to be accomplishable for users (appropriate level of difficulty).
- Cheating needs to be tackled (e.g. by video or photo evidence).
- Outdoor challenges are dependent on weather and season.
- Acquisition of partners for branded challenges must be assured.

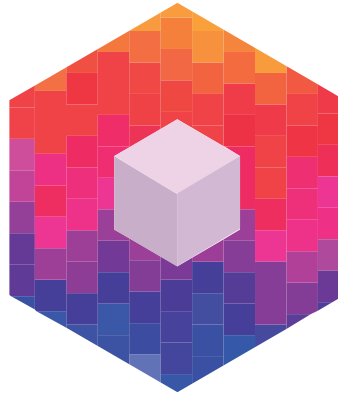
Outlook

After setting up the minimal viable product and acquiring a solid user base, additional features are added to the product. In a first step, the gathering of health-related data is expanded. By developing an interface for the integration of wearables and soon-to-come smart clothing, users are enabled to better track their progress. Furthermore, it becomes seamless to prove the accomplishment of challenges. Next, AR and holograms will be incorporated into the system to make the experience of challenges fully immersive. This includes, for example, visual guidance to challenges or interaction with holograms as a new field of tasks.

The already mentioned merchandise and affiliate online shop for sports gear and trademark-related products will further strengthen the financial position of "made it.". Another expected revenue stream is the partnership with health insurances, which are increasingly under pressure due to demographic change.

By creating communities in all age groups, "made it." will become influential enough to get the attention of companies, cities, schools, and other organizations. Eventually "made it." aims to fulfill its long-term target of becoming the go-to partner for creating and sustaining healthy habits.





VRena
Challenge Yourself

VRena

Challenge yourself

Nowadays, lifestyle-induced diseases are one of the main threats to public health. An important factor supporting this development is the increasingly sedentary lifestyle of the modern society. Modern technologies offers the opportunity to apply relevant technologies and thus creates a new source of motivation to lead an active life. Virtual Reality represents one of the most innovative technologies that opens an exciting world of multiple applications. Though VR goggles have been around for a couple of decades now, Virtual Reality technology has experienced a significant improvement in the last five years. Several VR hardware machines allowing complete immersion are available in the market, yet they are too expensive and large for consumers to buy and install at home.

VRena is a dedicated space with VR machines suitable for both single users or groups to immerse themselves in VR. It strives to provide individual consumers with immersive, physically challenging VR experiences by equipping spaces with the latest technologies. It can be installed in a designated area of customers for either a specific event or a longer period. Thus, users get to experience gaming in a way that demands actual physical movement and is highly entertaining.

The VRena portfolio consists of three different areas: e-sports, fitness, and mind&soul. Depending on the area, the hardware and software of the machines offer different possibilities. The e-sports section focuses on providing an immersive gaming experience, whereas the fitness area combines traditional

workouts with entertainment, thus creating a novel type of exercise. Finally, the mind section is a source of relaxation, which is seen as a convenient getaway from the daily routine.

The target group includes both individual users and business customers. The target users are change-resistant people, traditional gym-goers, and individuals with high stress levels. Potential business customers are gyms, theme parks, or exhibition organizers. Depending on the type of customers, VRena aims to provide either a subscription-based model or an installation service for equipping designated areas of businesses.

Business Model

Value Proposition

VRena provides dedicated spaces with the latest generation VR machines for users to immerse themselves in VR. There are three different services: e-sports, fitness, and mind&soul. Each of them creates a different value. Both individual users and business customers profit from the diverse portfolio of VRena. For individual users, it is a unique opportunity to dive into the world of Virtual Reality.

VRena e-sports provides its users with a fun yet physically challenging VR experience, containing both entertainment and social connectivity with other players. Due to the competitive character of the e-sports, VRena also serves as a source of great motivation to stay fit and healthy.

VRena fitness, on the other hand, is a promising high-tech solution for traditional gym goers who get to experience their ordinary training within the exciting world of VR. VRena is designed in a way that helps users find the right fit for their needs and wishes. In addition, both e-sports and fitness motivate users to stay fit due to their highly-gamified elements. Finally, VRena mind&soul is a source of peace and relaxation for individuals with high stress levels in their daily lives. It is a fast and convenient getaway from the work routine due to its meditation possibility.

Thus, all three sections do not only help create healthy habits, but also provide users with an opportunity to sustain these habits in the long run. Since VRena possesses functions for single users and bigger groups, as well as multiple locations and long opening hours, users experience high levels of flexibility.

Furthermore, business customers benefit from VRena's value creation as well: Once their users appreciate the additional effects of VR, VRena becomes attractive for businesses to enhance their own value proposition. VRena is thus a one-stop provider for any new VR hardware solutions.

Key Partners

VRena has several partners with different areas of interest: Hardware and software suppliers, digital influencers from the gaming and entertainment fields, brand ambassadors, and various event organizers that are suitable for presenting VRena in different locations.

Hardware suppliers represent the most decisive partnership for VRena since they enable having equipped VR spaces. Thus, it is important to build strong partnerships with companies such as Icaros or Holodia, hardware suppliers the VRena business will potentially rely on. The software system strongly impacts the user's experience while using one of the arena's services, which raises VRena's demand for high-quality products. While VRena strives to foster its in-house development of the interface and integrations, the company will have to acquire software updates and new content from other key partners – VR market places. This will most probably be represented in the form of games, sports, or renderings of eye-catching and attractive places.

In the digital era, it is highly important to connect with influencers from the fields of entertainment, technology, and fitness who are willing to promote the uniqueness VRena brings to its users. Forming long-term partnerships with previously selected brand ambassadors provides an opportunity to obtain international recognition.

Lastly, event organizers can notify VRena about relevant happenings or facilities where the arenas could be installed so more users get to experience the world of virtual reality. This will have a strong impact on marketing, brand awareness, and customer acquisition of VRena.



Key Activities

VRena aims to combine fitness and entertainment by managing hardware and software systems. Thus, the first crucial activity is to acquire a certain amount of VR headsets and devices as well as machines for computing the virtual world. An essential part of the software acquisition is the purchase of several VR games including physical exercise that can be tailored to everyone's demands and wishes. To provide users with a continuously exceptional experience, the gaming environment and design need to contain high levels of entertainment and addicting effects.

Furthermore, for the business idea to work, VRena must ensure a sufficient size of facilities to create a pure gaming environment for its users. Facility management will assure high efficiency and functionality of the developed ecosystem by considering human labor, systems, space, and processes.

Acquiring relevant customers as well as ensuring their continuous loyalty is also a key activity. Thus, diverse marketing campaigns and offers are to be realized, particularly at the very beginning of VRena's introduction to the outside world. These include events for digital influencers that would represent change-resistant people or traditional gym-goers, as well as promotions, e.g. "bring five people get five hours for free".

Finally, VRena must have an accounting department to ensure its financial success in the long run. Since initial activities of VRena are investment-intensive, strong marketing is required for the business to run well in the first years. However, if VRena manages to serve as an addictive and fun VR experience with an impact on the physical engagement of the users, its long-term success is not unlikely.

Key Resources

The goal of VRena is to provide a holistic service around Virtual Reality in standalone concept stores and in VR equipped spaces within third party venues. Three types of key resources are required to achieve this goal.

Physical resources: The central part of VRena is the equipment required to provide an immersive Virtual Reality experience. This includes goggles, omnidirectional treadmills, input peripherals, audio devices as well as the required computing power in form of high-end computers. Additionally, VRena concept stores in key cities showcase the possibilities of the differently themed VR space options, which are oriented towards gaming, fitness, and a mindful experience. These contain the previously mentioned VR equipment placed in a thought-out interior and exterior design branded according to the VRena Corporate Identity.

Human resources: The three different themes of the VRena experience target different user groups which require individual marketing approaches. This is mostly achieved through partnering with influencer personalities from the respective métiers in gaming, fitness, and mindfulness. In addition, on-site staff is a crucial key resource since first time users need personal assistance as well as technical maintenance of the complicated hardware. This helps to acquire new customers and achieve VRena's long-term business-success.

Intellectual resources: The hardware required for the VR experience is both expensive and relies on a not fully proven technology as the industry just emerged in recent years. The goal is to form partnerships with the dominant product suppliers in this field to achieve reduced starting costs in return for publicity provided to the young companies. Additional synergies exist with e-sports tournament organizers, fitness companies, gyms and the like. An additional intellectual key resource is the custom-developed interface where the users can choose from the different VR offerings. This lobby software provides a universal interface for customers to every underlying VR software platform in use.

Customer Segments

The target market of VRena can be divided into two main segments: Individual users and business customers. This requires VRena to develop two different customer approaches, one with a B2C and one with a B2B focus.

Since VRena aims at transforming the fitness and entertainment worlds by providing a solution that successfully integrates both fields, it will change the lifestyle of many people in different markets. VRena targets change-resistant and tech-affine people who enjoy the VR experiences the arenas are providing. On the other hand, users are also traditional gym members who need extra motivation to integrate higher levels of physical engagement in their lives. By providing an extraordinary, entertaining experience that incorporates the best of both worlds, VRena provides users with the opportunity to switch to a healthier lifestyle.

The business customers represent another decisive market segment of VRena and have the responsibility to expand its mission to new levels. Key business customers are gyms or fitness studios that are interested in incorporating VRena's services in their membership-based revenue models. This is a crucial element of VRena's business strategy, as gyms are a great source of new customers interested in integrating fitness activities in their lifestyle. VRena also addresses the corporate world by building strong relationships with big and relevant employers on the market. Since employers play an important role in users' lives and awareness for a better work-life-balance is growing in today's society, the corporate world is an exciting business opportunity for VRena to expand its market. Finally, diverse fair organizers and exhibitors help spread the word of VRena and its mission on the corporate level, which can provide the arena with new partnerships and a specific degree of prominence.



Customer Relationships

For VRena to attract and maintain a promising number of clients, it must focus on two main customer groups: Individual users and business customers. Both demand a specific approach, yet there are things they have in common. For individual and business customers, VRena is an inexpensive solution to gamify sports and integrate fitness and mindfulness into daily lives through a novel perspective provided by the latest technologies.

For users, VRena represents a supportive community combined with an impressive virtual world. Binding users happens on an emotional level. This can be provided by personal coaches for the arenas. Once the relationships with coaches and other gamers are established, the binding effect grows with every visit. At the earliest stage of its development, VRena has to create a community feeling on the exclusive basis. This way, change-resistant people enjoy belonging to a new circle of individuals and bring their fellow colleagues, friends, and family members to join the tech revolution in the branch of entertainment. Diverse membership and community-based promotions will help maintain customer lock-in effects and provide VRena with novel opportunities to enlarge the customer base.

Another challenge VRena has to overcome in order to fulfill its business goals is to cultivate its B2B strategy. To raise other businesses' interest in partnering with VRena, it needs to offer a holistic service. VRena will achieve this by offering a highly innovative platform with strong software and hardware solutions with diverse additional support functions to take the best care of the customers. At first, it is crucial to concentrate on building sustainable partnerships with businesses and act proactively in their favor for further customer binding and long-term business success. Eventually, these personal partnerships will help sales grow over time.

Channels

VRena's marketing and sales channels will primarily target the individual end users. The internet is the most effective channel for approaching potential customers since most users typically spend much time online. On the one hand, viral videos will spread via social media, raising public enthusiasm about entertainment and sports in VR. On the other hand, digital influencers from both gaming or the fitness scene will be invited to test VRena services and share their unique experiences with the audience. This is a valuable endorsement to communicate with potential users in an authentic, yet to a certain degree controlled way.

As VR is a futuristic and immersive technology, VRena will use this leverage to attract influencers to obtain attention via public relations and become present in the local press, radio, or TV news.

Since VRena services are bound to physical spaces, the business strongly relies on offline and direct communication in the key locations. To limit spending and nevertheless have an impact, VRena engages in unconventional marketing activities, such as going to universities and giving out information bags about the different VRenas nearby. These bags can then be transformed into goggles that function with every VR app on a smartphone. As the technology is quite new, it is important to captivate people with a convenient usage and thus make further experiences more desirable for users.

Additionally, VRenas can be used as venues for diverse marketing events. Along with the usual operating hours, e-sports competitions are hosted in order to attract potential customers. This creates a more intense community feeling among the existing customers and helps with acquiring new users.

Once a promising number of users is acquired, potential business customers will recognize the need to install VRenas within their existing facilities. This will be the right time for VRena to apply a direct sales approach to expand the business customer base. VRena will contact potential business customers directly or try to get in touch via trade fairs like Cebit, CES, Gamescom, or other networking events.

Revenue Streams

The business model of VRena proposes two main sources to generate revenue. Business customers that pay a monthly fee for equipping the room with VR equipment ready to use will amount to VRena's main revenue stream. The charged fixed monthly fee depends on the equipment type and further installations needed. This fee covers the maintenance service so that customers can rely on consistently working machines. The service is priced on a cost-based model, which is composed of fixed hardware and projected maintenance costs. This would allow securing a profit in any case. The business target group, gyms, are willing to pay the costs they usually disburse for their hardware equipment plus the additional revenues only generated by having VRenas in their portfolio.

The second source of revenue are the regular customers in the VRena flagship stores. The existing paying options offer either to pay per visit or to sign up for a monthly membership fee that includes an unlimited amount of usage. The monthly membership will be worth it as soon as the customer spends more than five hours at VRena. The target group for memberships currently pays for a gym membership, devices, fitness apps, games, and, potentially, in-app purchases. VRena could offer better value for money by providing a more fun and immersive fitness experience. Considering the high willingness to pay, VRena charges 60 EUR for a monthly membership.

Additional side revenues can be created by gastronomy, events, or selling complementary products displayed in VRena such as appropriate sports clothing or VR equipment.

Cost Structure

VRena is run by applying a value-driven approach. That means concentrating on the creation and delivery of a high value to the customer rather than focusing on cost minimization. The incurring costs can be divided into initial costs, fixed, and variable operating costs.

Initial costs: High initial costs arise from acquiring the VR hardware for placement in the flagship stores and rooms that are provided by business customers. Games and applications from online marketplaces like Steam will only make up for a small portion of the initial costs. Nevertheless, there is a significant cost for the development of the VRena platform software where all the different applications are integrated while still providing a user-friendly interface.

Fixed operating costs: Once the initial setup is completed, there are still costs which are independent of the number of customers. These costs mainly incur from VRena flagship stores for which rent and staff must be covered. In addition, further human capital is required for the organization itself, for example, accounting employees. Moreover, advertising costs have to be considered as well as capital costs that arise from the high initial investments.

Variable operating costs: As a service-based business model, a lot of VRena's operating costs can be directly allocated to the different business customers. Therefore, these costs can be easily offset with the incoming revenue stream. In our own flagship stores, power and maintenance must be covered according to usage. The number of coaches and IT support needed will also highly depend on the number of customers visiting the stores.



Scenario Fit

Literate. Flexible. Free? Despite high levels of health literacy, there is still the lack of motivation to integrate physical exercise into the schedule. Due to VRena's various areas of service, borders between entertainment and physical exercise slowly disappear, thus making healthy living more attractive. Since VRena possesses multiple locations with long opening hours, bookings of any of the services can be made in an easy and flexible way. High health literacy of the population may lead to some challenges in this scenario. Fitness gurus are aware that VRena does not fully represent a substitution of a wholesome training plan. Thus, several traditional gym-goers will pursue their own workout sessions and stay away from

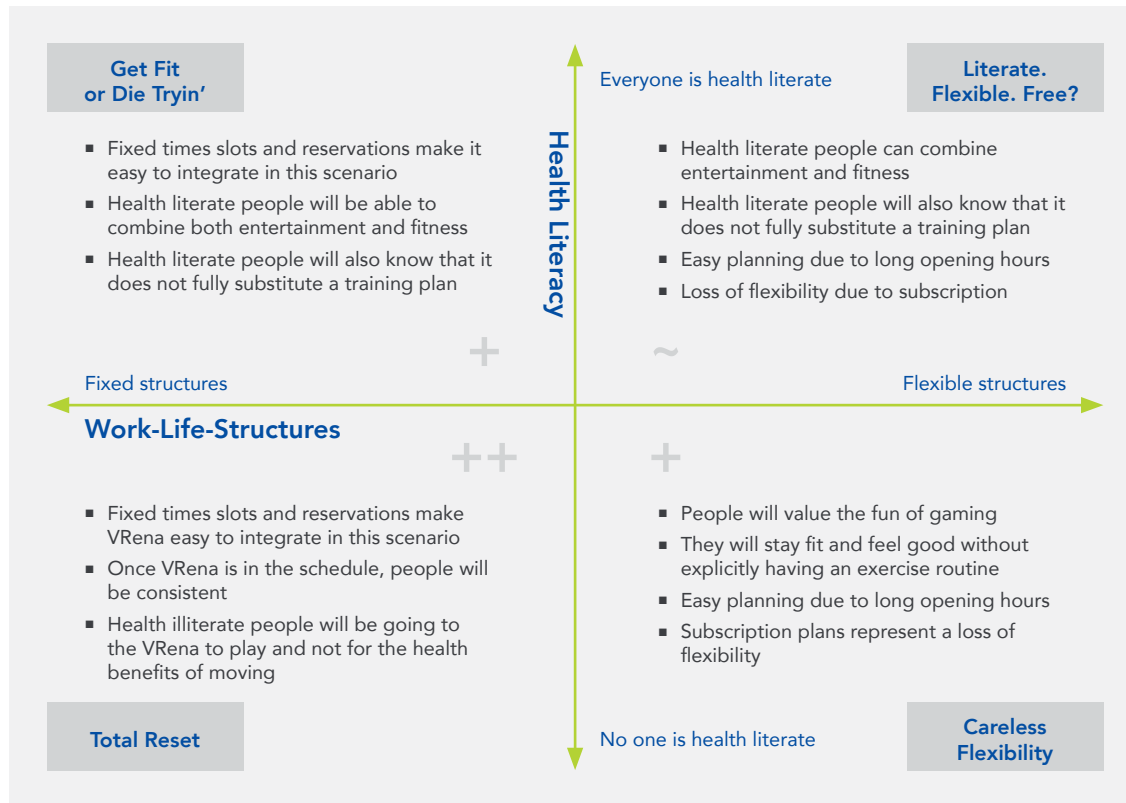
VRena's services. Another challenge arises from the highly flexible schedules of the users. The pricing options, particularly subscriptions, need to be adjusted to the customers who are used to a flexible lifestyle.

Get Fit or Die Tryin'. Since the population does not experience a flexible lifestyle, healthy habits can only be created and sustained if they are considered in the context of a fixed schedule. Should the schedule lack any room for physical exercise, people would have to integrate these into their free time. VRena provides an excellent solution for this scenario since any service can be incorporated into a fixed lifestyle

due to the arena's upfront reservation possibilities. In this scenario, employers or state representatives will take care of booking VRena services to keep their employees and citizens healthy and fit. Thus, a smooth work-life balance is created along with the combination of both entertainment and sports in the daily routine. However, the challenge resulting from high health literacy still represents a danger. People are aware that VRena cannot substitute a proper training plan, so some will not use it.

Total Reset. As the population shows low health literacy, people find themselves stuck in a routine that makes changes quite difficult. Due to the fixed lifestyle, it is easy and convenient to start going to VRena regularly. Since health is not an issue for the population, users will see VRena sessions as a source of entertainment. Most people will assumedly prefer the specific area of e-sports rather than the other two areas, since the value of exercising or practicing mindfulness is not quite clear. Nevertheless, due to the novelty and wonders the VR technologies bring, the two areas fitness and mind&soul could serve as a gateway to start practicing mindfulness and physical exercise purposefully.

Careless Flexibility. In a world of health illiterate people living in a flexible setting, an unhealthy lifestyle is the natural outcome. People lack the motivation to engage in physical activities completely as they are not aware of the health benefits. VRena tackles this problem of missing health literacy by focusing on the entertainment aspect in order to bring fitness to customers. Without explicitly working out for it, people will stay fit while enjoying their time in the VRenas. People will receive the VRenas well, as the visits are easy to integrate into their flexible schedule due to the long opening hours and different locations. Moreover, they will value the variety of choices when selecting different games and workouts.



Challenges

- Competitors have low entry barriers as the protection of tangible and intangible assets is limited.
- It can be difficult to convert one-time visitors into monthly members.
- Potential business customers must trust in VR as a service business model.
- New, complex technology from a variety of suppliers could cause teething problems.
- The high initial investment comes with a high dependence on investors.

Outlook

VRena plans to follow a strategic plan to expand its business to multiple geographical locations as well as acquire new business customers and individual users in the future. The three themes - e-sports, fitness, and mind&soul - will have separate marketing campaigns and promotions so that users perceive diverse parts of VRena's value proposition. Next, VRena will enter the hardware market by developing sensors to retrofit exercise machines as well as building its own equipment to extend the impressiveness of existing VR solutions. This will enable VRena to adapt the technology to any future needs and wishes of individual users. The designed technology can be then patented against any possible competition in the market. Finally, VRena will broaden its business from solely targeting the fitness and gaming industry towards offering customized VR software solutions for other industries, e.g. for police or army training.



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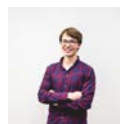
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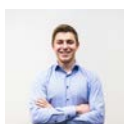
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CREATING AND SUSTAINING HEALTHY HABITS

The increasing concentration of living and working space in urban environments is making it more and more difficult for people from any age group to engage in sports activities and practice healthy nutrition. Furthermore, through an increasing digitization of our daily life and an increasingly connected world, the border between work and spare time is becoming more and more indistinguishable. Consequently, people who do not develop sustainable exercising routines early on, quickly struggle to incorporate healthy activities into their daily rhythm. These trends lead to a growing urgency for innovative ways to create and sustain healthy habits – taking into consideration how people eat, move, and live mindfulness.

Technological development is opening up new possibilities to incentivize pro-health behavior through, for example, Big Data Analytics, Pervasive Computing, Touchless Interaction, and Virtual Reality Technologies. However, growing processing power, combined with the increasing collection of health-related data, also leads to legal challenges concerning data privacy and protection.

This report consists of three parts: First, the authors analyze trends in the field of healthy habits. From these findings, four scenarios were derived that vividly depict possible futures. In the final part, five business ideas were elaborated and validated in each of the four scenarios.

The concepts ideated range from an arena for VR-fitness, a community-based app to create healthy habits through daily micro challenges, an implant to drive healthy living through real-time personalized recommendations, to a multi-sided booking platform for healthy activities at work.



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