MANAGEMENT SCIENCES

AND

FUTURE CHALLENGES

Ed. by Piotr Buła, Thomas Baaken, Kerstin Kurzhals, Halina Łyszczarz

Management Sciences

and Future Challenges

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The version on the occasion of the 30th anniversary of the cooperation 2019 between the University of Krakow and FH Münster University of Applied Sciences, Münster.

Preface President FH Münster

30 years of partnership between Krakow University of Economics and FH Münster University of Applied Sciences

FH Münster University of Applied Sciences and the Krakow University of Economics have been working closely together for 30 years now. There are few university partnerships that are so lively over such a long period of time. Moreover the two universities are linked by a very close friendship over three decades.

There is a regular and lively exchange in several fields. Students of Business Administration, European Business Programme, Master in International Marketing & Sales are constantly in Poland and vice versa. Over the years a total of around 600 students have benefited directly from this relationship. In addition, the universities work together in the fields of doctorate and habilitation as well as in a whole series of research projects, e.g. for the European Commission. Just recently, a joint research proposal between the two universities, "ARDENT – Advancing Rural Development through Entrepreneurship", was approved by the European Commission; the project started its work in October 2019.

We took this special anniversary as an opportunity to hold a ceremony and a conference and to publish this book on "The challenges of managing the future". For two days the participants of the conference made this important topic the focus of scientific exchange.

This compilation contains the latest findings, contributed by representatives of both universities. They make an important contribution to the transfer of knowledge between our universities but also into business and society. Students, lecturers and companies from both countries therefore benefit equally from this long-standing and very successful German-Polish partnership.
We hope that our friendship will remain just as fruitful and lively for many years to come and that it will be sustained and further developed by the generations to come.

Münster/Krakow, in December of 2019

Prof. Dr. Ute von Lojewski,
President FH Münster, University of Applied Sciences

Obituary to Professor dr hab. dr h.c. Janusz Teczke

Since the beginning of the cooperation 30 years ago in 1989 between the EUK Economic University of Krakow and Münster University of Applied Sciences nobody else has promoted this relationship as intensively as honorable Professor Janusz Teczke.

A noticeable special momentum arose in 1997 when he was appointed Head of the Department of International Management at the Faculty of Management and International Relations at the University of Economics Krakow, and from 2002 to 2008 when Janusz Teczke served as Vice Rector for Scientific Research and International Cooperation at his University.

For his outstanding achievements he received the Silver Cross of Merit in 1998, the Medal of the Commission for National Education in 2000, the Medal and Honorary Diploma - Outstanding Person of the Anhalt University oAS in 2002, the Knight's Cross of the Order of Polonia Restituta in 2004 and the Knight's Cross of the Order of Polonia Restituta in 2005. In 2009 he received an honorary doctorate by the University of Banking of Ukraine.

In December 2015, he was awarded an 'International Scientific Fellowship' and appointed Adjunct Professor at Münster School of Business. Janusz Teczke regularly attended the Science-to-Business Conference series, e.g. in Brussels, Pretoria, Tokyo and of course Münster, and presented most interesting papers; at several of those conferences he served as a member of the Scientific Committee. At the conference on 24/25 July 2018 in Padang, Indonesia, he was still active as Reviewer and Scientific Committee Member.

Professor Teczke's initiatives within the relationship of our two Universities have resulted in many joint academic educational elements, projects and activities. The UEK also acted as a partner in some EU projects - most recently in the highly successful 'The State of University-Business Cooperation in Europe' project for the European Commission.

Like no other Janusz Teczke has not only accompanied the cooperation of our two institutions, but has always actively promoted it and pushed it forward. From all these joint and common activities, a deep friendship had developed over the years, which was enhanced by his regular visits in Münster and vice versa of Münster colleagues in Krakow.

We learned a vast amount from Janusz Teczke - not least our enthusiasm for the vibrant city of Krakow and for a lively wonderful Poland. He was a gifted ambassador of his city as well as his country. On February 19, 2018, Professor Teczke passed away at the age of 69; he was buried in the Rakowicki cemetery, close to his beloved place of work at his university. We still had many plans - it is very unfortunate that we can no longer make them a reality.

For all editors, authors of the book, the Board of FH Münster and the Dean's Office of Münster School of Business

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Chapter 1:

Management in Marketing

Customer Journey and Touch Point Management in the Course of Digitalisation

Thomas Baaken, Patricia Kircher

According to a current GfK study, 60% of respondents use more than three mobile devices to inform themselves online about products and services (GfK, 2018). The research behaviour is independent of whether the service is later purchased on the Internet or stationary. Driven by digitalization, the number of possible online and offline customer touchpoints of brands has increased considerably and companies are therefore increasingly required to manage these contact channels in a targeted manner. Especially in digitalization, not all touchpoints that are decisive for the customer in the decision-making process can be controlled directly by the company: Rating platforms, social media and other online ratings with very high reach are available to customers at any time, but are determined by user-generated content (UGC). In a growing service economy, the success of service providers is increasingly dependent on customer-oriented touchpoints. This creates new challenges for companies with regard to digital and analog customer journeys in marketing, especially with regard to indirect touchpoints.

Keywords: Customer Journey, Customer Touchpoint Management, Digitization, Indirect Touchpoints, Online Marketing

1   Introduction

Today's digital technologies make it possible to establish highly personalised contacts and to exchange information between brand and consumer (Parise et al., 2016, p. 411). However, this brings with it many new opportunities for companies as well as challenges: According to a GfK study, 60% of respondents use more than three mobile devices to find out about products and services online, regardless of whether they are later purchased on the Internet or stationary (GfK Insights Blog, 2018).

Driven by digitalization, the number of possible contact points to customers (customer touchpoints) has increased considerably and companies are therefore increasingly required to manage them in a targeted manner (Böcker, 2015, p. 165). The focus here is on the customer's information and decision-making process, the so-called customer journey. Especially in online marketing, the customer journey is rapidly gaining in importance; Flocke and Holland call it the "*supreme discipline*" (2014, p. 214).

Indirect touchpoints in particular, which cannot be specifically controlled by the company, are sometimes decisive for the customer in the decision-making process (Meffert, 2019, pp. 126). Rating platforms, social media and other online ratings can be accessed by customers at any time with a very high reach and are determined as "User Generated Content" (UGC) (Kruse Brandão; Wolfram, 2018, p.1). The success of providers is increasingly dependent on customer-oriented touchpoints in a growing service economy (Gustafsson; Johnson, 2003, p. 8). Against this background and in the course of digitization, new challenges arise for companies in marketing with regard to the customer journey, especially with regard to indirect touchpoints.

2   The Customer Journey

The term **Customer Journey** comes from the field of classical marketing and describes the journey of a potential customer via contact points, **Customer Touchpoints (CTP)** to the company (Flocke; Holland, 2014, p. 214). Behind this journey is the approach that a customer repeatedly deals with the purchase of a product or service and thus satisfies his individual information needs (Böcker, 2015, p. 167). Kruse Brandão and Wolfram also call the Customer Journey the *"(...) interaction process that a person goes through with a brand in a certain section of an interest, decision, purchase process"* (2018, pp. 14).

The customer's process can be subdivided into different phases: from the need arousal, over the information search up to the final target action (Flocke; Holland, 2014, p. 214). This final target action is company-specific and can be, for example, the act of purchase or the use of a service, but also a newsletter subscription or an inquiry. According to Keller and Ott, there are further phases after the final target action, so that a customer-enterprise relationship exists for life (2017, p. 81). This final target action is followed by the utilization phase and the possible repurchase within the framework of loyalty.

According to Westenberg et al. (2010, p. 2), a touchpoint is any product, service, transaction venue through which a customer receives a significant impression of a brand on the path to purchase.

Referring to Clatworthy (2011, pp. 15–16), touchpoints are described to include, for instance, physical buildings, websites, print-outs, self-service machines, and customer assistants. Touchpoints convey verbal and nonverbal brand impressions and though shape brand preference. These interaction/contact points can be employees with direct customer contact, product performance attributes and all communication modes, including online- and offline channels or personal- and mass-communication. The impressions that customers gain prior, during or after

their purchase experience, be it positive or negative, can influence whether customers continue the buying process or terminate the transaction with a firm (Schüller, 2012, pp. 148–149).

Lemon and Verhoef (2016, pp. 76–78) identify brand-owned, partner-owned, customer-owned, and social/external/independent touchpoints. Brand owned touchpoints are customer interactions that are designed and managed by the firm and under the firm's control. They include all brand owned media, e.g. advertising or websites and any brand-controlled element of the marketing mix, e.g. attributes of product, service, price or the sales assistants. Partner-owned touchpoints are customer interactions that are jointly designed, managed, or controlled by the firm or one or more of its partners. Partners are, for instance distribution partners or forwarders that deliver machines on behalf of the firm. Customer owned-touchpoints are actions that the firm, its partners or other do not influence or control.

Social/external touchpoints recognize the important roles of others throughout the customer experience. These are for instance independent information sources that customers obtain by other customers when sharing experiences.

Harrison (2013, p. 185), as well as Stephen; Galak (2012, p. 624) distinguishes paid-, earned-, and owned touchpoints. Paid touchpoints are those that customers passively and involuntary see and hear (Harrison, 2013, p. 183). The company directly pays for them. Earned touchpoints include peer-to-peer encounters with the brand such as word of mouth or news coverage. Earned touchpoints are established and controlled mainly from third party organizations (Stephen; Galak, 2012, p. 625). Owned touchpoints are generated by the firms or its agents in channels that are under their control (Stephen & Galak, 2012, p. 625).

The sum of the individual contact and interaction points between customer and brand make up the Customer Experience (CX) (Böcker, 2015, p. 167). Since customers inform themselves both online and offline and behave very individually in their touchpoints, a holistic approach within the framework of the Customer Journey represents a challenge for companies, as shown in Figure 1.

Digital Touchpoints
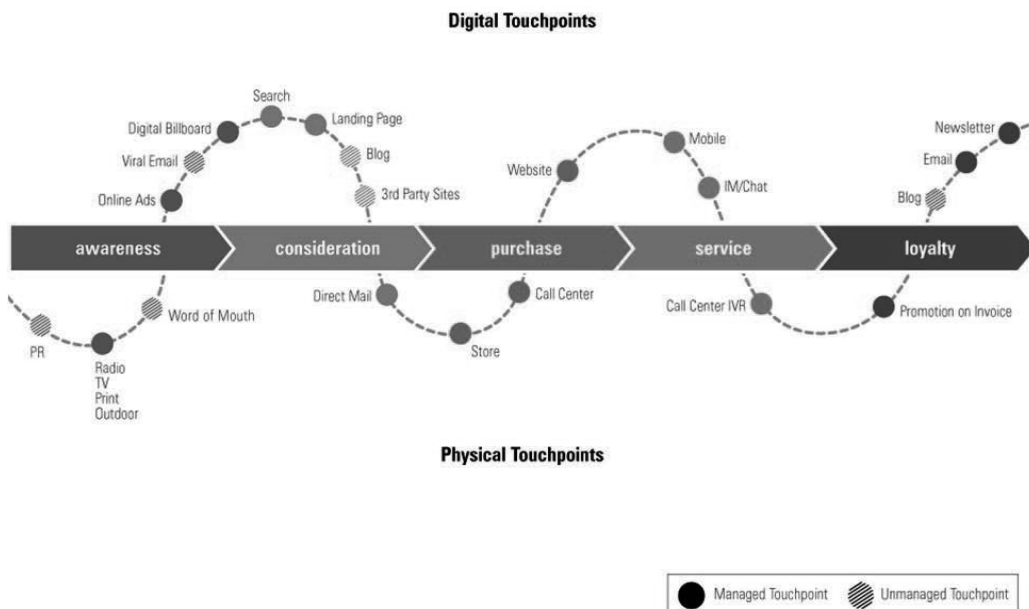
Figure1: The Customer Journey
Source: DeMeré (2017).

3   The Influence of Digitization on Customer Journey

In digital marketing, Customer Journey is closely related to e-commerce (Flocke; Holland, 2014, p. 215). The Customer Journey is thus an interactive multi-channel and multi-device purchase process. In addition to the original customer journey, the customer in the digital age is influenced by factors such as digital WOM communication in decision-making (Kruse Brandão; Wolfram, 2018, p. 97). Each individual touchpoint must therefore generate the highest possible level of awareness, communicate the brand and explain the product.

The customer has also developed further with the digital change (Kruse Brandão; Wolfram, 2018, p. 97). The characteristics of today's customers are individuality, heterogeneity, mobility, information overload and time constraints. The networked customer is increasingly becoming a driving force in digitization, an opinion leader on the Internet with influence on the behavior of other consumers. Consequently, his behaviour has an effect on marketing, trade and product development (Rusnjak; Schallmo, 2018, p. 3). Only companies and brands that interact attentively and intelligently with their customers and focus their strategies on customer experience will be able to hold their own in the networked world (Kruse Brandão; Wolfram, 2018, p. 97).

Digitalization will also lead to an increase in the number of customer touchpoints within the journey with which customers potentially come into contact (Kruse Brandão; Wolfram, 2018, p. 10). This mainly involves the addition of new

media, digital and smart technologies to the customer journey, which transfer the touchpoint to the customer's location. The focus is therefore on personalising the touchpoints according to the needs of the customers.

In the context of digitisation, some facets of the classic purchasing process have also shifted (Kreutzer et al., 2017, p. 168). An upstream process in expectation management that involves online access in the form of Internet research and third-party information in the pre-purchase phase. A part of this is the so-called user-generated content (UGC); experience reports of other people about the purchase and post-purchase phase. Channels such as blogs, communities and comments on social media platforms such as Facebook, Pinterest or Twitter make it possible to design the content of this phase. For Google, the most important moment in the purchase decision is no longer shortly before the purchase, but in the research phase before it (Figure 2; Google, 2011).

Figure 2: The New Mental Model of Marketing
Source: Google (2011).

Meffert et al. also mention changes in the customer journey caused by digitisation (2019, pp. 126): the phases are no longer run through linearly, but are in some cases repeatedly visited or entire phases skipped. The purchase alternatives in the Customer Journey are not, as usual, reduced in the course of time in the form of funnels, but can be supplemented and are therefore variable. In order to create a successful customer journey in the digital sector as well, companies are therefore increasingly aligning their own offerings with user requirements (Kreutzer et al., 2017, p. 113). The so-called user centering makes it possible to design the quality and sequence of the touchpoints holistically in such a way that an integrated and appealing experience is created for the customer.

4 Challenges and limits in marketing

The challenges in the digital age for the customer journey in marketing are outlined below. In accordance with the division of Holland; Flocke (2014, p. 839), these are thematically subdivided into technical, organisational and legal challenges and additionally supplemented by technical aspects.

4.1 Technical challenges

If one wants to be successful in the market, classical and digital media must always be viewed together and companies must position themselves cross-medially (Keller; Ott 2017, p. 368). This means that the CTPs should be played in the optimal network. This is a logical consequence of the **ROPO effect**: "Reseach Online - Purchase Offline" or "Reseach Offline - Purchase Online". Accordingly, the customer prepares for his stationary purchases by means of various third-party opinions, evaluations and recommendations on the Social Web or obtains information about services in the physical trade, but buys the cheapest offer on the Internet (Kreutzer et al., 2017, p. 163). At present, this presents companies with major challenges: Companies lose 33 percent of their customers in the customer journey when switching between online and offline media (Herzberger, 2016). According to Meffert et al., this cross-media interdependency must be countered by means of a context sensitivity that aims to meet customers within the various phases in a needs-based manner (2019, p. 129).

Similar to switching between online and offline, switching between different mobile devices must also be taken into account (**device change**) and tracked (Flocke; Holland, 2014, p. 234). If a potential customer uses different end devices for his research, there is a gap in the analysis of the customer journey.

Big Data's data management is also a major technical challenge for companies today (Flocke; Holland, 2014, p. 234). The recording of all data and steps of potential customers creates a large mass of information that needs to be evaluated with experts (Leeflang et al., 2014, p.1; Jamal, Bucklin, 2006, p.16; Moeyersoms, Martens, 2015, p.72).

4.2 Organizational challenges

According to Halvorsrud et al., there is the challenge of **isolated units** with separate organisational structures (2016, p. 841). This means that sales channels are anchored separately in the organization and therefore the customers are not considered across the board. Both Keller (2017, p. 36) and Herzberger (2016) take a similar approach when you talk about **companies' silo thinking**. Data on potential and existing customers are accessible digitally and analogously, but are separated in different departments and systems and not necessarily linked on a single platform (Keller, 2017, p. 36). Thus the orientation of the company towards the

customer for a better customer experience is pursued, but not strictly implemented. According to Herzberger, the organizational challenge is to align internal, often deadlocked structures and processes in such a way that the **procedural anchoring of** the CTM is optimized (2016).

4.3 Legal challenges

Dealing with **data sensitivity** represents a legal challenge in the digitization of the CJ (Keller, 2017, p. 36; Bundesverband Digitale Wirtschaft (BVDW) e.V. 2017). Critical is the tracking of customers to create customer profiles in the online area.

In addition to creating user profiles, contacting customers with advertising content also represents a limit (Flocke; Holland, 2014, p. 235). Customers must have actively agreed (**opt-in**) that the company may use the contact data to communicate current offers and other promotional content (Keller, 2017, p. 36). If the customer objects to the use of the contact data provided, this is referred to as an **opt-out** (Moos, 2012, p. 635). The basic challenge is the legally correct application of the opt-in and opt-out regulations, as well as the question: How do I motivate the customer to agree to the opt-in regulation?

4.4 Marketing Challenges

The **integration of new, digital contact points** presents companies with technical challenges (Kreutzer et al., 2017, p. 164). Analyses show that with over 100 touchpoints, companies are often only aware of up to 50 contact points. Brand contacts are much more diverse than companies expect (Dlugosch, 2017, p. 89). This poses a challenge, as the customer journey is increasingly not linear but recurring, with changing priorities and preferences. Recently, the number of contact points has increased significantly, making it more difficult to determine relevant contacts with the brand and their influence on the decision in the overall process (Herzberger, 2016).

Indirect touchpoints in particular pose a problem for companies (Kreutzer et al., 2017, p. 162): Previous management approaches concentrated on the so-called corporate sphere: direct touchpoints that the company itself manages. This leaves many contact points unattended, which at the beginning of the purchasing process can influence the customer in his information phase. These are typical indirect touchpoints, such as blogs, communities, rating platforms or online shopping clubs and social media. Many companies neglect these points of contact in a **sphere far away from the company,** as they elude direct control. Nevertheless, these contact points have a central influence on purchase decisions, as they are attributed a higher credibility than contents of corporate communication.

Digitalization also increases the **speed of change in** customer touchpoint management (Van Bommel et al., 2014, p. 1). It is particularly important to do justice to this in management.

5   Conclusion

"Regardless of whether the customer starts his journey in a branch or becomes aware of a certain product or brand via his personal computer and finally completes the purchase on a smartphone - a seamless brand experience is always the trump card" (Kruse Brandão, Wolfram, 2018, p. 10).

It has become clear that indirect touchpoints pose major technical, organizational, legal and technical challenges, especially with regard to digitization in service marketing. The focus is on the management of new digital media and the interaction of online and offline media as customer touch points. These challenges and limits must be met with innovative approaches in order to take advantage of new opportunities.

With a view to the future, an analysis of the competitors' own and their customer journeys must be carried out to ensure competitiveness. The focus should be on a coherent overall concept between direct and indirect touchpoints. Within the framework of the holistic approach, indirect touchpoints represent a weak point for companies, as they cannot be controlled directly. A very successful marketing measure to influence the indirect touchpoints is currently offered by the trend of influencer marketing, which offers only one of many options for holistic processing of the customer journey. In order to be able to sell successfully on the market tomorrow, companies must identify new touch points, shape them in the long term and finally successfully activate the customer on his "journey" there.

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Entrepreneurship is one of the topics of the Centre and is divided up in sections: Academic, Student, Rural, Female, Digital, Social and Transformational Entrepreneurship.

The Centre has conducted several surveys on European Level, e.g. "The state of University Business Cooperation in Europe" in 2010/11 and "University-Business Cooperation in Europe" 2017/18 (www.ub-cooperation.eu).
Recently for PwC the study "Entrepreneurship Hubs in 19 Countries of Europe".
The Centre employs some 30 Researches from 15 different countries on Third Party funds; coming from German and other Governments, EU, DAAD and Industry. Before Thomas Baaken served as Vice President Research and Technology Transfer. Thomas Baaken is member of several advisory boards like "International Marketing Campaign for the German Research and Sciences" in the world at Ministry of Higher Education and Research in Berlin, "Science City Münster" at Münster City Council, the University-Industry Innovation Network UIIN in Amsterdam and also at diverse SMEs.

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Marketing in the Health Sector – Background and Overview, Particularities and Applicability

Tobias Kesting

This article provides a conceptual framework for marketing in the health sector. It starts with a theoretical background on the development of marketing, hereby providing the basis for defining relevant core technical therms, such as health products and health marketing. It then continues with an more detailed overview on the sector and its fields of actitivity and actors and illustrates the chances and particularities relevant for health marketing activities. The proposed solution for a successful and sustainable application of health marketing in practice turns out ot be a kind of deductive approach, which regards marketing (and its sub-disciplines) as a toolbox to be adapted to the specific sub-market constellation regarding actors, products and environmental conditions. This approach serves as a way to further make us of the potential marketing bears for the health sector, as it may largely contribute to societal needs and welfare in an aging and more individualised society.

1 Background

Nowadays an established research field featuring a continuously high and increasing practical relevance, marketing has been further developing and adapting to numerous fields of activities in the last decades. The classic understanding of marketing focuses on traditional physical goods of everyday life, hereby providing the foundation of business-to-consumer (B-to-C) marketing (Kimmel, 2010, p.3). Yet, the applicability of marketing goes far beyond this narrow view and the classic focus of B-to-C marketing has been shifting and extended towards novel concepts of marketing. In his 1972 Journal of Marketing article "A Generic Concept of Marketing", Philip Kotler states that "(…) marketing applies to any social unit seeking to exchange values with other social units." (Kotler, 1972, p.53).

In addition to the basic concept of B-to-C marketing, particularly business-to-business (B-to-B) marketing and service marketing established as further marketing disciplines aimed at specific business activities and product characteristics. Additionally, over the following years and decades, more and more publications have been broadening the marketing focus, for instance, contributions on marketing for public organisations (e.g. Kotler & Lee, 2007) and for the non-profit sector

(e.g. Andreasen & Kotler, 2008), resulting in further marketing specialisations and sub-disciplines (such as public and non-profit marketing). These developments point out the relevance of adapting the classic approach on marketing towards the specific market conditions, actors, products and particularities of business or activity sectors. Further authors even develop more specific approaches, linking basis marketing concepts with specific markets, e.g. B-to-B marketing in professional soccer (Bieling et al., 2004).

Among the first contributions connecting marketing and health is the article of Saltman and Vertinsky from 1971, which proposes a model for marketing health services (Saltman & Vertinsky, 1971). The first issue of the journal "Health Marketing Quarterly" was published in 1983 and this journal still exists today with several issues each year. Further books and edited books on health marketing and health care marketing came out in the 70s, 80s, 90s and in the millennium years (e.g. Cooper, 1979; Keith, 1985; Hillestad & Bercowitz, 1991; Thomas, 2008). As seen here, there obviously exist different terms on the issue, which points towards the necessity of more precise definitions. The first keyword is "health". Referring to the health definition given in the constitution of the World Health Organization (WHO) from 1946, "[h]ealth is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2014, p. 1).

Further relevant terms to be found in literature are "health products" and "healthcare services". Insight Medical Publishing (iMedPub) defines health products "(…) as those substances which gives (sic!) energy or makes (sic!) the person healthy." Examples for such "(…) health products are vitamins, minerals, herbal medicines, homeopathic preparations, probiotics and (…) traditional medicines (…)." (Inside Medical Publishing, 2019).

A further term often featured in publications on health marketing is "health care". Lees-Marshment (2004, p. 124) refers to health care as a largely intangible product aimed at the treatment of an illness or support for ill-health which e.g. features consultation, detection, treatment, operation, after care and/or rehabilitation, as well as the promotion of good health and factors encouraging good health and actions against ill-health. This understanding of health care is in line with Fortenberry (2010, p. 22), who as well regards health care as the activities featured in the relation between health care providers and patients, i.e. a focus on this very B-to-C relation. However, this perspective, merely comprises parts of the overall health sector activities, as it does not involve further actor groups and B-to-B relations, for instance, and hence only refers to health products featured in the relation between health care providers and patients.

In addition, considering that a treatment by a physician typically is a service to a large extent that may be supplemented by a prescription for a medicine, it becomes obvious that a strict separation between physical goods and health care services is not a suitable approach when discussing marketing in the health sector. Instead, many health products are service-based and feature a combination of physical and service components. Even buying medicine at a pharmacy may include further specialist advice on behalf of chemist, so that a consumer's purchase of medicine is not necessarily a pure physical good.

Hence, this article proposes an own, broader definition of health products: Following the WHO definition of health (WHO, 2014, p.1), health products serve as an umbrella term for all kinds of physical goods, services and combination of physical goods and services aimed at restoring physical and mental health and preventing health problems or diseases of any kind and/or support health and healing processes in an indirect way.

According to the definition of the American Marketing Association (AMA), "[m]arketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners and society at large" (Association of Marketing, 2017). This definition takes over a rather holistic point of view. According to the AMA definition, marketing primarily aims at the satisfaction of customer needs and marketing activities that strive to establish a value-driven, sustainable system for all actors involved (customers, stakeholders and the society) (Chavez & Sayre, 2012). Following Chavez and Sayre, this definition can well be applied to the health sector, featuring e.g. patients or individual health care consumers, physicians, intermediaries and other organisations as customers (Chavez & Sayre, 2012). Consequently, this understanding of marketing according to the AMA definition is very suited for the health sector, in particular due to its overall societal focus. Based on AMA marketing definition and Chavez and Sayre (2012), this article understands health marketing as all activities, sets of institutions and processes which aim at creating, communicating, delivering, and exchanging health-related offerings that have value for customers, clients, partners and other actors in the health sector and eventually for the society at large. This view furthermore includes procurement markets (raw materials, personnel etc.) as well as internal marketing, i.e. marketing aimed at employees of health marketing organisations and beyond (e.g when it comes to sector-independent workplace health promotion activities).

2 Overview on Fields, Actors, Products and Chances

The background on health marketing has already emphasised that the health sector is very heterogeneous, featuring lots of different kinds of organisations, such as hospitals, surgeries, health insurance companies, pharmacies and medical supply stores. Given the variety of health product suppliers, the customer side of health products is as well very diverse. To illustrate this diversity, the following table (Table 1) provides an overview on selected fields of activity, products, suppliers and customers in the health sector:

Table 1: Overview on selected health sector fields of activity

Field of activity	Product/s	Supplier/s	Customer/s
Pharmaceutical industry	Pharmaceuticals	Pharmaceutical manufacturers	Wholesale trade; hospitals; pharmacies, patients
General healthcare	Healthcare services	Hospitals, physicians	Patients
Geriatric care	Residential and domiciliary care	Residential care homes for the elderly, home health care services	Elderly patients
Medical supply industry	Medical supplies	Medical supply manufacturers	Medical supply stores, hospitals, physicians, patients
Health insurances	Insurance products	National and private health insurances	Organisations and individuals (consumers)
Health tourism	Health tourism journeys	Health tourism agencies, health resorts	Health tourism travellers (consumers)
Further Prevention	Substance abuse counselling, workplace health promotion	Governments, communities, employers, third-party service providers,	Employees, consumers, organisations

Source: Own illustration.

Having provided an overview on fields and products as well as on core supplier and customer groups in the health sector, the next issues to be addressed are the necessity and the chances of health marketing.
From the point of view of health product providers, increased competition (Goddard, 2015, p.567) makes it more and more necessary for these organisations to apply marketing for ensuring their long-term existence, and hence sufficient supply of health products as well as the employees' jobs.

Demographic change and the aging society bear both chances and requirements or rather obligations with respect to health marketing. The increasing number of elderly people, particularly in developed countries, provides new market chances for organisations in the health sector, e.g. with respect to market development (tailoring health products to elderly people and their specific needs, e.g. organised

travels and sports events for the elderly, barrier-free activities etc.) (Chavez and Sayre, 2012).

Health awareness campaigns (e.g. regarding smoking and alcohol) or stress management trainings aim at improving the individuals' health-related behaviour and reduce or prevent abuse of legal drugs and further substances (Scherenberg, 2017, p.37).

Furthermore, health marketing is as well necessary for organisations providing health products to attract employees and strive for staff retention (Thomas, 2008, p.8). In Germany, for instance, there is a drastic lack of nursing staff, particularly in geriatric care, which increases continuously (Bundesagentur für Arbeit, 2019). Additionally, establishing activities of workplace health promotion in each business sector even underlines the relevance and chances of health-related (marketing) activities beyond the health sector (Scherenberg, 2017, p.122), hereby increasing the relevant market of health products to some extent.

This aspect eventually leads to the most relevant chance of health marketing, namely to ensure long-term provision of health products for the society as a whole. It e.g. involves the supply of medical treatment by hospitals and physicians as well as medical research for new product development aimed at fighting or even preventing diseases such as dementia and cancer.

3 Particularities of the Health Sector and Health Products

As already illustrated in the first two sections of this article, the health sector features specific conditions. In this respect, Thomas (2005, p.47) states that "[h]ealthcare is different from other industries in terms of characteristics inherent in the industry and the attributes of buyers and sellers." This statement is basically relevant for the overall health sector and not limited to healthcare services. Hence, marketing in the health sector as well differs from "traditional" marketing in several aspects. The following aspects will illustrate this:

The term "customer" is not always fully suited in the health sector. For instance, in case of an emergency, e.g. someone suffers a stroke, he or she does not deliberately and actively become a customer of an emergency medical physician and even cannot choose the physician who treats him or her. In other cases, a market situation similar to a supplier-consumer relation as in traditional B-to-C marketing or rather trade marketing can be observed, e.g. when buying non-prescription, i.e. over-the-counter medicine at a pharmacy. In this case, the relation is de facto almost the same when a consumer purchases groceries in a supermarket. Yet, as stated in Section 1, the purchase may involve additional specialist advice on behalf

of chemist. This may be even more relevant with respect to prescription only medicine, which individual customers not directly choose because they really want to purchase and consume it, but rather to cure an illness. These examples emphasise that rules of "classic" market situations are not suited for an unchanged 1:1 transfer to the health sector.

Furthermore, due to the large service proportion of numerous health products, service provider personnel play an essential role, not only regarding the customers' general service experience, but as well quality perception and customer satisfaction. Numerous service-based health products are very difficult to evaluate for customers as laypersons in terms of quality and professional competence (e.g. a patient will rather not appreciate a physician's successful treatment, when he/she perceives the service provider personnel's behaviour as unfriendly or inadequate in any other way).

Despite the chances marketing in the health sector bears for the actors involved and the society as a whole, ethics and social responsibility as well play a crucial role regarding health issues. This makes organisations in the health sector to ensure marketing practices that are ethically responsible and eventually focus on customer well-being, particularly with respect to patients. For instance, physicians and hospitals are to practice ethically and avoid unnecessary procedures that may be more profitable for them but are less helpful and perhaps even more painful for patients and relatives and further dependants (Chavez & Sayre, 2012).

This points to a further particularity of health marketing, namely an increased number of rather heterogeneous stakeholders in health markets. For instance, employers in each business sector rely on healthy or convalescing employees. Relatives of elderly patients attach great importance on humane treatment by residential and domiciliary care personnel. Residents living near hospitals rely on responsible driving and ambulance cars and avoidance of noise disturbance by sirens and rescue helicopters. The citizens, interest groups and the society as a whole as well expect ethically responsible behaviour of health product providers and medical researchers (e.g. discussions and political debates on animal testing in research). Both health care providers and citizens expect responsible measures on behalf of the ministry of health and their government when it comes to health sector-related decisions and regulations (Bercowitz, 2011, p.20).

Further particularities are that consumers of health products typically not pay all costs associated to their medical treatment. Additionally, imperfect market knowledge regarding costs and products puts constraints on the individual customer's decision making. Moreover, health systems typically assign third parties,

such as health insurance entities and employers with decision power, so that consumers and many health product providers have rather few influence on the overall system. As a purely consumer-driven health market is therefore unrealistic, at least empowering consumers in the health sector may be an attainable goal according to Chavez and Sayre (Chavez & Sayre, 2012).

Last but not least, an international view, the health sector features numerous health systems, i.e. health systems differ from country to country and feature specific regulations. In Germany, for instance, there exists specific rules regarding medicant advertising, featured in the "Heilmittelwerbegesetz" (HWG) (HWG, 2019). This law regulates the advertising on medicants in Germany and e.g. forbids deceiving customers regarding the effects of a product. This means that pharmaceutical manufacturers cannot carry out advertising campaign in such a way as e.g. for sweets and beverages.

4   Applicability of Health Marketing

Based on the background and the reflections stated so far, it is obvious that a "one-fits-it-all" health marketing approach neither exists nor can be developed in a proper way. It therefore does not make sense to provide a generic health marketing concept, but rather taking over a more differentiated point of view, hereby following the heterogeneous sector or rather market conditions, including the illustrated particularities. This becomes obvious in Table 2, which provides the linkages between the health market fields of activity, its core actor relations and the relevant marketing disciplines. It refers to Table 1 and hence focuses not on all, but on selected fields of activity in health marketing.

Table 2: Overview on actor relations and marketing approaches in the health sector

Field	Core Actor Relations	Marketing
Pharmaceutical industry	Manufacturers and hospitals	B-to-B marketing
	Manufacturers and wholesale and retail trade	B-to-B Trade Marketing
	Pharmacies and consumers	B-to-C Trade marketing
General healthcare	Healthcare providers and patients	B-to-C service marketing
	Hospitals and insurance companies and physicians	B-to-B service marketing
	Health insurances and patients	B-to-C service marketing

Field	Core Actor Relations	Marketing
Geriatric care	Residential care homes or home health care services and elderly patients and/or relatives	B-to-C service marketing
	Residential care homes or home health care services and health insurances	B-to-B service marketing
	Health insurances and elderly patients and/or relatives	B-to-C service marketing
Medical supply industry	Manufacturers and hospitals and/or physicians or insurances	B-to-C marketing
	Manufacturers and patients	B-to-C service marketing
	Health insurances and patients	
Health insurances	Health insurances and patients	B-to-C service marketing
	Health insurances and employers	
		B-to-B service marketing
Health tourism	Health tourism agencies and/or health resorts and consumers	B-to-C service marketing
	Health tourism agencies and/or health resorts and health insurances	B-to-B service marketing
	Health insurances and consumers	B-to-C service marketing
Further Prevention	Government/communities and/or non-profit organisations and/or employers and/or third-party service providers and citizens and employees	B-to-C service marketing
		B-to-B service marketing

Source: Own illustration.

Following Table 2, a more detailed look at the kind of marketing of these fields of activity and actors emphasises that there is no approach that can be labelled as "generic health marketing". Instead, marketing in the health sector is to makes use of several disciplines and discipline combinations of marketing and adapt them to the specific needs of the respective health marketing field. This becomes even more evident, as several fields of activity partly overlap with specific actors (e.g. health insurances) that are featured in numerous business relations.

Table 2 points out that business-to-business (B-to-B) marketing plays a major role in the health sector The characteristics of B-to-B marketing are in general a fewer number of customers, longer and more complex sale processes featuring group decisions and personal sales (Thomas, 2008, p.129). Personal sales are crucial in many fields of health marketing in the B-to-B context, be it in the relation between medical supply vendors marketing their products to hospitals (Thomas, 2008, p.129), but as well for service marketing in the health sector, as seen in healthcare

services. Service marketing itself combines with either B-to-B and B-to-C marketing. One of numerous examples for B-to-B service marketing is the marketing of health insurance providers towards employers purchasing health insurance coverage for their employees (Chavez & Sayre, 2012). An example for B-to-C service marketing is the relation between health insurances and patients and/or their relatives. In Germany, for instance, you pay for a nursing care insurance and you can receive money from your national health insurance for taking over the homecare of an elderly person in your family (Pflege durch Angehörige, 2019).

In addition, organisations in the health sector are to apply internal marketing. Internal marketing in particular refers to efforts of effectively training and motivating customer-contact employee as well other supporting service staff to ensure customer satisfaction. Typical features of internal marketing e.g. comprise meetings, internal newsletters, special events and appreciation dinners. For a successful implementation of internal marketing, it is crucial to put emphasis on an effective communication allowing employees to actively contribute to the internal dialogue and keeping employees current on developments (Thomas, 2008, pp. 129-130). As pointed out in Section 2, staff retention is important in fields of activity such as geriatric care, so that internal marketing is already nowadays an important issue in the health sector.

In his 1986 article on marketing services, Magrath proposes to extend the traditional 4 Ps of traditional good-based marketing by three further Ps, namely personnel, processes and physical facilities, to fulfil the requirements to service marketing (Magrath, 1986). At least the integration of "personnel" as a fifth "P" has been largely approved by scholars (e.g. Meffert et al., 2018). It is obvious, that this fifth P is highly relevant in most fields of the health sector, even largely independent of the actual health product being marketed. In addition, particularly for healthcare services (e.g. treatment by a physician), processes and physical facilities play as well a valuable role, so that it seems suitable to integrate the sixth and seventh P in the marketing mix. This may make much sense, in particular with respect to a proper and time-efficient organisation of the administrational and treatment process a customer perceived and with respect to the design and atmosphere of waiting rooms for patient. Swift processes and comfortable waiting rooms may largely contribute to patient satisfaction.

Hence, given both the heterogeneity and the particularities of the health sector, its actors and products, applying marketing concepts in this sector requires diligent adaptations. In this respect and in addition to the marketing concepts being applied, further established marketing and management concepts and activities, such

as product innovation, segmentation, are as well applicable in and to be adapted to the respective health sector fields of activity (Chavez & Sayre, 2012).

Eventually, the idea of marketing is about providing benefit to the actors involved. Health issues eventually concern each individual, numerous organisations and governmental bodies and thus eventually the society as a whole. Yet, marketing is not about posing strict, "artificial" borders regarding product characteristics (physical goods vs. services) and marketing approaches, but should instead focus on integration and combination, hereby making use of learning potential and synergies between several marketing disciplines, e.g. B-to-B and service marketing (Kesting et al., 2014, p.14). This is relevant for both research in general (focus on interdisciplinary research in each field), in health marketing research and in organisational practice. Such combination is the key for successful application of health marketing in practice.

Going beyond the issues covered in this article, this conceptual framework of health marketing and the implications derived from it even apply for further market relations surpassing the health sector in a narrower sense. This may, for instance, refer to procurement markets, e.g. when organisational buyers in hospital buying centres negotiate contracts with electronic records solution providers or when governments engage in hiring managerial consultants (Chavez & Sayre, 2012). Such business relations feature at least one actor who is not necessarily directly linked to the health sector and yet, health sector- and health marketing-related particularities need to be considered here.

5   Summary and Conclusions

It has become obvious that the health sector, or rather its numerous fields of activity, is very heterogeneous in terms of structures, products, organisations and further stakeholders, regulations, and the specific needs and benefits or benefit expectation of the different actors involved as direct or indirect customers. Consequently, there does not exist a generic kind of health marketing, and it would not make sense to establish one. Instead, depending on the specific market conditions, organisations in the health sector need to make use of adapting and combining established marketing disciplines, concepts and measures suited for their respective field/s of activity.

In sum, understanding marketing in the health sector best refers to applying it as a kind of toolbox to be adapted for each marketing problem arising in the field. This points towards a deductive approach on marketing, which needs further refinement though. This can well be achieved by applying an additional combination of established concepts from marketing and strategic management.

To conclude, it is not the product, it this the actors', customers' and target groups benefit as well as the suppliers' benefit that marketing is eventually to be based on. Much more, health is essential for individuals and the society as a whole, so that the overall focus eventually lies on the societal responsibility and benefits. In this respect, health marketing does bear valuable chances and potential to contribute to societal needs and welfare. Marketing in the health sector, applied in an ethically responsible and diligent way, will eventually provide benefit to the society as a whole.

Health is and remains an overall societal task and each actor, be it individuals or organisations, politicians or governments is to contribute to it in each possible and adequate way. Responsible and sustainable health marketing, which as well considers ethical issues, may turn out to be a valuable cornerstone of success to a more health-conscious healthcare providing society.

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Marketing in Health Sector

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From Support to Automation – The Role of AI in Marketing

Judith Helmer

Artificial Intelligence as a new technological trend is faster, cheaper, more efficient, and precise than other technologies or the human expertise. It has the power to transform workplaces by taking its role within the company. Especially in the data-rich analytics and creative work of marketing AI can step in. This paper analyses the degree of the role of AI in marketing – supporting, augmenting, replacing, automating – to assess in how far and to what degree AI applications are able to shape this area. Furthermore, it identifies influencing factors which should be considered in the AI implementation process and rounds off with a look into the AI future.

Keywords: Artificial Intelligence, AI classifications, AI development, changes in workplace, support, augmentation, replacement, automation, AI applications, marketing trends, marketing process, black box phenomenon, AI investments, AI implementation, black box, data security, narrow AI, general AI, bots, algorithms, dynamic pricing, data processing

1 Introduction

Artificial Intelligence (AI) is no longer an abstract idea of researchers. Companies have realised the large potential that AI technologies can bring to the global economy and are investing heavily (Sterne, 2017). According to a simulation done by Burghin et al. (2018) at the McKinsey Global Institute, 70 percent of companies will have adopted at least one application of AI in their business operations by 2030. This development brings implications for the workplaces worldwide if AI applications take their role in the company. The exact consequences cannot be accurately predicted at the moment, but, as an example, some research projects estimate an increase in unemployment in the United States between nine and 50 percent (Lee, 2018), depending on the role that AI will take within the company.

Some AI practitioners and researchers argue that AI should take an augmenting role rather than automating whole processes or jobs (Duan et al., 2019). When having a specific look on marketing activities and processes, it includes some standardised tasks, but also some communicative and creative parts. In this instance, the question arises in how far AI applications can be implemented in marketing processes and which role they take.

As AI applications are relying on large amounts of data (Kumar et al., 2019) and the marketing sector is constantly collecting data about consumers, competitors, trends, and other environmental factors, there might be a potential for AI in marketing (Sterne, 2017). This paper aims at analysing AI applications in the marketing environment and giving an overview of the role of AI. Before starting the analysis, AI fundamentals will be presented in chapter two to give a profound background of AI in theory – definitions, classifications, and the development of AI technology – and to show the recent trends and AI applications in the business environment, and more precisely in marketing. After briefly discussing the methodical steps in the third chapter, chapter four is going to present the analysis concerning the role of AI in marketing. In the first part, AI applications will be observed under the perspective of the steps of the marketing process. After that, further factors will be described which influence the role performance and success of AI in marketing. In the last part, this paper looks at future topics of AI which might change the role of AI in marketing.

The chapter does not aim to a wholistic view about AI in marketing but serves as an introduction Therefore, it is focussed on common applications which are used by companies.

2   AI – fundamentals of theory and application in business

2.1   Definitions, classifications, and development of AI technology

Although the term Artificial Intelligence has become an upcoming trend in recent years, the origin of AI, or also referred to as Machine Learning, can be dated back to the 1950s (Duan et al., 2019). In general, AI is seen as a technological system which tries to recreate human intelligence (Lee, 2018). To measure whether a system is intelligent or not, Haenlein and Kaplan (2019) refer to the Turing Test as todays benchmark. Only if a human cannot distinguish whether he interacts with a human or a machine, this machine can be named intelligent. In addition to this, AI is also described as a system which has the ability to handle external data, learn from them and use them for specific tasks and goals (Kumar et al., 2019). Other definitions claim it as efficiency-enhancing tools which are transforming business (Agrawal, 2018) or a "technology [which] operates in the domain of automation and continuous learning, acting as the intelligence that drives data-focused analytics and decision making" (Kumar et al., 2019, p. 136). Due to the development of AI over the past years, the definition of AI has evolved as well, thus hindering the establishment of a commonly accepted definition – AI is still a moving target (Duan et al., 2019).
Since the first years of AI, it has undergone many ups and down, namely the AI summers and winters, with some further milestones being discovered (Lee, 2018).

Today, there is a range of technologies which are already used in business. Therefore, the most important technological advancements are illustrated and classified in figure 1.

The first years of AI were dominated by **Symbolic AI**. This classical approach mainly consists of **rule-based expert systems**. The technique of rule-based inference makes use of logical rules, if-then rules, which are applied into an algorithm by human experts. Then, these algorithms are fed with input data. With the help of the if-then rules, the system derives its outcome, namely the result or conclusion concerning the input data. This system works well for simple and well-defined tasks in a controlled environment, but cannot work on its own (Sterne, 2017; Lee, 2018; Duan et al., 2019; Gentsch, 2019; Haenlein & Kaplan, 2019). In this time, the first attempts of **natural language processing** were also established, meaning the understanding of a language followed by a response of the machine according to the written word (Sterne, 2017; Gentsch, 2019). Today, these kind of algorithms are used in many applications, although they are now referred to as "excellent algorithms of informatics" instead of AI (Gentsch, 2019, p. 27).

As the tasks to be solved became more complex and environments more flexible, it gave rise to **sub-symbolic AI** which is now the dominating part of AI (Gentsch, 2019). Being surrounded by a large amount of data, these systems have the ability to learn by themselves and form their own algorithmic structures. The underlying technology founded – **artificial neuronal networks (ANN)** – are inspired by biological information-processing mechanisms, namely the human brain. By feeding it with training data – input data and the corresponding outputs –, the ANN searches for underlying patterns and builds up own structures – it learns. The first versions of ANN were already found in the 1980s (Bourton et al., 2018; Lee, 2018; Duan et al., 2019). Today, most applications are constructed as ANN (Haenlein & Kaplan, 2019), often known under the term machine learning. To perform more complex tasks, the ANN also had to become more complex which was achieved by the foundation of **deep learning** in the 2010s (Lee, 2018; Statista, 2019b) boosting the accuracy of classifications and predictions. Today, these systems are also known as **convolutional neural networks (CNN)** and **recurrent neural networks (RNN)** (Chui et al., 2018; Overgoor et al., 2019). This system required a more complex network, more computational capacity, and abundant data (Overgoor et al., 2019).

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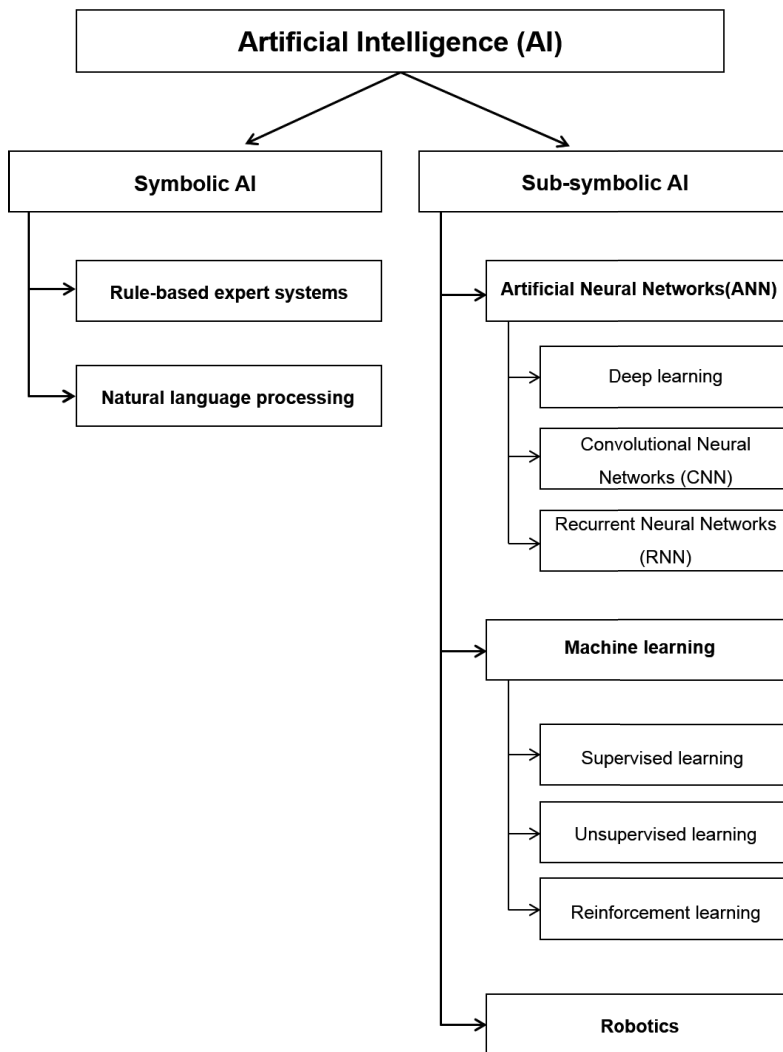
Figure 1: Classification of AI technologies
Source: Own illustration based on Statista (2019b, p. 8) and further developed.

Machine learning is defined as the "way of using a given data set to figure out how to perform a specific function through trial and error" (Sterne, 2017), meaning the system figures out how to solve a problem on its own. The human expert just teaches it how to learn from the given data. So, the system has the ability to change its mind about the given task and find a new way to solve it. The human component stays out of the learning process and, thus, the algorithm and logic is unreadable for humans (Sterne, 2017). Within machine learning, it can be distinguished between supervised, unsupervised, and reinforcement learning. These terms refer to concrete learning types which are used for applications within machine learning (Gentsch, 2019). **Supervised learning** uses labelled data which are split up into

training and testing data. In the first step, the machine uses the training data to learn patterns and set up an algorithm. In the second step, the test data is used to evaluate whether the machine has learned correctly to predict the right outcomes (Sterne, 2017; Overgoor et al., 2019). **Unsupervised learning** is used when the given data is unlabelled. There is no specific task given to the machine (Sterne, 2017) and it does not know what the data represents, but searches for patterns and similarities within the data (Overgoor et al., 2019). **Reinforcement learning** shows similarities to unsupervised learning, but in this technique the machine receives some feedback on the conclusion it has derived from the unlabelled data. Thus, it can adjust its actions based on the feedback (Chui et al., 2018; Overgoor et al., 2019).

Next to the presented computational systems, **robotics** is another upcoming trend of AI. This includes not just the processing of data, but also a corresponding action of the robot (Sterne, 2017). It has the ability to interact with humans and even develop a certain degree of self-awareness. Robots are a combination of many technologies within machine learning like computer vision, tactile perception, and deep learning (Statista, 2019b).

As further ideas are still in the research process, AI looks into a bright future. At the moment, all technologies are limited in a certain way to tasks, environments, kind of data or computational capacity. The vision for the future is to step out of the so called narrow or weak AI (Sterne, 2017) and reach generalized AI systems which can perform several tasks without the need to be trained for each task individually. This is called general or strong AI (Sterne, 2017; Chui et al., 2018). The final step would then be the Super Intelligence (Haenlein & Kaplan, 2019).

2.2 Trends and AI applications in the business environment

Next to the trend of AI in research, AI technologies have also entered the business world predicting a huge economic success worldwide or as Lee (2018) describes it, the age of discovery followed by the age of implementation. According to a study of PricewaterhouseCooper, it is estimated that AI will contribute 15.7 trillion US dollar to the global economy in 2030 (Rao & Verweij, 2017) with a growth rate of 154 percent in the AI software market in the next years (Statista, 2019a). Many firms have realized that in many areas detailed knowledge about customers, markets, and other forms of data can serve as a competitive advantage (Duan et al., 2019; Kumar et al., 2019) and are investing in intelligent process automation and AI technologies. It is predicted that there will be a spending on these technologies worldwide of about 13.6 billion US dollar in 2020 with a rising

tendency (Statista, 2018b). The impact which AI will bring to the economic world will not only be driven by productivity gains due to the automation of processes and the augmentation of their labour force, but also by increased consumer demands coming from personalised offerings and higher-quality products and services (Rao & Verweij, 2017). This causes structural shifts in the strategy of companies (Kumar et al., 2019). Depending on the role of AI within the company, it might cause shifts in jobs. It is predicted that a certain degree of shifts will appear. Especially jobs with largely standardised or calculable tasks, which can be taken over by AI, are at risk, while new jobs will be created as well (Lee, 2018; Haenlein & Kaplan, 2019; Kumar et al., 2019; Lee, 2018).

2.3 Trends and AI applications in marketing

The described trend can also be observed in the marketing environment. Corporate spending on AI software for marketing will grow from about 360 million US dollar in 2016 to 2 billion US dollar in 2020 with a cumulative average growth rate of 54 percent worldwide (Sterne, 2017). Especially due to the current trend of personalisation in marketing, AI grows in popularity (Kumar et al., 2019) with a projected increase in value of 1.4 to 2.6 trillion US dollar worldwide (Kumar et al., 2019).

Next to the personalisation of goods and services, recommendations, dynamic content selection, and dynamic display styles are factors for AI applications, too (Sterne, 2017). Starting from narrow AI applications replacing standardized tasks (Sterne, 2017) to stronger bonds with customers interacting with AI applications on a personal level, generating high-quality customer data, and creating additional customer value (Kumar et al., 2019). Most applications in marketing work in the area of data analysis, followed by on-site personalisation, optimization and testing, email marketing, image recognition and/or processing, automated campaigns, content creation, programmatic advertising, digital asset management, and video recognition and/or processing (Statista, 2018a). The applications with the largest impact can be found in the radical personalisation, discovery of new trends and anomalies, price and product optimisation, and predictive analytics (Sterne, 2017). Due to the opportunities and abilities of AI, it can perform different roles within marketing and, thus, influence the work in marketing ranging from a support function to the full automation of a process. Duan et. al. (2019) have identified four different roles which will be used within this paper – supporting, augmenting, replacing, and automating.

3   Methodology

To evaluate the role of AI in marketing for the purpose of this paper, the four presented roles will be analysed within the framework of the traditional marketing process according to Kotler et al. (2017). The basis for this paper was the description of AI in the marketing process by Gentsch (2019) whose findings will be considered under the perspective of AI roles. After the analysis of the marketing process further influencing factors will be presented which shape the company-specific usage and success. Finally, an outlook of the future development will be given to complete the picture. This paper represents the status quo of common AI applications in marketing and aims to give an overview by presenting exemplary applications. Specific company cases exceed the range of this paper and shall be observed separately.

4   Analysis of the roles of AI in marketing

4.1   AI in the traditional marketing process

4.1.1   Situation analysis

The first step, the situation analysis, consists of the collection of external and internal data concerning the business environment. So, the company tries to gather all relevant data concerning financials, markets, competitors, trends, and other surrounding powers. As one of the most known tools, the SWOT analysis is used as a first fundamental analysis (Kotler et al., 2017).

According to Lee (2018), companies have collected a large amount of structured data without knowing how to properly analyse them and derive the right conclusions. Despite the usage of electronic devices, software systems and computer capacity were not good enough to uncover hidden patterns with the growing amount of data. Here, AI applications present new levels of analysis which allow a more accurate and precise derivation of conclusions (Lee, 2018; Overgoor et al., 2019).

Within the internal analysis, bots can help to gather information about the relevant key performance indicators, strengths and weaknesses of the company. For the external analysis, bots can analyse customers and competitors and learn about customers' behaviour by observing conversations or directly communicating with them. With the help of the collected data about the past, predictive modelling algorithms can foresee future developments and consumer behaviour (Gentsch, 2019).

Due to the recent advancements in computational power and the data availability, AI is able to predict the future within complex problems based on historical data. Performing these analyses within marketing, it not only saves time and reduces costs, but it is also much more accurate and able to include more relevant information (Overgoor et al., 2019). While, according to Sterne (2017), marketers have relied on their gut feeling and common sense for a long time, AI takes out the subjectivity, relying solely on data.

By doing this, AI is not only supporting the traditional tasks of marketers within the situation analysis, it also expands the tasks performed and open up much more findings about the business environment. As these new intelligent systems show a better and cheaper performance than humans. They even have the potential to replace marketing experts in this step of the marketing process and also work automated, depending on the degree of AI implementation.

4.1.2   Marketing strategy

After having analysed the relevant data and identified the critical success factors, a mission statement, marketing strategy, and the positioning need to be defined (Kotler et al., 2017), meaning this step is about a decision making process in which the strategic direction has to be identified out of the previously drawn conclusions.

While human prediction has been found as substitute of AI applications (Agrawal, 2018), human judgement is seen as complementary (Sterne, 2017). Applications are able to assist with defining the relevant target group and giving predictions concerning different options. But defining the final value proposition needs analytical as well as creative skills (Gentsch, 2019). AI can serve as a consultant or second opinion by opening up new, previously unimagined solutions and strategies (Chui et al., 2018) and impact human decision making (Duan et al., 2019). But the final decision will still to a certain degree be influenced by gut feeling (Sterne, 2017) and in line with the company's principles and values (Gentsch, 2019).

Therefore, AI applications can just serve as a support, but cannot replace or even automate this step of the marketing process.

4.1.3   Marketing mix

The marketing strategy is followed by the concrete marketing tactics formulated in the marketing mix – the decisions concerning product, price, place, and promotion (Kotler et al., 2017). Many different AI applications can be found which support and optimise the marketing tactics.

Within the **product**-related tactics it is defined which characteristics and advantages of the product shall be highlighted to convince the costumer of the offering (Kotler et al., 2017). As personalisation is one of the big trends in marketing (Kumar et al., 2019), AI algorithms can be used to personalise the customer experience by using chatbots as communication tools. These bots gather information about the customer's needs and transfer them to a personalised offering. Furthermore, the product itself can be personalised as AI offers possibilities for new and innovative products (Gentsch, 2019). In this part, it can take a supporting and augmenting role, but cannot completely replace the human expert as product-related decisions have to be in line with the overall company goals and, thus, require human judgement.

Concerning **pricing** decisions, traditional marketing tactics are about identifying the general price range, which is accepted by customers, and the individual price variances of certain customer segments and sales channels (Kotler et al., 2017). Dynamic pricing is one of the new trends in this area. With the help of AI algorithms product prices are automatically changed in real time according to the demand, availability, and competition. Especially airlines and companies like Amazon and Uber are known for using this technique (Gentsch, 2019). Due to the fast processing of large amounts of data, AI can not only support marketers in pricing decisions, but also augment the traditional task by performing dynamic pricing. As pricing includes calculable and precise tasks which can be performed by AI, there is also the possibility that AI applications can replace human experts. It can even automate the whole process of pricing as it is already done at some companies (Gentsch, 2019).

Place-related tactics deal with the right sales channels which shall be used for the chosen product and customer segment. This is about evaluating sales opportunities and deciding on the right composition of sales channels (Kotler et al., 2017). Electronic commerce forms the basis for AI. It can transform the online purchasing experience by performing the whole purchasing process on its own. Based on given payment information, delivery details, and past purchasing behaviour, personal butlers take over the purchasing process fully automated without interference by the customer (Gentsch, 2019). By this, AI applications fully automate the

buying process if it is applied on the presented level. It has to be mentioned that these kind of place-related tactics do not work for all companies in the same way and just include online sales channels. Most of the sales channel decisions are still done by marketers.

As **promotion** tactics, marketers usually set up a separate marketing plan which covers all detailed information from the general mission statement to the individual promotion activities (Kotler et al., 2017). Setting these promotion activities in line with the customer needs is crucial for the marketing success. In this case, AI applications serve as a helpful support as they are able to track customers' behaviour and react accordingly and in real time. Furthermore, mature self-controlled recommendation systems have a huge potential for cross-selling opportunities, selling the offer and other additional prices. As a result, it has been found that this individualised kind of promotion is more efficient and cheaper than mass advertising (Gentsch, 2019). Within the promotion tactics, AI applications can be applied in different ways. It can support marketers by reducing the number of times they have to set or rearrange promotion activities. In addition, it is more precise in serving customer needs and, thus, realising more selling opportunities. But these kind of applications are missing the creative skills for designing marketing activities. Some applications, as for example some website tools, are using bots which give advice on how to set up a website (Gentsch, 2019) and can build creative insights (Bourton et al., 2018), but creative tasks are still decided and set up by human experts in the first place. After that they can run automated by AI.

4.1.4   Implementation controlling

Similar to the situation analysis, the final control of the implemented marketing activities is based on qualitative and quantitative data which are compared with the previously set strategies and targets. If necessary, marketing activities are rearranged according to the deviation from the target (Kotler et al., 2017). With the help of AI systems, it is possible to measure a large number of factors, evaluate the efficiency of a campaign, and uncover hidden potentials. Performing these tasks, AI systems are much more accurate and efficient than human marketers. They can solve more complex and subjective problems and can be run automated by a smart process automatisation software which learns automatically from the analysed data. Furthermore, they help to visualise the results on dashboards (Gentsch, 2019). In this part, these applications are clearly augmenting and automating marketing tasks. But in the last step, the conclusions drawn from data have to be interpreted and decisions have to be made concerning the further composition

of the marketing mix. Here, human judgement again becomes an integral part (Agrawal, 2018). AI applications can support the human expert in the decision making process, but the final decision is still made by the human expert as well as the following reaction (Agrawal, 2018; Overgoor et al., 2019). With its possibilities in data processing it goes beyond human capabilities and can perform this automated, but the human still has to step in when it comes to the final decision making.

Table 1: Overview of the analysis results concerning the role of AI in the marketing process

		Marketing Process					
		Situation Analysis	Marketing Strategy	Marketing Mix				Implementation Control
				Product	Price	Place	Promotion	
Roles of AI applications	Supporting	✓	✓	✓	✓	$[✓]^*$	✓	✓
	Augmenting	✓	✗	✓	✓	$[✓]^*$	✓	✓
	Replacing	✓	✗	✗	✓	$[✓]^*$	✗	✗
	Automating	✓	✗	✗	✓	$[✓]^*$	$[✓]^{**}$	✓

Legend:

✗ = not possible   ✓ = possible $[✓]$ = possible in specific cases

＊ = only applicable for companies selling via electronic commerce

＊＊ = only specific activities can be automated after having previously been set up by a human expert

Source: Own illustration.

It can be found that AI takes different roles within the steps of the marketing process. All results of the presented analysis are visualised in table 1. These results can differ in the individual company case depending on the level of AI implementation. Nevertheless, it gives an overview of the possibilities of AI in marketing.

4.2 Further influencing factors for AI in marketing

Companies are more and more realising the opportunities of AI in business. But nevertheless, there are several factors which can influence the role and success of the AI investment. The most important factors are described in detail.

Before making a major investment, entrepreneurs should take into account how long it will take until the specific market is transformed and adjust the investment amount accordingly (Agrawal, 2018). When doing this, it should be noticed that

AI progress is likely to be exponential in the future (Agrawal, 2018). When investing, it is important to align the applications with the **company goals** (Kumar et al., 2019). Entrepreneurs should have a clear vision what they want to achieve with AI, as the effectiveness of the investment is directly linked to the goal-specification clarity (Agrawal, 2018). Bourton et al. (2018) recommend starting the AI process at the very beginning by asking fundamental questions as the basis for further actions. CEOs shall be open-minded to discover original, unexpected, and breakthrough ideas in this process. They need to understand where AI can boost innovation, insights, and decision making, realise where it brings efficiency, and identify the way to revenue growth (Kumar et al., 2019). In the same time, they should also see and accept where AI has its limits (Chui et al., 2018). In the end, this approach will make companies more inwardly agile and foster creativity in the transformation process (Bourton et al., 2018; Kumar et al., 2019). The final AI approach should fit to the initially identified problem and CEOs should be aware of possible biases within the data and algorithms (Chui et al., 2018). After having implemented the AI systems, it is important to manage the learning loop, meaning to make sure that the conclusions which the AI system has drawn from the input data should be fed into the system again to guarantee continuous learning (Agrawal, 2018).

The **human factor** is another influence which should be integrated into the AI implementation. It is sometimes difficult to trust a machine as humans like to keep the control and do not want to accept that a machine should take over (Agrawal, 2018). Furthermore, the implementation is likely to bring the so called black box problem (Haenlein & Kaplan, 2019). People want to know the reasons why an algorithm has come to a specific conclusion (Chui et al., 2018). So, building up trust in machines is difficult if the way the machine works is hard to explain or cannot even be tracked by humans (Chui et al., 2018). That is why it is important to make sure that employees understand which role AI should take within the company and to ensure them that they are not replaced (Sterne, 2017). However, Duan et al. (2019) found that due to more attention on AI and business applications, the technologies seem more common in use and are better accepted in public.

The last, but important, factor is the **legal regulation** of data usage. In the knowledge economy, humans have understood that information is like a currency (Kumar et al., 2019). Data availability is a basic requirement for AI applications (Chui et al., 2018). But there are some privacy concerns rising in the public which have already led to first data protection laws, like the recently issued General Data Protection Regulation in the European Union (Sterne, 2017). These are limiting

the amount of available data and, thus, are influencing the success of AI applications (Haenlein & Kaplan, 2019; Kumar et al., 2019).

4.3 Future outlook

As described in chapter 2.2 AI is increasing in business application and success. In the future, it is likely that it will turn around complete business models and, by this, will influence the role of AI in business and marketing. As an illustration, Agrawal (2018) describes the case of Amazon which might use AI systems in the future to turn around the whole buying process by already shipping products based on past customer behaviour, although these customers have never set the respective order prior to the shipping.

Furthermore, researchers are hoping for the generalisation of AI. General AI is the idea of a model which is trained in a way that it can solve all kind of tasks and is not limited to these specific tasks or environments. Coming from narrow AI to general AI would set a new milestone within AI research and would, as well, broaden the role of AI in business (Chui et al., 2018). The two AI superpowers China and the United States are already competing to achieve this major breakthrough (Lee, 2018).

5 Conclusion

To conlcude, the analysis of the technical possibilities of AI applications has shown that AI can take various roles in the marketing process. It shows highest performance in the fast processing of data, the identification of hidden characteristics, and the objective evaluation based on historical data. Nevertheless, it is limited to a specific task that it has learned within a stable environment. Furthermore, its objective evaluation is limited to the data that it has been given. So, it would decide for each specific case and might leave out the bigger picture of brand values, identity, and principles. The results of this paper's analysis are in line with the statement that AI is performing better than human prediction (Agrawal, 2018), but is dependent on human judgement (Sterne, 2017; Agrawal, 2018; Overgoor et al., 2019). This means jobs of marketers might shift to more decision-making and creative-thinking tasks, leaving the standardised, data-related tasks to the AI systems.

Kumar et al. (2019) support this view that AI will transform workplaces. They suggest that some existing job tasks will change, while new jobs will be created due to the integration of AI applications. Furthermore, operational and managerial teams will be formed. AI will make marketing more efficient as it fastens the de-

cision-making process and immediately provides information and insights (Overgoor et al., 2019). But according to Sterne (2017), marketing jobs won't be that much at risk as it involves tasks which cannot be completely taken over by AI.

Similar to this analysis, Duan et al. (2019) explain that "[…] AI should be used to augment human judgement rather than automation" (p. 68). Therefore, companies should support employees in acquiring fusion skills in the human-machine interface to solve the black box issue (Duan et al., 2019).

Another analysis has shown that AI can replace humans at the operational and tactical level, but not at the strategic level. Its supporting role is evaluated as helpful on all three levels (Duan et al., 2019). So, AI is viewed more as a support system than a standalone expert system (Duan et al., 2019, p. 68), a useful tool, but not a replacement (Sterne, 2017).

This paper's analysis supports similar findings of current research, but it should be noticed that it is not exhaustive. Within the scope and aim of this paper, a general picture of AI in marketing was given. So, a detailed analysis of specific cases or single steps of the marketing process might be up for future research projects including the execution of quantitative research. Furthermore, it represents the status quo of AI applications. Due to the fast development of AI research, it is useful to repeat similar analyses from time to time. While having taken the perspective of the company and its employees, it might also be interesting to analyse the implications of AI from the customer perspective and how it changes the customer experience.

This paper has shown a first step into the sphere of AI to be expanded in the future. There is not a clear picture for the future of AI yet. Stephen Hawking says "the development of full artificial intelligence could spell the end of the human race" (Cellan-Jones, 2014, n.p.), while the CEO of IBM, Ginni Rometty, sees AI "technologies to augment human intelligence (…) we see a world where this is a partnership between man and machine and this is in fact going to make us better and allow us to do what the human condition is best able to do" (Duan et al., 2019, p. 63) – a topic for further discussion.

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Luxury and Sustainability: A Contradiction or not?

Carmen-Maria Albrecht, Marie Golaz

Sustainability is a major strategic challenge for luxury companies. The luxury industry has been accused of falling behind or even being at odds with issues of sustainability. At first glance, sustainability and luxury values may seem incompatible. Based on a review on the concepts of luxury and sustainability and an analyis of selected luxury brand benchmarks, the connection between the two concepts is shown. Meeting sustainability demands has the potential to be a major growth driver for luxury companies today.

1   Introduction

Sustainability is a major strategic challenge for companies. In times of acute awareness of global warming, pollution, scarcity of energy, social inequalities, fair trade, and natural disasters, the term sustainability finds its way into nearly all meetings of executive committees in large companies (Lochard & Murat, 2011; Kapferer & Bastien, 2012).

Many questions are asked about sustainable development strategies in luxury companies since luxury brands are subject to much criticism, in particular from NGOs (non-governmental organizations), governments, and consumers (Kapferer, 2010; Davies et al., 2012). Sensitivity to sustainability issues within the group of luxury consumers is rising as well (Kapferer, 2015).

The luxury industry is a very noticeable sector when looking at its size and economic power as well as its high-profile customers (Kapferer, 2010). Moreover, it is a closely examined industry because of its link to perfection (Kapferer & Michaut, 2015). In fact, the luxury sector must be cautious not to lose its impeccable image and be careful not to fall behind and miss the chance to demonstrate its excellence within the realm of sustainability. Although the image of luxury seems flawless, defenders of sustainable development tell otherwise (Kapferer & Bastien, 2012). For example, 95% of the gold used in the jewellery industry is untraceable (Lochard & Murat, 2011). Moreover, it is known that chrome is drained into rivers by tanneries and mercury is drained into rivers when gold is extracted (Kapferer & Bastien, 2012). It is also important to point out "war diamonds", which are diamonds illegally extracted and used to buy weapons to fight

during African wars (Lochard & Murat, 2011). These facts reveal that the luxury industry is not free from the burden of issues pertaining to sustainable development.

Many studies around consumers' perception of sustainability in luxury products or services have been conducted (e.g., Kapferer & Michaut-Denizeau, 2014). Most of them concluded that younger generations are sources of growth and that they will represent approximately 55% of the luxury market in 2050 (Bain & Company, 2019). However, these young generations also attach very high importance to sustainable products and services (Abtan & El Ghouzzi, 2018). Considering consumer perception and consumer buying behavior is therefore essential for luxury companies which intend to respond to sustainable development challenges.

"Sustainable development is no longer an option", confirms Marie-Claire Daveu, chief sustainability officer at Kering (Daveu, 2019). Luxury companies cannot ignore the issue of sustainability in their core strategy any more (Abtan & El Ghouzzi, 2018). Therefore, the question of how luxury companies deal with sustainability arises. To help to answer this question, it is important to look at both concepts that seem very opposite at first sight but can be considered as intrinsically linked (see also Kapferer & Michaut, 2015). Furthermore, selected luxury companies are examined as to how they integrate the concept of sustainability into their strategy.

2 Luxury and sustainability: linked or contradictory concepts?

2.1 Concept of luxury

What characterizes a luxury brand is its superior quality which is traditionally linked to the concept of craftsmanship and thus higher prices, heritage, rarity, beauty, extraordinariness, and symbolic meaning (e.g., Albrecht et al., 2013, Wiedmann et al., 2009). A luxury brand can thus be described as "the most selective in its distribution; the most image-driven; the most extreme in its product quality (...) and the most expensive" (Kapferer & Bastien, 2009, p. 313). The perceived degree of luxuriousness, however, can vary. There are brands of the upper range and brands of the lower range of luxury within the same product category (Vigneron & Johnson, 2004). Moreover, the perceived degree of luxuriousness can also vary across product categories (e.g., jewellery versus accessories; Okonkwo, 2007) The symbolic meaning of luxury brands mainly relies on their "aura" (Kapferer, 2012) and "dream value" (Dubois & Paternault, 1995) which make luxury brands so appealing and desirable.

To further understand the concept of luxury, it is important to also outline the concepts of fashion and premium, as these are often confused with the concept of luxury. Fashion brands focus on the mass market, their products are not created to last in time, and they are associated with imitation, which is all contradictory to the luxury business model (Okonkwo, 2007; Kapferer, 2009, Kapferer & Bastien, 2012). For premium brands, however, quality of the products is important as well, but the price is set at a more reasonable level and is thus lower and distribution is less selective than for luxury brands (Kapferer, 2009; Dall' Olmo et al., 2015).

2.2   Sustainability in business: corporate social responsibility (CSR)

Sustainability is linked to social, environmental, and economic dimensions. Needs of society impacting businesses have become more and more significant, and as a result, companies have to adapt their strategies to answer to their stakeholders' concerns. The concept of corporate social responsibility (CSR) has derived from this development and various organizations and authors have explained the concept of CSR (Simpson & Taylor, 2013). One selected definition of CSR refers to "achieving commercial success in ways that honour ethical values and respect people, communities, and the natural environment" (Business for Social Responsibility, 2010).

3   Luxury and sustainability: incompatible values or linked concepts?

The luxury industry has been accused of falling behind or even being at odds with issues of sustainability. Luxury values abundance and excess while sustainable development suggests limitation (Kapferer, 2010). Even Kapferer and Michaut (2015) who support the idea that sustainability and luxury are intrinsically linked concepts point to potential areas of conflict. They state that pleasure and superficiality for luxury and altruism, moderation, and ethics for sustainable development are opposed. They also perceive a contrast between ostentation and the fairness facet of sustainability. The perception that luxury stimulates social exclusion is highlighted by other researchers as well (e.g., Schaub, 2009; Voyer & Beckham, 2014). At first glance, sustainability and luxury values may seem incompatible, but luxury is not limited to superficiality and ostentation.

There are research works that support the idea that luxury and sustainability have always been linked (e.g., Kapferer & Michaut-Denizeau, 2014). The two concepts share similar values, such as craftsmanship, quality, and tradition, and they are against any kind of fashion throwaway society (Janssen et al., 2014). Moreover, there is a clear convergence between sustainability and luxury as they focus on rarity and beauty (Kapferer, 2010.; Kapferer, 2012). For François-Henri Pinault, Chairman and CEO of Kering, luxury orients itself toward sustainability

values, which can also be seen by its focus on product durability (Schaub, 2009). Thus, the value of durability can be added to the principles of both luxury and sustainability. Kapferer (2015, p.154) affirms that "luxury is by definition durable" and durability is a core value for sustainability. Therefore, long-term perspectives are very important for both concepts. While luxury products should stand the test of time as they are of a high quality and durable (Kapferer, 2010), the concept of sustainability implies that "future generations" should be considered in all matters on a triple bottom line basis: economic, social, and environmental (Lochard & Murat, 2011).

To sum up, the luxury sector appears to have the values and foundations necessary to integrate the principles of sustainability (Kapferer, 2010; Lochard & Murat, 2011; Kapferer & Michaut-Denizeau, 2014; Janssen et al., 2014). The values advocated by luxury and sustainability which seem to encourage the relationship are those of craftsmanship with creation and production of a durable luxury product out of high-quality raw materials. Sustainability and luxury are therefore two concepts which are increasingly addressed simultaneously.

4   Integration of sustainability demands into luxury companies

4.1   Reorganization of traditional luxury companies

Since luxury is a "very visible sector" (Kapferer 2010, p.42) and stands for excellence, the industry is under huge scrutiny regarding sustainability (Kapferer, 2015). Luxury companies have realized they have to urgently consider sustainable development issues in their corporate strategies. Consequently, they are motivated to innovate through means of the organization and processes along the entire value chain to answer to sustainability's challenges. Kering and LVMH are chosen as two luxury corporations since they have successfully taken the challenge to integrate sustainability into their strategy.

4.1.1   *Kering*

"Luxury and sustainability are one and the same"–this credo is held by François-Henri Pinault, Chairman and CEO of Kering (Kering, 2019). Kering, a global luxury group, develops brands in fashion, leather goods, jewellery and watches such as Gucci, Saint Laurent, Boucheron, Pomellato, Ulysse Nardin, Girard-Perregaux (Kering, 2019). In 2019, the group has been listed second in the Global 100 Corporate Knights Index, ranking the world's most sustainable brands (Corporate Knights Global 100, 2019). Kering pursues three precise objectives

with their sustainability strategy: "care" which aims at reducing the group's environmental footprint; "collaborate" builds know-how and promotes diversity and parity; and "create" encourages innovations (Kering, 2019).

Kering developed an environmental profit and loss (EP&L) account accessible to anyone on the Internet. In 2016, Kering first launched a simplified, interactive, and playful version of this account called "My EP&L" for students in order to enable them to measure and compare environmental impacts of different products and in the end to attribute a monetary value to them (Kering, 2019).

In 2018, Kering generated 13.665 billion euros of revenue, with 29% growth compared to 2017. Moreover, the group economically focuses on a "multi-brand business model", "organic growth" through "transversal projects", and "sustainable development" actions to ensure its proper growth (Kering, 2018).

On the environmental level, Kering indicates through its actions and investments that nature protection is a core value for the group. With the EP&L each maison from the group can monetize its environmental impact. It specifically examines the following environmental impacts: carbon emission, water consumption, water pollution, land use, air pollution, and waste. This footprint can be filtered by country, by step (processing, extraction, etc.), by material (metal, fur, leather, etc.), by raw material, and by business unit. Consequently, Kering can use the EP&L account to direct its sustainable development approach, enhance its procedures and supply sources, select the best-adapted technologies and innovate in new and fresh alternatives (Kering, 2019).

Socially, Kering ensures the well-being of the employees and supports them with training and development to reach their career goal. Moreover, it attaches great importance to woman's place in society. "Kering is the only luxury group listed on the 2018 Bloomberg Gender Equality Index" (Kering, 2019). Furthermore, Kering is engaged in preserving craftsmanship, artisans and their expertise (Kering, 2019).

4.1.2   LVMH

Louis Vuitton Moet Hennessy (LVMH) is a luxury group managed and owned by Bernard Arnault and represents 70 maisons operating in different luxury sectors (wine and spirits, fashion and leather goods, perfumes and cosmetics, watches and jewellery, and selective retailing) (LVMH, 2019).

Since 2001 LVMH has been showing its engagement via an "environmental charter". Today, the LIFE (LVMH Initiatives for the Environment) program is at the core of the maisons' strategies and reinforces the integration of sustainability

in managing processes as well as facilitating new monitoring tools (Abtan & El Ghouzzi, 2018).

LVMH generated 46.8 billion euros of revenue in 2018, with a growth of 10% compared to the year before (LVMH Annual Report, 2018). The group focuses on economic growth, commitment to creativity and excellence, and sustainability. LVMH is leader on the luxury market and aims to strengthen its competitive position (LVMH, 2019).

Socially, the group emphasizes the following values: discrimination prevention and respect; talent development and craftsmanship preservation; improvement of employee quality of life; and interacting with communities and fostering local development (LVMH CSR report, 2018).

On the environmental level, the group was the first to create an environmental department in a company in the late 1990s. Furthermore, the LIFE program was developed in 2012 to integrate environmental aspects into managerial processes and to consider innovative practices at each maison while helping to create new environmental management tools. Four objectives for 2020 (that were fixed in 2016) are set: Regarding the "product objective", LVMH seeks to enhance the environmental efficiency of all products and within their entire lifecycles. The "supply chain objective" takes into account the traceability and origins of raw material, preservation of resources, and the application of the highest standards in procurement chains. Reducing CO_2 emissions by 25% by 2020 is part of the "CO_2 objective". The "site objective" asks all maisons to improve their environmental performance by 10% at all sites as well as "improving their energy efficiency by 15%" (LVMH, 2019).

4.2 Luxury companies that have met sustainability demands from start

4.2.1 Eco-born brands

"Eco-born" brands confront historical companies in that they integrate sustainability into their DNA. The combination of luxury and sustainability has been a natural mix and is an essential component of their business model. Thus, eco-born brands represent true competition for traditional luxury companies, showing that luxury brands can completely integrate social, environmental, and economic values into their business model (Lochard & Murat, 2011).

The following brands are chosen as the most representative of this new generation of sustainable luxury brands and are thus referred to as best-practices: Stella McCartney, JEM, and Norlha.

4.2.2 Stella McCartney

Stella McCartney paved the way to sustainable luxury and is a symbolic pioneer. The brand is based on nature, people and animal respect and integrates sustainability completely into its business model while ensuring that the growth of the company follows those values (Stella McCartney, 2019). After 17 years with the Kering Group, the brand Stella McCartney is now part of LVMH (LVMH, 2019).

A major part of the designer's website is dedicated to advice on everyday tips to answer sustainable development issues, as well as explaining the higher cost of products (Stella McCartney, 2019). For instance, the designer explains that vegetarian leather products are more expensive than real leather ones due to very specific manual work needed to reach the same high quality as real leather products ("it can cost us up to 70% more") (Stella McCartney, 2019). The brand integrates sustainability into the entire value chain. Even stores, offices, and design studios are run by the "Green Guidebook". For example, they are powered by renewable energy and wood that is used in stores and offices are Forest Stewardship Council (FSC) certified (Stella McCartney, 2019).

Stella McCartney is part of the Ethical Trading Initiative that promotes workers' rights and of the Natural Resource Defence Council that seeks to decrease waste and water use (Stella McCartney, 2019). Generally, the brand promotes the "circular economy" and is highly committed to associations that aim to protect people and the planet (e.g., Wildlife Friendly Enterprise Network, Textile Exchange, Sustainable Apparel Coalition, Parley for the Oceans, Centre for Sustainable Fashion, Canopy) (Stella McCartney, 2019).

The brand website clearly shows the designer's commitment to sustainability and the decision to completely remove leather and fur from her collections and to use organic cotton and wool, recycled polyester and silk instead (Stella McCartney, 2019). Although Stella McCartney has a high sustainable engagement, the designer has been criticised for her own lifestyle and her collaborations, which are in contradiction to the values she communicates. For instance, she created a collection with H&M, a company related to sweatshops and very poor working conditions in Asia (Worldpress, 2012).

4.2.3   JEM

JEM (Jewellery Ethically Minded) is a representative example of the jewellery sector to understand how a luxury jewellery brand based on sustainability is different from other jewellery brands. Words speak for themselves: the brand name announces the integration of sustainability into its brand identity. JEM was launched in 2009 and focuses on ethical gold and lab-grown diamonds (1.628 Paris, 2019a; JEM, 2019).

Traditional gold-mining and diamond extractions are areas that are "subject to economic exploitation, human rights violations, child labour abuses, but also to health risks and environmental inequalities" (JEM, 2019). Therefore, JEM puts sustainability at the very heart of its strategy and participates in every part of the value chain (1.628 Paris, 2019a). The gold supply stems from two sources. It is either made by jewellery recycling or it is Fairmined Gold certified by the Alliance for Responsible Mining (ARM) that adheres to ethical, environmental, socially responsible, fair trade and transparency standards for the small-scale and artisanal mining industry (1.628 Paris, 2019a; JEM, 2019). Moreover, JEM is committed to work exclusively with partners that guarantee the traceability of the material at every stage along the value chain–"from the mine to the jewellery box" (JEM, 2019). The jewellery design is made in French studios and defends values such as minimalism, which highlight gold rarity and preciousness. Moreover, the jewellery is handcrafted by local artisans using traditional and environmentally friendly techniques (JEM, 2019).

4.2.4   Norlha

Norlha launches collections with products based on yak khullu (i.e., the soft under down that the yak grows in fall and sheds in spring) from Tibetan highlands, sheep's wool from central Tibet and silk from China (Norlha, 2019). The brand strives for transparency and traceability along the value chain, for environmental respect, and for better working conditions (Norlha, 2019). It handcrafts all products with artisanal techniques: weaving, felting, and tailoring. Moreover, Norlha helps to ensure that the future generation stays in the country. In fact, many young people are willing to leave the Tibetan highlands to escape deplorable living conditions and find a better job. Norlha as an employer gives young Nomads an opportunity to stay (Norlha, 2019.).

Norlha has been rewarded for its engagements and commitments based on the three pillars of sustainability by 1.628 Paris, an association organizing the Salon du Luxe every year with discussions about the future of sustainable luxury (1.628 Paris, 2019b). Furthermore, Norlha has been expanding its sustainable luxury and

cooperates with famous French brands such as Balmain and Lanvin and produces products for those designer brands (Positive Luxury, 2019).

5 Conclusion

Even if luxury and sustainable development might seem at odds at first sight, the literature review and practical examples have shown that their common points go beyond their divergences. Sustainability is and can be a major growth and development driver without being seen as a constraint for luxury brands. "To remain a leader versus mass-goods and fashion, luxury will have to be sustainable in social, economic and ecological terms" (Kapferer, 2010, p.45). Integrating sustainability into corporate strategies does not signify to curb and restrain creativity or to alter brands' DNA. It should rather be seen as a potential for future growth (Kapferer, 2010; Lochard & Murat, 2011).

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Chapter 2:

Management in Companies

The influence of the presence of women in boards of directors on the firm performance in publicly listed enterprises in Poland and Germany

Joanna Siebert, Kerstin Kurzhals

Although the progress in the inclusion of women in top management in public-owned enterprises is on the rise, it is still far from balanced in terms of gender diversity. The presented study sheds new light on the discussion concerning the impact of women in boards of directors in the context of transition and developed economies on the efficiency of firm's performance and allows for their comparison. The comparative analysis based on the WIG 30 and DAX 30 companies in the period of 2013-2018 indicates that the presence of women in boards do not affect significantly the efficiency indicators in the tested sample. The results of the study however reveal that in Germany the appointment of female directors suggests a different diversity strategy than in Poland.

Keywords: gender diversity, board diversity, transition economy, financial performance, public-owned enterprises

1   Introduction

Although the trend towards women inclusion in various areas of corporate governance is visible, the underrepresentation of women in top management positions remains. The topic of the role of women in corporate governance has been considered in relation to gender diversity and linked to firm's organisational performance, strategy, social behaviour and management by many studies (Carter et al. 2003; Campbell-Mínguez & Vera, 2008; Nielsen & Huse, 2010; Hafsi & Turgut, 2013; Kirsch, 2018). Gender diversity of top management has evolved as an important part of the broader concept of diversity in corporate governance which deals with dissimilarities in directors' attributes along with age, ethnicity and race (Hafsi & Turgut, 2013, p.464).

The reason why the topic of gender diversity was brought up in the public sphere is the underrepresentation of women in corporate directorships as reflected by the statistical data. In 2017, the directorships of large public listed companies that were occupied by women accounted to around 22% in United States, 25 % in European Union (EU-28) and 5% in Japan (European Commission, 2018; Catalyst, 2018). This marks a great shift towards inclusion of women in the leadership positions in comparison with the data from 2010 (12.3% in US, 12% in EU and

0.9% in Japan) (Catalyst, 2018; European Commission, 2018). This significant change in the presence of women in corporate boards to a great extent could be explained by the introduction of national regulations which held firms accountable to reach certain percentage of female representatives in corporate boards. The example of Norway, the first European country that in 2003 introduced 40% quotas on the female representation in boards of directors was followed by many countries in the following years including France, Italy, Belgium and Germany (Kirsch, 2018, p.347). Some countries introduced non-compliance sanctions in forms of warnings, fines, suspension of director's benefits or nullification of board elections (European Commission, 2012) whereas others included sanctions only for state-owned enterprises (e.g. Poland) and no sanctions at all (e.g. Netherlands).

According to Kirsch (2018, p.347) one could distinguish four main aspects of gender diversity which have been encompassed by existing streams of literature. First, the scholars tried to identify whether there are gender differences between female and male directors by analysing the demographics, human and social capital characteristics or differences in traits and values. Secondly, another stream of research has devoted their attention to the factors shaping the board gender composition with the special distinction of micro-, meso- and macro- scope factors. Thirdly gender diversity was analysed in relation to the corporate performance encompassing financial value (e.g. Carter et al., 2003; Campbell- Mínguez & Vera, 2008) business strategy (e.g. Matsa & Miller, 2013), social and ethical performance behaviour (e.g. Hafsi & Turgut, 2013; García-Sanchez et al., 2015) and board processes (Nielsen & Huse, 2010). The fourth stream of research has focused mainly on the regulations applied by institutional actors on the organisations indicating fixed quotas of female representation in corporate boards (Kirsch, 2018, p.347). Since the literature on gender diversity seen in the light of the firm's corporate governance structures, evolved predominantly in the Anglo-Saxon context, the scholars called for more diversified evidence from other parts of the world (Young et al., 2008). In this vein, this study addresses the concerns of the existing scholarship for more scientific evidence in transition economies on the role of women in corporate governance in the light of societal, economic and political changes towards higher gender equity.

2   The Role of Women in Corporate Governance

2.1   Gender diversity in corporate boards

In order to understand the core of gender diversity and its implications for firms, Kirsch (2018, p.350) developed a framework of board gender composition

which is a starting point for the insights drawn in this paper. Figure 1 visualizes the main components of discussion in relation to research on gender diversity.
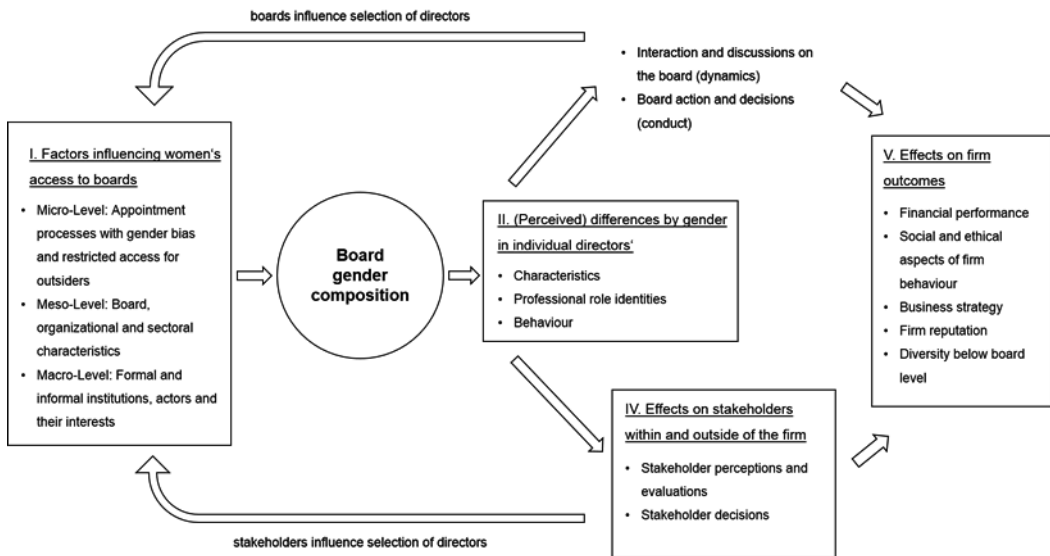
Figure 1: Framework for understanding board gender composition. Source: Kirsch, 2018, p.357.

The first set of components addresses (I) factors influencing women's access to boards that determine the effects of board composition on boards dynamics (III), other stakeholders (IV) and firm outcomes (V) (Kirsch, 2018, p.357). These include (i) micro-level factors that focus mainly on director selections and appointment (Jensen & Zajac, 2004); (ii) meso-level factors encompassing differences between boards, firms, industries and countries; and (iii) macro-level factors that address the institutional and supranational engagement into shaping the environment (Kirsch, 2018, p.351). For the purpose of further analysis, the aspect of board composition on firm performance (V) will be further outlined below.

2.2 Gender composition impact on firm performance

There are few main sets of literature that explain the effects of gender board composition on the firm's performance. Kirsch (2018, p.353) mentions that existing literature focuses mainly on the effect of gender board composition on firm financial performance, social and ethical firm behaviour. Firm financial performance has been investigated by many scholars in direct relation to presence of female in boards, whereas others have found that the relation between female on

boards and firm's performance is mediated by other factors such as board effectiveness (Campbell & Mínguez-Vera, 2008).

The scholarship on the firm financial performance provides two types of measurement indicators: market measures and accounting- based measures (Gentry & Shen, 2010, p.514; Al- Matari et al., 2014, p.25). The results on the link between the board diversity in terms of gender on the firm financial performance are mixed. Whereas some studies find a negative relationship between the percentage of women and firm value (measured as ROE, ROA) (Shrader et al., 1997), other researchers find that boards with female directors are characterised by greater participation of directors in decision- making, tougher monitoring of the CEO, or better alignment with the interest of shareholder value; all which may have positive, negative or no effects on corporate performance (Adams & Ferreira, 2009, p.304). For instance, Adams & Ferreira (2009, p.308) in their study found a positive relation between female presence and return on assets (ROA) along with the assumption that female presence enhances shareholder value (argument that women appointment on board is an equivalent of appointment of independent director). However, their findings are not robust enough to conclude a positive relationship for other market measures (Adams & Ferreira, 2009, p.306).

In their meta-analysis, Post & Byron (2015, p.33) find that the female directorships are not linked to improvement of market measures (such as market-to-book-ratio and Tobin's Q), they are however positively related to the accounting measures of return on equity (ROE) and return on assets (ROA). They also conclude that although there is no direct relationship between female directorships and market performance, this impact is dependent on the context (Post, Byron, 2015; Hoobler, Masterson, Nkomo, Michel, 2018). As Post & Byron (2015, p. 34) note, the relationship becomes more positive in contexts with stronger gender parity and negative in contexts with weak gender parity. A recent study of Hoobler et al. (2018, p.2473) in which overall women's leadership on joint effect of firm accounting and market measures performance was examined, provided evidence that the especially female CEO presence is related positively to financial performance.

Along with the insights drawn from Post & Byron's (2015) study, in the study of Hoobler et al. (2018, p.2482) the effect is stronger in communities not only with egalitarian context, but also in contexts with more progressive attitudes towards women. This suggests that creating opportunities for female directorships appointment is crucial when willing to improve organisational results. The approach towards quantifying the link between the presence of female directors solely to firm financial performance has been criticised by the recent scholarship pinpointing to

the importance of social and ethical performance, firm's strategic performance and business reputation (Kirsch, 2018, pp. 353-355; Hoobler et al. 2018, p.2485). Recent studies have examined this impact of female presence on other aspects of firm's performance. For instance, Kirsch (2018, p.353) systematizes the research that finds a positive link between female presence and lower fraud frequency, greater transparency and disclosure activities, less accounting errors and tax avoidance, higher earnings quality and more accuracy in financial statements. Other stream of research concludes a positive relationship between female directorships and corporate philanthropy, CSR policies and sustainable practices (e.g. employee policies, human rights, corporate governance, product quality), stakeholders' relationships (Hafsi & Turgut, 2013; García-Sanchez et al. 2015; Setó-Pamies, 2015). The argumentation behind the positive link of female presence with the socio-ethical aspects of firm performance traces back to gender differences, drawing on the female communal characteristics and male agentic behaviour theories (Kirsch, 2018, p.353).

Hoobler et al. (2018, p. 2485) finds this approach essentialist in its nature, suggesting an alternative approach of focusing on the underlying mechanism, how do the presence of women on boards of directors affect organisational performance. There is a growing body of research that establishes the link between female presence in boards in relation to business strategy and reputation (Kirsch, 2018, p.353). Although, as Kirsch (2018, p.354) notes, the effect of higher share of female directorships on reputation is still poorly defined, the studies on the effect on business strategy offer some interesting insights. For instance, some provide evidence that higher share of women directors on boards influence positively the degree of innovation within a firm (Torchia, Calabró & Huse, 2012), lower acquisition rate and lower bid premia (Chen, Crossland & Huang, 2016) or lesser extent of labour force reduction (Matsa & Miller, 2013).

Summarising, despite the increasing interest from academia and practice in research investigating the role of woman in corporate governance, longitudinal studies on the impact of gender diversity on firm's performance are in vast majority placed in Anglo-Saxon context. Still, little is known about the specifics of relationship between gender diversity and firm's performance in the corporate governance systems of transition economies (Young et al. 2008). Accordingly, the aim of this study is to shed a new light on the discussion concerning the impact of women in boards of directors in the context of transition and developed economies on the efficiency of firm's performance.

3   Quantitative Research and Methodology

To address the research objectives as mentioned above, this research sets out to contribute to the academic field by quantitatively analysing the impact of women in boards of directors on the firm financial performance in German and Polish stock exchange indices of public-state enterprises taking into consideration three efficiency indicators: return on equity (ROE), return on assets (ROA) and price to earnings ratio (PE). The subsequent chapters will outline the steps of the empirical investigation which consist of data collection, descriptive data analysis, Pearson coefficient correlation analysis and least squares regression with robust standard errors.

3.1   Data Collection

This study involves the panel data from public listed companies in Germany (developed economy) and Poland (transition economy), gathered from 2013 and 2018. The sample contains 336 observations from a time frame of six years in blue- chip companies across two stock exchange indices: Warsaw Stock Exchange WIG30 and Frankfurt Stock Exchange DAX30. The comparison of WIG30 and DAX30 gives a good overview of the trends present in country corporate governance, since publicly listed companies contribute to the growth of economy and success of the stock market as a source of financing, increasing returns and venture capital (Daily FX, 2019). The data collected encompasses the time period from 2013 to 2018. This is due to the attempt of eliminating the effects of financial crisis on the stock exchange market, which could have biased the results of the study.

In order to measure the influence of women in boards of directors on firm's performance, the data set consisted of multiple variables. The following *independent variables* have been considered: board size (total number of directors), board structure (number of female and male directors), percentage ratio of female directors relative to the board size, management structure (two-tier structure), industry type, and dummy variables for countries were introduced (0- Germany, 1-Poland). The firm performance (as the dependent variables) was measured at the level of accounting-based indicators: return on assets (ROA) and return on equity (ROE) as well as market performance indicator: price earnings ratio (PE). Selection of firm's performance measures corresponds to similar approaches in the existing literature, following studies of Valenti et al. 2011 and Al-Matari, 2014.

Since the information on the structure of corporate governance in Polish and German companies differed across sources, the data on the board size, structure, share of female directors has been collected and computed manually from final year reports. The longitudinal data on the efficiency measures ROA, ROE, P/E

ratio and industry type comes from two main sources: EMIS Intelligence Database for Polish listed companies and the data base of Reuters for German listed companies. In total, out of 60 listed Polish and German enterprises, 4 of them were erased from the set either due to missing values or which listing on the Stock Exchange appeared later than year 2013. This accounted to 28 firms in each stock exchange index.

3.2   Data Analysis

3.2.1   Descriptive analysis

In both countries, the average share of female in boards over the period 2013-2018 has substantially increased, reflecting an overall trend in the raise of women in positions of top management (Table 1). In the period 2013-2018 the average share of female directors in Polish WIG 30 accounted for 12.09%. The share of female directors evolved from an average of 10.84% in 2013 to 14.75% in 2018, reflecting a 35 percent point increase over six years. There were 18 female directors in the 2013 and this number in 2018 in the WIG 30 index rose to 28 female directors.

In case of DAX 30, these figures have been slightly smaller. The average share of women in boards over 2013-2018 equalled to 9.70%. The numbers of female directors also rose, from 6.50% share of female directors in 2013, to 13.01% in year 2018. This amounts for an increase of 52 percent points in the span of six years, reflecting therefore more dynamic rise in gender diversity than in WIG 30. The Table 1 outlines the share and sum of female directors across two indexes.

Table 1: The increase in number of female directors between 2013- 2018 in DAX 30 and WIG 30. Source: Own compilation based on analysed data.

WIG 30	Mean share of female directors	Number of female directors	DAX 30	Mean share of female directors	Number of female directors
2013	10.84%	18	2013	6.50%	13
2014	10.33%	17	2014	8.09%	16
2015	10.43%	19	2015	9.60%	20
2016	10.97%	20	2016	9.51%	20
2017	15.24%	27	2017	11.46%	24
2018	14.75%	28	2018	13.01%	27
Total	**12.09%**	**129**	Total	**9.70%**	**120**

When comparing the share of women in boards of directors between DAX 30 and WIG 30 across sectors and industries, few observations must be made. In case of DAX 30, the highest share of female directors in the years 2013-2015 has been seen in transport and logistics services, including companies such as Deutsche Post

and Lufthansa where the share of female directors went beyond 25%. Since 2017, there has been also a significant increase (slightly above 20%) in the female directors' positions in the software and IT services, which may be explained by the higher availability of STEM programmes for women and initiatives both on the side of public and private players to engage more women in technology sector in Germany (e.g., National Pakt für Frauen in MINT-Berufen). Relatively scarce number of female directors still prevails in pharmaceutical and multiline utilities sectors, with no female directors in metal and mining industry. This finding is also consistent with former study of Bremmer et al. (2007) who concluded that industries with higher isolation of final consumers such as production, resources or engineering tend to have fewer female directors in their boards.

3.2.2 Pearson coefficient correlation analysis

In order to test the relationship between dependent and independent variables in the analysis, the Pearson coefficient correlation analysis has been performed following other studies on the relationship between female presence in boards and firm's performance, e.g., Kompa & Witkowska (2017) and Huang et al. (2019). It is important to note that correlations do not imply causation between the variables, but a relationship between them. The results are presented in Table 2 and 3. The correlations were performed separately for WIG30 and DAX30 in order to include the characteristic of the country context.

Table 2: Correlations for WIG30 and DAX30.
Source: Own computation based on analysed data with the use of software SPSS Statistics.

DAX30	ROE	ROA	PE	BODSIZE	NOMEN	NOFEM	PERMEN	PERFEM
ROE	1	.384**	-0.035	0.017	0.014	0.017	-0.042	0.044
ROA	.384**	1	-0.016	-0.047	-0.030	-0.062	0.022	-0.031
PE	-0.035	-0.016	1	-0.136	-0.136	-0.054	0.016	-0.017
BODSIZE	0.017	-0.047	-0.136	1	.952**	.535**	-.292**	.286**
NOMEN	0.014	-0.030	-0.136	.952**	1	.254**	-0.001	-0.003
NOFEM	0.017	-0.062	-0.054	.535**	.254**	1	-.922**	.921**
PERMEN	-0.042	0.022	0.016	-.292**	-0.001	-.922**	1	-.991**
PERFEM	0.044	-0.031	-0.017	.286**	-0.003	.921**	-.991**	1

WIG 30	ROE	ROA	PE	BODSIZE	NOMEN	NOFEM	PERMEN	PERFEM	s.
ROE	1	.822**	-0.035	-0.001	-0.059	0.123	-0.125	0.143	
ROA	.822**	1	-0.022	0.035	0.074	-0.051	0.056	-0.031	
PE	-0.035	-0.022	1	-0.083	-0.070	-0.029	-0.012	0.011	
BODSIZE	-0.001	0.035	-0.083	1	.858**	.318**	-.165*	.159*	
NOMEN	-0.059	0.074	-0.070	.858**	1	-.210**	.347**	-.349**	
NOFEM	0.123	-0.051	-0.029	.318**	-.210**	1	-.950**	.954**	
PERMEN	-0.125	0.056	-0.012	-.165*	.347**	-.950**	1	-.994**	
PERFEM	0.143	-0.031	0.011	.159*	-.349**	.954**	-.994**	1	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 2: Pearson's coefficient matrix: WIG30. Source: Own computation based on analysed data with the use of software SPSS Statistics.

The impact of women in boards on firm performance

Pearson's correlation coefficient in sets of WIG 30 and DAX 30, reveal some particularities of relationships between the variables. First, the relationship between the number of female directors and efficiency indicators is relatively stronger in WIG 30. This is particularly vivid in the correlation between number of female directors and return on equity (ROE). While in WIG 30 this correlation is positive and small (0.123), in DAX 30 it is even smaller (0.044). Both ROA and PE ratio are negatively correlated with the number of female directors on boards and this relationship is close to 0. In terms of relative share of women in boards and efficiency indicators, the results of WIG 30 reveal a positive relationship with ROE (0.143), positive minor correlation with PE ratio (0.011), as well as negative correlation with ROA (-0.031). These results are however not statistically significant. In DAX 30 female share is positively correlated with ROE (0.044) and negatively correlated with ROA (-0.031) and PE (-0.017), however none of the variables is statistically significant and all are close to 0. A strong and positive correlation is observable between the number of female and board size among two sets, much stronger relationship vivid in DAX 30 (0.535) compared to WIG 30 (0.318). These relationships are also statistically significant. Hence, among two sets the percentage of men in the boards is highly and negatively correlated to board size, indicating higher share of male directors tend to be a proxy for smaller boards. In both sets of data, this correlation is statistically significant and very strong. An interesting finding is also the relationship between the number of female and male board directors. In case of WIG 30, this relationship is negative and statistically significant, reflecting that with the increase of female directors the number of male directors decreases. In case of DAX 30, this correlation is positive and statistically significant, revealing that the increase of female on boards is accompanied by the increase in male on boards, indicating that the female ratio is offset by the increasing number of men on boards.

3.2.3   Least squares regression analysis

Regression results included all the dichotomous variables for the firms within the non-financial sector leaving out the dummy variable for finance companies as the benchmark variable. In order to comply with the assumptions of linear regression, appropriate tests, scatter and Q-Q plots for serial correlations, normality, linearity, homoskedasticity and outliers were verified. Through the visual inspection of the plot of standardised residuals and unstandardized predicted values as well as the Breusch- Pagan test (p=0.000 < 0.05) the violation of the homoskedasticity assumption in two sets of data across all three dependent variables ROE, ROA and PE ratio, was identified. As a result, in order to prevent biasing the significance tests, the least squares regression with heteroskedastic-consistent standard error estimator (HCSE) and fixed effects was applied. As Hayes (2007, p.709) points out, although in case of heteroskedasticity, the estimator of the OLS regression parameters remains unbiased, the covariance matrix of the parameter estimates under heteroskedasticity may provide confidence intervals and significance tests that are liberal or conservative. The assumptions for lack of serial correlation (Durbin-Watson test) and linearity (Normal Q-Q plots) were met, and the identified outliers remained since they reflected the actual data of the firms. The results from the least squares regressions with robust standard errors for three efficiency measures ROE, ROA and PE of WIG 30 and DAX 30 firms are presented in Tables below.

In WIG 30. The R square measures for all the efficiency indicators differ substantially, indicating that independent variables explain much better the results of ROE and ROA than PE. It results that the independent variables explain only around 5% of variability in the PE ratio compared to 18.5% of ROA and 22.6% of ROE. The percentage of female directors in the boards of directors in WIG 30 has a statistically significant impact on ROE among WIG 30 companies, indicating that companies with female directors on boards tend to have a higher return on equity (ROE). The same impact is not confirmed in relation to return of assets (ROA) and PE ratio.

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Table 3: Regression results WIG 30 (2013-2018).
Source: Own computation based on analysed data with the use of software SPSS Statistics.

	ROE	ROA	PE
PERFEM	0.146* (0.035)	0.040 (0.026)	0.887 (1.042)
BODSIZE	-1.381** (0.519)	-0.366 (0.447)	-7.858 (5.266)
SOFTIT	8.762 (5.923)	10.421** (5.087)	78.180*** (42.546)
CHEM	-2.265 (2.507)	2.149 (1.704)	9.746 (11.447)
TEXT	8.843** (3.542)	7.537* (2.110)	27.656 (17.550)
MULTITEL	-8.637* (1.699)	-1.093 (1.002)	-16.709 ***(8.995)
OILMET	-9.745** (3.960)	-0.807 (2.043)	62.126 (68.031)
TRANS	-9.366*(2.982)	-2.001 (1.388)	18.885 (25.256)
OTHER	3.790 (4.647)	0.753 (1.234)	0.953 (30.569)
Constant	17.903* (3.655)	4.755*** (2.696)	48.801** (21.223)
Observations	168	168	168
R^2	0.226	0.185	0.051

standard errors (HC3) in parentheses, heteroscedasticity consistent standard error estimator was used.
* $p< 0.01$; ** $p<0.05$,
*** $p<0.1$

Along with share of female directors, the impact of board size on ROE seems to be statistically significant, whereas it has the opposite direction than the female directorships. This indicates that in WIG 30, larger boards have a lower ROE. The results on the board size and efficiency indicators suggest that there is also a negative coefficient towards ROA and PE ratio, but these remain not significant. In terms of sectors significance, these are evaluated in comparison to financial firms ROE, ROA and PE ratio. In contrast to ROE of financial sector firms, the three sectors: multiline utilities, oil and mining industry and transport score a lower return on equity by around 9 %, whereas textile industry outcompetes the ROE of financial sector by 8.8%. Interestingly, the female share in the three abovementioned sectors is significantly lower than in those of finance sectors and also 20% lower in the textile industry (Table 6). When reviewing ROA results, textile and software industry stand out, indicating a return on assets respectively by 7.5% and 10 % higher in comparison to the financial sector. The female ratio in directorships is also lower in these sectors compared to finance firms by 18% and 20% respectively. In terms of PE ratio, compared to finance industry only software industry has a higher PE ratio, whereas multiline utilities note a lower PE ratio.

DAX 30. The R squares in DAX 30 of the efficiency indicators are substantially higher than in case of WIG 30, which suggest that the model fit much better to the analysed panel data and can explain variability in the dependent variable more effectively.Especially strong seems to be the effect of independent variables on return on assets, which explains 64% of the variability in ROA. In DAX 30 index, there is no statistically significant evidence that female directorship influence any of the efficiency indicators. Neither, the board size seems to have a statistically

significant impact on the efficiency of firms. In terms of analysed sectors, five of them have a higher ROE compared to finance firms. These include:

Table 4: Regression results DAX 30 (2013-2018).
Source: Own computation based on analysed data with the use of software SPSS Statistics.

	ROE	ROA	PE
PERFEM	0.005 (0.174)	-0.0181 (0.020)	0.280 (0.211)
BODSIZE	0.279 (0.943)	0.0378 (0.106)	-1.0321 (0.723)
SOFTIT	7.492** (3.454)	7.465* (0.655)	14.590* (4.093)
CHEM	6.587** (2.839)	7.608* (0.422)	5.620 (3.894)
TEXT	8.951*** (5.068)	6.933* (1.291)	7.878*** (4.220)
MULTITEL	7.1322 (15.600)	0.2652 (0.807)	-4.442 (5.764)
OILMET	-13.0334 (11.696)	-1.1287 (1.053)	66.529 (80.674)
INDCON	4.840*** (2.530)	4.310* (0.388)	-2.394 (3.609)
TRANS	11.899* (3.859)	4.854* (0.622)	0.033 (7.460)
PHARMA	4.141 (3.294)	4.726* (0.408)	7.933** (3.961)
OTHER	5.852 (6.161)	4.930* (0.995)	-8.410*** (4.910)
Constant	6.641 (9.618)	0.466 (0.958)	21.174* (6.110)
Observations	168	168	168
R^2	0.0327	0.642	0.1474

standard errors (HC3) in parentheses, heteroscedasticity consistent standard error estimator was used.
* $p< 0.01$; ** $p<0.05$, *** $p<0.1$

Software industry, chemicals, textile, industrial conglomerates with automobile industry as well as transport companies. Apart from transport companies, which has a ratio of female directors higher by 8%, the remaining sectors have 4- 8% less female directors on their boards compared to finance industry.

In terms of return on assets, almost all five sector groups (excluding multiline utilities and oil& mining) tend to have a higher score compared to financial sector. The women directors share in boards of directors in these companies imply however an inverse relation to the return on assets. Although in this analysis, there seems to be no statistically significant relationship between the women's ratio of DAX 30 boards and return on assets, the results suggest that vast majority of DAX 30 companies with higher returns on assets tend to prefer the boards with lower female ratios and that these effects can largely explain the variability in the return on assets considering the R square measure.

The only non-financial sector in DAX 30 that has a higher female ratio on their boards is the freight, logistics and airline industry in which the main players consist of Deutsche Post or Lufthansa. With regards to price and earnings ratio, software industry, textiles and pharma are outcompeting the finance industry. The share of the female directors in the boards of the companies in these sectors, tend

to be between 4% to 7% lower than in case of finance firms. This inverse relationship between the presence of female directors in German boards and higher PE ratios in DAX 30 index seem to be more vivid than in WIG 30.

Table 5: Regression results for share of female directors in various sectors in WIG 30 and DAX 30 (2013-2018).
Source: Own computation based on analysed data with the use of software SPSS Statistics.

PERFEM	WIG 30[1]	DAX 30[2]
SOFTIT	-18.952* (3.003)	-4.640 (2.990)
CHEM	-5.897 (5.54)	-4.340*** (2.637)
TEXT	-20.48* (2.801)	-8.529** (3.860)
MULTITEL	-6.912*** (3.82)	-7.756* (2.637)
OILMET	-15.147* (3.278)	-14.085* (3.860)
INDCON	-	-4.411** (2.164)
TRANS	-20.48* (2.801)	8.455* (2.990)
PHARMA	-	-7.704 *(2.442)
OTHER	-6.492** (2.82)	-9.918* (3.860)
Constant	20.48* (2.801)	14.085* (1.726)
Observations	168	168
R^2	0.207	0.250

[1] standard errors (HC3) in parentheses   [2] standard errors (OLS) in parentheses
* $p < 0.01$; ** $p<0.05$, *** $p<0.1$

4   Discussion

The contribution of this study sheds a new light on the differences between inclusion of women in boards of directors in the systems of corporate governance in transition and developed economies. On the examples of two stock indices from Warsaw Stock Exchange (GPW) in Poland and Frankfurt Stock Exchange (FWB) in Germany, the particularities and trends in the inclusion of female directors on boards are examined. Despite the remaining high underrepresentation of women in boards of directors, across both stock indices the increasing trend of appointing more women in boards of directors over the six-year period from 2013 to 2018 is visible. It is reflected not only by a higher average of female directors in Polish WIG 30 (12.09 %) compared to German DAX 30 (9.7%) but also a more dynamic growth rate in the number of female directors in DAX 30 conditioned by the presence of legally binding female quotas and sanctions in Germany.

Both in Poland and Germany, financial institutions including investment and commercial banks tend to include a greater number of female directors on their boards than the non- financial firms. As some studies point out, this fact may be due to higher risk aversion attitudes of women, which qualify them as better risk managers than men (Gulamhussen et al., 2015). The outcomes of this study also indicate that the impact of female directors on the performance of public listed companies differs across countries. In Polish WIG 30, women on boards tend to

influence positively the return on equity, while having no impact on the return on assets and price to earnings ratio. This finding reflects that women in boards have a positive impact on a management ability to generate profit out of investments across WIG 30 firms.

In German DAX 30 female directors seem to have no statistically significant impact on the efficiency of firm performance. This outcome may have a two-fold explanation. First, since the majority of DAX 30 companies are resource or production-based with a high isolation from final consumer, the share of female directors is scarce, a finding that aligns with the results of Brammer et al. (2007). Secondly, many studies highlight that in order to exert a meaningful impact on the organisational performance a certain threshold of women in boards must be exceeded (Huang et al. 2019). Hence, across both indices on average boards tend to have 1 female director implying that female directorships are rather seen as tokens (Torchia et al. 2011). Interestingly, within DAX 30, none of the companies include more than 2 women on boards of directors and the increase in number of women on boards is positively linked to the increase of male board members and board size which may suggest that German DAX 30 companies follow a certain diversity strategy and female appointment is usually offset by a male appointment.

In case of Polish WIG 30, the maximum number of women directors' accounts to 4 and is present only in finance and banking sector. In contrast to DAX 30, the increase in number of female directors is accompanied by the decrease of male members and increase in board size which suggests that female director appointment is seen as an equivalent to an appointment of male board member. This finding also challenges the assumption of Post & Byron (2015) that more female directors are present in contexts with greater gender parity. Although Germany scores higher on the gender equality index (GEI) (65.5 compared to 56.8 in Poland), the number of female directors in WIG 30 is significantly higher (European Institute for Gender Equality, 2017).

Although the results of this analysis outline that there is overall no significant link between the female presence in boards of directors and firm's efficiency measures, the inspection of examined sectors allows for interpretation that the vast majority of non-financial sectors with a higher ROE, ROA and PE ratio than finance firms, tend to prefer boards with lower female ratio. This effect is particularly large for software and textiles industries across both stock indices.

5   Conclusion

The aim of the study was to analyse the impact of women in boards of directors on the firm financial performance in German and Polish stock exchange indices of public-state enterprises taking into consideration three efficiency indicators: return on equity (ROE), return on assets (ROA) and price to earnings ratio (PE). The results revealed a positive and significant but weak relationship between the female share in Polish stock price index WIG 30 on return on equity (ROE). The effect of female share on return on assets (ROA) and price to earnings ratio (PE) in the Polish index was found to be neither strong nor statistically significant. In case of German performance index DAX 30, neither statistically significant relationships nor significant effects of female directors on accounting and market measures were present. The main contributions of the study to the existing literature is the comparative analysis of the effects of female directors on the firm performance in transition and developed economy at the example of Poland and Germany. Additionally, this paper also indicates that German companies tend to have a different board gender diversity strategy than Polish firms, which has been confirmed by the increasing number of male members on boards with the appointment of female directors.

The study has important implications for the future research especially in relation to gender and board diversity in transition economies. First, the findings suggest that further cross- country investigation of the impact of gender diversity on firm performance considering factors such as cultural and organisation characteristics in transition economies is necessary. Secondly, since the board composition impact on firm performance for the purpose of this study was quantified to the board size and gender diversity, further research should address other aspects of board composition such as: independence of directors or board diversity understood in terms of ethnic and cultural diversity. Other areas of further expansion of the topic is the analysis of the patterns in appointments of female directors in transition economies as well as examining the role of women directors in other dimensions of corporate performance such as corporate social responsibility, social behaviour and strategy. This approach challenges the research to include also more qualitative methods.

This study has also some limitations. Since the composition of stock price indices change over time and some companies leave, others become listed, the cross-country comparison of the stock indices remains challenging. Other limitation also refers to the sizes of the companies in DAX 30 and WIG 30. The DAX 30 companies are substantially larger than WIG 30 which may also impact the role

of women in larger firms differently than in smaller firms. Another concern is related to the compatibility of data sources. Whilst there is overall confidence in the German and Polish data sources, there might be minor differences in calculations of efficiency indicators across countries.

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Activist Investors - Curse or Blessing: Banging the Drum

Olaf H. Arlinghaus

For a long time, a large number of top managers in listed companies have regarded communication with their shareholders as a necessary evil and now, in times of activist investors, are faced not only with the great challenges of opening up to shareholders and revealing their own corporate strategy, but also at the same time have to withstand the massive external pressure from activist investors, who are rarely majority shareholders. To achieve this, it is essential that a complete re-thinking of the communication strategy of those responsible for the company takes place.

1 Introduction - Definition: Activist investor

An activist or active investor is a natural or legal person who attempts to influence a company's strategy by investing in a company that is usually listed on the stock exchange (Hautli, 2018). A distinction can be made between activist investors who seek to increase the value of their investment and so-called short sellers who focus their activities on minimising the value of the company in order to maximise their profits through so-called short selling (i.e. the purchase of shares and options to ensure that the share price falls noticeably). The higher the price losses for short sellers, the higher the profits for them.

Similarly, activist shareholders are often interested in companies getting more indebted and paying out more to shareholders. Activist shareholders have not only been pursuing this goal in recent years. Especially in the 1980s, former corporate raiders such as Nelson Peltz and Carl Icahn became famous/notorious with these strategies (Seeger, 2014).

Both investor groups, the activist investors and the short sellers have in common that they pursue a very intensive and sometimes very aggressive communication policy in order to achieve their goals.

2   Goals of activist investors

The aim of activist investors is always to increase the value of their own investment. This goal is to be achieved through share buybacks, higher dividends, mergers & acquisitions (M&A), spin-offs, strategy changes or through changes in the top management of the target company's management, board of directors or supervisory bodies such as the supervisory board, board of directors, advisory board, etc. (FAZ, 2002). The activist investor also attempts to obtain a change in business policy or the spin-off or separate initial public offering (IPO) of a part of the company.

These goals should be pursued and achieved in the shortest possible time. However, this initially economically sensible intention of activist investors in the sense of an increase in sharehold value must be examined more closely. The well-being or prosperity of an attacked company is rarely the issue. Activities are almost always geared to the success and well-being of the activist investor.

Active investors are often of the opinion that the respective management of the company has developed self-interests that are diametrically opposed to those of the shareholders or investors and that these are value-destroying. Deficiencies in corporate governance as well as excessively high salaries or company jets and magnificent offices are often complained of. These struggles are often fought in public media and social networks (Henkel, 2013).

3   Instruments of activist investors

The most important instruments of these investors are the special audits requested and a parallel accompanying and also very aggressive communication mix, which aims to intimidate management and supervisory board and to unsettle further investors and ultimately to attract activist investors.

In their possible attacks, short sellers bet on a falling stock market price and deliberately crash it by publishing critical statements about the company (CMS Hasche Siegle, 2018). In order to make this set of instruments effective, activist investors make use of the legally regulated information rights of shareholders. In particular, the applicable minority law for shareholders is an effective means for activist shareholders to pursue their interests in Germany. The activities of activist shareholders are simplified if there are no anchor shareholders and the proportion of free float is very high.[1] If, in addition, only a small proportion of shareholders

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[1] Free float is defined as less than 5 percent of all shares of a company held by a shareholder.

and their voting rights are represented at general meetings, it is easier for activist shareholders, alone and in part with the assistance of voting rights advisors pursuing similar objectives, to make voting decisions and pursue their own objectives.

4   Activities of activist investors in Germany and Europe

Since the financial crisis, activist campaigns have also increased in Germany. Between 2016 and 2018 there were 26 public campaigns by activist investors in Germany. That's 160% more than between 2013 and 2015 (AlixPartners, 2019).

Figure 1: Development of public campaigns of activist investors
Source: Own illustration based on AlixPartners (2019).

The aim is usually to increase performance in comparison to the industry average by acquisition and/or destruction. The activists are acting increasingly aggressively and are also directing attacks personally against senior managers. Often other shareholders with misinformation are also mobilized to support the campaigns ("rage shareholders"). Examples include the activities of Swedish financial investor Cevian Capital at Bilfinger and Thyssenkrupp in 2016[2], Active Ownership Capital (AOC) at Stada also in 2016, which led to a takeover by other financial investors, and the attacks by hedge fund founder Paul Singer on Thyssenkrupp's management in 2018.

At Grammer AG, an activist campaign even had a negative impact on customers who feared that the company would be broken up. Between the end of 2016 and November 2017, there were about 120 such campaigns in Europe, almost twice as many as five years earlier. In some cases, investors short sell the shares

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[2] The activist investors Cevian Capital and Elliott Management successfully urged the German conglomerate Thyssenkrupp to split in 2018 (Chazan, 2019).

of their target company and drive the share price in the desired direction with negative allegations about the company (Löffler, 2017).

5 Dealing with activist investors

Here a look into the USA helps. There, activist investors are less and less successful with their business model, as American companies are now much better able to defend themselves against the influence of activist shareholders.

The two-tier governance system in Germany, in which an Executive Board member responsible for day-to-day business is supervised by a Supervisory Board consisting of investor and employee representatives, has in the past often protected companies from annoying investors (Chazan, 2019). German companies, however, offer an ideal target for the attacks of activist investors, in particular due to a very great need for harmony in the supervisory boards. In return, American supervisory boards are much more vehement and united against the aggressive strategies of such investors, as various examples clearly show.
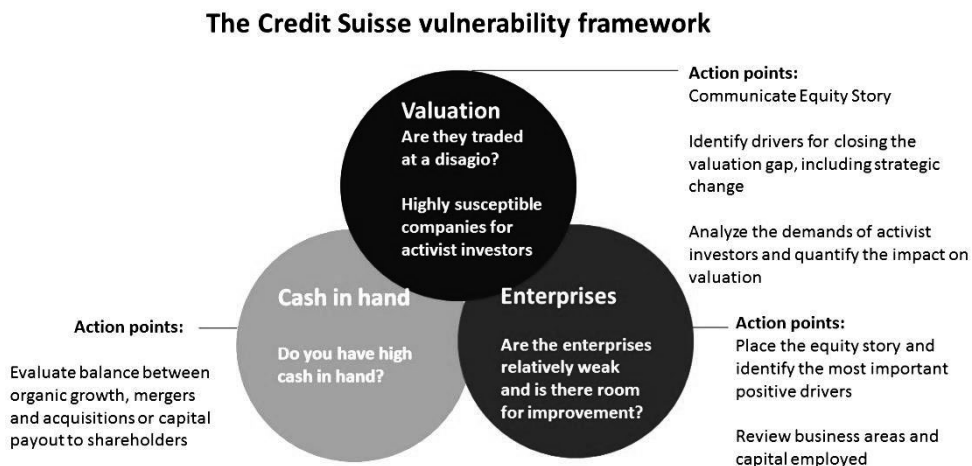
Figure 2: The credit suisse vulnerability framework
Source: Credit Suisse (2016).

The instruments for dealing with activist investors are diverse, but they are still given little consideration in the investor relations activities of listed companies. Only when an attack by activist investors has taken place is it sometimes attempted with hectic actionism to master the situation.

A functional and regularly maintained risk and prevalence management system in conjunction with an active investor relations strategy helps to a considerable

extent to ward off attacks from activist shareholders and to avert their desired goals.

Listed companies are still caught "cold" when activist shareholders intensively inform other shareholders and the media about the alleged misconduct and omissions of management. Management must make preparations to ensure that such attacks remain ineffective.

One of the elementary instruments on the part of the company under attack is a constant and regular information policy, especially vis-à-vis anchor shareholders, but also vis-à-vis all other shareholders. To initiate an information policy only when the pressure in the company and in the management and supervisory board is very great is clearly too late and is viewed extremely sceptically by most shareholders. Shareholders then justifiably ask themselves why such communication has not already taken place beforehand in the quality and quantity expected by the capital market.

Often those responsible for the company do not know their own strengths and weaknesses enough and have too few points of contact with their shareholders. One of the main tasks of activist shareholders is to identify the fundamental weaknesses of the company and the acting top managers. It must therefore be the task of management to have prepared a clear strategic concept in the event of an attack. Not only the Management Board is required to do this, but also the corporate divisions that deal with investor relations and corporate communications, as well as legal eventualities, must be clarified at an early stage with their own legal department or with law firms specializing in capital market law, and the responsible persons must be closely involved. Similar involvement and coordination is also of fundamental importance vis-à-vis the Supervisory Board (Löffler, 2016).

6 Summary

The opportunities for activist shareholders to attack and assert themselves are very diverse (not only in Germany) and often extremely effective. As a result, under pressure from activist investors, companies must cut costs, increase dividends and buy back shares to raise the share price.

Conversely, companies with strong business development, good valuations and disciplined capital allocation are much less often targeted by activist investors than those that do not (Credit Suisse, 2016).

Despite all understandable criticism of the actions of activist shareholders, it should not be forgotten that companies and managers who have not sufficiently

pursued the interests of their company over a long period of time or who were essentially out for their own enrichment are often (or can be) targeted.

In the meantime, activist shareholders are not always seen merely as a threat, but also as an opportunity for a sustainable financial and strategic orientation of the company along investor interests (Löffler, 2017).

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How real is real enough? Challenges in training workers using virtual reality

Michael E. Wasserman, Sandra L. Fisher

Virtual reality (VR) is starting to realize some of its promise as a tool to improve training effectiveness. However, training professionals face many challenges in applying VR to training and development. Existing theories and models relating to organizational training and learning are infrequently used in the VR literature. This paper provides a typology of VR technologies specifically relevant to trainng and integrates existing training frameworks and theory into findings on VR training. We offer guideposts for those contemplating VR implementation in four important areas: training reactions in a VR context, VR-specific learning outcomes, opportunities for assessment using VR, and the effect of VR on training transfer.

Keywords: Virtual reality, digital learning, e-learning, training evaluation

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1   Introduction

Virtual reality (VR) is becoming a key tool in the arsenal of training and human resource professionals in the industry 4.0 environment. VR and advanced simulation technology have long been accepted in aviation, where it would be too dangerous to ask a novice pilot to practice flying a real aircraft. As virtual reality headsets and related equipment become both less expensive and more powerful, corporate adoption of VR-based training is increasing (Bailenson, 2018). However, research on corporate uses of VR for training and development is limited and many challenges lie ahead. Much of the literature on VR training methods has been published in the computer science or topical specialization literatures (e.g., industrial safety, medicine) rather than the Human Resources Management (HRM) literature where the training literature is centered (e.g. Ahn et al., 2014; Crochet et.al, 2017; Grabowski & Jankowski, 2015). Thus, we find that theories and models relating to organizational training and learning are infrequently used in the VR literature, with the focus on "does it work?" rather than understanding why and how it works. A greater understanding of why VR works in the training context would help training designers meet the challenges that lie ahead and create effective programs that leverage this emerging technology.

2   A short history and basic typology of virtual reality training

It is probably worthwhile to offer a definition of virtual reality and briefly trace the history of this technology in order to better understand what VR can and cannot do. We describe a typology that will be helpful in focusing our understanding of VR as it related to training and to distinguish between the different types of technology that can carry the label of virtual reality, as these different types may have different effects in the learning environment. VR is defined and operationalized differently across studies, and from the practical perspective, in the offerings of training and technology vendors.

One generally accepted definition of virtual reality is "Virtual reality is the term used to describe a three-dimensional, computer-generated environment which can be explored and interacted with by a person. That person becomes part of this virtual world or is immersed within this environment and whilst there, is able to manipulate objects or perform a series of actions." (Virtual Reality Society, 2017). Virtual reality traces its conceptual roots back to science fiction writing in the 1930s (Evenden, 2016), along with rudimentary stereoscopic viewers such as the View-Master (McFadden, 2018). Technological product development intensified in the 1960s and 1970s, with different approaches and uses being taken roughly simultaneously, made possible by the advancement of mainframe computing power. The US Air Force advanced the technology in the development of flight simulators, the US Defense Advanced Research Projects Agency (DARPA) in mapping projects, and academic researchers in a variety of areas related to information technology, cognition, and decision-making (Evenden, 2016; Dohrmel, 2017). The term 'virtual reality' itself emerged only in 1987 (McFadden, 2018).

In the late 1980s, gaming emerged as a new driver of technological advancement, with many gaming companies investing in VR research and development. Commercially available consumer products were introduced in the early 1990s (Evenden, 2016). A whole class of VR technology (Google Cardboard and others) uses extremely cheap nearly-disposable headsets and relies on the power of the users' own mobile phone to power the graphics, sound, and user interactions (McFadden, 2018). Indeed, the hype is finally becoming a consumer product that is in the hands of consumers, as virtual reality technology diffuses into society at an accelerating rate. In 2018, 8 million units of virtual reality gear (goggles and other immersive devices) are expected to be sold worldwide, and 40 million VR units sold is forecast for 2022 (Richter, 2018).

It is not surprising that there are several different versions of VR in use. Table 1 provides a basic typology with definitions and examples, building on Baus and Bouchard (2014). This paper focuses on immersive technologies that are asynchronous (the highlighted cell).

Table 1: A typology of virtual reality technologies

Temporal→ ↓ Technology	Synchronous: Real Time Telepresence	Asynchronous: Simulated Environment
Non-Immersive VR *2D screens, e.g. laptop, tablet, or smartphone. Uses common input devices, e.g. keyboard or mouse (Baus & Bouchard, 2014)*	Individuals share experiences using standard 2D devices. Examples: Many virtual worlds (e.g. Second Life) and computer games, played with others remotely, on 2D screens (Garcia, et al., 2016).	Individuals experience another environment using a standard 2D device. These asynchronous, non-immersive experiences are seen in simple training exercises and computer games.
Immersive VR *Head-mounted displays, advanced visualization systems, and motion input devices, e.g. gloves (Garcia et al., 2016)*	Individuals share highly realistic immersive and experiences using displays that help users experience a place other than their current physical location in real time. Used in gaming and in operation of remote drones or explosives removal/disposal (McFadden, 2018).	An immersive virtual reality (IVR) replication of a real-world training context, designed so trainees can practice in a safe, low-cost, accessible environment (Tichon, 2007). Examples include full-size simulators (flight cockpit), or head mounted displays used by physicians (McFadden, 2018).
Augmented Reality (AR)/Mixed Reality (MR) *Computer generated images are overlaid on real-time images of the physical world as captured by the camera (e.g. of a smartphone).*	A blend of virtual and real objects, displayed in real time. One example is overlaying virtual images of tooth structures onto a patient during oral surgery (Keebler et al., 2018). Examples include games such as Pokemon GO.	Not applicable - by definition, augmented reality is overlaying computer generated vision, which makes it an inherently synchronous experience.

This category is the best suited and most readily available for organizational training initiatives. Immersive technologies, such as goggles and gloves, give users high fidelity and alignment with training situations, and the asynchronous nature means that training can be done at the learner's pace, with limited reliability

for internet connectivity or timing training so that other users are in the training space simultaneously.

A key question in the research literature is often when it makes sense to design training that uses fully immersive VR rather than using the less expensive non-immersive version, or even 2-D video and animation in computer-based training.

There appears to be some agreement around basic conditions in which VR is a superior solution. VR and advanced simulation technology has long been accepted in aviation, where it would be too dangerous to ask a novice pilot to practice flying a real aircraft. Similarly, pilots need to train for situations which happen rarely, such as an engine explosion. Other situations which are too expensive to create in real life, or which cannot be easily created for training purposes, also lend themselves to VR (Bailenson, 2018). In the next section, we explore some of these contextual factors in more detail as we review specific learning outcomes that have been studied in the context of VR.

3 Key organizational training concepts

3.1 Trainee reactions

Research studies and practitioner white papers consistently report on favorable trainee reactions to VR-based training (e.g., Grabowski & Jankowski, 2014). While debate exists about the importance of training reactions in leading to learning outcomes (Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997), some research has shown that there is a positive relationship between reactions and learning in technology based training (Brown, 2005; Orvis, Fisher, & Wasserman, 2009). Training reactions can be conceptualized as a single factor of satisfaction or can be divided into sub-factors such as enjoyment, relevance or utility, and technological satisfaction (Brown, 2005). Reactions are then related to training engagement, or the extent to which trainees are paying attention to training and are actively involved in the learning process.

Research to date shows that a variety of trainee reactions have been studied in the VR context. Trainees report high levels of enjoyment with most VR-based training (Grabowski & Jankowski, 2014) across both immersive and non-immersive technologies. Huang, Rauch, & Liaw (2010) assessed motivation and utility-based reactions, finding positive trainee perceptions of the extent to which a VR training program would help them solve problems more effectively. Technological satisfaction has been addressed in several ways, including immersiveness (Grabowski & Jankowski, 2014) and VR environment realism (Pedram, et al., 2014). One-third of the trainees in the Pedram et al. (2014) study reported that the

environment was not realistic and this diminished the experience for them, as realism was negatively associated with usefulness. This suggests that technology satisfaction as a reaction measure may be even more important in VR training, and that more immersive environments may help promote trainee satisfaction and learning. Trainees also generally show high levels of attention and engagement in VR training. Learners must attend to the important details of training in order to reach the desired learning outcomes (Kraiger & Mattingly, 2018), and engagement promotes this. From a practical perspective, trainees may also develop more positive impressions of the organization and the training department from using leading edge training technology.

One unusual type of reaction measure that is relevant with VR is the adverse physical reaction to use of a VR headset. Certain features of immersive VR environments (e.g., rotation, orientation) can cause unpleasant physical symptoms due to the discrepancy between what the individual is experiencing physically and in the virtual world. Thus, we see studies such as Ragan, Scerbo, Bacim, & Bowman (2016) measuring simulator sickness as an important reaction to VR based training. It would be reasonable to expect that simulator sickness would be negatively related to learning outcomes. Non-immersive VR, such as desktop apps, is less likely to cause simulation sickness. For immersive VR, there are suggestions that as the quality of VR presentation improves to better integrate the internal and external experiences of the user, rates of simulator sickness will decline (Huang, et al., 2010; Bailenson, 2018).

3.2   Learning outcomes

Kraiger, et al. (1993) developed a three-part framework to identify and evaluate different types of learning outcomes; affective, behavioral, and cognitive.

Affective outcomes include changing attitudes about tasks, processes, groups, or individuals, or enhancing motivation or self-efficacy for a particular task (Kraiger et al., 1993). For example, customer service training is often designed to change attitudes about customers perceived as difficult (e.g. those with disabilities or senior citizens) through increased empathy and compassion (Diamond, 2018). VR-based training has shown some success in training affective learning outcomes because the fidelity of the training experience and the novelty of the technology generates a willingness to engage with the training and shift perspectives that otherwise might be rigid. If the trainees feel as if they are truly experiencing something like a negative customer service experience, they may be more likely to change their beliefs or opinions about it.

Skill-based or behavioral outcomes focus on the extent to which the trainee can adequately perform the desired behavior, either in a simulated test environment or on the job. Research on VR-based training has demonstrated success in increasing trainee skills levels in a variety of domains, including surgery, American football, safety, and energy use.

Opportunity to practice the desired skill is an important predictor of skill acquisition, and Bailenson's research (2018) indicates that the body and brain react to VR experiences as real, allowing repetition in the virtual environment to count as practice. The physical fidelity of such practice depends on the quality of the input and sensing technology to provide a realistic experience (e.g., controlling a virtual scalpel with a gaming joystick vs. really holding a scalpel in surgery). However, Crochet et al., (2017), in a non-immersive simulation, demonstrated the effectiveness of training using surgical devices with haptic feedback. Kraiger et al., (1993) also discussed the importance of evaluating skill compilation, or the extent to which trainees demonstrate higher-level rapid, fluid performance. The assessment capabilities of VR are well suited to measure these fine distinctions in behavioral outcomes.

The third category, *cognitive outcomes*, examines knowledge, knowledge organization, and cognitive strategies. Several studies have shown that VR training produces equivalent to slightly better short-term knowledge retention in a variety of knowledge areas, ranging from high voltage electricity equipment maintenance (Garcia et. al, 2016) to donning an airplane personal flotation device (Chittaro et. al, 2018). Another relevant cognitive outcome is decision making. VR training has been successfully used to train National Football League (NFL) quarterbacks on making decisions about the right play to run, doctors on appropriate steps to take in emergencies, and sales representatives on opportunities to rent more equipment (AiSolve, 2017; Bailenson, 2018; Morris, 2017). Perhaps VR's effectiveness in decision making training is based on factors such as offering repeated opportunities to practice and creating psychological fidelity of the performance conditions, both important factors in training effectiveness (Kraiger & Mattingly, 2018).

3.3   Assessment methodology

VR offers opportunities to assess trainee skill development in a more refined, realistic way. VR simulations offer a "controlled, standardized, and safe environment" (Bier et al., 2018) in which performance can be measured, even when training was not conducted in a VR environment. Rather than using more traditional measurement techniques such as written tests or role plays, VR offers an

option for evaluating trainee cognitive and behavioral responses to realistic situations. Through VR, detailed data on performance, such as direction of gaze and reaction times, can be collected that could help determine if a trainee needs more practice to perform effectively. This type of assessment could be used even if the training itself was not conducted using VR.

Bier et al. (2018) described a training program that was conducted on a regular desktop computer but the assessment was later done using VR.

For example, in Wal-Mart's use of VR to train store managers about crowd management on Black Friday (Metz, 2017), responding correctly and quickly is important to avoid getting crushed by the crowds. This type of learning outcome would be difficult to assess effectively through either a multiple choice test or a role play. A timed multiple choice test could assess decision making with limited time availability, but would lack many of the environmental cues that make the decision making challenging. It would be difficult and costly to create a role play scenario with hundreds or thousands of people to test the trainee's decision making in a more behavioral way. However, a VR-based assessment could place the trainee in a cognitively realistic store environment, require rapid decision making in the midst of the stressful environment, and give trainees feedback on whether or not they were visually attending to the correct information. Thus, training assessment has the potential to gain greater validity by using VR.

3.4 Training transfer

Training transfer is the concept of using learned knowledge or skills over time (maintenance) or in slightly different situations (generalization) (Baldwin & Ford, 1988; Baldwin et al., 2017; Blume et al., 2010). To this point, research on VR training has focused on short term training outcomes with little consideration of training transfer. In general, training transfer is facilitated by several different conditions in both the learning environment and the transfer environment. In the learning environment, transfer is affected by pre-training interventions such as goal setting, program framing, and training design elements such as the order of presentation (Blume, et al., 2010; Baldwin, et al., 2017). In the transfer or performance environment, support from the supervisor, support from peers, and opportunity to perform the learned skills are all positively related to transfer (Baldwin, et al., 2017).

Question 1: Does the use of VR in training promote training transfer?

In the VR training literature to date, there is little data on maintenance over time or generalizability of learned knowledge and skills to other situations. One exception is Thomsen, Bach-Holm, Kjærbo, Højgaard-Olsen, Subhi, Saleh, Park, la Cour & Konge (2017), who demonstrated that cataract surgery skills transferred effectively in the short term (less than two weeks) from the virtual training environment to the operating room. Similarly, Garcia, et al. (2016) found positive effects for both knowledge and skills related to high voltage power line maintenance in near term transfer with a delay of 9 days. Ragan, et al. (2016) studied the use of different technology configurations on short term transfer to a near-transfer task. Myers, Starr and Mullins (2018) focused on the concept of fidelity between flight simulator training environments and the transfer environment, looking at physical fidelity, cognitive fidelity, and functional fidelity. They noted that recent aircraft accidents have been partially attributed to low fidelity simulations, making it difficult for pilots to generalize the skills they learned during training to the performance situation. Further enhancing the fidelity of such simulations appears to be an opportunity for developing effective VR training techniques.

Question 2: Can VR help enhance transfer, regardless of the training method?

Even when training is conducted in-person or using different technology, it appears that VR could be an important tool in the transfer environment to maintain or generalize learned skills. In particular, VR simulations could help provide practice if opportunity to perform is limited. The technology allows users to practice under the same conditions, maintaining skill levels over time, or systematically vary the conditions to enhance generalization. For example, STRIVR's system for the National Football League is designed to allow more repetitions to help with skill development, but also help with generalization as quarterbacks can use the technology to view and practice different situations (Bailenson, 2018).

Beyond these two specific questions, we believe that VR has the potential to help the training field move forward with new research directions. Baldwin, Ford and Blume (2017) suggested that a more person-centric approach to transfer is important, in which the researchers attempt to understand not just which trainees learned more as a way of predicting transfer, but how trainees experience the training event itself. VR measurement techniques could assist with this goal. Fine-grained measurement methods available through VR could also help with measurement of transfer curves over time to better understand within person variability in the transfer process (Huang, Ford & Ryan, 2016).

4   Future research challenges

One future research challenge is to examine trainee reactions to VR over time as these training systems become more common. At the present time, VR training solutions in most organizations benefit from a novelty effect where trainees have positive affective reactions simply to the technology itself, finding it new and interesting. These positive reactions may be unsustainable over time. Perhaps trainee reactions and engagement will decrease as VR is used more regularly. Or, well-designed VR may continue to elicit high levels of interest and engagement.

Another future research challenge is understanding the impact of individual differences. There is an extensive body of research on the impact of individual differences in various training environments (Gully & Chen, 2010), but these factors have been relatively unexplored in VR training. Personality is another factor that may differentially impact effectiveness of VR training. We have found in past research that trainees high on conscientiousness tend to perform well in e-learning environments (Orvis, et al., 2009). This effect may disappear in VR training environments where trainees must have an appointment to participate in the training for a specified time period. With true immersive VR that requires use of a headset and other specific hardware, as opposed to desktop VR simulations, training may lose the "anytime, anywhere" features that have been attractive in e-learning. Learners with a high desire for control over certain aspects of their training experience may have negative reactions to tightly structured VR environments (Howardson, Fisher, Wasserman & Orvis, 2018). Finally, one individual difference unique to VR training, simulator sickness, should be studied further. To the extent that this characteristic varies across individuals, we would expect trainees with a tendency to experience the adverse physical effects to react more negatively to the training and to learn less.

5   Conclusions

This review of the current VR training literature in the context of organizational training theories and models will help us better understand how and why VR can overcome challenges to facilitate learning. VR appears to be poised to see greater adoption in corporate training. Thus, researchers and managers will need better frameworks and tools, grounded in theory and research, to guide decisions about when and how to use VR. Managers and researchers should be thinking about trainee reactions to VR, identifying appropriate learning outcomes in a VR context, leveraging enriched assessment opportunities, and finally, understanding the relationship between VR and transfer of training.

Perhaps VR is just an incremental step along the continuum from classroom to PC to mobile learning, but perhaps there is more to VR than just a technological upgrade in how material is delivered to learners. The characteristics of immersion and the psychological interplay between perceived location, perceived context, the ability to interact with one's surroundings, and learning could, perhaps, mean VR will be a bigger leap than some are perceiving. Immersion may influence the retention and ability to apply learned knowledge and offer a more powerful opportunity to practice skills. The potential for VR to influence learners in ways that effectively translate into changes in behavior is strong. We believe managers should be excited to consider the powerful potential VR can offer and that researchers should be even more excited to jump into this space and provide the solid research that managers need to make better decisions about whether to invest, where to apply, and how to use VR technologies as part of the corporate training toolkit.

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Tackling Food Waste: Factors that influence food waste

Burcu Kör, Eveline Schreurs, Ingrid Wakkee

The increased generation of food waste is a global and national problem. The purpose of the study is to investigate the factors that influence food waste and the role of technology in tackling food waste in the Netherlands. One of the main findings of the research is food waste is that consumer food waste is mainly influenced by food passing expiry date, food that is left too long in the fridge and consumers buying too much food. In final household consumption, digital platforms and applications enable individuals to share and donate their food, thereby creating awareness on food waste prevention and the environmental benefits.

Keywords: Food waste, consumer food waste, factors that influence food waste, digital platforms and applications.

1. Introduction

According to the Food and Agriculture Organization of the United Nations (FAO), one-quarter to one-third of all the food produced worldwide is wasted. Food waste is one of the major sustainability issues. Therefore, there has been a growing interest in the prevention of food waste. This is driven by concerns about world hunger, environmental impacts, resource scarcity, economic costs, and waste management (Thyberg, 2015). Additionally, food loss and waste have adverse effects on the environment due to the use of water, soil, energy and other natural resources to produce food that no one consumes (FAO, 2015). The world population is growing and by 2050, 70% more food is needed to feed the population (Rezaei & Lui, 2017). So, in order to feed the future population and to reduce the negative environmental impacts, food waste should, globally, be reduced to a minimum.

It is estimated that 40% of food waste in the developed countries is created at the retail and consumer stages (FAO, 2016). Retailer practices encouraging over purchasing, supermarket contracts requiring cosmetic perfection, consumer behavior in the home and marketplace, and hospitality industry procurement practices are the main reasons for food waste in the developed countries (Fox, 2013). According to Rezaei and Liu (2017), most of the food waste occurs at the consumer stages in developed countries. Given this focus, this research claims that

consumers can play a crucial role in minimizing consumer food waste through consumer engagement and the provision of smart solutions, such as digital platforms and applications that ensure more efficient use of food products. Therefore, the main objectives of this research are to identify the factors that influence consumer food waste, as well as to examine the relationship between the amount of consumer food waste and the technologies in the Netherlands. Supporting consumers to minimize food waste can be achieved via three stages: 1) understanding and evaluating food waste, 2) identifying the factors that influence consumer food waste and 3) identifying the technological impact that would reduce consumer food waste.

The rest of this article is organized as follows: "Theoretical background" section focuses on the definitions and classification of food waste, factors that influence food waste and technological development, such as digital platforms and applications that can impact the wastage of food. Subsequently, the method and results are presented. The last section presents the conclusion as well as the limitations and future research suggestions.

2 Theoretical background

2.1. Definitions of food waste

Food waste is a global problem, as well as one of the most challenging issues humankind is currently facing (Rezaei & Liu, 2017). As several studies emphasize, there is a need to investigate the social and environmental implications of food waste. Therefore, it is important to define food waste and identify categorizations of food waste in order to study and quantify food waste, as well as to improve food waste management (Buzby & Hyman, 2012; Garcia-Garcia et al., 2017). Unfortunately, definitions of food waste are not universally agreed upon (Lebersorger & Schneider, 2011; Thyberg & Tonjes, 2016). Multiple terms, such as food loss and food waste, have been used interchangeably (Schneider, 2013; Thyberg & Tonjes, 2016). However, food waste and food loss aren't synonyms. Frequently, a distinction between food loss and food waste is made (Wohner et al., 2019).

According to Buzby and Hyman (2012, p. 561), food loss is "a subset of post-harvest losses (or post-production) and represents the edible amount of food available for human consumption but is not consumed". Food loss is defined as to spilled or spoiled food that occurs before it reaches the consumer. It typically occurs in production, storage, processing and distribution stages in the food value chain (Rezaei & Lui, 2017). According to FAO (2013), food waste refers to losses at the end of the food chain, which is related to human behavior. Food waste relates to removing food that is still edible for human consumption from the food supply

chain (Rezaei & Lui, 2017). Food waste typically occurs at the retail and consumption stages in the food value chain, whereas food loss takes place at the earlier stages of the food supply chain, such as during production, post-harvest and processing stages (Fox, 2013; Rezaei & Lui, 2017). For consistency in this paper, food waste is be defined as a waste of edible items or food, which is directly linked to consumer action or inaction. The focus of the paper is food waste rather than food loss. Since in developed countries, food waste is generated in higher quantities than food loss.

2.2. Classification of food waste

In order to find suitable food waste management solutions, it is essential to categorize food waste. Because each type needs a different approach to be avoided. There could be a certain amount of food waste, but some food of it may be inedible or waste could be unavoidable. If food waste is categorized, it is better measurable and gives greater visibility insight in the problem.

There are many different classifications to categorize food waste and different treatment methodologies have been used. According to the European Commission (2014), food waste has been classified into three categories: "(i) food losses: food products lost during the production phase; (ii) unavoidable food waste: referring to food products lost during the consumption phase (banana peels, fruit cores, etc.); (iii) avoidable food waste: products that could have been eaten, but were lost during the consumption phase." Additionally, Garcia-Garcia, et al. (2016) proposed a classification of food waste, including nine indicators: edibility (i.e., edible and inedible), state (i.e., eatable and uneatable), origin (i.e., animal-based and plant-based), complexity (single product and mixed product), animal product presence (meat, animal product and animal by-product), treatment (i.e., processed and un-processed), packaging (packaged and unpackaged/separable from packaging), packaging biodegradability (i.e., biodegradability packaging and non-biodegradability packaging) and state of the supply chain (i.e., catering waste and non-catering waste). In line with the classification of European Commission (2014) and Garcia-Garcia, et al. (2016), we focused on avoidable food waste (i.e., products that could have been eaten, but were lost during the consumption phase), and include three indicators of food waste which are edibility, state and origin. Edibility refers to a product that is considered edible if it is expected to be consumed by humans during its lifetime, if not it is considered inedible. Fruit skins, meat bones, and some vegetable stalks are considered inedible (Garcia-Garcia, et al., 2016). State refers to only edible products are assessed on the state. A product is eatable

if it is still in acceptable condition. Another level of this category included products that are uneatable for humans but still, fit for animal feeding (Garcia-Garcia et al., 2016). Origin refers to a product can be either animal-based or plant-based. A product is animal-based if it is produced by an animal or uses parts of animals, if not it is plant-based (Garcia-Garcia et al., 2016).

2.3. Factors that influence food waste

In order to find a suitable solution to food waste, the factors that influence food waste should be identified. However, there is no simple solution for food waste because there are many different causes of consumer food waste. In the literature, several researchers have investigated the influence of different variables that may influence food waste. According to Parfitt, Barthel and Macnaughton (2010), food waste, which refers to the stage of post-consumer, includes different characteristics such as plate scrapings, poor storage or stock management in homes: discarded before serving, poor food preparation technique: edible food discarded with inedible, and food discarded in packaging: confusion over 'best before' and 'use by' dates.

The study of the effects of socio-demographic factors on food waste has been previously undertaken in the literature by multiple researchers (e.g., Barr, 2007; WRAP 2009; Quested et al., 2013; Jörissen, Priefer, & Bräutigam, 2015). According to these studies, age, gender, educational level, income and household composition might influence the amount of food waste. However, there are different results in terms of the relationship between socio-demographic factors and food waste. For instance, some studies found people waste less (Secondi et al., 2015; Stancu et al., 2016), while others indicated the opposite (Cecere et al., 2014). Previous studies also found that women waste more (Visschers, Wickli, & Siegrist, 2016), while others suggested women produce less food waste (Cecere et al., 2014; Secondi et al., 2015). Furthermore, people who have a higher education level tend to have an employment status, and, people who are employed tend to generate more food waste compared to those who are unemployed (Secondi et al., 2015). Additionally, some studies found that households with different incomes displays different attitudes towards food waste reduction (Principato et al., 2015; Qi and Roe, 2016). In addition to socio-demographic factors, intention to avoid food waste, planning habits, personal and subjective norms, food waste awareness, and data label and storage knowledge might also have an influence on food waste (Visschers, Wickli, & Siegrist, 2016; Graham-Rowe, Jessop, & Sparks, 2014). According to Parizeau et al. (2015), household planning habits regarding cooking and storing food might be helpful to consume older products first, to decrease unintended food purchase, which prevents generating food waste.

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2.4. Food sharing through digital platforms and applications

The current global situation consists of a huge paradox: on one side there is poverty and hunger, on the other side billions of tons of food are wasted around the world each year (Hebrok & Boks, 2017). Even though food sharing is a common feature of society, the ways of food sharing are rapidly changing (Harveya, Smitha, Gouldinga, & Illodo, 2019). Recently new opportunities for a sharing economy have emerged due to digital platforms and applications, which were facilitated by the digital revolution and technological progress (Hebrok & Boks, 2017). Digital platforms and applications allow peer to peer (P2P) transactions. "P2P refers to technology which enables two or more peers to collaborate spontaneously in a network of equals (peers) by using appropriate information and communication systems without the necessity for central coordination" (Schoder & Fischbach, 2004).

Examples of a sharing economy through digital platforms and applications are Uber and Airbnb. However, these sharing economies through digital platforms and applications also appear in relation to food. An example of this is OLIO, according to their website OLIO connects neighbors with each other through food. OLIO is a mobile application that offers surplus food and other items to be shared instead of thrown away. Users can snap a photo of their leftover food, provide a description and pick up details so that another user can pick it up (OLIO, 2019).

3. Method and Results

3.1. Data collection

In this study, we concentrated on avoidable waste of animal and/or plant-based edible and eatable items or food, which is directly linked to consumer action or inaction. We collected the data in June and July 2019 by carrying out a survey. The survey was administered to 200 households in the Netherlands and a total of 115 (57.5% response rate) were usable. Participants in this study answered the questionnaire in a voluntary manner and were informed of the aim of the survey. Participants were also assured of the anonymity and the confidentiality of their answers. In this study, 5-point Likert scale is used for each statement for obtaining the data from the respondents.

3.2. Respondents' demographic characteristics and descriptive analysis

The demographic characteristics of the participants are shown in Table 1. Most respondents were female (80%) and were younger than 25 years old. Most of the respondents had a bachelor's degree (52.2%), followed by master (24.1%).

Table 1: Demographic Characteristics of the Respondents

Characteristic		Frequency	Percentage
Age	<=24	54	47
	25 - 34	22	19.1
	35 - 44	14	12.2
	45 - 54	11	9.6
	>=55	14	12.2
Gender	Male	52	45.2
	Female	63	54.8
Current Degree	>= High School	5	8.6
	College	12	10.4
	Associate	9	15
	Bachelor	66	57.4
	Master	16	13.9
	Ph.D.	2	1.7
Household size	1	18	15.7
	2	22	19.1
	3	21	18.3
	>=4	54	47
Annual Income	<= €10.000	35	30.4
	€10.000 - €19.999	14	12.2
	€20.000 - €29.999	17	14.8
	€30.000 - €39.999	30	26.1
	>= €40.000	13	11.3
	I prefer to not comment	6	5.2

Table 2 presents the information related to the level of concern regarding food waste, self-reported amounts of food waste, household planning habits and routines, potential technological developments in households, and digital platforms and applications. As can be seen in Table 2, fruits and vegetables are wasted most often. Respondents purchase food from supermarkets almost always, as well as they sometimes buy discounted products close to the expiry date. They often use the freezing method to preserve or use up leftover food. Most of the leftover is disposed and most of the food is judged by expiry date, instead of visibility and smell in the Netherlands. Table 2 also illustrates that respondents rarely use food waste prevention apps but their level of intention towards investing in technology that would help to reduce food waste is high.

They also use a mobile app that allows them to pick up leftover meals for a reduced price at restaurants and shops a lot, as well as they often go to a restaurant where they can eat leftover food for a reduced price.

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Table 2: Descriptive statistics

	Mean	Std. Dev.
On average, how frequently do you purchase food?*	1.63	.958
Where do you purchase food **		
- supermarket	4.70	.565
- market	2.17	.648
- local independent shop	1.96	.916
- place of work	1.90	1.15
- restaurant	2.85	.550
- take away	2.82	.711
- wholesaler	1.29	.648
- online supermarket	1.50	.584
- other online apps	1.73	.971
- other	1.19	.547
Self-reported percentage of food waste***	2.63	.569
How often do you waste the following types of food? **		
- Fruits and vegetables	3.23	1.06
- Bread and cereals	2.23	.798
- Meat and Fish	2.38	.874
- Dairy products	2.86	.945
- Drinks	1.68	.600
- Other	1.17	.510
If food is thrown in the garbage, how much does this bother you?****	2.89	.553
How interested are you in reducing food waste? ****	3.71	.621
How often do you plan your food shopping? **	1.91	.286
What is the impact of planning food shopping on food waste? ****	2.51	.608
How do you judge leftover food? **		
- Expiry date	4.41	.887
- Visibility	3.88	.690
- Smell	3.71	.781
- Throw away all leftovers	2.91	.904
- Other	1.28	.680
How often do you use the following processes to manage food waste?**		
- Composting	1.24	.875
- Disposal	4.28	1.40
- Donate to a food charity	1.03	.184
- Food sharing scheme	1.06	.329
- Other	1.00	.000
How often do you use these ways to preserve or use up leftover food? **		
- Smart storage, e.g. with ethylene absorbers	1.31	.554
- Freezing	3.45	.725
- Dehydrating	1.60	.652
- Food processor/blender/juicer	2.60	.869
How often do you buy discounted products close to the expiry date?	3.00	.664
Which of the following initiatives would assist you to prevent food waste? ****		
- A mobile app to assist you to plan food shopping	3.25	1.06
- A mobile app allows you to pick up leftover meals for a reduced price at restaurants and shops	3.50	.854
- A restaurant where you can eat leftover food for a reduced price	3.40	1.33
- A mobile app helps you cook meals with leftover ingredients	2.73	1.07

- A mobile app provides information on food preserving composting	2.93	1.00
What is your level of intention towards investing in technology that would help to reduce food waste? ****	3.70	.671
How often do you use food waste prevention apps? **	1.06	.237

*(scale 1: daily, 2: 4-6 times a week, 3: 2-3 times a week, 4: once a week, 5: more than a week); **(scale 1:never-5:always); ***(scale 1: 0%, 2: greater than 0% and less than 15%, 3: 16%-30%, 4: 31%-50%, 5:more than 50%); **** (scale 1: none at all, 2: a little, 3: a moderate amount, 4: a lot, 5: a great deal)

Concerning the socio-demographic characteristics, 70.4% of individuals aged 24 and lower wasted between 16% and 30% of food. 90.9% of individuals aged between 25 and 34 wasted 16% and 30% of food. The percentages of individuals of other age groups, who wasted between 16% and 30% of food, are considerably lower: 27.3% for individuals aged between 45 and 54, 7.1% for people aged 55 and over. The percentages of individuals of all age groups except individuals younger than 25 (i.e., 1.9%), who wasted more than 30% of food are zero. 28.6% of individuals aged 55 and over have 0% food waste and 64.3% of this age group wasted greater than 0% and less than 15%. All other age groups wasted more than 0%. A strong significant relationship between the amount of food wasted and age was confirmed by the Chi-square test (Pearson chi2(12) = 59.038 p-value = 0.000). Regarding the association between self-reported percentage of food waste and gender (Pearson chi2(3) = 9.006 p-value = 0.029) as well as between food waste generation and level of income were found to be statistically significant (Pearson chi2(15) = 49.906 p-value = 0.000). Specifically, females appear to be more conscious of food waste than males (25.2% of females produce no more than 15% of waste compared to 9.6 % of males). People who have a higher income level tend to generate less food waste. Moreover, there is an association between the frequency of shopping and food waste generation (Pearson chi2(3) = 9.006 p-value = 0.029). Self-reported percentage of food waste is significantly related to intention towards investing in technology that would help to reduce food waste (Pearson chi2(3) = 36.665 p-value = 0.000), a mobile app to assist you to plan food shopping (Pearson chi2(9) = 86.546 p-value = 0.000), a mobile app allows you to pick up leftover meals for a reduced price at restaurants and shops (Pearson chi2(12) = 43.753 p-value = 0.000), a mobile app helps you cook meals with leftover ingredients (Pearson chi2(12) = 75.747 p-value = 0.000) and a mobile app provides information on food preserving composting (Pearson chi2(12) = 61.769 p-value = 0.000).

Factor analysis was used to reduce items regarding mobile applications' usage down to one-dimensional factor that have eigenvalues greater than 1 and explains 65% of the variance. Factor loadings ranged between 0.73 and 0.86, which are above the recommended value of .50 (Hair et al., 2009). Regression analysis was

conducted to test the relationship between mobile applications' usage and self-reported percentage of food waste. Mobile applications' usage has a positive and significant effect on self-reported percentage of food waste ($p<0.001$, $R^2 =0.51$).

4. Conclusion

The Dutch Ministry of Agriculture, Nature and Food Quality has estimated that Dutch consumers throw away an estimated € 2.5 billion a year in edible food (Westerhoven, 2013). Therefore, it is important to understand food waste and investigate the factors that affect consumer food waste in the Netherlands. Avoidable consumer food waste can be categorized in edibility, state and origin. The results of the study indicate that there are several factors influence avoidable consumer food waste in the Netherlands. Food waste is mainly influenced by food passing expiry date, food that is left too long in the fridge and consumers buying too much food. Discounting is a well-known technique to convince consumers to buy products close to the expiry date and to reduce food waste (Jörissen, Priefer & Bräutigam, 2015; Buisman, Haijema & Bloemhof-Ruwaard, 2017). The findings of the study indicate that consumers prefer to buy leftover food at a discount, as well as discounted products close to the expiry date. Therefore, discounts on leftover and products close to expiry date can have an important impact on reducing food waste. In addition, food waste is related to frequency of food shopping. The results of this study also showed empirical evidence that females, older people and participants from higher-income level waste less.

Digital platforms and applications can be implemented in initiatives to reduce food waste. Not only can digital platforms and applications create awareness to consumers, but also new technologies allow P2P transactions for a sharing economy (Michelini, Principato & Iasevoli, 2018). Several initiatives in food waste reduction through mobile applications have already been started; for instance 'Too Good to Good', 'No Food Wasted', 'ThuisAfgehaald' and 'OLIO' (Michon, 2019); and the willingness of consumers to reduce food waste and invest in these technologies is high. Therefore, digital platforms and applications can positively impact reducing consumer food waste. In consumer food waste food, technologies, such as digital platforms and applications enable individuals or organizations to share and donate their food. This new sharing economy also creates awareness on food waste prevention and the environmental and ethical benefits. For the

Netherlands, it is recommended to further investigate and explore digital platforms and applications to tackle food waste. Most of the food waste happens on the consumer side in the Netherlands, and therefore prevention of food waste

should focus on this area. Digital platforms and applications can reach many people easily and enable a sharing economy of food, to prevent food from getting spilled.

Our study had some limitations. The first limitation concerns the self-reported nature of our survey data. To alleviate this limitation, several procedural of Podsakoff et al. (2003) were used to minimize potential problems for common method variance: assuring anonymity and confidentiality to all participants. Second, we only collected data from a single country and obtained a non-representative sample size. Hence, in order to increase generalizability of the findings, the study should be repeated with an increased sample size and in a different cultures.

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Chapter 3:

Management in Universities

The Reflection of 'Third Mission' in the Strategic Statements of UK Universities

Eglantine Julliard, Thorsten Kliewe, Habtamu Diriba Garomssa

A set of endogenous and exogenous development over the past few decades have propelled 'third mission' into the centre of higher education (HE) policy discourse. Increasingly HEIs are expected to contribute to regional development through 'third mission' outputs. In light of this growing expectation, the study analysed the strategic statements (i.e. mission, vision and values) of 50 systematically selected HEIs from the UK through qualitative content analysis. The aim was to see to what extent and in which ways HEIs have integrated 'third mission' objectives and activities into their strategic statements. The result shows that most HEIs have integrated 'third mission' objectives in some fashion. However, there were institutional differences in the interpretation of 'third mission' objectives and activities. Significant difference was also evident across institutional types.

Keywords: Regional development, Engagement, Innovation, Outreach, Entrepreneurship

1 Introduction

1.1 Context

The last decades have been decisive for universities, as they have seen their role partly reconsidered and redefined. In addition to teaching and conducting research, which were their traditional missions, a so-called 'Third Mission' has risen up to the agenda. Although there is no commonly accepted definition, it generally refers to the relationship between higher education and society. As Sam and van der Sijde (2014) argue, the fundamental idea of the 'Third Mission' is the engagement of universities towards the society as a contribution to socio-economic development. As a result of the shift of universities' role in the modern economy, the strategic scope of higher education institutions (HEIs) has been broadened, giving birth to the concept of 'third mission' and its variants such as "engaged university", "civic university", "entrepreneurial university" (Perkmann et al., 2013; Kearney, Maxwell, 2015).

The very first signs of the 'Third Mission' appeared in the mid-late 1800s in the form of external engagement of universities in the industry (Davey, 2017). This new concern was mainly present in technical fields, where for instance chemical discoveries from academic researchers would be commercialized. Later, in the

1990s, another driver for universities' 'Third Mission' arose from societal change. United States (US) and United Kingdom (UK) universities began to lack funding, hence their need increased to collaborate with industry via the commercialization of laboratory findings. Moreover, from a more general perspective, it is interesting to notice how the increasing importance of innovation over the last thirty years has led governments to rethink the role of universities in society, giving them more responsibilities when it comes to exploiting knowledge and technology for societal purposes (Davey, 2017). A number of policies, instruments and programs have been set up in order to support this greater role of higher education, particularly in Europe.

Many governments around the globe consider nowadays that third stream activities are of great importance in the context of the emerging knowledge economy which is driven by intellectual capital and knowledge production, consumption, and dissemination (Kabir, 2019).

1.2   Problem

Catalysed by a set of endogenous and exogenous developments, 'Third Mission' activities are increasingly considered as vital responsibilities of HEIs in the knowledge economy. However, engaging in third mission activities is not a straight forward process for HEIs as some of the literature might indicate (see for instance Pinherio, 2012; Benneworth, Zeeman, 2018). This is because HEIs have to balance the impact of non-academic engagement on core academic activities of education and research. Notwithstanding some of the potential synergy that could be achieved, trying to actively engage in third mission activities while at the same time striving for excellence in education and research could lead to 'strategic overload' (Rubens et al., 2017; De Boer et al., 2007; Sánchez-Barrioluengo, Benneworth, 2018).

As Pinheiro et al. (2015) argue, "there are major tensions and volitions surrounding the institutionalization of third mission within academia that remain largely unresolved". It is therefore important to explore how HEIs go about harmoniously integrating third mission alongside the two long standing missions of education and research. Moreover, every university is unique with its own history, culture, core competence and strategic orientation (Doha, 2012). As such, the way every institution interprets and integrate third mission activities in to their institutional fabric is expected to be diverse.

It is within this context that this study aims to make a contribution by analysing the mission, vision and value statements of HEIs in the UK to see in which ways they reflect third mission objectives and activities. More precisely, the study will

be guided by the following two major research questions. To what extent have universities in the UK integrated 'Third Mission' objectives and activities in to their strategic statements (i.e. mission, vision, & values)? and How is the 'Third Mission' interpreted in the strategic statements of UK HEIs?

The mission, vision, and value statements are considered for evaluation because they act as a foundation for institutional strategy which would in turn determine whether or not third mission is going to be successfully embedded within the institution.

2   Literature Review

2.1   Visions, Mission, Values

Although, organisations' missions and visions are closely connected, they are two distinct kinds of statement and do not serve the same purpose. A mission statement must address the reason for the organisation's existence, answering the question "Why do we exist?" (DuFour; Eaker, 1998) or "What is our fundamental purpose?" (Lunenberg, 2010). The most obvious answer to both these questions would be that the university exists to help students learn. However, Lunenberg (2010) offers a more detailed explanation of the concept, arguing that a school's mission statement includes much more than that and should answer deeper questions such as "What does it mean to help students learn how to learn?" (Bellanca; Brandt, 2010).

A vision statement differs from a mission statement in qualitative terms. If the mission refers to the school's purpose, the vision sets a direction for its future. Similarly, a simple question to answer would be "What do we hope to become?" (DuFour; Eaker, 1998). As explained by Gurley et al. (2014), a vision statement should give an overview of how the university would ideally look like in the future. The logical order for the process is to create a mission statement first, and then to develop a vision that extends the mission in to the future.

As for values, they consist of the shared beliefs. Likewise, DuFour and Eaker (1998) suggest a guiding question to define values statements is: "How must we behave in order to make our shared vision a reality?". Values should give stakeholders a clear idea of how they should behave in order to optimise the chances to reach the developed vision.

2.2   'Third Mission' Perspectives

This section will present a literature-based analysis of various 'Third Mission' perspectives. The purpose is to identify different conceptualizations of third mission which will then be used as codes in evaluating the mission, vision and value statements of HEIs in the UK.

2.2.1   *Socio-economic Impact*

The broadest and perhaps the most commonly used conceptualization of 'Third Mission' pertains to the contribution of universities to the socio-economic developments of their localities and beyond (Siegel, Wright, & Locket, 2007). Socio-economic development being a broader conceptualization usually encompasses other sub objectives or activities such as "promoting scientific innovations to develop new technologies and industries; ensuring the support of the existing industry by universities and assisting specific regions through economic development" (Hatakenaka, 2005, p. 2).

Hatakenaka (2005) suggests that value statements play a critical role in terms of embracing this third mission perspective of socio-economic contribution. However, this doesn't mean that universities should compete against private enterprises, as they are obviously not actual 'commercial' entities. This only means that they should contribute to socio-economic development through third stream activities. Stanford and MIT are given as examples as they attach particular importance to their economic impact and operate on a result-oriented and society-oriented culture (Hatakenaka, 2005, p. 11).

2.2.2   *Innovation*

Another perspective of universities' 'Third Mission' is innovation. Innovation is rather presented as a sub-objective allowing universities to achieve socio-economic impact in society. Under this perspective "the university is viewed as an actor in a regional innovation system contributing to knowledge generation and regional innovation-enhancing interactions" (Trippl, Sinozic and Smith, 2012, p. 2).

The use of Regional Innovation Systems (RIS) perspective enables us to visualise and understand the purpose and the place of innovation within the scope of universities' 'Third Mission'. The RIS concept considers innovation as a 'collective regional learning process' based on interactions between a first group of actors that generates knowledge and a second group that exploit it.

In this dynamic system, universities are important knowledge generating institutions: they conduct research and interact with businesses, either SMEs or bigger companies, which exploit the knowledge.

The RIS framework focuses on knowledge exchange between HEIs and businesses thanks to various knowledge transfer mechanisms such as contracted research, consulting, formal R&D co-operations and also other mechanisms that do not involve financial compensation for universities (Trippl, Sinozic and Smith, 2012).

By using the RIS framework, we have an understanding of the dynamics related to universities as contributors to innovation in society. In other words, the concept enables us to visualise how universities fit into innovation dynamics and processes.

2.2.3   Entrepreneurship

The other dominant research stream within the context of 'Third Mission' corresponds to the 'entrepreneurial university' concept. Although a wide range of different conceptualization exists, the idea in its narrowest form refers to the exploitation of the universities knowledge through commercialization. Specifically, it refers to universities that are active in patenting, licensing and/or spinoff creation (Perkmann et al., 2013).

The number of university spin-out businesses has been consistently growing in the past decades, reflecting the increasing importance of the 'commercialisation' perspective of 'Third Mission'. This has been especially noticeable in the UK where the average annual increase was 15.3% between 2008 and 2011 (Hewitt-Dundas, 2015). Likewise, through patents, universities are able to transform research findings into tangible commercial goods that can bring significant returns (Clark, 2007).

2.2.4   Engagement

Another perspective on third mission focuses on universities engagement. The meaning of 'engagement' in the context of our research is quite broad. It generally refers to a two way and responsiveness interaction between the university and the society. In other words, the interaction is expected to lead to "the adaptation of university functions to regional needs" (OECD 1997; Chatterton and Goddard 2000; Uyarra 2010). As Breznitz and Feldman (2010) argue, the engaged university undertakes a role of "active neighbourhood involvement". Such engagements could include for instance providing training and consultancy support to local companies and policy advice to municipalities and the government.

Before proceeding further, it is important to note that following the conceptualization of Perkman, et al. (2013), we distinguish university engagement from university entrepreneurship. In that while the latter is narrowly focused on the exploitation of universities intellectual outcome through commercialization, the former refers a broad set of less formal knowledge creation and transfer techniques such as collaborative research, contract research or consulting (Sánchez-Barrioluengo & Benneworth, 2019, p.2)

2.2.5 Outreach

Lastly, 'Third Mission' can be seen as an 'outreach' activity. Mugabi (2014) argues that 'outreach' has the following three characteristics: they are realised with the intention to benefit the community, they use knowledge and other academic resources of universities, and they support university and unit missions. Although such activities can take various forms depending on the university, Lynton (1995) gives a list of the most obvious ones: technology transfer, technical assistance, policy analysis, programme evaluation, professional development, expert testimony and public information (as cited in Mugabi, 2014). More generally, Lynton (1995) indicates that outreach activities denote the relationship between universities and the whole society; occur in multiple different forms and places; and aim at creating, transmitting, applying and preserving knowledge for the direct benefit of the community (as cited in Mugabi, 2014).

From the above description it is apparent that there is a lot of conceptual overlap between engagement and outreach. However, because outreach focuses on the flow of knowledge going from the HEIs to the community rather than on the two-way relationship between both that is implied by engagement, we have decided to retain both as separate codes.

The Reflection of 'Third Mission' in the Strategic Statements of UK Universities

Table 1: List of Codes

Codes	Authors
Socio-economic Impact	(Sánchez-Barrioluengo, Uyarra, & Kitagawa, 2019; Siegel, Wright, & Locket, 2007; Jaeger & Kopper, 2013; Mihaela &Amalia, 2014; Sánchez-Barrioluengo & Benneworth, 2019)
Innovation	(Piirainen, Andersen, & Andersen, 2016; Jaeger & Kopper, 2013)
Entrepreneur-ship	(Franklin, Wright, & Lockett, 2007; Doutriaux, 1987; Smilor, Gibson, & Dietrich, 1990; Cocorullo, 2017; O'shea,Allen, Chevalier, & Roche)
Engagement	(Benneworth & Zeeman, 2017; Cesaroni & Piccaluga, 2016; Furco, 2010; Hart & Northmore, 2011; Al-Kodmany, 1999)
Outreach	(Nampala, Kityo, & Adipala, 2013; Hearn, Thomas & Cobb, 2012; Boggs, 1986)

3 Research Design

3.1 Research Context

UK universities were among the first to undertake the 'Third Mission' primarily in the form of knowledge transfer activities. Prior to the 1990s, UK HEIs received funding for their two initial missions of teaching and research. However, 1999 marks the beginning of a whole new era for UK universities with the establishment of third-stream funding by the Higher Education Funding Council for England (Clough and Bagley, 2012). The aim of this new funding stream was "to support HEIs to increase their capability to respond to the needs of business and the wider community" (HEFCE, 2009, p. 22). From a more general perspective, the HEFCE's intention was "to enhance the direct and indirect economic benefits of HE" (HEFCE, 2009, p. 23). Thanks to this financial incentive, the 'Third Mission' rapidly gained a significant importance, positioning the UK as a pioneer of third-stream activities. Considering the high level of advancement of the UK in the field, we will take it as a case.

3.2 Qualitative Research

A qualitative research method was used for this study in order to analyse if and how the 'Third Mission' was reflected in the mission, vision and values of UK

universities. A qualitative approach was deemed appropriate as we wanted to an-alyse existing content and identify the presence of terms which fall within the scope of universities' 'Third Mission'. The codes used to conduct this qualitative research are listed in the previous section.

3.2.1 Sampling and data collection procedure

Out of 161 accredited, degree offering institutions that predominately offer their program through a face to face format, a sample of 50 UK universities were selected through systematic random sampling. The sample size was deemed suffi-cient as it is above the threshold most often recommended for qualitative research (Braun & Clarke, 2016). The pertinent data i.e. mission, vision and value state-ments was collected by browsing through the official websites of the 50 institu-tions.

The sample consisted of two major university groups: comprehensive universi-ties on one side, and art universities on the other. The term 'art' is understood in a broad sense, including music, drama and other related studies. The other part of the sample, consisted of a more conventional type of universities which we de-scribe as 'comprehensive' universities. This distinction is important because it al-lows to evaluate whether there is a difference of third mission orientation amongst the two categories.

3.2.2 Analysis

MAXQDA qualitative data analysis software was used to analyse the collected data. For the sake of precision and clarity during the analysis, the data collected from the universities' websites was divided in to several documents before being imported into the software. As a first step, the data was separated into two major categories: data from 'comprehensive' univer-sities on one side, and data from 'art' universities on the other. A second division was then made within each category, dividing the data in three doc-uments: mission, vision and values statement.

A coding process was then undertaken on all collected data in order to identify in the strategic statements any terms or sentences reflecting univer-sities' 'Third Mission'. The process was initiated with a list of five codes retrieved from literature review. Each code corresponds to a specific per-spective of the 'Third Mission'. As the number of codes was likely to accu-mulate as analysis progresses, a record of existing and potential emergent codes was kept in a separate document stipulating the code name, a short content description and a brief data example for reference.

4 Results & Discussions

4.1 Research Results

This section presents the results of the study. The findings were analysed in the light of the two main research questions outlined previously.

4.1.1 Reflection of 'Third Mission' in strategic statements of UK Universities

This section addresses the first research question which aims to evaluate the extent to which the 'Third Mission' dimensions are reflected in strategic statements of UK universities. In this regard, Table 2 illustrates that a total of 167 third mission codes are identified from the total of 107 strategic statements (mission, vision and values) analysed. This indicates that on average at least one third mission dimension is incorporated in either the mission, vision and/or value statements of UK universities.

However, the incorporation of third mission in the strategic statements was starkly different between comprehensive and arts universities. In that with a total of 152 codes, comprehensive universities contain twice as much third mission aspects in their strategic statements as compared to their counter parts in arts universities.

Lastly, the table also shows that, although the distribution of 'Third Mission' dimensions is relatively even among the mission, vision and value statements in the case of comprehensive universities, in arts universities it is only mentioned as part of their mission and values statement.

Table 2: Appearance of codes in the strategic statements of comprehensive and art universities

	Comprehensive HEIs	Art HEIs	Missing
No. of HEIs	41	9	NA
Mission	47 [1] 3	5 [1]	15
Vision	46 [1]	0 [1]	11
Value	59 [1]	10 [1]	17
Total	152 [1]	15 [1]	43
Ratio	3.71	1.67	

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3 [1] refers to the number of 'third mission' codes identified in the specific strategic statement

4.1.2   Interpretation of the 'Third Mission'

As a first step, results from comprehensive and art universities were analysed together to get a general overview of the frequency of each code. As can be seen in Figure 1, with 55 appearances in total, 'Engagement' is the most frequent code, followed by 'Socio-Economic Impact' which is mentioned 40 times. Then comes 'Innovation', 'Entrepreneurship' and 'Outreach' with 30, 22, and 18 occurrences respectively.

Code System	Mission...	Vision...	Values...	Mission...	Vision...	Values...
Socio-Economic Impact	15	9	13	2		1
Innovation	7	8	12			3
Entrepreneurship	6	3	11			2
Engagement	10	21	20	2		4
Outreach	9	5	3	1		

Figure 1: Appearance of each code in the collected data (display nodes as values). [4]

As a second step, the appearance of each code in the data of comprehensive universities was analysed. As can be seen in Figure 2. 'Engagement' is the code that appears most frequently in the strategic statements of comprehensive universities, and especially in the vision and values. Special attention is also given to the 'Socio-Economic Impact' dimension which is mentioned frequently. What is interesting to notice about this code is that its appearance is almost equally distributed between mission, vision and values statements. The remaining positions are taken by 'Innovation', 'Entrepreneurship' and 'Outreach' respectively.

Code System	Mission...	Vision...	Values...
Socio-Economic Impact	■	▪	■
Innovation	▪	▪	■
Entrepreneurship	▪	·	■
Engagement	▪	■	■
Outreach	▪	·	·

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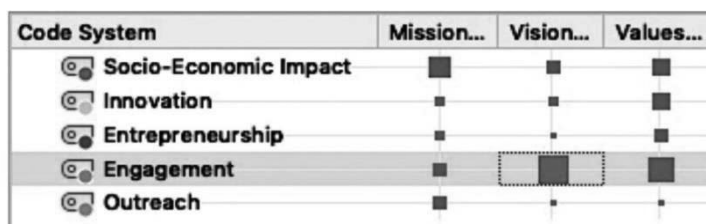
[4] The first mentioned mission, vision and values refer to comprehensive universities, whereas the last three columns refer to art universities.

As a final step the appearance of each code in the data of art universities was analysed. Similarly, 'Engagement' is the most frequently mentioned code. However, this time, it does not appear at all in the vision statements as it did for comprehensive universities. It is actually the case for all codes: the 'Third Mission' is never reflected in the vision statements of art universities from the sample. 'Socio-Economic Impact' appears in the mission statements and values almost as frequently. Then come 'Innovation' and 'Entrepreneurship' which are mentioned in the values. Finally, 'Outreach' appears only a few times in universities' missions.

Figure 3: Appearance of each code in the data of art universities

4.2   Discussion of Results

This section discusses the main findings of the study.

4.2.1   University type as an influential factor

The study reveals the importance of the type of universities as an influential factor. Based on the results, it appears that there is a significant difference between art universities and comprehensive universities in terms of how the 'Third Mission' is reflected in the missions, visions and values. UK comprehensive universities appear to be more committed to the 'Third Mission' than art universities. Although the underlying reasons were not evaluated as they were beyond the scope of the study, this finding implies that the extent of universities' engagement with third mission it at least to some degree affected by the nature of the university.

4.2.2   Dominance of 'Engagement'

One of the key objectives of the study was to see in which different ways HEIs interpret third mission objectives and activities. In this regard, results show that 'Engagement' is the most dominant form of 'Third Mission' interpretation by universities in the UK.

However, a closer look at their strategic statements shows that their translation of the 'Engagement' dimension appears to be slightly different from one another, in terms of scope and the stakeholder they target. For instance, for Teesside University, which has the following mission statement "Through education enriched by research, innovation, and engagement with business and the professions, we transform lives and economies.", it is clear that engaging with businesses is an important component of their third mission strategy. Whereas for Coventry University, the focus is more on the community and collaboration with stakeholders in the education system. As it is clearly stated in their mission statement "Long term engagement with the local community, especially educational institutions such as primary and secondary schools".

4.2.3 Importance of 'Socio-economic Impact'

If the 'Engagement' perspective prevails in the collected data, there is also a significant presence of the 'Socio-Economic Impact' that deserves to be pointed out. When comparing the distribution of both codes throughout the data, the analysis of the results reveals that the 'Socio-Economic Impact' code is more proportionally distributed through the mission, vision and value statements. This shows that UK universities tend to consider the 'Socio-Economic Impact' perspective of the 'Third Mission' in a more consistent manner.

4.2.4 'Third Mission' as a value

Finally, the study results show that the 'Third Mission' is frequently referred as a value, both by comprehensive and art universities. As mentioned in the introduction of this thesis, values generally consist of shared beliefs which give stakeholders a clear idea of how they should behave in order to increase the chances of reaching the developed vision. In other words, values have a critical role to play in terms of institutionalizing 'Third Mission' activities in to the culture of HEIs.

5   Conclusion & Implications

In conclusion, the study has shown that, consistent with the rise of 'Third Mission' to centre of higher education policy discourse over the past few decades, most UK universities have included 'Third Mission' aspects in to their strategic statements in some form or fashion. However, the frequency of its representation within the strategic statements was found to be different across universities. Additionally, it was found that the nature of the university has some impact on the level of representation of 'Third Mission' within the strategic statements of universities.

What's more, it was found that different universities have different interpretation of 'Third Mission' even whilst having the same dimension included in their mission, vision, and value statements. Meaning, while two universities might be employing the same terminology in their strategic statements, the substance of it i.e. the stakeholder group they are targeting and the intensity and form of collaboration they intend to follow might be completely different. This implies that the integration of third mission in to the core function of a university is a context sensitive process.

The study has both a theoretical and practical implications. From a theoretical point of view, the above mentioned findings make a modest contribution to the 'Third Mission' literature by provide an insight regarding the interconnection and intricacies that may exist between contextual factors and third mission orientation. From a practical stand point, the findings provide insight to policy makers, higher education leaders and external stakeholders who are interested in steering HEIs towards greater societal contribution through 'Third Mission' activities.

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The Reflection of 'Third Mission' in the Strategic Statements of UK Universities

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Definitions of University-Business Cooperation

Todd Davey, Balzhan Orazbayeva, Arno Meerman, Thomas Baaken

This book chapter contributes to the debate on UBC by shedding light on its conceptual foundations and definitions. For UBC research to flourish, it is important not only to focus on the factors affecting UBC at different levels, but to develop a comprehensive understanding of conceptual processes and terminology associated with this phenomenon. While the contribution of this chapter is indeed important conceptually, it also contributes to practice since to date the understanding of UBC is commonly being captured differently by different universities and businesses, which is well manifested in the diverse labelling of the professional staff dedicated to UBC, ranging from technology transfer professionals to engagement and relationships managers.

Keywords: UBC, Technology transfer, Knowledge transfer, Valorisation, Universities, Industry

1   Introduction

In recent years, university-business cooperation (UBC) has received substantial interest in academic, practitioner and policy circles as a source of scientific discovery and innovation. Its contribution as a facilitator of technological advancement and regional development has been widely acknowledged (Wakkee et al., 2019; Mascarenhas et al., 2018). Thus, UBC has proven itself as an economic driver that is able to contribute to society in a more meaningful way through technology transfer and diffusion of knowledge (Rajalo & Vadi, 2017).

The prolific stream of research has developed, improving our understanding of collaborative activities and relationships between higher education institutions (HEIs) and industry, although the state of knowledge remains relatively fragmented and uncertain (Skute et al., 2017; Perkmann et al., 2013) by following distinct directions and using different terminology to describe these relationships. While this terminology has been gradually changing in recent years from, for example, university-business and university-industry collaboration or cooperation to university engagement and engaged universities, researchers or practitioners have utilised this terminology loosely, warranting clarification to enable literature to go forward (Davey, 2017). Thus, the current state of the literature lacks a comprehensive view on a wide range of definitions of UBC and terminology used to describe

this phenomenon. This chapter will correct this shortcoming by providing an overview of different definitions of UBC and focusing, in particular, on conceptual processes related to UBC and different terminology associated with UBC.

2   Conceptual processes related to UBC

In describing how universities contribute more specifically to society, a number of conceptual processes have been established including *technology transfer*, *knowledge transfer*, *valorisation* and entrepreneurship (related to universities). These processes try to capture the way in which objects of value, such as knowledge, capabilities or technologies, are transmitted or exchanged across organisational boundaries. A description of these processes provides valuable and specific insights in the way that universities contribute to society through the three missions, but more specifically to this dissertation, through UBC and entrepreneurship.

In an evolutionary sense, *technology transfer* was the first of these processes to be recognised in literature following WWII. The concept of *knowledge transfer* received greater recognition in the 1990s, before knowledge exchange became a more accepted term in the 2000s. *Valorisation* is the most modern concept (see sections below for further information). This shift in focus by literature and practitioners from *technology transfer* to *valorisation* mirrors the shift from mode 1 knowledge production, a linear model of *technology* and *knowledge transfer*, to mode 2 processes, which are 'characterised by nonlinearity, trans-disciplinarily and co-production by heterogeneous groups' built through exchange (Swan et al., 201, p.1311; Gibbons et al., 1994). Despite this movement, and the fact that most *technology transfer* operations do not break even (Breznitz and Feldman 2010a), *technology transfer* literature, focussed on commercialisation of research, still dominates (Salter & Martin, 2001).

For all this coverage, there are few studies which capture the differences between these concepts in a structured way. For this reason, the following section will aim to tease out these differences and build a base ontology as a means of clarification.

2.1   Technology transfer

The concept of industrial innovation, a process of firstly basic and then applied research being developed and commercialised, was first introduced by Vannevar Bush's report 'Science—The Endless Frontier' in 1945. Since that time, the concept of technology transfer has been further developed by a number of authors

including Gibbons & Johnston (1975), Kline & Rosenberg (1986) and Von Hippel (1976).

Increased research funding following WWII, primarily aimed at economic growth (Cohen et al., 2002), created the seed-bed for the period up until the 1980s, whereby science-business partnerships, based upon the unilateral principle of technology transfer, became the norm (Van Looy et al., 2004). This growth in technology creation and transfer was driven by the notion that innovation was essential for economic growth and that innovation was driven by basic research, with the most appropriate focus for this type of research being universities (Mowery & Sampat, 2006). Following the Bayh Dole Act, in the early 1980s there was a much greater proliferation of research commercialisation in the one-directional mode of technology transfer (Kenney & Patton, 2012), usually in the form of the creation of licensing agreements, joint ventures, partnerships, or spin-out companies (Holi et al. 2008).

Technology transfer has been defined as 'the process whereby inventions or IP from academic research is licensed or conveyed through use rights to industry' (AUTM ,1998 p.3) and typically coming from universities (Holi et al., 2008). One of the original tenets of *technology transfer* was the concept that the modality of transfer was primarily one-directional, from public research to industry, and that research was independent of commercialisation (Cohen et al., 2002), moving the innovation from the point of creation to the point of operation (Guerin 1999). Using public funds, the university would assume ownership of the research and earn income through the sale of rights to business (Kenney & Patton 2012). It was accepted that research was a driver on technological development and in generating economic development (Lucas 1988, Grossman and Helpman 1994, Romer 1994, Aghion and Howitt 1995) and that primarily the principle player in public research was a university (Cohen et al., 2002). In capturing this flow, Fujisue (1998) technology is created in the university (public knowledge, basic research) and moves to industry (private, applied) either through a high tech venture (basic, private) a national initiative (public, applied), or directly from university to industry in the form of licensing.

Traditionally, *technology transfer* has been identified as the movement of 'know-how, technical knowledge, or technology from one organisation to another' (Bozeman, 2000 p.629). Technology transfer has been expressed in literature through a limited number of variables: the number of invention disclosures made, the number of patents applied for, the number of patents granted, enhancing a process, the number of technology licensing agreements with private companies, the number of start-up companies per year that are established around technologies

coming from university research, and the total value of technology licensing fees earned by the university per year (Breznitz & Feldman, 2010a, Markman *et al.,* 2004; Rogers, 2002; Luger & Goldstein, 1997). In literature, *technology transfer* is primarily focussed on only two types of UBC: the collaboration in, and commercialisation of, research.

The primary actors in the technology transfer involve the university, as the technology supplier; industry, as the technology customer (Cohen et al. 2002); and the government providing the legal framework for 'transactions' between the two. For this reason, TTOs have been a key feature of technology transfer, primarily since the creation of the Bayh Dole Act in the US (Kenney & Patton, 2012).

2.2   Knowledge transfer

Theory on knowledge transfer in respect to universities and business began emerging in the early 1980's with Teece's article 'The Market for Know-How and the Efficient International Transfer of Technology' (1981) and became a focus for practitioners within universities during the 1990's. At this time, knowledge transfer through technology and was a process by which research messages were 'pushed' by the producers of research to the users of research (Lavis et al., 2003b).

Literature in *knowledge transfer* recognises a number of key principles. It can occur 'between individuals, from individuals to explicit sources, from individuals to groups, between groups, across groups, and from the groups to the organisation' (Karlsen & Gottschalk, 2003, p.113). The knowledge transferred or exchanged can be internal or external to the source organisation (Bou-Llusar & Segarra-Cipres, 2006) and moves across the boundaries created by specialised knowledge domains (Carlile & Rebentisch, 2003). It often involves high amounts of tacit knowledge movement with a high reliance on social interactions (Nonaka & Takeuchi, 1995) with the resulting knowledge being applied to develop new ideas or enhance the existing ideas (Liyanage et al., 2009) to enhance material, human, social and environmental well-being. Knowledge is often embodied in theory and principles which help understanding between cause and effect, is transferred through non tangible forms and its precise impact is more amorphous and difficult to measure (Landry et al., 2007).

Whilst many authors use *technology* and *knowledge transfer* synonymously, often with the same meaning, the difference between the two has been recognised in a number of publications. Arvanitis et al., (2008) perceive that *technology* and *knowledge transfer* are essentially the same concepts and the difference is only in the material being transferred; knowledge being more tacit and technology more explicit. Others see that *technology transfer* is one part of a broader *knowledge*

transfer system, with *technology transfer* referring to a more limited set of activities than *knowledge transfer* (European Commission 2009a; Harmann 2007).

Related to knowledge transfer is the process of knowledge exchange, a concept that has also been cited in literature. Generally, the concepts of knowledge transfer and knowledge exchange are used interchangeably when referring to an interactive interchange of knowledge between research users and researcher producers (Kiefer et al. 2005). In respect to stakeholders specifically involved in knowledge *transfer* involving science, generally literature acknowledges knowledge producers as including universities and research institutions and knowledge receivers as business, government or the community (Phillips KPA, 2006). However, some authors still view *knowledge transfer* as one directional, as the word 'transfer' implies, and only use the term 'knowledge exchange' to capture a more modern understanding of the 'transaction'. *Knowledge exchange* has emerged as a term that captures the growing evidence that the successful uptake of knowledge requires more than one-way communication, instead requiring genuine interaction among researchers, decision makers, and other stakeholders (Lavis *et al.* 2003b).

The range of activities considered to create *knowledge transfer* is broader than the activities that create *technology transfer*, which is premised on how knowledge is understood. If one takes the understanding that knowledge is both explicitly and tacitly exchanged, it can be said that *knowledge transfer* must involve research, but also from a range of different scholarly and academic activities (Harmann, 2007). For this reason, the types of activities that are recognised to facilitate *knowledge transfer* show that knowledge comes from a more expansive range of cooperation types, involving a greater number of stakeholders than simply university and business. Some of the activities named include hiring graduates, publications, conferences and seminars, consultancy, contract and collaborative R&D (Technopolis, 2012).

2.3   Valorisation

Valorisation5 is an emerging concept that is grounded in capturing the full spectrum of value conversation coming from universities, particularly those forms of value creation coming from the so-called HASS disciplines, Humanities, Arts and

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[5] The concept of 'vinculation', a Spanish word used in UBC and university-community settings, seems to closely align with the notion of valorisation. The word itself is of Latin origin, vinculum, which according to the Oxford Dictionary means 'a bond or tie' and implies the interaction or relationship the university has with a stakeholder or community.

Social Sciences (Benneworth and Jongbloed 2010). Reflecting its growing prominence, the concept of valorisation (in Dutch 'valorisatie') is recognised in Dutch law. In addition to teaching and research, universities are required to deliver on the 'third mission' to provide service to the community. In this context, 'society' is a primary stakeholder of valorisation, referring to the utilisation of scientific knowledge in practice and how knowledge from universities should add value beyond the scientific domain (Benneworth & Jongbloed 2010).

Both valorisation and commercialisation are transfer processes, creating value from knowledge and are used synonymously (Wubben et al. 2005). However, literature recognises a clear difference in that commercialisation is more focussed on creating commercial benefits or outcomes from scientific knowledge (Slaughter & Leslie, 1997), whereas valorisation makes knowledge more broadly accessible for societal stakeholders (Benneworth & Jongbloed, 2010). Compared to the concept of innovation, valorisation is considered to be broader because innovation relates to bringing something successfully to market, whereas valorisation includes the often long lasting chain of processes that starts with first thoughts (Van Geenhuizen, 2010).

Capturing a greater amount of intangible and tacit forms of knowledge, inevitably knowledge valorisation is more difficult to manage, to measure, is more costly, is more indirect and requires specific strategies and processes (Teece, 2000). Recognised more broadly as making 'the results from academic research available or more easily accessible in order to increase the chances of others—outside academia—making use of it' (Benneworth & Jongbloed, 2010, p.568), valorisation also recognises co-production of knowledge with non-academic groups, and thereby, the importance of a valorisation system whereby tacit knowledge through interactions can more easily flow (Van Geenhuizen, 2010).

In this context, some important factors found to support knowledge valorisation include the regional nature of valorisation including the size and nature of firms in the region, the size of the business ecosystem to develop economies of scale and scope and a critical mass above which growth starts to develop as a self-propelling mechanism, the size and quality of research institutions as well as communicating externally that attractiveness of the valorisation system to attract further players (Van Geenhuizen, 2010).

Valorisation differs to *knowledge transfer* in literature in respect to the directness and active nature of the transfer/exchange. The limited literature available on *valorisation* is less specific about how, what and to whom knowledge is transmitted through *valorisation* and is less specific and tangible in respect to whether it is

simply finding ways to make scientific knowledge more accessible, or it is a more organised form of transfer/exchange. The directional flow is not necessarily nominated, with *valorisation* requiring a domain and the hierarchy of knowledge creator and knowledge customer having less emphasis, rather *valorisation* is the result of interaction whereby knowledge is exchanged to create benefit.

3   Definitions associated with UBC

Table 1 provides an overview of the different terms that are used to describe and study UBC. As it appears, all terms are seemingly used interchangeably. However, in order to provide clarity, a review of the different ways UBC was addressed in these selected publications was undertaken, resulting in the identification of four key ambiguities: (i) 'industry' and 'business', (ii) 'university' and other terms, (iii) the scale of cooperation, (iv) development of relations.

In order to provide the necessary clarity for UBC, and the suitability and use of the various terms, the definition and use of these words needs to be explored. For this reason, a combination of accepted word definitions from the Oxford Dictionary and literature will be used as well as supplementing these two sources at times with policy reports to provide an operational perspective. What can be observed is that the original use of the word (dictionary meaning) is sometimes different to how it is being used, and misused, in literature.

3.1   'Industry' and 'business'

The first inconsistency found was in the use of 'industry' and 'business', with the term industry being the dominant form used in journal articles, as was demonstrated in high representation of industry in the bibliometric study. Within literature, 'industry' is used primarily to reflect 'Trade and all activity relating to it'. However, it must be noted that there was little emphasis or focus given to the word 'industry' in its use, with no specific definitions of 'industry' found when referring to UBC.

However, in the practical use of UBC a trend toward the use of 'business' can be observed. A review of European policy reports (governmental and consulting) obtained through a simple online search using the terms described previously, revealed that there was an equal use of both terms, 'business' and 'industry', with both used interchangeably without distinction. However, a trend was observed in European policy circles towards the use of 'business', potentially reflecting an initiative of the 'Directorate General Education & Culture', a directorate of the EC, who have created a UB Forum series multiple funding initiatives using this term.

According to the Oxford Dictionary *industry* generally refers to a 'branch of productive labour' with a slight tendency to be used more specifically for 'trade or manufacture' whilst *business* refers to 'trade and all activity' as well as 'a commercial company, firm, or enterprise' or generally to 'the world of trade and commerce'.

Table 1: Definitions of 'industry' and 'business'

Industry	A class of enterprises which operate within the same or similar markets (Gabler 2000)
	A particular form or branch of productive labour; a trade or manufacture (Oxford Dictionary 2014)
	Systematic work or labour; habitual employment in some useful work, now esp. in the productive arts or manufactures (Oxford Dictionary 2014)
Business	A commercial company, firm, or enterprise conducting such activity (Oxford Dictionary 2014)
	Trade and all activity relating to it, esp. considered in terms of volume or profitability; commercial transactions, engagements, and undertakings regarded collectively. Hence more generally: the world of trade and commerce' (Oxford Dictionary 2014)
	Trade and all related activity as a subject of academic study or examination (Oxford Dictionary 2014)

Referring to the definitions of both words above, when referring to a broader discourse of what is UBC, the term business would seem to be more appropriate, except in the case of technology transfer which refers to a narrower transfer of technology to 'industry' including technical industries and manufacturing. For this reason, this dissertation will follow this recommendation by using 'business' in place of 'industry'.

3.2 'University' and other terms

The predominant term used for the academic side of UBC is university, as demonstrated in the number of citations found in the bibliometric study.

The Oxford Dictionary defines university as 'a high-level educational institution in which students study for degrees and academic research is done'. However, at times a number of other terms have been used in place of university including HEI (see Kitagawa and Lightowler 2013), academia (see Holden 1985) and also science (see Kaufmann and Tödtling 2001).

In defining *academia* as 'the environment or community concerned with the pursuit of research, education, and scholarship', the role of the university is seemingly replicated indicating the synonymic capabilities of the two words. In literature, 'academia' has been used interchangeably in place of 'university' (see Fujisue 1998 and Polt *et al.* 2001), in a similar synonymic way to the use of 'industry' and 'business'.

Higher Education Institution (HEI) is another word used synonymously with 'university'. The analysis revealed that the use of 'HEI' instead of 'university' was often made intentionally to include a broader definition of what constitutes a university (see Davey *et al.* 2011). In this sense, the term 'HEI' incorporates tertiary institutions such as colleges and schools polytechnic and applied sciences universities, which are not always considered universities. In certain European countries, such as in the Netherlands, Germany and in Scandinavian countries, where certain institutions have only more recently issued certain degrees or undertaken academic research, there is a greater distinction made between these institutions. Despite this, in the literature examined, there was no evidence found to indicate that authors used 'university' exclusively to mean the traditional 'university' to the exclusion of the full range of HEI types named above.

Science defined as 'the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment', encompasses the role of research which may or not be undertaken within the university setting. Furthermore, the definition does not refer to education and thus would obviously include research institutions and other locations where science takes place, as was intended by Kaufmann and Tödtling (2001) and OECD (2002) in their use of 'science' instead of 'university'. In literature when referring to cooperation with business, it has been used to encompass endeavours of science undertaken outside the university including within publically-funded scientific institutes and bodies such as the Fraunhofer Institute in Germany and CSIRO in Australia (see Debackere and Veugelers 2005).

In using one term or another, it would seem logical to use the term that fits the topic in question, with all having clear, albeit subtle, differences.

Table 2: Definitions of 'university' and associated terms

University	A high-level educational institution in which students study for degrees and academic research is done (Oxford Dictionary 2014)
Higher education	All types of institutions, which provide higher education and are the source of new knowledge and technology which are formally recognised by the relevant national/regional authority and include: universities, universities of

institution (HEI)	applied sciences, polytechnics /technical universities and colleges and tertiary schools (Davey et al. 2011)
Academia	The environment or community concerned with the pursuit of research, education, and scholarship (Oxford Dictionary 2014)
Science	The intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment (Oxford Dictionary 2014)
	[Industry-science relationships] include stakeholders as governments, industry, public research organisations, civil society and are focused on labour mobility and spin-offs (OECD 2002)
	[Industry-science relationships] are the interaction between firms and public-sector research (Polt et al. 2001)

3.3 UBC dealings

The bibliometric study shows that different terms are used in how the dealings between university and business were described. As was demonstrated in the bibliometric analysis, the main terms used to describe these dealings were relationships (relations), followed by linkages, collaboration, interaction and cooperation. The use of these terms will now be discussed.

Commencing with ***interaction***, it is defined by the Oxford Dictionary as 'reciprocal action; action or influence of persons or things on each other'. Whilst few authors define the term specifically in literature, there is a general consensus that interaction is an interface between university and business that can be an isolated event or part of a multi-interface between the two actors as might occur in a relationship (Ternouth *et al.* 2009, D'Este and Patel 2007). Interactions can also represent more casual exchanges between university and business including 'social interactions' (Azagra-Caro 2007 p.2) which involve no on-going relational element.

The Oxford Dictionary defines ***linkages*** as 'the condition or manner of being linked; a system of links' as well as 'a link; an association or correlation; the process of linking or connecting'. In respect to UB linkages, authors noted an exchange of creativity, ideas, skills and people (Plewa *et al.* 2013) and others document the exchange of knowledge, resources, and technology (López Martínez *et al.* 1994) which can involve both informal and formal 'mechanisms' (López Martínez *et al.* 1994). Authors such as Waluszewski *et al.* (2008 p.13) find that linkages are 'interpersonal links developed between individuals through interaction' which distinguishes that a linkage is an escalation (development) of relations from

interactions whilst Plewa *et al.* (2013) also discern that linkages imply some form of relational element which is more casual dealings. A linkage can be in the form of one link (or interface) or many linkages between individuals and organisations.

Collaboration is defined in the Oxford Dictionary as 'united labour, co-operation; *esp.* in literary, artistic, or scientific work' whereas *cooperation* is defined as 'the action of co-operating, i.e. of working together towards the same end, purpose, or effect; joint operation'. In this respect, as well as in the literature, there is no differentiation found between the two terms with continual interchangeable use. For this reason, we will remain with 'cooperation' during the dissertation as a synonym for collaboration. In respect to UBC, cooperation has been defined as relationships of an individual and collective nature (Santoro and Bierly 2006) in a partnership, alliance or network (Commonwealth of Australia 2004) which aim to create reciprocal and mutual benefit (Davey *et al.* 2011) through knowledge and technology production (Bozeman *et al.* 2012). Cooperation implies a relationship of some construct where there is a common objective (Commonwealth of Australia 2004), whether it is achieved or not (Bozeman *et al.* 2012), implying that cooperation does not need to be an on-going or continuing activity.

Cooperation includes 'all types of direct and indirect, personal and non-personal interactions between organisations and/or individuals from the firm side and the university side' (Schartinger *et al.* 2002 p.304). They are seen to involve a range of programs, projects, and institutional actors (Mowery 1998) requiring direct, person-to-person interaction (Bozeman et al. 2012) and including partnerships, alliances or networks (Commonwealth of Australia 2004). Finally, cooperation occurs when both parties 'actively contribute to knowledge development' and when their cooperation is 'visible in terms of joint agreement and/or joint result' and or 'through agreements or through results' (McKelvey et al. 2003 p.485).

Cited in a similar way to cooperation is *engagement*. Perkmann *et al.* (2013) defined engagement as 'knowledge-related collaboration by academic researchers with non-academic organisations' and recognised that it involves informal *technology transfer*. Cohen *et al.* (2002) identified that engagement includes 'person-to-person interactions' that include universities and other organisations, including firms, showing that 'engagement' is principally used to define external dealings, not specifically with business.

The last of the interfaces is university-business relationships (or relations) with the Oxford Dictionary defining a *relationship* as 'the way in which two or more people or things are connected, or the state of being connected' as well as 'a connection formed between two or more people or groups based on social interactions

and mutual goals, interests, or feelings'. 'Relations' is a word primarily associated with the 'various ways by which a country, state, etc., maintains political or economic contact with another'. In this way, relationships (and relations) acknowledge social interactions, mutual goals and exchanges of interest as well as the presence of feeling in a 'state' or 'a continuing attachment or association between persons, firms etc.' (Agnes 1999 p.1209).

In regards to UBC, literature highlights that relationships have shown to be multifaceted, complex, and diverse, whereby feedback loops are common. In describing university-business relationships, authors note that relationships can occur between individuals, organisations or groups (Plewa & Quester, 2006), can be of a continuing nature (Agnes, 1999, p.1206) and found to be based upon trust, commitment, common goals and mutual respect which enable the diffusion of ideas, skills and people (Plewa & Quester, 2007).

Similarly to the previous term discrepancy, the choice to use one term or another should be made upon the intended use, using the review of UB dealings as a framework for decision-making.

Table 3: Definitions of UBC dealings

Interaction	Reciprocal action; action or influence of persons or things on each other (Oxford Dictionary, 2014)
	Interactions between universities and industry include all types of direct and indirect, personal and non-personal interactions between organisations and/or individuals from the firm side and the university side (Schartinger et al., 2002)
Linkages	The condition or manner of being linked; a system of links. Also, a link; an association or correlation; the process of linking or connecting (Oxford Dictionary, 2014)
	Interpersonal links developed between individuals through interaction (Waluszewski et al., 2008)
Engagement	Knowledge-related collaboration by academic researchers with non-academic organisations (Perkmann et al., 2012)
Cooperation	Working together towards the same end, purpose, or effect; joint operation (Oxford Dictionary, 2014)
	Activities such as co-development, co-authorship and collaborative R&D, where both parties are expected to actively contribute to knowledge development and where those activities are visible in terms of joint agreement and/or joint results like patents or scientific papers' and 'visible through agreements or through results' (McKelvey et al., 2003, p.485)

Collaboration	United labour, co-operation; especially in literary, artistic, or scientific work (Oxford Dictionary, 2014)
	[Collaboration] covers a diverse array of programs, projects, and institutional actors. No single recipe for project design, program policies, or evaluation applies to all these disparate entities (Mowery, 1998)
	Social processes whereby human beings pool their human capital for the objective of producing knowledge (Bozeman, et al., 2012)
Relationships	A connection formed between two or more people or groups based on social interactions and mutual goals, interests, or feelings. The way in which two or more people or things are connected, or the state of being connected (Oxford Dictionary, 2014)
	A two-way process requiring cooperation and the search for a win-win situation for both partners (Gummesson, 2002)
	A continuing attachment or association between persons, firms, etc.' (Agnes, 1999)
	University-Industry relationships are trusting, committed and interactive relationships between university and industry entities, enabling the diffusion of creativity, ideas, skills and people with the aim of creating mutual value over time (Plewa & Quester, 2007)
Relations	The various ways by which a country, state, etc., maintains political or economic contact with another

3.3.1   Development of dealings between university and business

As was evident in the previous section, literature illuminates a scale of interactions ranging from linkages to relationships, generally recognising an escalation or development path which UBCs follow. This builds on the notion that previous interactions, creating desirable social and economic outcomes, indicate a tendency for further, possibly escalated, interaction by building increasing levels of trust and understanding (Lambe et al. 2011 & Plewa et al., 2013). Using a combination of the 'stage theory', whereby relationships develop sequentially and irreversibly (Dwyer et al., 1987), and 'states theory', whereby relationships are complex, staccato (depending on project availability), divergent or subject to dissolution (Grayson & Ambler, 1999), university-industry dealings both have escalation as well as pulsing dealings of great complexity (Plewa et al., 2007).

In describing a model for research transfer development, Anderson et al. (1999) describe that the process of collaboration begins with the 'awareness' of a need, a market need on the business side and a research need or gap on the academic side.

Awareness then leads to communication between the two parties and then interaction of an unspecified nature.

In its approach to collaboration with universities, Hewlett Packard sees 'awareness' slightly differently, understanding this step as being aware of the other potential collaborator (Healy et al., 2014). This awareness phase is followed by 'involvement', 'support', 'sponsorship' and 'strategic partnership' with each stage characterised by subsequent activities and a corresponding deepening of the relationship.

The transfer or exchange of technologies, knowledge and resources between university and business is characterised by informal to formal modalities (Rothwell 1982; Baba 1988). Interaction and linkages were generally used by authors to indicate informal interactions (López Martínez et al., 1994) whilst more formalised dealings were found in cooperation, alliances and partnerships although even these latter forms have an element of informal knowledge exchange (Plewa et al. 2013). With informal interactions being one of the most significant forms of relationship between university and industry worldwide (Sutz, 2000), interactions and linkages form an important mechanism in building relationships, whilst informal meeting and relations have also been found to further extend and strengthen existing relationships (Segatto-Mendes & Mendes, 2006).

Despite there being a long history of university cooperation with society through the establishment of land grant universities in the US, often with business as a focal point for cooperation, the notion of strategic relationships between university and business on a larger scale is a more recent phenomenon (Etzkowitz, 1998). These strategic partnerships are characterised by the company, who gets more strategically involved in the direction of the university, and potentially vice versa. In this situation, rather than simply handing over technologies, the two are engaged in a longer-term, bi-directional exchange and active collaboration exchange through multiple forms (Barnes et al., 2002) with common goals and visions.

The 'Partnership Stairway Model', developed by the Münster University of Applied Sciences in Germany, provides a model for the escalation as well as dissolution of UB cooperation and identifies four different 'stages' of development in a UB relationship (Baaken & Schröder, 2008). Recognising a broader range of cooperation activities between university and business than just research, the model nominates the stages as 'formation', 'basic collaboration', 'joint collaboration' and 'strategic partnership' and describes the stage through a number of criteria:

number or regularity of collaboration, time orientation, number of people in-volved, and management level involved (Davey et al., 2011). At the 'top' of the stairway the model defines a strategic partnership to involve multiple types of collaboration, involve more-than-one regular joint activities and involve multiple stakeholders on both sides, including upper management of both organisations, and a long term orientation (Davey et al., 2011).

The importance of stakeholders (people) in the development or advancement of UB relationships has been established in a number of studies (Cambra-Fierro et al. 2011; Davey et al. 2011; Santoro & Chakrabarti, 2002). Plewa et al., (2013) identify the people element, as well as deepened level of personal and professional understanding, reflected through mutual trust and understanding, were essential for relationship success. The 'Partnership Stairway Model' uses a 'fields by play-ers' approach to stakeholder management, whereby the deepening of relationships and commitment demands a corresponding 'higher-level' organisational stake-holder interaction (Baaken et al., 2008). With a customer and partner relationship management underpinning the approach, lower and less intensive levels of inter-action are managed at the Professor level, more committed cooperation demands an escalation to the Dean or departmental level, whilst strategic partnerships are handled by upper management (Baaken et al., 2008).

In their publication 'an overview of strategic alliances between universities and corporations', Elmuti et al. (2005) outline a strategic research alliance process, which captures the nature of strategic research-oriented alliances at a project level. The process commences with needs identification on both sides, moving to a joint working group, a formal agreement, process definition and activity execution fol-lowed by an evaluation.

In summarising these dealings between universities and businesses, an eleva-tion of commitment can be observed as demonstrated in 'Figure 1: Dealings be-tween university and business'.
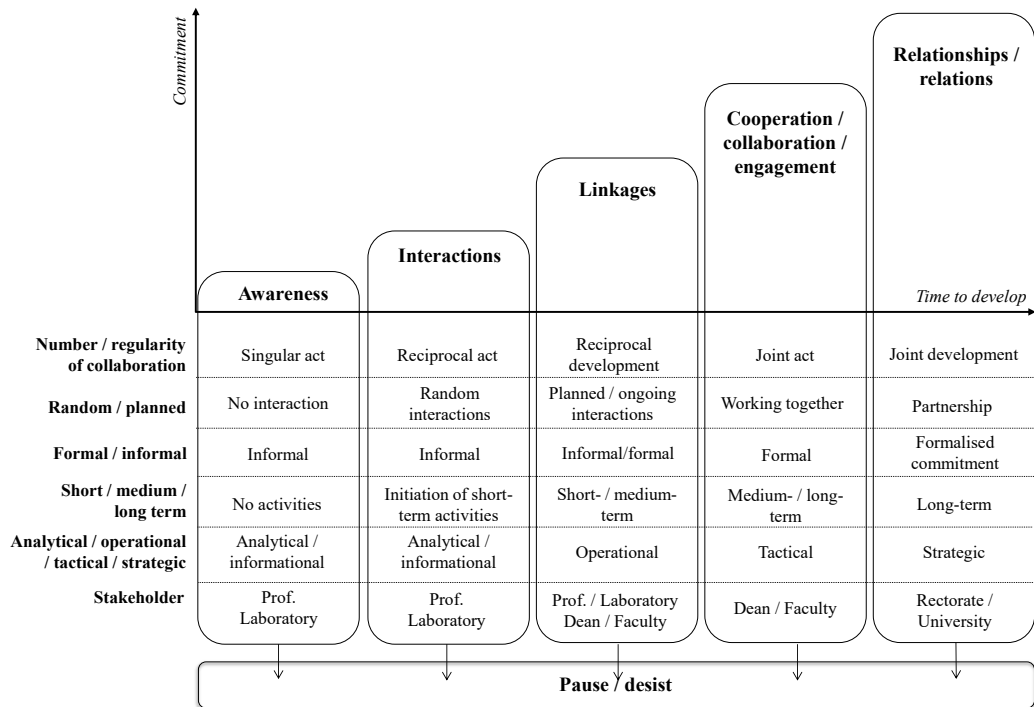
Figure 1: *Dealings between university and business*

The illustration above highlights various characteristics of the different forms of dealings between universities and businesses. 'Interaction' involves analytical or informational reciprocity primarily in an informal and unplanned way. 'Linkages' occur around an operational topic either in a formal or informal but planned way, whilst 'cooperation' focuses on a joint act, usually a project, taking place over a medium to longer term. Finally, a relationship is (usually) the result of previous dealings, has a longer term parameter and is often formalised in a partnership or alliance.

Figure 1 also depicts the escalation from 'awareness' to 'relationships' as a staged process whilst also integrating the 'states' perspective whereby dealings can be paused, desisted or dissolved.

3.3.2 Knowledge transactions

The core elements in UB relationships are transactions (Bercovitz and Feldmann 2006) of knowledge in both tacit and explicit forms. The nature of the creation and flow of knowledge is an important factor influencing the development of UBC, including entrepreneurship, at universities. Being at the heart of collaboration between universities and businesses, clarifying how knowledge is created,

transferred, exchanged or applied becomes essential to its understanding and management. Rappert et al. (1999) argues that all too often the examination of UB cooperation becomes a list of types or forms of collaboration and ignores the nature of the things being exchanged. For this reason, this section will address both the specific entity at the centre of the 'transaction' between universities and business and then talk more specifically about the ways in which it is then transferred, exchanged or applied.

Having been defined by the Oxford Dictionary as 'facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject' (Oxford Dictionary 2014), it can be said that knowledge can be acquired through experience or education.

With a two-way exchange of knowledge rather that a unidirectional knowledge transfer being increasingly recognised to be at the heart of collaboration, Etzkowitz (1998) nominates three modes of *technology transfer*: (i) the technology originates from the university but is developed externally in an existing company, (ii) the technology is created externally and the academic improves the process or product, and (iii) the technology is created within the university and is taken out into a new company. Building on this to better incorporate modes of knowledge transfer and exchange, there is a case for co-produced research which is commercialised externally as a fourth form. A fifth form is evident when knowledge developed external to the university and brought into the university system, exemplified through an invitation for local entrepreneurs to participate in university programmes, sometimes referred to as a 'spin-in' (U.S. Department of Commerce 2013), although these occurrences can be quite rare.

4   Conclusion

With UBC receiving substantial acknowledgement as a source of scientific discovery and innovation as well as a contributor to a regional development, the prolific stream of research has developed focussing on collaborative activities and relationships between higher education institutions (HEIs) and industry (Davey et al., 2018), individuals involved in the collaborative activities (Bstieler et al., 2017), barriers, drivers and motivators (Galan-Murors & Plewa, 2016), and the knowledge transfer processes on organisational level (Bekkers et al., 2008) among others.

Notwithstanding the growing academic interest in UBC as an area of research, the state of knowledge remains relatively fragmented (Skute et al., 2017; Perkmann et al., 2013) and employs different terminology to describe the relationships between universities and businesses. Because, the current state of the literature

lacks a comprehensive view on a wide range of definitions of UBC and terminology used to describe this phenomenon, this chapter addressed this shortcoming by providing an overview of different definitions of UBC and different terminology associated with UBC and its conceptual processes.

Thus, this book chapter sheds light on conceptual foundations and definitions of UBC and develops an improved understanding of conceptual processes and terminology associated with this phenomenon. The chapter showed clearly the overlaps and respective foci of the different conceptual processes, contributing to the discussion about how the university and business cooperate with each other. Furthermore, it showed that there is indeed a great deal of different terms being used to describe the same phenomenon with different views on the role of the university within them and from different stakeholder perspectives.

While noting the contributions made by this chapter, and given its descriptive nature, it is also important to recognise a number of the future research directions. The further research should acknowledge that university cooperation today goes beyond just engagement with industry (Rybnicek & Königsgruber, 2019). Therefore, there is a need to address new modes of university engagement using systematic literature review and bibliometric analysis on university engagement and definitions associated with it. Furthermore, further research could be focussed on empirical studies investigating how these conceptual processes and terminology are applied by practitioners and policy makers.

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Entrepreneurship is one of the topics of the Centre and is divided up in sections: Academic, Student, Rural, Female, Digital, Social and Transformational Entrepreneurship.

Exploring the design elements for developing educational escape rooms for experiential entrepreneurship education

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Entrepreneurship education (EE) aims to prepare students for the future labor market. Since the 1980s, there has been a shift in EE from conventional towards experiential pedagogy such as game-based learning (GBL). Though GBL promotes cognitive development, it contributes marginally to student motivation. A new development within GBL that shows promise to positively influence student motivation is non-digital gamification such as educational escape rooms (EER). Yet, there is a lack of research explicating the design elements for EERs. Therefore, in this conceptual study, we develop design elements that aids educators in creating EERs for experiential EE.

Keywords: entrepreneurship competence, entrepreneurship education, educational escape rooms, educational design

1   Introduction

Experiential entrepreneurial education (EE) has gained prominence in today's institutions of higher learning. A form of experiential EE that has been commonly used is game-based learning (GBL). Game based learning is the use of complete games such as computer simulations (Deterding et al., 2011). Though being effective for enhancing cognitive learning (Vogel et al., 2006), GBL is weakly related to student motivation (Wouters et al., 2013). This limitation is crucial since student motivation is key for learning outcomes in the form of solution strategies (Bandura, 1993).

A recent trend within GBL is the use of educational escape rooms (EER). This pedagogy shows promise since it has been found that EER is positively related to student motivation (Wiemker et al., 2015). Educational escape rooms can be described as competitive physical adventure games (Jambhekar et al., 2019). These games are non-digital GBL (Deterding et al., 2011) and there is a call for more studies using EERs for targeting large student groups (Clarke et al., 2017). Various EERs have been deployed for higher education purposes, especially addressing competencies in beta studies (Zhang et al., 2018). Despite the practical nature that EE has in common with the previously mentioned fields, there is a paucity in ap-

plying EERs to this discipline mainly due to a lack of instructions on how to develop EERs as an innovative pedagogy for experiential EE. Developing these games is difficult, time consuming and costly (Kapp, 2012).

Therefore, the objective of this conceptual study is to investigate the design elements for EERs in experiential EE. We developed design elements based on the literatures of experiential learning, entrepreneurship competencies, and gamification. We contribute to the literature of EE by proposing guidelines for non-classroom experiential learning. Krueger (2015) states that in experiential EE, there is the need to focus more on the pedagogy. We show the design elements especially for the development of EER as a new (innovative) form of pedagogy for experiential EE.

This chapter proceeds as follows. In section two, we review the literature on EE, GBL, gamification and EER. In section three, we propose the design elements for developing EER. In section four, we conclude the study.

2 Literature review

2.1 Entrepreneurship Education

Entrepreneurship education has seen different shifts in educational philosophy (Hägg & Gabrielsson, 2019). There has been a shift in the pedagogy of EE from a cognitivist learning theory to a constructivist learning theory (Ertmer & Newby, 1993). Traditionally, the main concept taught was business planning (Honig, 2004). Today's EE pedagogies rest on the experience of starting up. This is mainly due to the increased popularity of the theories of experiential learning (Piaget, 2000) and problem-based learning (Bruner, 1996). Trial-and-error activities lead to learning, problem-solving, and creativity (Jones & English, 2004).

2.2 Game-based learning

Game-based learning refers to complete games such as computer simulations (Deterding et al., 2011). It is defined as "any form of interactive computer-based game software for one or multiple players to be used on any platform and that has been developed with the intention to be more than entertainment" (Ritterfeld et al., p. 6). Game-based learning is mostly web-based (Zyda, 2005) and is an effective educational tool (Bellotti et al., 2014; de Freitas, 2006).

Game-based learning is useful for EE (Antonaci et al., 2015). Research shows that GBL provides benefits for students to practice learned content and for teachers to verify knowledge and skill acquisition (Hauge et al., 2013). It has positive effects on various forms of learning: situated learning (Van Eck, 2006), learning by

doing (Belloti et al., 2014), and cognitive learning (Vogel et al., 2006). Moreover, the immediate feedback of GBL enhances procedural learning (Belloti et al., 2013).

Nonetheless, GBL has limitations with regards to the abstraction process in learning and cooperation among students (Hauge et al., 2013). In addition, there is a lack of GBL on the market that focus on motivational aspects (Antonaci et al., 2015). It is not found to be positively related to motivation of the students (Wouters et al., 2013). For GBL to be used effectively in EE, it depends on the behavior of its users (Belloti et al., 2014) since the motivation of one student is also dependent on the behavior and motivation of other students. A recent development within GBL is the use of EERs. These EERs are positively related to student motivation (Wiemker et al., 2015) and show promise to be used in experiential EE.

2.3   Educational escape rooms

Educational escape rooms can be developed as a non-digital GBL. Educational escape rooms are "live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited time" (Clarke et al., 2017). Compared to classroom education, EERs are more dynamic and realistic. The EER is not about learning knowledge, but mainly about learning soft skills such as collaboration, communication, self-efficacy and financial literacy (Lopez-Pernas et al., 2019). Students do not only need these skills as a student or later on as an employee but can also use them as a self-employed person. This is important for a better connection to the labor market (Moberg, 2014).

Educational escape rooms can contribute to experiential learning (Belloti et al., 2014). Experiential learning, which is a form of constructivist learning, focuses heavily on self-regulation, by the necessity of making choices and taking responsibility (Glaserfeld, 1983). Furthermore, students are involved in their own learning process on a metacognitive, motivational and behavioral level (Kirschner, 2018). Therefore, in this study the self-determination theory of Ryan and Deci is used, which outlines three basic elements for successful self-determination- intrinsic motivation, autonomy and competence (Ryan & Deci, 2000).

3   The design elements

Gamification of education is still fairly new in EE and only a few examples of the use of EERs can be found (Järveläinen et al., 2019). There is a lack of instructions on how to develop EERs as an innovative pedagogy for experiential EE.

To develop these design elements for EER, we visit the constructivist learning theories (Piaget, 2000; Johnson & Johnson, 1981; Vygotsky, 1978; Bruner, 1976). We also visit the entrepreneurship competencies framework and include design elements of gamification. The EER is designed in a similar fashion to commercial escape rooms, where participants can play without specialized knowledge, with the exception of some basic financial literacy. However, students will have to use their prior knowledge of high school in order to integrate the specialized knowledge that is given to them as tools in the game.

3.1   Constructivist learning

Constructivism is a theory of cognitive development, where learning arises by constructing knowledge from experiences (Piaget, 2000). This form of constructivist learning focuses heavily on self-regulation, i.e., calling for making choices and taking responsibility (von Glaserfeld, 1983), and by involving students in their own learning process on a metacognitive, motivational and behavioral level (Kirschner, 2018). Constructivism also entails the zone of proximal development (ZPD) (Vygotsky, 1978) and the importance of sociocultural learning. Especially the strategy of scaffolding, where the teacher or fellow students establish intermediate steps (i.e., build scaffolding) to optimize the learning process and develop skills (Bruner, 1976). Conditions for effective cooperation also forms an essential aspect within constructivist theories of learning (Johnson & Johnson, 1981). These theories are typically used in the field of gamification, especially for the designing EER.

In this study, we selected cooperation as a design element because collaboration between students is necessary during the EER. It is difficult to be successful on your own because students first need their sub-groupmates and, later in the game, their classmates to escape. Therefore, students must take the responsibility for cooperating within the group. The game should be designed so students can encourage and facilitate the effort of each member. Tables and chairs can be set up for each group to have enough space to work together. This setup promotes interaction during the game (Johnson & Johnson, 1981). Hence, we suggest:

> *Design element 1: educational escape rooms should be designed to include the need for cooperation among students.*

3.2 Entrepreneurship competencies

Competence refers to the underlying traits, skills, knowledge and motives that enable individuals to do a job or the behavior individuals should demonstrate to accomplish a task (Mitchelmore & Rowley, 2010). In this study, we refer to the latter use of competence. We define entrepreneurship competence as the "underlying characteristics such as specific knowledge, motives, traits, self-images, social roles and skills which result in venture birth, survival and/or growth" (Bird, 1995 as cited in Mitchelmore & Rowley, 2010, p.96-97).

Several entrepreneurial competencies have been associated with venture performance (Mitchelmore & Rowley, 2010). For example, opportunity, relationship, analytical, innovative, operational, human, strategic, commitment, learning and personal strength (Man et al., 2002). Bellotti et al. (2014) distinguish finance, marketing, business set-up and management, and spotting business opportunities. Mitchelmore and Rowley (2010) makes a distinction between entrepreneurship (e.g., environmental scanning, recognizing opportunities, and idea generation), business and management (e.g., business plan preparation and financial and budgeting skills), human relations (e.g., leadership and hiring skills), and conceptual and relationship competencies (e.g., decision-making and interpersonal skills). Although according to this typology, there are specific entrepreneurship competencies, for any entrepreneur to be successful he/she must display the competencies in all categories. Boyles (2012) suggests the categories of cognitive (i.e., the entrepreneurial mindset to identify opportunities and make decisions), social (i.e., skills required to create social capital) and action-oriented (i.e., initiative and proactivity) competencies. Bicagalupo et al. (2016) group entrepreneurship competencies into ideas and opportunities, resources, and action.

Although there is similarity in the conceptualization of entrepreneurship competence across entrepreneurship literature, in this study we follow the European Commission by Bicagalupo et al. (2016). Five competencies are required in EER-spotting opportunities, self-awareness and self-efficacy, motivation and perseverance, taking the initiative, and financial and economic literacy. First, 'spotting opportunities' (i.e., using imagination and abilities to identify opportunities for creating value) should be part of EER. Students have to identify needs, challenges and establish new connections and bring scattered elements of the games together to create opportunities, to solve the games and escape the classroom. Therefore, we suggest:

> *Design element 2: educational escape rooms should be designed to include the need for spotting opportunities by students.*

Second, 'self-awareness and self-efficacy' also needs to be included in EER. This competence regards believing in yourself and continuing to develop, by identifying and assessing individual and group strengths (Bicagalupo et al., 2016, p.12). In this study, we selected 'self-awareness and self-efficacy' as a design element because these competences are necessary for applying skills outside the context in which it has been learnt (Amagir et al., 2018). EER needs a variety of different tasks that require different skills which students should apply in different contexts. Students have the opportunity to demonstrate their competence and this promotes students' self-efficacy, and belief in their abilities (Bandura, 1977). We suggest:

> *Design element 3: educational escape rooms should be designed to include the need of self-awareness and self-efficacy by students.*

Third, the competence 'taking initiative, motivation and demonstrating perseverance' also needs to be designed into an EER. This competence refers to attempting challenges, staying focused and being determined to turn ideas into action (Bicagalupo et al., 2016, p.12). In order to help students in their development, the strategy of scaffolding must be integrated in EER (Vygotsky, 1978). For example, a start with relatively easy puzzles and hints on demand during the game at the cost of a time penalty. By deploying supervisors in the EER to monitor the student activities and administer hints, we want to keep students motivated during the EER. Hence, we propose to give students the autonomy and possibility to get help when they think they need it. In this way we challenge every student at their own level.

> *Design element 4: educational escape rooms should be designed to include the need for students to take the initiative, demonstrate motivation and persevere.*

Finally, 'financial and economic literacy' (i.e., developing financial and economical knowledge) is also vital for EER (Bicagalupo et al., 2016, p.12). We selected this competence as a design element because finance is a regular component of EE (Mwasalwiba, 2010). Indubitably, the entrepreneurial process consists of financial decision-making. Research (cf. Amagir et al., 2018) shows that experiential learning lends itself well to making students acquire basic financial literary. An EER create situations in which students understand the necessity of financial literacy. Thus, we suggest:

> *Design element 5: educational escape rooms should be designed to include the need for financial and economical literacy by students.*

3.3 Game design elements of gamification

Gamification is defined as "the use of game design elements in non-game contexts" (Deterding et al., 2011, p.2). Rather than enhancing play and playfulness, gamification is rule-based. Gamification has been observed to increase motivation through challenge, curiosity and fantasy (Malone, 1981).

Different game design elements are used to increase motivation. The most common design elements discussed in gamification literature are to include visibly the status of the gameplay and encourage social engagement among the players (Dicheva et al., 2015), for example points, badges, and leaderboard (Subhash & Curney, 2014). Other common elements found are autonomy and competence (Przybylski et al., 2010), levels/ stages, prizes, progress bars, storyline, feedback (Nah et al., 2014), avatars (Lee & Hammer, 2011), countdown clock (Kapp, 2012), and virtual goods/ currency (Zichermann & Cunningham, 2011).

Gamification can also be applied to non-digital games (Deterding et al., 2011, p.2). In this study, we suggest five design elements that can be transferred to physical EER- a storyline, progressing levels of difficulty throughout the game, countdown clock and feedback. First, the storyline provides the context of the game (O'Donovan et al., 2013) and can be used to increase the interest of the students (Nah et al., 2014). Second, studies show that progressing levels of difficulty allows learning (e.g., Ericsson, 2008). Third, entrepreneurial decision-making is often time bound. Therefore, it is required to introduce time constraints by using a countdown clock. Fourth, hint managing is an essential factor for success (Lopez-Peras et al., 2019). Finally, also immediate feedback is also helpful to engage students (Nah et al., 2014). We suggest:

> *Design element 6: educational escape rooms should include the game design elements of storyline, increasing difficulty, hint managing, countdown clock, and immediate feedback.*

4 Conclusion

In this study, we developed six design elements to create EER from theories experiential learning, entrepreneurship competencies, and gamification. This pedagogy positively influences student motivation and shows promise for experiential EE. The design elements incorporate both competencies required to solve the games by the students and elements to enhance the gaming experience and student motivation.

In creating EER, the following remarks should be taken into consideration. First, the design elements should be used with caution since we limited the design

elements to only applied institutions of higher learning. The application of the design elements beyond these institutions require further research. Second, we limited the design elements to the skills required to play the games and game elements that influence gameplay. We did not take into consideration the competences required to develop EER by educational professionals, neither materials and competencies to implement EER.

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Chapter 4:

Logistics and Facility Management

Franz Vallée, Colin Schulz, Ann-Christin Rüdebusch, Sophia Volbert

Mastering Omnichannel Challenges in Logistics: A Step-by-Step Guide for Customer-Centric Firms

Franz Vallée, Colin Schulz, Ann-Christin Rüdebusch, Sophia Volbert

Customer demands are increasing in the age of digitalization. To enable seamless customer experience, retailers need to orchestrate all available online and offline channels. As they pursue an omnichannel strategy, retailers are increasingly relying on developing logistics capabilities to meet customer demands in a flexible manner. The authors develop an omnichannel pyramid; an action plan that systematically guides firms through the logistical requirements when transitioning from multi-channel to omnichannel retailing.

Keywords: Omnichannel, Logistics, Customer-Centricity

1   Introduction

Ten years ago, it was common for customers to use one channel when buying a product – it was a case of either brick-and-mortar or online. Today, more than 70% of all customers make use of multiple channels during the buying process (Sopadjieva et al., 2017). Customers expect, as a matter of course, to be able to shop and inform themselves at any place and any time. They expect a seamless customer experience across all channels and contact points – from the first impulse through purchase, fulfillment, and return to recommendation. Retailers need to meet individual preferences, irrespective of whether the products are purchased in-store, online, or via smartphone. A consistently high standard is required for all cross-channel services such as click and collect, in-store return or in-store order. Offers and services have to be personalized in accordance with individual preferences. Deliveries have to be flexible and on time, whether the customer chooses a delivery to his home, to a store, or into his car boot. Efficient omnichannel logistics are indispensable in order to meet customer needs in a personalized and flexible manner. Logistics can therefore be regarded as the backbone of successful omnichannel retailing (Jocevski et al., 2019; Vallée et al., 2018).

The role of logistics in omnichannel retailing has received increasing attention in the academic literature (e.g., Galipoglu et al., 2018, Hübner et al., 2016a; Ishfaq et al., 2016; Jocevski et al., 2019). Planning, optimizing and controlling external and internal material and the related information flows are crucial when executing

an omnichannel strategy. However, while research focuses on the revision of logistic structures, it remains too general (Galipoglu et al., 2018; Hübner et al., 2016a; Kembro et al., 2018). It provides no practical answers with regard to current operational challenges, such as the role of stores in the delivery process (Galipoglu et al., 2018), or data harmonization and analysis across channels (Lim et al., 2018).

Managerial practice further illustrates the importance of these logistics capabilities. For example, the US grocery store chain Stop & Shop makes use of self-driving grocery stores from the start-up Robomart to fulfil customer orders anywhere and in the shortest possible time. Finding the best way to restock the robots remains a challenge for the retailer. However, it is crucial when offering its customers a seamless customer experience; the customer can use an app to purchase groceries from a self-driving robot nearby. Information about available products and delivery time is always provided in real time and no checkout is needed when customers receive their order.

Building on the above discussion and examples, the authors develop a systematic approach to guide retailers through the omnichannel transition and fill the gap in contemporary research by providing a process for the development of logistics capabilities.

The remainder of this paper is structured as follows. The next chapter reviews relevant omnichannel literature, while the need for omnichannel logistics in practice is highlighted in Chapter 3. Chapter 4 constitutes the centerpiece of the article, namely a step-by-step guide for developing an omnichannel logistics concept. The final part presents an overview of future challenges in the omnichannel environment.

2 Omnichannel Logistics in Theory

Non-friction omnichannel services, seamless customer experiences or cross-channel integration are some of the keywords used to describe omnichannel in the literature (Böckenholt et al., 2018; Brock & Bieberstein, 2015; Gizycki & Elias, 2018). Before discussing omnichannel and its current state in literature, the differences between single-, multi-, cross- and omnichannel are briefly described, as these terms are often used simultaneously in the media and in practice.

2.1 From single-channel to omnichannel

Single-Channel: Single-channel trade refers to the sale of goods and services via a single channel. Traditionally, stationary stores are referred to as single-channel retailers (Piotrowicz & Cuthbertson, 2019). Nevertheless, exclusively

online players such as Zalando and Amazon started as single-channel merchants before they started to open stationary stores (Heinemann et al., 2013).

Multi-Channel: Multi-channel sales are a further development of the single-channel business model and refer to expansion to at least two sales channels. One of the first multi-channel sales approaches was sales via a stationary retailer and the simultaneous distribution of a mail-order catalogues. However, it was not until e-commerce began in the 2000s that multi-channel sales experienced a real upturn (Schröder, 2005). Through the evolution of the internet, merchants are able to sell both online and via stationary retail at the same time. The different channels are not integrated in multi-channel retailing. This means that customers cannot switch smoothly between the individual channels during the purchasing process (Böckenholt et al., 2018).

Cross-Channel: By contrast, in the cross-channel approach, channels are already integrated to such an extent that customers can switch between them, i.e. they can order a product on the internet and pick it up from a stationary shop (click & collect), or order a product in a shop and have it delivered to their home (in-store order) (Tripp, 2019). Although the cross-channel approach, in contrast to multi-channel, contains an initial link between the channels, its internal processes are not fully integrated (Böckenholt et al., 2018). This is particularly evident from the fact that the communication channels are not yet integrated with the sales channels.

Omnichannel: In contemporary literature, omnichannel management is described as the interconnectedness and integration of all sales channels and customer contact points used by the company (Böckenholt et al., 2018; Brock & Bieberstein, 2015; Piotrowicz & Cuthbertson, 2019; Tripp, 2019). Therefore, the company systematically uses, interconnects, and integrates all communication and sales channels. Moreover, the customer is the center of an omnichannel strategy (Böckelholt et al., 2018; Verhoef et al., 2015; Tripp, 2019; Vallée et al., 2018). Customers can no longer differentiate between different channels when they experience a seamless shopping experience.

2.2 The relevance of omnichannel logistics

Over the past five years, the topic of omnichannel has gained enormous importance in research. The number of published journal articles on this topic illustrates its increasing relevance; there has been a tenfold increase in the number of such publications since 2014, and the numbers are expected to rise even further in the future as companies start to implement omnichannel strategies.

One major research topic in the field of omnichannel is logistics. Omnichannel logistics can be understood as all logistics activities that aim to provide the customer with a seamless shopping experience across all sales and communication channels (Vallée et al., 2018). Despite the growing interest, Galipoglu et al. (2018) conclude that, many key topics such as the development of retail distribution networks, assortment planning across several channels, the logistical role of stores in the delivery process, and the interaction of different logistical aspects are underrepresented. However, the relevance of omnichannel logistics is made clear by the fact that various authors regard the reorientation of logistics and warehouse structures and the revision of logistics concepts as necessary (Hübner et al., 2016b; Hübner et al., 2016c; Ishfaq et al., 2016).

Lim et al. (2018) conclude that there are four research gaps in retail logistics:

- operational challenges in carrying out logistics on the last mile,

- overlap of last-mile and sharing economy models,

- data harmonization and analysis, and

- the transition from prescriptive to predictive distribution design on the last mile.

Since the last mile is analyzed in detail in the literature, this field has particular relevance for researchers (Lim et al., 2016). Lim and Srai (2018) emphasize that the current understanding of supply networks in relation to omnichannel on the last mile is insufficient; especially since the last mile – as the most expensive building block of the supply network – requires a system and a planning framework to be developed in order to evaluate and optimize the supply networks during this stage (Hübner et al., 2016a; Lim et al., 2018). In addition to the last mile, delivery networks must also integrate reverse logistics. This is becoming increasingly complex in a scenario where customers can shop via different channels and have different take-back options (Ang & Tan, 2018). It is also pointed out that all subsystems of the supply chain (storage, picking, internal transport, last mile) play an important role in omnichannel retail and must therefore be considered together, unlike in the past. It is also noted that logistics networks today are no longer calculated purely based on logistical parameters, but must also consider product, customer, and market characteristics (Wollenburg et al., 2018).

Another topic that is frequently discussed within retail logistics is the role of logistics service providers through the development of online retailing. As logistics providers are often the first physical point of contact for customers, retailers are considering insourcing their logistics activities again. Therefore, logistics service providers that have so far been virtually invisible to customers have to develop further, especially in the areas of business partnerships, customer service,

acquisition, and expansion, in order to survive in the market (Rai et al., 2018). Otherwise, retailers that are currently more likely to outsource their logistics may rethink their decision with an increasing omnichannel orientation (Rai et al., 2019).

Although some authors point out that omnichannel retailing can only work in a combination of logistics and software, there is scant literature on the subject. In their ideas for further research, Hübner et al. (2016a) point out that connections are seen in the interaction of IT systems and the speed of delivery possibilities and that further research should therefore investigate the possibilities of the interaction of enterprise resource planning (ERP) and customer relationship management (CRM) systems. Pietrowicz and Cuthbertson (2014) also address the combination of software and logistics by pointing out that the introduction of technology and redesign of the supply chain network must be assessed simultaneously when pursuing an omnichannel strategy. Similarly, Jocevski et al. (2019) point out that the three dimensions that must be met to successfully implement omnichannel in retail are (1) customer experience, (2) integrated data analysis, and (3) effective supply chain and logistics. The complexity is increased by the fact that different strategies must be applied for the different phases of the supply chain (Rai et al., 2019).

The literature review demonstrates that researchers agree on the impact omnichannel strategies have on logistics. Hence, they agree on the need for redesigning logistics processes to meet increasingly complex customer requirements. However, contemporary research lacks an understanding of the development process of omnichannel logistics capabilities. There is still no best practice as to what such a transformation would look like.

3 Omnichannel Logistics in Practice

As stated in the previous chapters, omnichannel is changing the traditional structures and processes within firms. In order to merge the channels completely, it is necessary to break traditional online and offline silos to enable customer-centered processes. Consequently, the coordination of channels is fully oriented towards the customer journey. However, what exactly does this mean for the existing logistics processes? Existing processes have to be reviewed, analyzed, and redesigned to meet a consistent and personalized distribution while being cost-effective and efficient. The process design must be based on customer demands and preferences (Miller, 2016, Vallée et al., 2018, SI-LOG, 2019).

When setting up customer-centric omnichannel logistics, companies have to consider four fields of change (Vallée et al, 2018).

Process Integration: A successful integration of all channels requires that the various systems should communicate. The minimum requirement is that customer, product, stock, and order data are centrally stored and provided in real time. To keep track of the changing environment, the system and IT architectures that are utilized have to be optimized continuously. The optimization and development should be oriented towards the customer journey.

Intralogistics: Fulfillment across channels emanating from the same distribution center increases the complexity of intralogistics processes. The reduction of batch sizes and the increase of returns are two of the main reasons for this. In order to return goods to the shelves as quickly as possible, intelligent conveyor technologies and IT systems must support the process to ensure high availability of goods. This is especially relevant in the fashion and consumer electronics industries. Wearables and robotics are used to increase efficiency of the intralogistics process.

Last Mile: Omnichannel retailers need to adapt delivery options, such as on-demand, same day, or time-slot, to keep up with online players. The key to achieving this is a combination of the store network, new city hubs, transparency in stocks, and last-mile innovations. Stores and city hubs can be used as customer-related warehouse locations. Parcels need to be delivered on demand via platforms using freely controlled transport capacities, including delivery robots and drones. In China, DHL, together with EHang, operates the first last-mile delivery drone in Guangzhou (Nicolai, 2019).

Smart Stores: Due to ongoing digitalization, traditional retail stores are becoming increasingly equipped with modern IT systems and technology to fulfill the customer requirements of omnichannel shoppers. One example is virtual shelf extension. Digital displays or tablets enable customers to order products if a certain size or color is not available in the store or is out of stock. Beacons are another valuable technology for retailers. They enable location-based services[6] such as offering special deals or information based on the customer's position in the store. The information obtained inside the store can be used for retargeting measures in online channels. All implemented technologies and systems focus on the personal shopping experience.

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6 Location-based services can be implemented by beacons and Wi-Fi technology. Beacons are small Bluetooth radio transmitters. If a customer has the retailer's app on its smartphone and the Bluetooth is on, the customer can be located, and push-notifications can be sent. The analysis of Wi-Fi data can even shed light on the visitor flow of new customers.

4 Action Plan from Multi-Channel to Omnichannel Logistics

Rising customer demands force retailers to be customer-centric and develop omnichannel solutions. The transition from multi-channel to omnichannel logistics is a complex and challenging journey – especially when no strategy that includes a structured approach exists. Many retailers are uncertain about how to start when they are currently active on one or several disconnected channels. Therefore, the authors have developed a procedure model known as the omnichannel pyramid (Figure).

First, retailers[7] need to identify the stage they are currently in. Any company, regardless of what stage it has reached, can then follow the systematic guide to master the omnichannel transformation process.
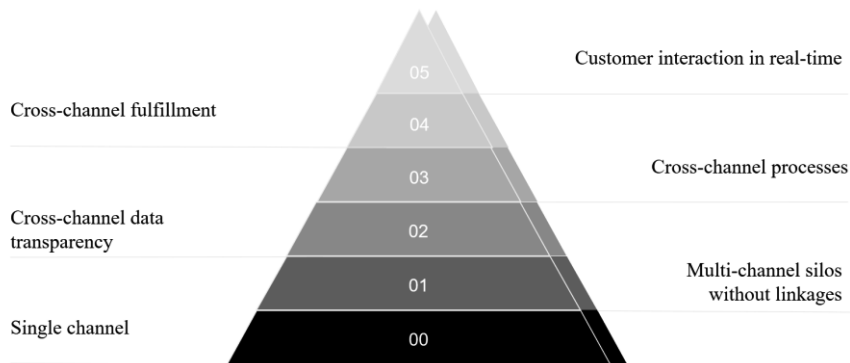
Figure 1: Omnichannel pyramid

4.1 Single Channel

For some companies, this can be the initial stage. As a single-channel retailer, a company focuses only on one distribution channel to reach its customers, e.g. online, stationary stores, catalog, etc. Due to constantly changing customer demands, companies turn away from this approach and add new distribution channels. When adding channels, the following steps will apply.

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[7] The focus of this paper is on retailers. However, the systematic approach of the omnichannel pyramid can also be applied to firms with another customer focus (e.g. business-to-business dealers) or firms from another distribution level (e.g. wholesalers).

4.2 Multi-channel silos without linkages

Many retailers are currently combining different distribution channels such as brick-and-mortar stores, fully owned web shops, and third-party platforms. However, they are usually not linked to each other, and the customer therefore cannot experience a seamless purchasing process; for example, sometimes the different channels offer different prices and product ranges, or reward systems cannot be used for every channel (Beck & Rygl, 2015).

When customer, price, and stock data are not shared between channels, operational synergies cannot be reached at this point. For example, replenishment activities for the stores and distribution of online orders to the end customers are carried out by different distribution centers.

4.3 Cross-channel data transparency

The first step for a company with multiple channels is to create cross-channel data transparency. Product details, prices, stock and order information should be shared in real time across all channels. Data transparency is an indispensable prerequisite for reaching all further stages.

This state is achieved when old, traditional systems such as ERP or warehouse management systems (WMSs), and IT systems that specialize in e-commerce (e.g. product information management systems (PIMs) or shop systems) are integrated.

A company has three strategic options on how to reach data transparency (Anduschus, 2018):

1. add required functions to existing systems,

2. implement a distributed order management system (DOM) that includes the required new functions and integrates with existing, traditional systems, or

3. outsource relevant process steps, including IT, to a third-party provider.

4.4 Cross-channel processes

The next step in the development process towards omnichannel retailing is to establish cross-channel processes that focus on the customer. The customers want to be able to switch back and forth between channels – for example, to search offline, buy online, and collect in-store. These processes should be developed and implemented systematically. Offering a seamless shopping experience requires a constant analysis of the customer journey.

Relevant processes from the customer point of view are (Paché et al., 2018):

1. Click and collect: order online and pick up in-store.

2. Stock traceability: view a store's stock online and vice versa.

3. In-store order: place an order in-store including delivery options, like home delivery or pick-up in-store.

4. In-store return: return online products in-store.

4.5   Cross-channel fulfillment

The penultimate step sets its focus on fulfillment. The aim is to implement a cross-channel, flexible and customer-oriented fulfillment. In order to reach this goal, it is necessary to restructure the traditional logistics structures that are divided into online and offline logistics. Four milestones need to be accomplished to enable anytime-anywhere deliveries (Strang, 2013):

1. Connection of all distribution centers, warehouses, city hubs, and stores.

2. Processes to pick, pack, and distribute the goods have to be implemented at all potential points of fulfillment: distribution center, warehouse, city hub, and store.

3. Selection and integration of new third-party providers for same-day delivery.

4. Implementation of new intelligent order management systems.

4.6   Customer interaction in real time

The final step for a company to successfully put its omnichannel strategy into practice is to personalize customer interaction across all sales and communication channels. This gives the retailer the opportunity to track customers (e.g. online or in-store) and provide them with personalized information throughout the purchasing process. Again, this is feasible only with seamless process integration. For example, the digital displays in stores cannot provide information, if they are not connected to the company's IT systems. Three steps have to be followed when building real-time customer interactions:

1. Track the customer journey online as well as offline.

2. Create automated contact paths so that action Y is triggered when a certain behavior X occurs.

3. Steer products anticipatively based on customer behavior and interactions.

Amazon is a pioneer in anticipatory shipping. The term "anticipatory shipping" is used to describe the delivery of goods to a specific area or address before the

customer has placed the order. Based on the customer's purchase and search history, Amazon is able to predict the goods that will presumably be ordered. To reduce delivery times, Amazon sends the predicted goods to a distribution center near the customer.

5 Outlook

In an age of digitalization and the associated change, firms need to ask themselves: What is next? Which trends, technologies, and concepts should be already considered today? This final chapter gives a brief overview of how customer behavior is likely to change in the future and how it will impact logistics.

In the future, omnichannel retailing will include new sales and communication channels. In particular, language assistants are of vital importance. With these virtual assistants, users can search for information or purchase consumer goods. Amazon's Alexa and Google Home are the voice interfaces in a number of digital applications and devices. Therefore, retailers have to develop applications for these devices to enable their customers to buy their products via these language assistants ("Alexa, I'd like to buy five basic white V-neck shirts from retailer xy"). Retailers, regardless of their size, need to provide these interfaces to compete with customer-centric companies such as Amazon. The prerequisites are that all channels are linked, and customer, stock, price and product data are available.

The market penetration of language assistants will lead to a further increase in the online business of dealers. An additional indicator is the emergence of mobile and social commerce. For Generation Y – i.e. those born between 1980 and 2000 – shopping via mobile devices has become standard practice. They are very technology-oriented and attach great importance to their external impact. Social commerce helps them to receive direct feedback from their peer group when shopping. Retailers should be aware that Generation Y will account for more than half of the workforce by 2020.

As a result, shares of the channels continue to shift. On the one hand, digital competence is becoming increasingly important. On the other hand, the set of logistics capabilities required for flexible and individual fulfillment is changing. There is no alternative to omnichannel, because the developments discussed above are permanent and the implementation speed will continue to increase: those who do not take action now will not be able to compete in the future.

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Measurement of the Added Value in Corporate Real Estate Management – Challenge, procedure and implementation

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Purpose: The purpose of this reasearch is to describe how the measurement of the Added Value of Corporate Real Estate Management can be transfered into operational practice. Measuring the impact of this function on core business is one of the key tasks for the future. In the past, CREM/FM was often understood as a pure cost collector and the actual work was reduced to cost minimization, but now the connection between core business activities and CREM/FM is the core of considerations. Based on the concept of the Tableau de Bord a tool is developed which is applicable to visualize the horizontal and vertical goal relationships in a company.

Keywords: Added Value, Strategy Operationalization, Value Creation, Performance Measurement

1 Introduction

The dynamic world forces companies to face divergent market challenges and to change old strategies into new ways of thinking and solutions. Corporate Real Estate Management (CREM) as well as Facility Management (FM) function need to face more and more the challenges of digitalization, the growing importance of sustainability and constantly changing working environments in the fight for the best employees. Finally, real estate needs to be seen as the fifth company resource whose strategic value is just emerging (Joroff, et al., 1993). Real estate decisions in companies are one of the most consequential, since capital is often tied up for the long term, decisions are difficult to reverse and numerous areas of the company are sometimes affected by a lack of opportunities for correction over time. Accordingly, properties must be regarded as "management objects" (Schulte und Schäfers, 2004) which are dealt with systematically and in a target-oriented manner. The fact that above all financial goals in the form of pure orientation along costs are often too prominently the focus of attention is also stated by NOURSE and ROULAC (Nourse and Roulac, 1993). Apart of an old fashioned understanding in which CREM/FM is more a degenerated function with an only cost orientated focus, the new understanding sees CREM/FM in a wider view as an intermediate, who's moderating between the requirements from the core business and the real estate market with providers on every life cycle stage. CREM/FM can prove

its entire efficiency if the functional subsystem itself is understood as a potential system within the company. Only if the direct benefit of a CREM/FM on the core business - in the understanding of the creation of an active value contribution - is recognizable, the potential of this function is correctly used.

It is therefore crucial to steer CREM/FM processes towards precise targets and to measure achieved goals and highlight Added Values to the complex product. Due to the different changes in the market and the impact on the involved parties CREM/FM needs to become a more strategic focal point in the future – as a management discipline that touches all the stakeholders and constitutes the interconnection in the value chain of real estates.

2　Measuring Added Value in CREM/FM

2.1　Challenges and a temporal genesis of the Added Value

To date, neither in the scientific nor in the practical context has been a clear definition of the "Added Value". According to de Vries et al., this may be due to the following factors:

1. inconsistent definition of the company result (organizational performance),

2. difficult quantification of property-related effects and impacts,

3. the impossibility of looking at the influence of real estate in isolation (de Vries et al., 2008).

From a conceptual perspective, the CREM/FM objectives are derived from the overarching corporate strategy (Pfnür, 2014; Lindholm, 2006; Miciunas, 2003), whereby the horizontal objectives of the other corporate functions (Lindholm, 2006) must also be processed within the target system. The CREM/FM itself must embed these targets in an appropriate medium and into long-term strategies which are suitable to support the changing goals and thus improve the competitiveness of the company (Pfnür, 2014). These property-related decisions and measures in turn lead to different monetary and non-monetary effects within the organisation. The fact that real estate can be attributed such far-reaching economic significance is primarily due to the study by Zeckhauser and Silverman (1983).

Deng and Gyourko show that there is a negative correlation between the company's return and the property ownership rate. The return from real estate is usually significantly lower than from the core business and therefore real estate is more likely to generate other forms of Added Value:

⇨ Increasing the efficiency and effectiveness of the core activities in the company (Deng and Gyourko, 1999),

⇨ Increasing the productivity of each department and decreasing the costs (Apgar IV, 1995),

⇨ Increase the shareholder value by linking the business strategy to the real estate strategy (Lindholm, 2008; Micinuas, 2003).

Due to the different types of use and the diversity of corporate objectives, Nourse and Roulac develop eight generic real estate strategies with different business objectives (Nourse and Roulac, 1993). Similar strategies and real estate-related measures can be found by Lindholm and Leväinen (2006).

Apart from further attempts to approach Added Value, it is above all Pittman and Parker that are investigating which instruments and procedures can be used to increase the Added Value in CREM/FM (Pittman and Parker, 1989).

Meanwhile there are different models for the description of an Added Value available in the literature (Jensen et al., 2013; Jensen, 2012; Lindholm and Leväinen, 2006), the benefits of a Facility Management (FM) department are widely described and they became increasingly important in recent years (Jensen, 2010, Jensen et al., 2013). The reason for this is that FM has so far been regarded only as a "Cost Collector", although the management discipline contributes significantly to core business' value creation and to the entrepreneurial competitive position by controlling secondary processes (Jensen et al., 2013). However, this contribution is not clear to many managing directors and companies. It is therefore important to highlight those benefits in quality and quantitative measures.

In this paper, the FM Value Map (Jensen, 2012) is considered as a starting point for the acknowledged research field of the Added Value. It is intended to help understand how FM can generate Added Value for the core business and the environment of the company. This instrument can also be used to identify elements that are particularly important for generating Added Value in a specific case.

One of the main problems is that it is unclear how to measure the benefits that come with professional and effective CREM/FM. The measurement of the benefits of a CREM/FM department has not yet been operationalized and stays mostly in a conceptual manner. Initially Added Value can be described as a "trade-off between benefits and sacrifices in connection to organisational objectives (added value)" (van der Vordt et al., 2016). For the measurement, this paper considers Added Value in a broader view of goal fulfillment that means it is about not only

meeting targets, but also over-fulfillment and outperformance of processes, business ideas or departments goals. The EU pointed out, that on "a general level, […] Added Value is the value resulting from an EU intervention which is additional to the value that would have been otherwise created by Member State action alone." (European Commission, 2011).

2.2 Research approach

In order to gain deeper insights of Added Value, the methodological approach based on a combination of qualitative and quantitative methods. This paper tries to sum up some results with a focus on the qualitative insights.

Table 1 shows the focus of the applied literature research. This leads to a total of 39 articles from scientific journals and conference papers, which represent the starting point of a qualitative content analysis (Mayring, 2015).

Table 1: Characteristics and focus of the literature review; colored background = study focus (Cooper, 1988)

	Attribute	Characteristic			
(1)	Focus	Results	Methods	Theories	Application
2)	Target/Aim	Integration		Criticise	Challenges
(3)	Organisation	Historic		Conceptual	methodical
(4)	Perspective	Neutral representation		Taking an position	
(5)	Target group	Professionals	Researcher	Practitioner	Public
(6)	Coverage	Complete	Completely selective	Representative	Central

Relevant text meanings are explicated as content analytical categories. The definition of categories always includes a name, an explication, an example and, if necessary, a delimitation if several categories overlap. In order to measure the Added Value of CREM/FM, key performance indicators (KPI) or KPI systems are generally necessary, as these have the characteristic of measuring facts. As a result, the categories of the category system are based on the requirements placed on a KPI system by literature (Reichmann et al., 2017; Küpper et al., 2013). The complete category system is shown in Table 2.

Table 2: category system

category name	characteristic [code]	explication	example
involvement of company goals	yes [1]	The central starting point of the measuring model are the general company objectives (of the core business)	"It is a management system that focuses the efforts of people, throughout the organisation, towards achieving strategic objectives and converts the organisation's vision and strategy into a comprehensive set of performance and action measures […]."
	no [2]	The general company objectives are not mentioned in the model	"The idea that measures should be derived from strategy is being replaced by the view that stakeholder needs are the fundamental perspective on performance (Neely and Adams, 2001)."
completeness	high [1]	All hierarchy levels and CREM functions are mapped; owner and user interests are included.	
	medium [2]	All CREM hierarchy levels and some CREM functions or all CREM functions and some CREM hierarchy levels are mapped, owner/user interests are only partially included.	"The model focuses on specific department goals that were derived directly from the corporate strategy as shown in figure 3. This means that every department has its own value creation target to contribute to the company's overall goal."
	low [3]	CREM hierarchy levels and CREM functions are only partially mapped, owner/user interests are partially or not at all included.	"The BSC is able to provide utility at all management levels if managers have an understanding of the mechanisms of the concept."
flexibility	high [1]	An adaptation of the model is completely possible, the method is designed for flexibility.	"It will include several standard measures such as customer satisfaction, though in each case these should be tailored to meet the organisational requirements."

	medium [2]	An adaptation of the model is partly possible	
	low [3]	An adjustment of the model is not possible at all	
target orientation	yes [1]	The model corresponds to a target system and target value specifications are integrated.	"link strategic objectives to targets and annual budgets"
	no [2]	The model contains no target values.	"Based on nine criteria, this model describes a cause-and-effect relationship between enablers and results of business processes within an organisation […]."
operationalizability	operationalizable [1]	The Added Value can be represented in quantified form	"To what level the output and outcome has been improved can be measured by calculating the difference between FM/CREM performance and organisational performance before and after the intervention(s)."
	not operationalizable [2]	The Added Value cannot be represented in quantified form.	"At this time the proposed model remains provisional; however, work is progressing to define measurement systems for each of the variables […]."
other	Other	text passage is not assigned to any category	

The configurations of the categories of 27 measuring models are analysed. The prioritized measuring model is the one with the best configuration of the categories and leads to the used model in the further research. Table 3 shows the assessment of the categories. The more the circles are filled, the more the category is fulfilled.

Table 3: Assessment of the categories

ID	author(s)	measuring models	involvement of company goals	completeness	flexibility	target orientation	operationality
F_1	Riratanaphong, C.; van der Voordt, T. J. M	Conceptual model of performance measurement and influencing factors	●	⊘	⊘	⊘	○
F_5	Sarshar, M.; Pitt, M.	Customer value-Modell	⊘	⊘	⊘	⊘	○
F_9	Jensen, P. A.	FM Value Map	⊘	◐	●	⊘	○
F_14_2	Meng, X.; Minogue, M.	BEM	⊘	⊘	◐	⊘	⊘
F_14_3	Meng, X.; Minogue, M.	Key Performance Indicators (KPI)	⊘	⊘	⊘	⊘	●
F_14_4	Meng, X.; Minogue, M.	CMM	⊘	⊘	◐	⊘	○
F_16_1	Featherstone, P.; Baldry, D.	Utilisation Comfort Index (UCI)	⊘	○	⊘	●	●
F_16_2	Featherstone, P.; Baldry, D.	Workspace Attendance Indices (WAI)	⊘	○	⊘	●	●
F_32	Green, Andrew N.; Jack, Andrew	value mapping solution	○	◐	●	●	●
F_82	Brown, Andrew W.; Pitt, M. R.	"cause and effect relationships" und "path analysis"	○	○	◐	⊘	○
F_86	Amaratunga, D.; Baldry, D.; Sarshar, M	Balanced Score Card (BSC)	●	◐	⊘	⊘	○
JCRE_2	Lindholm, A.-L.; Leväinen, K. I.	Framework for Identifying and Measuring Value Added by Corporate Real Estate	●	○	●	●	⊘
JCRE_3	van der Voordt, T. J. M.; Jensen, P. A.	Value-adding management (VAM) model	●	⊘	◐	●	⊘
JCRE_5_1	Lindholm, A.-L.; Nenonen, S.	Post Occupancy Evaluation (POE)	⊘	⊘	⊘	⊘	⊘
JCRE_5_2	Lindholm, A.-L.; Nenonen, S.	Building-in-Use (BIU)	⊘	⊘	⊘	⊘	⊘
JCRE_5_3	Lindholm, A.-L.; Nenonen, S.	Performance Map	●	⊘	●	●	●
JCRE_5_4	Lindholm, A.-L.; Nenonen, S.	MicroScanFM	⊘	◐	⊘	⊘	⊘
JCRE_5_5	Lindholm, A.-L.; Nenonen, S.	Apgar real estate score (ARES)	⊘	⊘	⊘	⊘	●
JCRE_16	Jordan, M.; McCarty, T.; Velo, B.	Scorecard	●	◐	◐	●	●
JCRE_25	McCarty, T. D.; Hunt, R.; Truhan, J. E.	Quarterly evaluation scorecard	⊘	⊘	⊘	●	⊘
JCRE_33	Scheffer, J. J.L.; Singer, B. P.; Van Meerwijk, M. C.C.	Model for measuring the alignment of corporate real estate with corporate strategy	●	⊘	◐	●	●
JCRE_50	Harris, R.	productive workplace-framework	●	⊘	⊘	⊘	●
JCRE_62	Stadlhofer, G.	CRE performance questionnaire	⊘	⊘	⊘	⊘	●
JCRE_76	de Vries, J. C.; de Jonge, H.; van der Voordt, T. J. M.	Conceptual framework to research effects of real estate interventions on organisational performance	●	⊘	⊘	⊘	○
JCRE_91	Osgood Jr., R. T.	Strategy Alignment Model	●	⊘	◐	⊘	⊘
PM_35	Pitt, M.; Tucker, M.	Benchmarking	●	⊘	⊘	⊘	○
EFMC16_1	van Sprang, H.; Ghuijs, J.; Groen, B. H.	Added Value Dashboard (Gerritse et al.)	⊘	○	◐	⊘	⊘

The target group of the examined material is mainly the specialised science and the business practice, since some contributions were created by practice-oriented case studies and thus contain concrete implications for practice. The scientific papers have different sources of development, which are mostly due to the change of the perspective in CREM or FM from a pure cost consideration to the generation of a value contribution for the core business of the company and the increased strategic importance of real estate in the operational context. Further reasons for

some papers are the general trend towards "performance measuring" and especially in CREM and FM an increasing need for the measurability of the Added Value generated for the core business. Most of the papers are research papers in scientific journals or conference proceedings from the years 1992 - 2019.

A descriptive analysis of the measurement models by the categories shows that the Balanced Scorecard (F_86) is in first place (see Table 3). The central starting point are the company's objectives. As a result, the key figures are derived stringently from these objectives or from the corresponding corporate strategy. In addition, target values are given to measure success, so that the model is highly operationalizable and target-oriented. The flexibility is given by the fact that the key performance indicators are not prescribed and are adaptable in principle to most different use cases. Further perspectives can also be added to the BSC. With regard to completeness, no text passage could be identified in which the criterion is completely fulfilled.

3   Conceptualization of an Added Value measuring tool for CREM/FM

In general, the Added Value is a complex hypothetic construct (Homburg and Giering, 1996) which cannot be observed directly. In this context, the conceptualization will include the development of constructional dimensions and the development of a measurement instrument as a model operationalization (Homburg and Giering, 1996). From this perspective, the Added Value at the strategic level can be multi-sighted and multi-dimensional; Lindholm and Leväinen (Lindholm and Leväinen, 2006) for example offer an initial starting point at the real estate strategy level.

Based on the aforementioned descriptive analysis of the essential models named in CREM/FM related literature, the Balanced Scorecard (BSC) (Kaplan and Norton, 1992, Kaplan and Norton, 2001) can be seen as the most suitable model to work with regarding the Added Value measuring. Bourguignon, Malleret and Norreklit analysed the BSC in a more detailed view and compared it with the Tableau de Bord. Both instruments are very similar. However, there are some differences between those two that leads to the Tableau de Bord to a more suitable instrument for the achieved goal of this paper: "The tableau de bord does not explicitly rely on any specific strategic model and areas of measurements but on managers' conception of strategy; this means that the manager's subjectivity and the environment may play a major part in the design of the area of measurements in the tableau de bord, whereas the balanced scorecard is more a tool with predetermined categories" (Bourguignona et al., 2004). It combines the strategic perspective with the operative implementation and is also able to map a hierarchical

structure. One topic on an operational level was to develop a tool, which is able to combine the strategic corporate level with the operational level and which is suitable for differentiating the degree of goal attainment in a cross-functional (horizontal between functions at the same corporate level) and hierarchical perspective (vertical within one function). Therefore, the Tableau de Bord is a very practical and valuable instrument, because it gives the user a quick insight into actions and their status at different level (Bourguignona et al., 2004).

With consideration of the multidimensionality, the model was conceptualized through the following level:

Table 1 Hierarchy model level (Bernhold et al., 2019)

Level	Main topics and description
Corporate Level	Description and derivation of the overarching corporate objectives (e.g. customer satisfaction) [possibility to use the target elements, e.g. of (Lindholm and Leväinen, 2006; (Jensen and van der Voordt, 2016)]
Functional Level	Description of the share of each corporate function (e.g. CREM/FM or Logistics) in this goal; in total the result over all corporate functions must be 100%
CREM-FM-Level	Description of the share of each CREM/FM department (e.g. Asset Management or Building and management) in this goal; in total the result over all CREM/FM-functions must be 100%
Task Level (Indicators)	Definition of the KPIs used to determine whether the objectives have been met

The framework assumes a cascaded development in a top-down manner and begins therefore with the corporate level. From this point, the KPIs at the task level are only an operationalized reflection from the company strategy on the top level and furthermore, the KPI is more like a surrogate, which combines the observable real world with the conceptual Added Value model.

4   Operationalization of an Added Value measuring tool for CREM/FM

On a general level, Added Value can be seen as any overfulfillment of the objective set by the company (i.e. the overfulfillment of objectives which should

have been achieved even without special measures). It is assumed that the Added Value of the CREM/FM would be generated by the involvement of different company functions. The Added Value is thus to be regarded as a key indicator of target achievement (or overachievement) and thus a cross-functional result.

Table 2 Measuring of goal achievement with Track Record (example)

No.	Indicator	Unit	Target value	Ac-tual value	Track Record (goal)	rela-tive weigh-ting	Weighting within the de-partment	Track Record (weighted)	Rating
1	Return	%	3	4	1,333	8	25,00%	0,333	Out-per-former
2	Amount of rent	EUR / sqm	6	6	1,000	4	12,50%	0,125	goal achie-ved
3	Ancillary costs	%	2	2,3	1,150	8	25,00%	0,288	Out-per-former
4	Influencea-bility of ancillary costs	%	50	49	0,980	2	6,25%	0,061	Under-per-former
5	Reliability of budget planning	%	95	100	1,053	5	15,63%	0,164	Out-per-former
6	Real Estate value	EUR	100.000	90.000	0,900	5	15,63%	0,141	Under-per-former
In to-tal	/		/	/	/	/	**100,00%**	**1,112**	/

One of the main tasks is the operationalization of the model and its practical application. The indicators at the Task Level (see table 4) act as Key Performance Indicators (KPI). Each KPI is weighted regarding their meaning from 1 to 10 (1 = very low importance; 10 = very high importance) and the weighting is carried out in accordance to the Analytic Hierarchy Process (Saaty, 1986). Every KPI has a

target and an actual level. Table 5 gives an overview over the calculation process as an example of the Asset Management Department.

It should be noted here that KPI´s are not to be viewed singularly, but rather in a close and complex network of relationships with respective interactions. Therefore, we include the Track Record principle to assort the indicators by paying in on destined targets. The Track Record can be seen as a success indicator and will be calculated for every CREM/FM-department and every function itself; its characteristic expressions can be described as follows.

Table 3 General characteristic of the Track Record (Bernhold et al., 2019)

Value of Track Record	Degree of success
TR > 1	The set targets are exceeded (Outperformer)
TR = 1	The set targets are achieved
TR < 1	The set targets are not achieved (Underperformer)

From a mathematical perspective, the TR can be described as follows

$$TR_{jk} = B_k \times \frac{\alpha_j}{\sum_{i=1}^{n} \alpha_i} \times \frac{Output_j}{Input_j}$$

Equation 1 Measuring the Added Value (Bernhold et al., 2019)

with:

$Output_j$ = actual value of a KPI_j

$Input_j$ = target value of a KPI_j

α_j = relative weighting of a KPI_j (in accordance to the other weightings)

B_k = endogenous influence factor of department k

n = Total number of KPIs considered

TR_{jk} = weighted Track Record for KPI j of department k

Using the model, it should be possible to measure how much one factor affects the other and what impact this has on the return - for example -, how customer satisfaction contributes to the level of return through other factors. The weighted values within the model should make it possible to measure the actual given share that CREM/FM contributes to the return.

The model focuses on specific department goals that were derived directly from the corporate strategy. This means that every department has its own value creation target to contribute to the company's overall goal. The company may adjust targets related to the KPIs dynamically. Resulting from the combination of input, output and weighted assessment factors of the KPIs, the Track Record for each department and the associated targets is calculated. The sum of the Track Records of all CREM/FM related departments results as an entire Track Record of the overall CREM/FM efforts.

The results of the calculation are displayed in the model based on three categories. If the Track Record calculation for a target results in a value smaller than 1, the target for the corresponding indicator has not been reached and the department is classified as "underperformer". If the Track Record result is exactly 1, the respective target was reached on point; the result is classified as "goal achieved". Whilst, Track Record values higher than 1, are highlighted as "outperformer" (see table 6).

Of course, categories for Track Record values may be modified for different business cases easily. As the Track Record model for Added Value is a comprehensive model for the use in different departments and various business units it supports a management display using the simplification of a KPI dashboard.

5   Conclusion

Regarding this, the preliminary literature analysis showed clearly that there is no common understanding of Added Value in CREM nor in FM, although a widely accepted definition is the essential basis for any comparable and reliable measurement. This goes along with the necessity of visible company goals to departments and adding value stakeholders. The real estate strategy has to be clearly specified and operationalized to all departments in a top-down manner. This can be ensured easily by connecting CREM and FM figures with KPIs from core business activities. But simply the connection of KPIs is not sufficient enough: communication needs to be operated additionally, which means that the top management needs to be involved within the development of the real estate strategy and the identification of influencing performance factors between function departments. For a broader acceptance of using the Track Record model to identify the Added Value

of all participants, it is also useful to make success visible to employees, managers and further stakeholders by using visual presentation forms like the dashboard and data driven calculations. The presented model is therefore both: an assessment tool for the measurement of Added Value, but also a communication instrument for all participants in adding value to core business.

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Service Level Agreements: Critical Success Factor for Controlling Logistics Services

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Cooperation with a logistics service provider has the potential for conflict that should not be underestimated. Service Level Agreements (SLA) help to clarify mutual expectations in advance and to strengthen the partnership with logistics service providers to avoid disputes between the cooperation partners. A SLA is a written performance agreement between the client and the contractor. The aim of this study is to determine practice-relevant success factors and to derive a guideline for creating SLAs. On the basis of a broad literature analysis and an empirical study with 40 companies, success factors were identified and a procedure model for the creation of SLAs was derived. The model was successfully validated at a company in the chemical industry. Specialisation in individual industries offers potential for future research.

Keywords: Service level agreements, SLA, logistics services, controlling, cooperation, supply chain

1   Introduction

Cooperation with a logistics service provider involves a potential for conflict that should not be underestimated – in the worst-case scenario, the partnership fails. To avoid problems and disputes on performance levels between the cooperation partners, service level agreements (SLAs) can help to clarify mutual expectations in advance. An SLA is a written performance agreement between the client and the contractor that is valid for a fixed period of time. It defines the services to be rendered and the obligations for both parties and records the consequences of compliance and non-compliance with the contract. The services are defined by service levels, which are quantified with the help of key figures and thus made measurable (Minner, 2007; Gadatsch & Mayer, 2014; Verma, 1999).

Companies often decide to use SLAs in the course of an outsourcing project. This is associated with the desire to secure a written agreement and to record all expectations from the outset. The outsourcing of logistics services is now being considered by many companies, which is why SLAs will likely gain in importance in the future (Schneider, 2004; Weber, 2002). Even though SLAs are becoming increasingly important in practice, there are still gaps in science and research.

This is demonstrated on the one hand by the fact that SLAs are predominantly only used in IT. In addition, there is a lack of a structured approach for the creation of SLAs.

The existing literature is mainly based on the practical experience of individual authors on the basis of one or fewer case studies, each of which only applies to a specific area of application. In order to increase the likelihood of success of SLAs, the following research question has to be answered: How can we determine practice-relevant success factors and derive a guideline for practitioners for creating SLAs? To investigate this topic, it is necessary to link research and practice. Theoretical assumptions must be tested for their suitability in everyday business life to gain application-oriented insights.

2 Modern instrument for efficient collaboration

Well-functioning communication is essential for a strong partnership. SLAs can make a decisive contribution. Negotiations on performance agreements create a dialogue between service provider and client in which responsibilities, needs, and demands are clarified. In the course of the negotiations, contents become more transparent and the potential for conflict can be reduced in advance. Without the exact definitions and consequences of the services and performance, there are no objective indicators for the achievement of objectives. Due to a lack of facts, arbitration is difficult in the event of a dispute. SLAs also help to ensure customer satisfaction because the service provider can react specifically to the requirements through clearly defined services (Minner, 2007). In addition, transparency in terms of cost structure is achieved. The definition of the expected services forms a solid basis for the creation of a price model, since it can be clearly defined which costs are incurred for which services (Seidel, 2006). Furthermore, processes can be made more efficient by clarifying responsibilities (Berger, 2004). Through the clear distribution of responsibilities, unnecessary waiting times prior to the elimination of a problem can be avoided.

3 Preventing conflicts of interest

The principal-agent theory is suitable for depicting the relationship between client and service provider. It examines the relationship between the principal (client) and the agent (contractor) and the conflicts of interest and objectives that arise (Schäfer, 2013). Both parties strive to maximize their own benefits and thus do not always act in the interest of the cooperation partner (Jensen & Meckling 1976). There is an asymmetry of information in favour of the client, which he can use to

his own advantage. SLAs can also help to limit opportunistic behaviour of the contractor.

Performance can be measured by key figures and can therefore also be sued in the event of conflict. The client can also take pre-defined, demanding service levels as an indication of the performance of the contractor. If the service provider agrees to these performance levels, this can be interpreted as a sign of their performance capability. In addition, SLAs can contribute to the transparency and comparability of offers submitted in response to calls for tenders. A tender is a written or formal offer to supply goods or provide a service for an agreed price. This facilitates the selection of a suitable service provider (Minner, 2007). The prerequisite for this, however, is that the SLAs are already available at the time of the tender or service provider search, and thus form the basis for the price offers. It is therefore worthwhile for the client to invest time in the drafting of SLAs even before the invitation to tender is issued (Hiles, 1994).

To prevent information asymmetries, it makes sense to have a well thought-out contract design right at the beginning of the tender, which controls the achievement of the set goals. Incentive systems can be used to prevent the contractor from using his information advantage to the disadvantage of the client. With the organization of the incentive system, the client stands before the goal conflict that on the one hand the principal must stimulate the highest possible performance of the contractor, and on the other hand the bonuses which can be adjusted are to be kept as small as possible (Roiger, 2007). Incentive systems are widely used in logistics and can be designed in various ways. On the one hand, incentives for high performance can be created with the help of a bonus-malus system. The inclusion of a bonus is particularly useful if the increase in performance brings special added value for the client. It is also possible to agree to have only penalties (penalties) without bonuses, which can also have a motivating effect on the service provider. The level of the penalties should be based on the principle that they have a deterrent effect on the service provider without threatening his existence. For the client, the amount should be sufficient to compensate for any damage incurred (Gerking, o.J). To prevent opportunistic behaviour on the part of the contractor, the sole monitoring of the services, as achieved by SLAs, is an effective measure. Through measurable results, the client can evaluate the performance of the service provider. Poor performance has a negative effect on the relationship and should therefore be avoided by the service provider.

The literature on SLAs primarily pertains to the responsibilities and duties of the service provider. For the service provider to be able to perform his duties sat-

isfactorily, the client is also required to do likewise. For example, poorly maintained master data within the merchandise management or warehouse management system can become an issue. A further example is the order transmission.

If the orders are transmitted or changed regularly after a prearranged time, this is disadvantageous for the service provider, which can affect also the level of performance.

These examples demonstrate that the awarding company must also participate so that agreed services can actually be implemented by the contractor. For this reason, responsibilities should be included in the design of the SLAs, especially in the interest of the service provider. The client should be aware that he contributes significantly to the success of the performance. Both sides have decided to cooperate to pursue their own goals. However, these goals can only be achieved together with the partner. Trust is an important factor without which a partnership cannot exist successfully. Both sides should be aware of this when drawing up the contract (Jung, 2007).

4 Elements of an SLA

No general statement can be made regarding the components of SLAs. The service agreements in the form of SLAs are as individual as the fields of application and contractual objects. Nevertheless, recommendations for the elements of an SLA in logistics could be derived from literature analyses and an empirical study (Minner, 2007; Berger, 2004; Schmidt, 2008). These are seen in Figure 1.
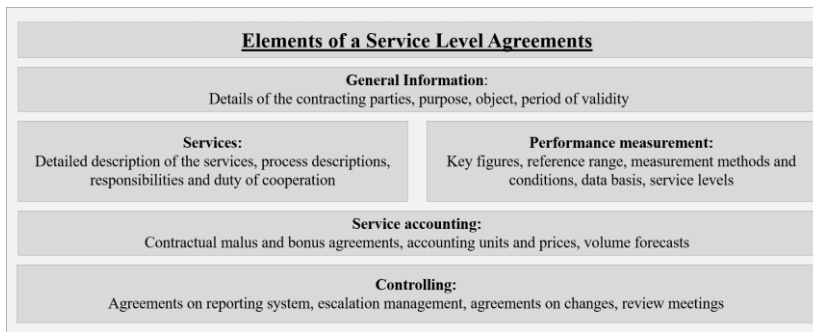

Elements of a Service Level Agreements
General Information: Details of the contracting parties, purpose, object, period of validity

Services: Detailed description of the services, process descriptions, responsibilities and duty of cooperation	**Performance measurement:** Key figures, reference range, measurement methods and conditions, data basis, service levels

Service accounting: Contractual malus and bonus agreements, accounting units and prices, volume forecasts
Controlling: Agreements on reporting system, escalation management, agreements on changes, review meetings

Figure 1: Elements of an SLA

Some elements of an SLA deserve special mention. Thus, it is essential to pay attention to details when describing the services to be expected to prevent conflicts through different interpretations. Detailed process descriptions and diagrams are helpful here. In this part of the SLA, the areas for which the service provider is responsible and what the client must do should be precisely defined and delimited.

To avoid misinterpretations, a form of expression should be chosen that is understood by all participants without room for interpretation.

When measuring performance, measurement methods and the database used must be defined precisely to ensure a common understanding of the calculation (Pulverich, 2007). It is essential to define the reference range and period, as it makes a difference, for example, whether a picking error rate is calculated for a day or for a week. The period should not be too long, otherwise variations in performance will be compensated.

The service levels (i.e. the agreement as to which performance levels are expected in this reference area) are also an elementary component (Minner, 2007). When defining the target values, both the capacity for fulfilment and cost-effectiveness play a role. If service levels are expected whose fulfilment is unrealistic, the potential for conflict increases. With regard to economic efficiency, it is recommended in the literature to use methods such as utility value analyses and economic efficiency calculations to assess and compare different service levels. In practice, however, service levels are usually determined subjectively and on the basis of experience (Berger, 2004).

With regard to the measurement, it must be agreed which data is to be used, who is responsible for the measurement, and how often the key figure is to be determined (Schietinger, 2007). In addition, the monetary consequences of falling short of the agreed performance should be clarified, or whether over-fulfilment of the service level is rewarded with bonus payments. It is therefore necessary to regulate at what value an over- or undersigning occurs and what payment obligations this entails. A bonus or malus does not have to be agreed for each code number. To adjust the compensation payments as closely as possible to the expected performance, service level agreements can be combined with a price model. The higher the expected service level, the higher the price for the service provided (Pulverich, 2007). Under certain circumstances, this can also include quantity structures that assist the service provider in its planning. Thus, it makes sense to include SLAs already in the tender for the service, since the service provider can then prepare corresponding bids based on the required SLAs.

Finally, controlling elements are required to analyse and interpret the results of the key figure measurement. The service level report is used to compare the agreed services with the achieved services, and then to initiate measures if necessary. In general, the reports should be kept "lean". In the SLAs, it must be agreed exactly who will create the reports at what time and at what intervals, how they will be designed and what they must contain. In addition, it must be clarified when the

reports are to be distributed to whom. Another element is escalation management. This must define the measures to be taken in the event of problematic situations.

Regulations must also be made stipulating under which circumstances the SLAs can be adapted and changed. Regular review meetings are an option for discussing performance deviations and proposed changes (Schietinger, 2007).

5   Using SLAs

The use of SLAs in a service relationship involves several phases. A division into design, implementation, and controlling phases is suitable for the presentation (Pulverich, 2007). The process of using SLAs can be depicted as a life cycle. Service level management refers to the monitoring and optimisation of SLAs and thus the use of the SLA instrument (Ellis & Kauferstein, 2004; Scholderer, 2011; Minner, 2007). This is a continuous process in which service quality is ensured by monitoring and adjusting the SLAs. This makes it possible to use SLAs as a total quality management (TQM) tool. The prerequisite for this is that not only sanctions are imposed in the event of a drop in performance, but also measures are taken to prevent underperformance (Parish, 1997). Companies that have a large number of SLAs in use IT-supported SLA management systems (Dunker, 2007).

The cycle can be represented in three main phases, which in turn contain subprocesses. Thus, in the design phase, the SLAs are first designed. In the implementation phase, negotiations are conducted and the SLAs are implemented. In the case of outsourcing, the two projects of outsourcing and Service Level Agreements can no longer be separated from each other. If the SLAs are implemented, the outsourcing project also starts and vice versa (Pulverich, 2007). Finally, a reporting system is established in the controlling phase and regular adjustment is ensured.

6   Empirical study on the design of service level agreements in practice

SLAs in cooperation with logistics service providers have so far not been sufficiently researched in scientific studies. The literature is mainly based on the practical experience of cars and company-specific case studies. To determine success factors for SLAs with logistics service providers and to derive an ideal process model, an online survey was conducted in a research project at Münster University of Applied Sciences. 103 potential participants were personally contacted and >2,000 potential participants were reached via forums and closed groups in professional networks. After cleaning up the data set, 40 questionnaires of the participants on the client side could be used for an evaluation. The representativeness of

the survey is correspondingly limited. The evaluation of the structural features initially revealed participation from many different sectors.

From this it can be concluded that SLAs are a cross-industry phenomenon. With regard to company size, only a small number of participants (13%) from small companies with up to 100 employees were recorded. This demonstrates that SLAs are more common in larger companies where logistics tend to be handled with the help of a service provider. 20% of the participants even work in companies with more than 10,000 employees.

In which areas does your company use SLA with a logistics service provider?

Value Added Services 22%

Transport and distribution 32%

Procurement 12%

Warehouse 34%

Figure 2: Application areas of an SLA

In the following section, the answers of the participants are presented who either use SLAs in their company in cooperation with a logistics service provider (85%) or have other experiences with this topic (15%). Regarding the frequency of the use of SLAs when working with a logistics service provider, 25% of the participants stated that they always use SLAs, and 40% of the participants stated that they use them frequently. The frequent use of SLAs suggests that they are considered sensible and that their use in these companies is already the rule. Multiple selection was possible for the areas in which SLAs are used. More than half (63%) mentioned at least two areas, which indicates that the use in connection with logistics services has proved successful. SLAs are most frequently used in warehousing (73%), followed by transport and distribution (68%). 48% state they use SLAs in value added services and 25% in procurement. When asked how long the participants have already used SLAs, 30% answered with one to five years (30%), slightly fewer participants with five to ten years (28%), and a quarter even for more than ten years. This demonstrates that SLAs are not a new phenomenon

and that some of the companies surveyed have been providing logistics services for a long time. The often time-consuming experience with SLAs also suggests practical answers in the other areas. With regard to the principles for the design of SLAs, quite clear tendencies can be observed. For example, 71% state that they consider extensive descriptions of the services to be useful. 71% also consider it right to design and manage the SLAs together with the service provider. It is significant to see to what extent the participants consider the given components of SLAs to be important.

The definitions of the individual services are at the forefront and are rated as indispensable by 86% of respondents. In addition, the mean value of key figures, responsibilities on the part of clients and clients, measurement procedures for calculating key figures, information on performance accounting, escalation rules, and the level of service levels are regarded as indispensable. All other components (regulations on reporting, regulations on changing SLAs, regulations on regular review meetings, malus and bonus regulations) were regarded as important on average. It is noticeable that bonus and malus schemes are considered least relevant, with malus schemes being considered slightly more important. This is not surprising, as the client side was questioned about the costs of the bonus schemes.

The use of bonus and malus payments was further investigated in two other questions. These questions revealed that just over half of the participants used both bonus and malus payments (52%). More than a quarter of respondents do not use either a bonus or a malus system (27%). What is surprising is that only one bonus system was chosen as the answer, albeit by just under six percent. Overall, it can be stated that the joint use of bonus and malus is the most widespread. With regard to the frequency of payments, it can be seen that the service provider of frequent penalties is invoiced as bonuses. 60% of the participants are of the opinion that a bonus system results in an increase in performance. Whether this actually has a motivational effect on the service provider can ultimately only be assessed by the service provider himself.

The survey results confirm that controlling of SLAs for monitoring and evaluation is widespread (86%). With regard to reports, 51% stated that they use standardised reports. Somewhat less than half (43%) of the participants also stated that they define clear rules regarding the implementation of service level reporting. 63% meet regularly with service providers to discuss services. The results reveal that service level reporting is highly important and is handled professionally. The existence of standardized reports and clear rules for their implementation suggest that the monitoring of services requires a structured approach. With regard to the

frequency with which service level reports are produced, the monthly report is the most widespread.

In addition, the experts were asked what type of preparation of the reports they consider to be useful in practice. It was found that a meaningful mix of graphs and figures was considered appropriate. A mixture of service provider and client, in which both parties bear their responsibilities, is also preferred when it comes to responsibility for preparing the reports. There is a great deal of agreement on the fact that the same report format is used for all addressees.

Although it may be useful to choose a more or less detailed form of reporting depending on the recipient, in practice there is probably a lack of time and resources for this. With regard to the detail of the reports, the majority (66%) chose a middle course of highly compressed and highly detailed reporting. However, almost all participants agreed that very detailed reports are less suitable for practice. This is also due to the limited availability of time and personnel resources. Ultimately, the results indicate that it makes sense not only to send the reports, but also to discuss them at regular intervals in meetings. 74% consider this to be an appropriate approach. This approach makes it possible to keep the SLAs up to date and, if necessary, to adapt them to requirements. This is not only important to continuously consider the client's requirements, but also to keep an eye on the feasibility for the service provider and to give him the opportunity to raise objections if necessary.

As far as the adaptation of the SLAs is concerned, there is great agreement that these should be regularly adapted to current needs. 83% consider this to be useful or rather useful. Almost 71% believe that the benefits of regularly revising the SLAs justify the effort. The answers to the question of whether such an adjustment is actually part of the service level management in one's own company demonstrate, however, that this cannot always be implemented in this way. More than half of the participants stated that this would not or rather not be implemented. 38% of those who consider a regular adjustment to be (more) useful do not implement it or rather do not implement it in their own company.

Overall, SLAs seem to pay off in practice, and 88% of the participants are satisfied with their use. 97% of the participants consider SLAs to be a suitable instrument for controlling logistics services. Furthermore, 49% of the practice experts consider their deployment to be worthwhile and stated that the benefits of the SLAs are greater than the effort involved. 37% consider the benefits and expenses to be balanced and only eleven percent believe that the expenses are greater than the benefits. The relatively high proportion of participants who consider the effort

and benefits to be balanced indicates that the creation and management of SLAs is also associated with work. Overall, the satisfaction with the use of SLAs in co-operation with a service provider demonstrates that this is a practice-oriented topic.
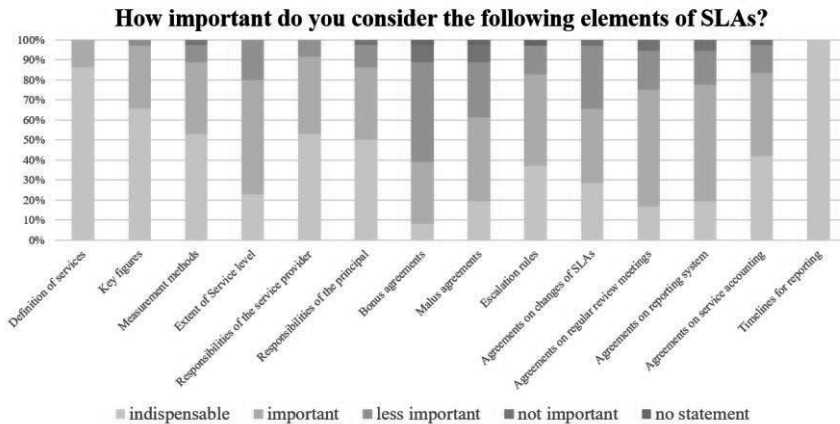

Figure 3: Elements of an SLA by relevance from a practitioner's perspective

7 Procedure model for designing SLA in practice

The conception of SLAs is to be regarded as an independent project and requires a systematic approach. Figure 2 displays a model based on the survey and a case study in a company in the chemical industry that supports the step-by-step development of SLAs on the basis of three phases. The performance descriptions are derived from the conditions in the company.

1. As-is analysis:

The aim of this phase is to identify the framework conditions of the project. This includes the inclusion of existing processes, the definition of strategic goals, as well as the identification of already known requirements. The process analysis makes it possible to identify areas in which improvements are necessary and in which special consideration must be given to SLAs. If possible, the current performance levels should be identified. The difficulty here is that there are usually no service levels and no or only a few key figures for measuring the current service levels (Pulverich, 2007).

2. Modelling

Within this phase, the services to be provided in the future are defined. The new target performances must be formulated and described precisely.

To define the quality and service requirements, the company and logistics targets can be used, and the requirements can be derived from these. The service description includes the responsibilities and cooperation obligations of the service provider and client.

The service description represents the first section of the SLA document and is also called the service level requirement (SLR). SLRs contain the basic descriptions of the requirements to be met by the service provider and are not yet binding between the contracting parties (Ellis & Kauferstein 2004; Wassermann, Kleinhans & Richardt, 2006). It is recommended that both contractors and service providers be involved in the design of the SLRs. This is the only way to ensure that, on the one hand, the requirements of the customer (client) are met and, on the other hand, that the service provider can actually provide the desired service (Parish, 1997). In the formulation, care should be taken to name the services as concretely as possible and to describe the responsibilities in detail.
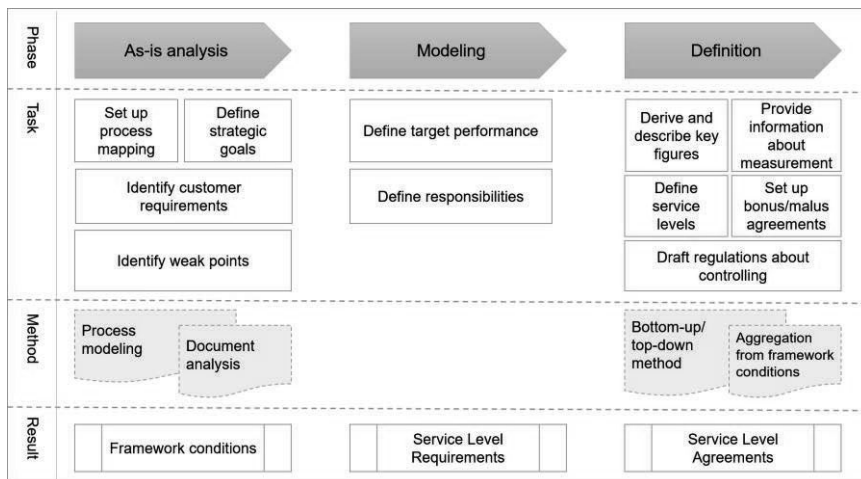

Figure 4: Procedure model for generating an SLA

3. Definition

The requirements identified in the previous phases shall be quantified in the definition phase by means of indicators. A suitable code number is defined for each requirement, with which the service performance can be measured.

In practice, the bottom-up method can be combined with the top-down method (i.e. the strategic goals defined in the analysis phase as well as the processes adopted are considered) (Weber & Grossklaus, 1995). The processes can be assigned to the affected strategic goals and developed from these operational goals. Together with the requirements of the end customer, key figures can be derived for each target area. In addition, measurement details are recorded. Depending on the key figure, the measurements can be calculated using data from the IT system or can be collected manually. In the case of surveys by the service provider, the data should always be accessible to the client and vice versa (Berger, 2004). On the basis of the actual service levels from the analysis phase in connection with the requirements for the future, the target values are then to be defined for each key figure. These are initially proposed values from the client, which then must be negotiated with the service provider. In addition to the key figures and the service levels, details on service deviations should also be clarified and regulations on bonus and malus payments created. Information on controlling must also be provided. Finally, the draft of the SLA document remains in the definition phase, in which the aspects mentioned here are to be summarized.

8 Conclusions

In summary, SLAs for the management of logistics services are gaining in practical importance. This is contrasted by a fragmentary consideration of the topic in research. On the basis of a broad literature analysis and an empirical study with 40 companies on the client side, both success factors were identified and a procedural model for the creation of SLAs was derived. The procedural model was successfully validated in a medium-sized company in the chemical industry. The model was deliberately not designed to be too detailed to keep it flexible for individual adaptation to practical projects. Even if in practice the procedure is not always "textbook", the use of some methods can still be profitable. To consider internal processes, customer requirements as well as strategic and operational goals make it possible to determine the service levels in a target-oriented way. Nevertheless, experience values can also make a contribution here. It is important that the SLA document is not regarded by the contracting parties as a rigid set of rules whose agreements may not be changed under any circumstances. Regular meetings between client and contractor are therefore essential, in which suggestions are made and services discussed. If objections are justified, both partners should be open to changes. In the spirit of partnership, fairness should also be maintained, particularly with regard to service levels and penalties. In terms of a sustainable partnership, the client is not served by setting service levels too high or penalizing them too harshly. This would lead to tensions in the short term and to the end of

the partnership in the long term. Ultimately, SLAs should benefit both the service provider and the client. The starting point for future research is specialization in individual sectors. In addition, the investigation of further possibilities for differentiation such as geographical regions and company size is recommended.

A closer examination of the client and contractor side also offers an approach for further investigations. A comparison of the requirements of both sides as a contribution to a functioning partnership would be revealing. Building on this, success factors could also be derived specifically for outsourcing projects. Empirical studies and case studies could contribute to a further validation of the process model.

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