

Chris Richter

DIGITAL COLLABORATIONS AND ENTREPRENEURSHIP – THE ROLE OF SHAREECONOMY AND CROWDSOURCING IN THE ERA OF SMART CITY

Thesis for the degree of Doctor of Science (Economics and Business Administration) to be presented with due permission for public examination and criticism in the Auditorium of the Student Union House at Lappeenranta University of Technology, Lappeenranta, Finland on the 9th of June in 2016 at noon.

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Abstract

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The thesis begins with the classical cooperation and transfers it to the digital world. This work gives a detailed overview of the young fields of research smart city, shareconomy and crowdsourcing and links these fields with entrepreneurship. The core research aim is the finding of connections between the research fields smart city, shareconomy and crowdsourcing and entrepreneurial activities and the specific fields of application, success factors and conditions for entrepreneurs.

The thesis consists of seven peer-reviewed publications. Based on primary and secondary data, the existence of entrepreneurial opportunities in the fields of smart city, shareconomy and crowdsourcing could be confirmed. The first part (publications 1-3) of the thesis are literature reviews to secure the fundamental base for further research. This part consists of newly created definitions and an extreme sharpening of the research fields for the near future. In the second part of the thesis (publications 4-7), empirical field work (in-depth interviews with entrepreneurs) and quantitative analyses (fuzzy set/qualitative comparative analysis and binary logistic regression analysis) contribute to the field of research with additional new insights.

Summarizing, the insights are multi-layered: theoretical (e.g. new definitions, sharpening of the research field), methodical (e.g. first time application of the fuzzy set/qualitative comparative analysis in the field of crowdfunding) and qualitative (first time application of in-depth interviews with entrepreneurs in the fields of smart city and shareconomy). The global research question could be answered: the link between entrepreneurship and smart city, shareconomy and crowdfunding could be confirmed, concrete fields of application could be identified and further developments could be touched upon. This work strongly contributes to the young fields of research through much-needed basic work, new qualitative approaches, innovative methods and new insights and offers opportunities for discussion, criticism and support for further research.

Keywords: smart city, shareconomy, crowdsourcing, crowdcreation, entrepreneurial opportunities, entrepreneurship

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May 15, 2016, Duesseldorf (near Cologne), Germany

Chris Richter

Don't give up!
Don't ever give up!

This work is dedicated to my family!

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Abstract

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List of publications

This thesis is based on seven papers. The following section presents the article and the author's distribution. The rights have been granted by publishers to include the papers in the thesis.

This thesis consists of seven journal articles, all peer-reviewed. Referring to the Finnish scale for evaluating the quality of the publications (Julkaisufoorumi), five of the seven publications made level "1" and one publication made level "2" on a three level hierarchy. "1" means basic, "2" means leading and "extensively appreciated and followed by the expert audience in the discipline of research area" (Julkaisufoorumi, 2015). One publication is published in an unranked journal. This article (article 6) will be published in the very recently created journal of "Journal of Innovation & Knowledge", which belongs to Elsevier Journals. This journal group has a strong reputation due to their A journals.

Transferring this evaluation to the German review system (VHB Online), a slightly changed result occurs due to the origin of the author. In a five-level ranking (from the top "A" to "E"), three article are published (or are in the review process) in journals classified "B", three are published in journals classified "C", and one is unranked. "B" are defined as important and respected scientific journals, "C" are defined as respected scientific journals by the German association of university teachers (VHB-JOURQUAL3, 2015).

Most of the publications were written in cooperation with co-authors. However, the author of the thesis was the first author in four cases (out of seven) and could even publish one article as a single author at "B" level. His own contribution to the publications are listed below.

PUBLICATION 1

Richter, C., Kraus, S., and Syrjä, P. (2015) The Smart City as an Opportunity for Entrepreneurs. *International Journal of Entrepreneurial Venturing*, accepted, Volume 7, Issue 3, pp. 211-226.

The author was responsible for the idea finding, the research plan, building the hypotheses, the literature review and writing most of the manuscript. The author was also responsible for the communication with the editor after two rounds of review and is also the corresponding author.

PUBLICATION 2

Richter, C., Kraus, S., and Syrjä, P. (2015) The Shareconomy as a Precursor for Digital Entrepreneurship Business Models. *International Journal of Entrepreneurship and Small Business*, Volume 25, Issue 1, pp. 18-35.

The author was responsible for the idea finding, the research plan, building the hypotheses, the literature review and writing most of the manuscript. The author was also responsible for the communication with the editor after two rounds of review and is also the corresponding author.

PUBLICATION 3

Richter, C. (2015) Crowdcreation as a Dimension of Crowdsourcing: Conditions for Entrepreneurs, *International Journal of Entrepreneurial Venturing*, accepted, Volume 7, Issue 4, pp. 324-340.

The author was responsible for everything as it is a single author publication in a B-level journal.

PUBLICATION 4

Kraus, S., Richter, C., Papagiannidis, S., and Durst, S. (2015) Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany, *Creativity and Innovation Management*, accepted, Volume 24, Issue 4, pp. 601–616.

The author was responsible for the idea finding, the research plan, building the hypotheses, the literature review, and writing most of the manuscript. The author undertook the in-depth interviews and supported the analysis and combined the contents. The author was mainly responsible for two reviews.

PUBLICATION 5

Richter, C., Brem, A., Kraus, S., Durst, S., and Gieselbrecht, C. (forthcoming) Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries, *Creativity and Innovation Management*, under review.

The author was responsible for the idea finding, the research plan, building the hypotheses, the literature review, and writing most of the manuscript. The author supported the in-depth interviews and the analysis and combined the contents.

PUBLICATION 6

Kraus, S., Richter, C., Brem, A., Chang, M.-L., and Cheng, C.-F. (2016) Strategies for reward-based crowdfunding campaigns, *Journal of Innovation & Knowledge*, accepted, Volume 1, Issue 1, pp. 13-23.

The author was responsible for the idea finding, the research plan, building the hypotheses, the literature review, expanding the data set manually and generating additional information, and contributed to the methods, research results, conclusion and managerial implications.

PUBLICATION 7

Kraus, S., Ferreira, J., Richter, C., Breitenecker, R., and Brem, A. (forthcoming) Directing the wisdom of the crowd: Key success factors for crowdfunding-based financing opportunities for entrepreneurs, *International Entrepreneurship and Management Journal*, under review.

The author was responsible for the idea finding, the research plan, building the hypotheses, expanding the data set manually and generating additional information, supporting the data analyses, and writing most of the manuscript including the methods, research results, conclusion and managerial implications.

Table 1: Overview of the seven publications

#	Title	Journal	Finish rate	German rate	Status
1	The Smart City as an Opportunity for Entrepreneurs	International Journal of Entrepreneurial Venturing	1	B	accepted, published
	By: Richter, C., Kraus, S., and Syrjä, P. (2015)				
2	The Shareconomy as a Precursor for Digital Entrepreneurship Business Models	International Journal of Entrepreneurship and Small Business	1	C	accepted, published
	By: Richter, C., Kraus, S., and Syrjä, P. (2015)				
3	Crowdcreation as a Dimension of Crowdsourcing: Conditions for Entrepreneurs	International Journal of Entrepreneurial Venturing	1	B	accepted, published
	By: Richter, C. (2015)				
4	Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany	Creativity and Innovation Management	1	C	accepted, published
	By: Kraus, S., Richter, C., Papagiannidis, S., and Durst, S. (2015)				

5	Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries	Creativity and Innovation Management	1	C	under review
	By: Richter, C., Brem, A., Kraus, S., Durst, S., and Gieselbrecht, C. (forthcoming)				
6	Strategies for reward-based crowdfunding campaigns	Journal of Innovation & Knowledge	-*	-*	accepted, published
	By: Kraus, S., Richter, C., Brem, A., Chang, M.-L., and Cheng, C.-F. (2016)				
7	Directing the wisdom of the crowd: Key success factors for crowdfunding-based financing opportunities for entrepreneurs	International Entrepreneurship and Management Journal	2	B/C	under review
	By: Kraus, S., Ferreira, J., Richter, C., Breiteneker, R., and Brem, A. (forthcoming)				

The Finish score varies from 0 to 3; “3” is the highest value. The German score varies from A to E, with “A” as the highest value.

*Publication 6 (Strategies for reward-based crowdfunding campaigns) will be published in the newly created “Journal of Innovation & Knowledge” and is therefore still unranked.

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List of abbreviations

DACH – D for Germany, A for Austria and CH for Switzerland

FsQCA – fuzzy set Qualitative Comparative Analysis

ICF – Intelligent community forum

ICT – Information and communication technology

IT – Information technology

Q&A – Questions and answers

QCA – Qualitative comparative analysis

SME – Small and medium enterprises

US – United States

1 Introduction

*“Digitization is creating a second economy that's vast, automatic, and invisible—
thereby bringing the biggest change since the Industrial Revolution”*

W. Brian Arthur (Arthur, 2011)

Regarding the quote, radical changes such as the invention of the steam engine or the assembly line in the context of the industrial revolution stand for increased speed, changing processes, changed business models, or saving resources (Carlsson, 2004; Senge et al., 2001). It goes hand in hand with the death of long-established businesses and the emergence of new, wild, radical companies (Zimmermann, 2000). The digital revolution, also called industry 3.0 (after the steam engine and the assembly line), is the harbinger of the now imminent 4th stage of development (Schlaepfer et al., 2015), the future project of high-technologies which communicate with each other, partly called Internet of the things (Atzori et al., 2010).

One of the key aspects of the entrepreneurial teaching by Schumpeter (1942) is the radical, the creative destruction (Senge et al., 2001). The readiness for change, for occupying niches and the new composition of existing production factors and the addition of new aspects leads to the Schumpeter approach, which is still highly accepted and the base for numerous explanations of entrepreneurship (Sledzik, 2013).

Currently, digitization determines the changes and improvements in several aspects of daily life, business as well as private sectors and even the interaction and communication between human beings (Arthur, 2011). The terms “always on” (Arthur, 2011), “24/7” (Malecki, 2003) or “mobile first” (Thomas, 2013) underline the relevance of the digital context, a high level of accessibility and high information content. Therefore, digitization in the context of entrepreneurship and entrepreneurial opportunities has increasingly raised interests from science and the economy in recent years (Hossain and Wigand, 2004). One of the terms, which often occurs in a variety of forms, is digital collaboration (Madlberger and Roztocki, 2009).

The definition of the term is very broad (Madlberger and Roztocki, 2009). Each Wikipedia entry or every Google result evaluation could be described as such a collaboration (He, 2012). Due to the fact that communication and working together are in everyday use and central aspects of our lives, the relevance of the topic is very high. The “user group” is unlimited. Therefore, a scientific consideration of this topic generates great attention. Several concepts of digital collaborations are currently being discussed: above all the intelligent city, which links various entities to increase the exchange, the comfort and the quality of life for the residents (Schaffers et al., 2011; Shapiro, 2008). This concept is called smart city. A second approach has emerged in particular in large cities, due to the lack of resources (e.g. “war of spaces”), and is the altered form of consumerism (Ozanne and Ballantine, 2010). Instead of buying everything and owning the goods, the trend of sharing objects has developed (Balck and Cracau, 2015). These objects can be of a digital (e.g. music), haptic (e.g. apartments) or

intellectual (e.g. knowledge transfer like Wikipedia) nature (Belk, 2010). This concept is called shareconomy. A third conception of digital collaboration is the detachment of tasks from classical companies to the anonymous mass (Zhao and Zhu, 2012). These tasks can vary from translations, reviews, tests, or financing ideas and projects (Tripathi et al., 2014). These options are processed via online platforms and in the necessary structure (Vukovic, 2009). The wisdom of the crowd is used to improve products and services or to find alternative options to realize financing (Brabham, 2008). These different approaches in the context of using the anonymous crowd via the Internet are subsumed under the term crowdsourcing.

Going back to the innovation theory by Schumpeter (1942), mostly small and medium-sized enterprises (SMEs) stand for flexibility, aggressiveness in conquering new markets, innovation consciousness and also the courage of trying something crazy and unexpected (Edwards et al., 2005; Rothwell and Dodgson, 1991). Established enterprises mostly cannot evoke the change to act in an unorthodox way due to the stakeholder expectations and the formal internal processes (Chang et al., 2011). Therefore, considering the SMEs in the DACH region (Germany, Austria and Switzerland), which have been focused on in this thesis, a strong impact can be determined.

In Germany, the number of SMEs, comprising micro, small and medium-sized businesses, has grown substantially since 2009 and amounts to approximately 2.2 million in 2013. In contrast, the number of large enterprises in the country is much smaller, i.e. approximately 11,000, corresponding to an SME market share of 99.5% (European Commission, 2014b). In Austria, this share even amounts to 99.7%, with approximately 300,000 SMEs and only 1,000 large enterprises in the year 2013 (European Commission, 2014a). Similar figures from the Swiss market reinforce the dominance and relevance of SMEs – in 2008, around 310,000 SMEs were counted, corresponding to a 99.6% share (WBF - Eidgenössisches Departement für Wirtschaft Bildung und Forschung, 2013).

This quantitative relevance of the topic combined with the thematic relevance justified the need for research in this field. Connecting the components digital collaboration and entrepreneurship, the assumption of the existence of various business opportunities and entrepreneurial fields of application seems justifiable. To the best knowledge of the author, existing literature uses more individual aspects of the collaboration concepts. The basic work and well-accepted definitions in the fields of smart city and shareconomy are not given (Allwinkle and Cruickshank, 2011; Katz et al., 2014) and therefore done in this thesis. Furthermore, no empirical evaluations in the areas of smart city and shareconomy are known. The analyses of German crowdfunding activities are rare and form a contrast to the dominant US-based evaluations (e.g. Kuppuswamy and Bayus, 2014; Mollick, 2014) Due to these facts, the author of this thesis addresses these topics. More concretely, this thesis explores gaps in the existing scientific literature:

First, are there entrepreneurial business opportunities in the concepts of smart city, shareconomy and crowdsourcing?

Second, what specific fields of application are given in the concepts of smart city and shareconomy and do the entrepreneurs' real experiences agree with the existing literature?

Third, what specific recommendations of action for entrepreneurs can be identified in crowdfunding (as a sub-category of crowdsourcing) concepts to increase the probability of success?

Considering the results of the thesis, the work provides contributions to the field of digital collaboration. Literature reviews in the first part of the thesis have created the fundamental basis. The combination of entrepreneurship and digital collaboration is illuminated comprehensively; self-created definitions subsume the best knowledge of the existing literature and paste it together in a very concrete form. The second part developed added value, because it was the first time that real world experiences and entrepreneurs out of the concrete fields were part of scientific work. To the best knowledge of the author, it was the first time that empirical work was accomplished in these fields and delivers concrete managerial indications. The third part contributes to the field due to the little examined German crowdfunding market and the comparison to the US market. Several so far unexplored features for successful crowdfunding projects could be identified due to intensive data set work. Practical implications could be considered. A personally developed cluster of success factors and typologies of crowdfunders were given and thus serve as a basis for future discussion in this field.

The author believes that this work is a small step in the research field and can help to build a better understanding of entrepreneurial opportunities in the fields of digital collaboration in the areas of smart city, shareconomy and crowdsourcing. Quotations and inquiries to already published articles underline this assumption.

1.1 Background of the study

Baker (as cited in Hossain and Wigand, 2004) defines collaboration in the business environment as communicating and working together across organizational boundaries. An environment fostering collaboration by aligning collaborative and knowledge working practices within the business paves the way for more effective and efficient ways of working, internally as well as externally with third parties (Evans and Brooks, 2005). With the increasing diffusion of computer networks, virtual or digital collaboration has emerged, referring to the use of information and communication technology (ICT) for the collaboration and collective interaction among diverse parties (Hossain and Wigand, 2004). These communication technologies that connect individuals and businesses range from the telephone (DiMartino and Wirth, 1990) to the Internet and the use of social media tools (Frame et al., 2009). The development of electronic communication technologies enables business to collaborate and

communicate without reference to hierarchical, divisional or geographic boundaries (Evans and Brooks, 2005) and allows information exchange across distributed organizational forms and inter-organizational communication (Fulk and DeSanctis, 1995). Collaborative technology has removed the prerequisite status of physical vicinity to enable the formation of social groups and enhances the diversity of cultures and functions within an organizational working group (Evans and Brooks, 2005).

Several authors describe an organizational form resulting from the spread of ICT within businesses: the virtual organization (Boudreau et al., 1998; Frame et al., 2009). This type of organization does not require employees to be tied to a specific workplace (Fulk and DeSanctis, 1995) or require them to perform services close to the customer and is characterized by collaboration through advanced communication technologies (Boudreau et al., 1998). According to Nohria and Berkley (as cited in Fulk and DeSanctis 1995), virtual organizations are comprised of five dimensions: (1) electronic files replace material files, (2) increased computer-mediated communication for key activities and face-to-face communication in order to maintain organizational cohesion, (3) the organizational structure consists of the organization of information and technology rather than individuals (4) networking and collaborating across firms leads to ambiguous external boundaries, and (5) the generation of global, cross-functional computer-mediated jobs.

Furthermore, the advancement of electronic communication and interaction along with its integration with computing technologies has enhanced its functionalities. While of a purely connective function in the past, communication technologies have enabled the electronic storage and retrieval of information from shared databases, hence allowing for communal communication and collaborations. In addition, these changes allow for richer communication and the exchange of more complex information among a larger variety of parties (Fulk and DeSanctis, 1995). Hence, the emergence of information and communication technology (ICT) provides employees in geographically dispersed locations with the opportunity to communicate, share information and data and collaborate on projects in order to achieve common business goals (Hossain and Wigand, 2004).

The approach of the digital collaboration has already been studied in various scientific fields. The articles have a very broad scientific background, such as forms of communication, technical requirements (ICT) and marketing.

Therefore, the following table is intended to select some interesting aspects and concretize the abstract scientific work about digital collaboration with real life experiences to create the connection to the real world and make it more tangible for readers of this thesis. Business-related collaborations started long before the use of digital media, so some older aspects of co-working are also listed to increase the understanding of the theme. Reasons for this rapid development of digital collaborations are on the one hand the high relevance due to the larger user groups and on the other

hand the importance of spare time oriented living together and the business-orientated economy.

The following table is further developed on the idea of Hinchcliff (2015):

Table 2: Development of collaboration

Stage	Key findings	Sources
Offline	The main offline tools employed by organizations to foster collaboration include telephone calls and face-to-face meetings	(Frame et al., 2009)
	Studies comparing virtual and face-to-face teams found that they exhibit similar levels of communication effectiveness, but a higher level of satisfaction for face-to-face interaction	(Warkentin et al., 1997)
Online Early stage	Data and documents are shared using a data grid or shared data repository that is designed to easily expand access for the new collaboration	(Frame et al., 2009)
	Learning can be enhanced with intranets, which are Web-based, firewall-protected networks that connect all employees through common, hyperlinked interfaces to documents, messaging and multimedia information sources	(Boudreau et al., 1998)
	Emails allow individuals to exchange information with predetermined and specific others	(Leonardi et al., 2013)
	Q&A forums and message boards allow individuals to post a message to a broad but unknown audience	(Leonardi et al., 2013)
	Groupware is more than just an electronic messaging system. It typically integrates electronic messaging with screen sharing, group scheduling, meeting support, group writing and other applications. These features support team leadership, facilitate group processes and extend the team's technical and managerial competence.	(Boudreau et al., 1998)

Online Social Business Era	An integrated <i>enterprise social media platform</i> includes tools such as social networking, microblogging and social tagging for internal communication	(Leonardi et al., 2013)
	1) use of publicly available sites like Facebook, Google+ and Twitter; (2) private implementations of open source or proprietary software, either installed on a company's own servers or acquired as a hosted (cloud-based) software service; or (3) in-house proprietary solutions, often built as prototypes by software vendors for later incorporation into commercial offerings	(Leonardi et al., 2013)
	As a consequence of their private usage, employees are familiar with Web 2.0 applications, have built the trust and are comfortable bringing their private technological expertise even into the corporate context	(Schaarschmidt et al., 2011).
	Collaborators can communicate using video-conferencing tools (such as the Access Grid with application-sharing tools such as the eMinerals JMAST tool) or instant messaging. Web 2.0 social networking tools (e.g. our SciSpace.net tool) enable collaborators to share and document ideas, dialogues, images, dialogues and reports	(Frame et al., 2009)

This development is supported by the further development of data transmission, faster and more flexible applications and the ability of higher scalability. Now, considering the last years, the terms “sharing”, “collaboration” and “networks” are already mentioned. However, the relationship to entrepreneurship is more rarely explored. Therefore, this thesis takes up this scientific gap and fills it with seven relevant publications.

1.2 Research Objectives

1.2.1 Research gap addressed by the thesis

Various articles discuss collaborations in the business world. Collaborations are based on the approach by contributing information, experiences, resources, skills and knowledge to improve the competitive situation of each partner (Speckman et al., 1998). Strong relationships between market players with a more cooperative than competitive approach (Bengtsson and Kock, 1999) fall under the umbrella of the term collaboration (Sydow, 1992). The goal of collaboration is mostly described by equalizing or even over-compensation for personal weaknesses and the transfer of personal strengths in

order to achieve common goals (Bronder and Pritzl, 1992). Other goals of collaborations (also called strategic alliances) are an increased flexibility in incoming orders, better access to potential new customers or markets through existing business relations to a partner, and limiting personal risk or even the access to of resources, which can act only in cooperation. A fundamental aim of collaborations is “joint competitive advantages” (Zentes et al., 1992, p. 20). Collaboration among individuals within an organization and between organizations offers a number of advantages. First, effective collaboration results in significant efficiency improvements and in a reduction of operational costs. Second, it allows organizations to increasingly build cross-functional teams regardless of their office location and ensures the inclusion of all appropriate and skilled people necessary. Third, virtual collaboration significantly reduces travel costs as for example face-to-face meetings can be replaced with video conferences (Evans and Brooks, 2005).

Considering disadvantages of organizational collaboration, appearing costs, a weaker market position or an unfavorable negotiating position can be identified (Porter, 1986). A crucial factor is the fact that such alliances always come together on a voluntary basis.

In light of the economic turbulences and challenges like globalization and demographic changes, many companies experience increasing pressure to innovate in order to secure their competitive position. Especially small and medium-sized enterprises are facing a lot of market challenges and are seeking to establish themselves in an environment characterized by reduced time to market and are pursuing diverse opportunities for continuous innovation. Therefore, SMEs are likely to share resources and benefit from knowledge exchange and collaboration (Schaarschmidt et al., 2011). Further, social and other forms of entrepreneurs require a diverse set of resources, including non-materials such as networks and knowledge as well as material resources such as financial assistance. In order to acquire the required resources, entrepreneurs often draw from collective and collaborative actions. The connections across businesses and the mutual support provide a platform for the exchange of practices, generation of new ideas and spreading of information (Montgomery et al., 2012).

The creation, exchange, diffusion and use of knowledge has been identified as the main source for innovation and in turn the main driver for economic growth (Johansson et al., 2006). In recent years, many companies and especially SMEs have obtained knowledge from an external network composed of a variety of sources such as customers, suppliers, research institutions and other firms in order to drive innovation (Chiaroni et al., 2010). Johansson et al. (2006) agree that innovations result from the complex interaction of numerous parties including individuals, organizations and knowledge institutions. Several authors suggest that the key for successful business operations and sustainable competitiveness is the utilization of superior know-how and capabilities that lead to continuous innovations, serving current and potential future customers (Johansson et al., 2006; Miles et al., 2005). Miles et al. (2005) even recommend a new organizational form that draws from the collaborative network of many organizations and thus makes

full use of every firm's innovation potential. The authors forecast that particularly small and medium-sized enterprises will join a multi-firm network as they do not possess sufficient resources to realize the model of continuous innovation by themselves.

Aldrich and Zimmer (1986) argue that entrepreneurs are embedded in a social context, facilitated by a social network that plays a critical role in their entrepreneurial process. Research has shown that entrepreneurs foster interpersonal and interorganizational relationships in order to gain access to various resources including information and advice of other actors in their network. This embeddedness in a network furthermore assists the entrepreneurial venture in overcoming its liability of newness by obtaining the resource of legitimacy (Smith and Lohrke, 2008). The collaboration within this network is not limited to the start-up stage of the entrepreneurial business but is promoted at later stages to ensure continuous access to business information and advice (Hoang and Antoncic, 2003). According to research by Johannsson et al. (2006), regional networks result in regional innovation systems in which the entrepreneur together with customers, producers, consultants, institutions and research institutes engages in ongoing collaboration and hence facilitates the development of innovation. It follows the assumption that SMEs and entrepreneurs jointly build a small regional cluster that is extended through the attraction of even more like-minded individuals and businesses. This cluster-building is a central aspect of entrepreneurial theory. Building a cluster means committing to a certain region, which can be assumed to be an outdated idea in light of the digital advancement. In fact, the access to the Internet and the strong alignment to online programs as well as contributions to common work projects can be made from anywhere, anytime (Hossain and Wigand, 2004). This argumentation leads to the belief that clusters and social exchange are transferred to an online network via chat, video-conferencing and other ICT tools. Several programs to support collaboration allow the boundaries between "local collaboration" and "digital collaboration" to be merged.

When deciding to engage in collaboration, entrepreneurs face different models of collaboration with different strategic trade-offs. Collaboration networks differ significantly in their degree of openness for membership and their governance (Pisano and Verganti, 2008). For instance, in a very open form of collaboration, crowdsourcing for instance constitutes a very open form of collaboration. In this model, a designated agent or sponsor outsources a task or job to an undefined large group of people through an open call (Howe, 2006). Alternative definitions describe crowdsourcing as a process in which companies broadcast challenges to a crowd, which then offers solutions to these problems and posts them to the online commons (Brabham, 2010). Hence, a large variety of actors can participate, including suppliers, customers and researchers, but hobbyists, students and even competitors can also engage in this form of collaboration. The advantage of such an open collaboration is the large number of potential innovators and idea generators and the attraction of previously not considered but valuable actors to the network. On the other hand, the effectiveness of this open form of collaboration is less compared to that of closed collaboration where only selected and best-suited parties interact. Further, entrepreneurs face the decision of a hierarchical or flat model of

collaboration: in the hierarchical model, a specific organization is able to control the direction of the innovation and capture a large share of the innovation's value. In the flat model on the other hand, these decisions are decentralized or taken jointly by the collaborators, allowing cost and risk sharing as well as the sharing of possible challenges in the innovation process. Pisano and Verganti (2008) suggest four basic models of collaboration that the entrepreneur must decide upon: a closed and hierarchical network (an elite circle), an open and hierarchical network (an innovation mall), an open and flat network (an innovation community) and a closed and flat network (a consortium).

Further regarding the relationship between collaboration and entrepreneurship, this thesis will introduce the reader to some of the most recent phenomena in entrepreneurship, namely the fields of smart city, shareconomy and crowdfunding. It is however to be mentioned that these topics have not been central to research agendas and hence the availability of appropriate literature is limited.

The Intelligent Community Forum (ICF) awards cities as intelligent communities when scoring high in a number of dimensions, including broadband connectivity, knowledge workforce, digital inclusion, innovation, and marketing and advocacy (Nam and Pardo, 2011). However, in the current literature there is a lack of consensus regarding a clear definition of a smart city. Some authors highlight the presence of ICT infrastructure as a prerequisite (Caragliu et al., 2011), others focus on the role of education and human capital for rapid urban growth rates, assuming that innovation attracts a skilled labour force (Berry and Glaeser, 2005), while others argue that the alignment of technology-mediated services, human infrastructure and the establishment of institutions form a smart city (Nam and Pardo, 2011). Furthermore, the relationship between a smart city and entrepreneurship along with its application opportunities remains largely unexplored in academic works.

Another prominent collaboration model is shareconomy, which is commonly understood as the systematic lending and borrowing of objects, especially through private individuals (Bendel, 2014). Belk (2014) further points to the role of the Internet and modern ICT in this collaboration model, with the online housing sharing website "Airbnb" constituting one of the best-known examples (Gerom, 2013). In shareconomy collaborative technologies are highly valued as they support high levels of interaction, as well as communication and information exchange among large groups (Karsten, 2003). However, academic work on shareconomy is still in its infancy stage (Katz et al., 2014) and most literature addresses case studies instead of representative quantitative research.

The phenomenon of crowdfunding has been subject to more extensive research efforts. This model can be regarded as an alternative possibility to receive funding and is especially popular among entrepreneurs who are likely to face difficulties of raising sufficient funds (Cosh et al., 2007). Crowdfunding allows entrepreneurs to turn to a large number of individuals or groups, the crowd, in order to receive small financial

contributions to their business venture (Agrawal et al., 2014; Mollick, 2014). However, most literature on this entrepreneurial model has relied upon rather generic data sets from Kickstarter, the largest crowdfunding site from the United States (e.g. Mollick, 2014). Hence, research on the models of smart city, shareconomy and crowdfunding is in need of more extensive work in general and specifically in regions outside of the United States.

By combining the above-mentioned fields of application in collaborative entrepreneurship with a strong focus on the countries of Germany, Austria and Switzerland, an obvious research gap emerges. This thesis aims to fill this gap and generate new and undiscovered insights in the area as literature for digital collaborations and entrepreneurial opportunities in the models of smart city, shareconomy and crowdfunding within these countries is very rare. While the lack of general literature on smart city and shareconomy makes a focus on certain regions obsolete, research on the phenomenon of crowdfunding needs to set a new regional focus due to the large amount of literature on US-based data sets and analyses.

As research in the fields of smart city and shareconomy in combination with entrepreneurship and entrepreneurial opportunities requires more basic research efforts, a more theoretical approach is appropriate. Crowdfunding on the other hand has been subject to more recent academic and scientific work and therefore a more empirical research agenda can be established that allows the comparison of insights with existing literature and findings. Thus, research in the fields of digital collaboration as entrepreneurial opportunities in the fields of smart city, shareconomy and crowdsourcing with a focus on the countries of Germany, Austria and Switzerland offers opportunities for theoretical, methodical and empirical contributions.

The state of research in the specific fields briefly addressed above led to a rough conceptual framework which gives structure for the thesis and the opportunity to clarify contributions, limitations and options for future research at the end of this work.

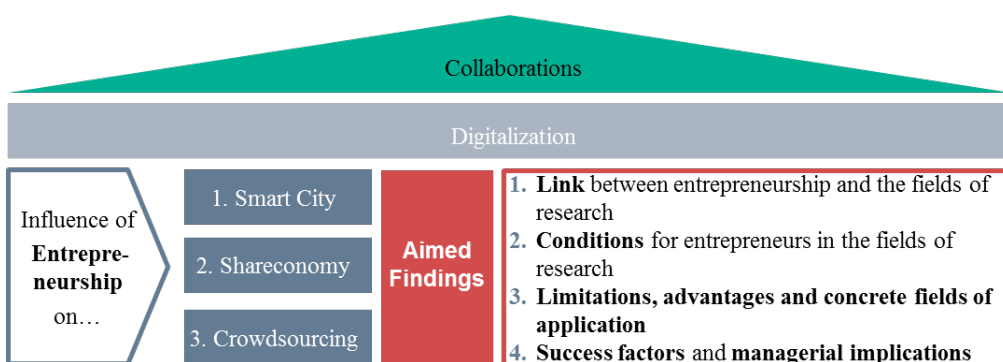


Figure 1: Conceptual framework of this PhD thesis

1.2.2 Scope and objectives of the study

This thesis offers a detailed analysis of entrepreneurial activities in the fields of smart city, shareconomy and crowdsourcing. The focus of this thesis in the broad fields is the digital collaboration and the entrepreneurial opportunities and challenges, combined with concrete managerial implications and concrete fields of activities. Especially the SMEs from the countries of Germany, Austria and Switzerland are considered in the empirical studies.

The combination of the themes of entrepreneurship and the digital themes of smart city, shareconomy and crowdsourcing paves the way for theoretical and empirical development in the near future. This thesis has to be rated and evaluated as a basis in this field of digital collaboration because the research in the fields is very young and thus only a limited amount of scientific literature is available. The results of the thesis provide numerous approaches for further research and thus it represents a strong contribution, especially in the countries of Germany, Austria and Switzerland. These countries should be considered as interesting and meaningful because economically they form the heart of Europe, in particular Germany. In order to obtain new insights into the young research fields, the study has been taken in two ways:

First, reviewing existing literature in the fields of smart city, shareconomy and crowdsourcing with a focus on entrepreneurial opportunities.

Second, generating empirical data to prove the existing literature, confirm or reject existing hypotheses and build our own insights.

In all seven publications, the central research question is: Are there business opportunities for SMEs in the fields of smart city, shareconomy and crowdsourcing, and what specific fields of application and recommendations of implementation are to be identified (especially in the countries of Germany, Austria and Switzerland)?

The following sub-questions are the derived, roughly related research questions for the seven articles and support the answering of the main question:

1. In what form and to what degree do smart-city-specific characteristics and fields of application contribute to entrepreneurial activities?
2. What are the connections between the up-and-coming field of shareconomy and entrepreneurship?
3. What are the conditions for entrepreneurs using crowdsourcing in general and crowdcreation in particular?
4. To what extent do the six characteristics of smart city apply to the real world experiences, what other factors are of importance, and what are the interconnections between the identified factors?
5. Which factors of shareconomy are really relevant for entrepreneurs?

6. What makes crowdfunding successful? Which combinations of key success factors of crowdfunding are relevant?
7. Which individual aspects of factors for crowdfunding projects ensure the success of crowdfunding campaigns?

The structure of the thesis and the order of the papers have been deliberately chosen and represent only a conscious selection of publications of the author, all written in the time of the writing of the thesis. The research process starts with an extensive literature review. Focuses are the fields of research of smart city, shareconomy and crowdsourcing, each with a focus on entrepreneurial opportunities. This part can be regarded as a base creation. However, this work is crucial and with a fundamental impact on further research by creating separate definitions and clear delimitation of research. By creating a base, the articles are built in a very similar way (publications 1, 2 and 3). The second part is built on quantitative analyses of entrepreneurial activities in the fields of smart city and shareconomy through in-depth interviews with German, Austrian and Swiss entrepreneurs. Through the development of a deep understanding of the research fields through the literature review in the first part of the thesis, the already existing insights could be checked and new insights could be developed through close examination of the entrepreneurial activities in the real world. Therefore, the second part of the thesis is the logical addition and provides deep insights in a so far almost unexplored field of research (publications 4 and 5). The logical third step of the thesis is the qualitative analysis. The reason is bisected, on the one hand to demonstrate the author's skillset to apply all relevant scientific methods and on the other hand to gain deeper insights of the behaviour of entrepreneurs in crowdfunding projects as a sub-topic of crowdsourcing with a large number of data sets. The results were compared with the dominating insights from US-based analyses and small, so far unexplored features for ascertaining the probability of success could be identified (publications 6 and 7).

Summarizing, the thesis provides a theoretical contribution to the fields of smart city, shareconomy and crowdsourcing by addressing the research objectives and gives very concrete, reproducible managerial implications. Considering the theoretical perspective, the creation of a definition for the fields of research under consideration of all existing literature and the sharp delineation of fields of application are to be highlighted. From the practical perspective, the matching of the existing literature with the real life experiences and the identification of small adaptations of existing success factors in the field of crowdfunding form the highlights from the perspective of the author. The thesis provides a relevant contribution to research in the fields of digital collaboration. Since the investigated fields are very young and very future-oriented, the articles of this thesis serve as a basis for distinctive discussion, further development, criticism and support. Due to the relevance of the topics and the focus on SMEs, the attractiveness for researchers and managers is ensured.

1.3 Structure

The thesis is structured as followed. The first chapter (Introduction) provides a background to the study and introduces the scope of the research and research objectives. The second chapter starts with the theoretical foundations of smart city, shareconomy and crowdsourcing. The interaction between the three themes and the entrepreneurial fields of application and business models are in the scope. The third chapter summarizes the methodological issues of the study execution, and describes the methods used in the literature review, qualitative (in-depth interviews) and quantitative research (fuzzy set Qualitative Comparative Analysis and binary logistic regression analysis) and research design applied in the thesis. The fourth chapter describes the objectives, content and results of the seven publications included in the thesis. The final, fifth chapter concludes the work by answering the research question of the study and proves a description of the thesis's contribution to the existing body of knowledge.

A logical construct of the seven publications included in the thesis is provided below. The table offers a detailed description of research questions and brings the publication together into one complete work.

Table 3: Research questions, objectives and publications

Research questions	Objective	Publication title	Research method and data
Publication 1: In what form and to what degrees do smart-city-specific characteristics and fields of application contribute to entrepreneurial activities?	To provide basic knowledge of the young research field of smart city and identify potential entrepreneurial activities for further research	The Smart City as an Opportunity for Entrepreneurs	Literature review
Publication 2: What are the connections between the up-and-coming field of shareconomy and entrepreneurship?	To generate background knowledge of the shareconomy and identify potential entrepreneurial activities for further research	The Shareconomy as a Precursor for Digital Entrepreneurship Business Models	Literature review

Publication 3: What are the conditions for entrepreneurs using crowdsourcing in general and crowdcreation in particular?	To produce background knowledge of crowdsourcing in general and crowdcreation in a more detailed approach	Crowdcreation as a Dimension of Crowdsourcing: Conditions for Entrepreneurs	Literature review
Publication 4: To what extent do the six characteristics of smart city apply to the real world experiences, what other factors are of importance, and what are the interconnections between identified factors?	To analyze the real world experiences of entrepreneurs from the field and compare them with the existing literature	Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany	Qualitative study; in-depth interviews; 12 entrepreneurs from Germany, Austria, Switzerland
Publication 5: Which factors of shareconomy are really relevant for entrepreneurs?	To analyze the real world experiences of entrepreneurs from the field of shareconomy and compare them with the existing literature	Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries	Qualitative study; in-depth interviews; 14 entrepreneurs from Germany, Austria, Switzerland
Publication 6: What makes crowdfunding successful? Which combinations of key success factors of crowdfunding are relevant?	To compare crowdfunding campaigns and identify options for entrepreneurs which are success factors through combination of features	Strategies for reward-based crowdfunding campaigns	fuzzy set/Qualitative Comparative Analysis (SPSS), 446 data sets from a German crowdfunding platform

Publication 7: Which individual aspects of factors for crowdfunding projects ensure the success of crowdfunding campaigns?	To identify options for entrepreneurs to optimize the crowdfunding campaigns and increase the probability of success for their future campaigns	Directing the wisdom of the crowd: Key success factors for crowdfunding-based financing opportunities for entrepreneurs	Binary logistic regression analysis (SPSS), 432 data sets from a German crowdfunding platform
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1.4 Definition of key terms

Digital collaboration – co-working with the help of mobile devices, the Internet and the unlimited access to these sources. Content of co-working is the sharing of knowledge and information. It opens global co-working regardless of location and time zone. This concept allows the integration of a broader circle to work on specific themes. Drivers of this movement are high Internet usage, email, social media, apps and open data.

Entrepreneurship – “is described as a dimension of strategic posture represented by a firm’s risk-taking propensity, tendency to act competitively aggressive, proactive manners, and reliance of frequent and extensive product innovation” (Covin and Slevin, 1991, p. 7).

Smart city – is a concept to reduce the problems resulting from urban population growth and rapid urbanization like waste, pollution or war of spaces (Chourabi et al., 2012). The system is based on information and communication technologies (ICTs) (Caragliu et al., 2011) and digital technologies. The strategy tries to connect the three key factors of technology, people and institutions (Nam and Pardo, 2011). Goal of the development is the creation of a more liveable city, economic, social and environmental sustainability, reducing costs and resource consumption and integrating the citizens more actively (Hall, 1988).

Shareconomy – the compound term of sharing and economy refers to the change in consumer behaviour. Instead of buying and owning goods, the concept is based on sharing. Background of sharing is the approach of Weitzmann (1984), that the wealth for all participants increases, the more participants join and share. Under the umbrella of shareconomy three different sub-categories are known: sharing of goods, sharing of digital content and sharing of intellectual content. The wide availability of Internet access and online platforms for sharing support the development.

Crowdsourcing – also a compound term of crowd and outsourcing. It is also called wisdom of the crowd (Kittur et al., 2007). The concept refers to the outsourcing of

corporate tasks and structures to third parties, here to partly unknown, anonymous workers (crowd). This concept is based on the Internet and the unlimited access to labour force thanks to globalization. Four different sub-categories are known: crowdvoting, crowdcreation, crowdfunding and crowdwisdom (Howe, 2006).

2 Theoretical point of departure

This thesis includes three key topics which are presented below: smart city, shareconomy and crowdsourcing including the sub-topics crowdcreation and crowdfunding. These key aspects are associated with entrepreneurial fields of application. Therefore, the three aspects are analyzed in detail in the following sections and linked with entrepreneurship.

The chapter concludes with a positioning of the work and a visualization of the relationships between the three key aspects.

2.1 Smart city and entrepreneurial opportunities

The depopulation of rural areas and migration to cities will continue. Smart city presents one option of urban living, urban development and living together in cities or even megacities in the near future (Winters, 2008). This development may offer entrepreneurial opportunities, which is considered in this thesis.

Defining “smart” cities, also called “intelligent”, “cyber” or “digital” cities, is almost impossible (Allwinkle and Cruickshank, 2011). Different approaches are subsumed under the umbrella of smart city (Lombardi, 2011). The term “smart city” is sometimes criticized as a buzzword or a hype due to a vague definition and the resulting very wide range of application fields. Four different approaches are consistently repeated: firstly, green or sustainable cities, secondly, cities with a broad offer of ITC services and applications, third, the connected city with all entities to avoid traffic jams or pollution, and fourthly, the intelligent city council with optimized processes (Lombardi, 2011). Another approach is to define smart city in a more abstract way, namely as a “strategic device to encompass modern urban production factors in a common framework” (Caragliu et al., 2011).

These production factors can vary in detail, but the distinction between hard and soft factors is generally used.

Potential hard factors are technologies (e.g. ITC) (Jensen et al., 2015), built infrastructure (Komninos et al., 2013) and natural environment (Chourabi et al., 2012). Soft factors are people and communities, economy and management and organization governance, policy context (Chourabi et al., 2012). Another approach is the division into six aspects: smart economy, smart people, smart governance, smart mobility, smart environment and smart living (Giffinger et al., 2007; Perera et al., 2014).

The communicated goals of smart city are also multi-layered: raising the quality of life and productivity as well as the growth effects of human capital development (Shapiro, 2008), sustainability including waste management (Perera et al., 2014) and saving resources and collaboration (Schaffers et al., 2011).

Smart city faces several challenges, the most often discussed of which is the availability of working IT infrastructure (including wireless Lan, servers, storage). More issues are data security and privacy (Townsend, 2014), big data or glassy (transparent) customers, responsibility and operation costs (Chourabi et al., 2012).

Concrete examples of smart city are hard to find, due to the lack of a concrete definition. Giffinger et al. (2007) identified 70 medium-sized cities in Europe. Outstanding results could be achieved by cities in Luxembourg, Scandinavia and the Benelux. Internationally, San Francisco (Glaeser and Berry, 2006; Walker, 2009), Singapore (High, 2015), Barcelona (Bakici et al., 2013; High, 2015), Nice (environment) (High, 2015; Schaffers et al., 2011), Doha, Taipei, Tel Aviv and Cape Town (Nam and Pardo, 2011), Stockholm (traffic) (Nam and Pardo, 2011) and Amsterdam (Hollands, 2008) have been identified.

Considering smart city in the search for entrepreneurial behaviour and opportunities, the first scientific elaborations started in the later years of the 20th century in a global, more theoretical approach (Cocchia, 2014). Case studies were created in the early 2010s. However, empirical work in the field of smart city is still rare, and in-depth interviews have, to the best of our knowledge, never been undertaken. Therefore, the search for and identification of entrepreneurial opportunities is mostly based on adjacent areas, transfers or literary work. Concrete examples are innovative ecosystems, user co-creation or so-called share economy or shareconomy, living labs or laboratories of innovation (Batty et al., 2012) and resource sharing (Schaffers et al., 2011). Another opportunity could be the storage and analysis of the data flow or “traces” (Pan et al., 2013) – also known as “big data” (Batty, 2012; Kitchin, 2014) or the future Internet (Hernández-Muñoz et al., 2011), which is also called Internet of things.

This part of the thesis is one of the first papers which covers the combination of smart city and entrepreneurial opportunities. This thesis offers a concrete definition of smart city and limits the range of application fields significantly.

2.2 Shareconomy and entrepreneurial opportunities

Another novel digital collaboration that has developed in recent years is called shareconomy. Shareconomy describes the changing consumer behaviour through sharing goods (Ozanne and Ballantine, 2010) and wisdom (Belk, 2010). The base for this movement is the availability of the Internet, providing an opportunity for unlimited access and exchange between users (Belk, 2014). The digital prerequisite of platforms offering, sharing and interacting is absolutely necessary and assists users in sharing in an organized way (Balck and Cracau, 2015).

The term shareconomy consists of the two words “share” and “economy”. Considering the first part “share”, possible objects of exchange are physical objects (e.g. housing, tools, cars, bikes, clothes), digital (e.g. music, data, pictures) or knowledge (e.g. reviews for hotels or restaurants, encyclopedias like Wikipedia) (Belk, 2014). Regarding the

second part “economy”, a massive change in consumer behaviour is attested. The shift away from self-owned property (Balck and Cracau, 2015), the perceived lower value of former status symbols like cars and the liberal way of life of the younger generation are cited reasons for the boom in sharing (Lawson, 2010).

Shareconomy is also named “sharing economy” (Belk, 2014), “collaborative consumption” (Belk, 2014), “peer-to-peer marketplace” (Zervas et al., 2015), “fractional ownership” (Lawson, 2010) or “democratic economy”, just to mention the most cited ones. Despite various names, the core of the motion is identical. Offering one item to a broader group of potential users via digital publications, compensation for the use of the items is mostly monetary (e.g. pay per use) (Zervas et al., 2015) but also includes non-monetary compensation (e.g. appreciation, recognition).

Shareconomy is a young but rapidly growing movement and therefore noteworthy. The foundation of the construct was provided by Weitzmann in 1984, presenting the intelligence of the crowd or “crowd wisdom” as the driver (Weitzmann, 1984). Through the increasing number of inhabitants in the big cities, multiple issues emerged. In addition to the challenges that are addressed by the concept of smart city like traffic control, pollution or garbage disposal, shareconomy faces the issues of “war of spaces”. Limited storage space or limited parking lots lead to the simple idea of sharing. In these examples: sharing bikes, sharing cars or sharing tools (Lamberton and Rose, 2012).

A recognizable driver of this movement is the social change of people (Lawson, 2010). Generation Y is, according to several surveys, not only interested in career success. The trend is towards a higher demand of work-life balance, greater social commitment, more interaction and living in a more sustainable way (Kelly et al., 2014). Sharing fits very well. Sharing means interaction with other people, saving money and resources (Balck and Cracau, 2015).

Controversially described is the entrepreneurial approach of the shareconomy movement. On the one hand, the part of sharing, the social or even green mindset is dominating. On the other hand, the monetization of the idea is pervasive (Lawson, 2010). The idea owner, the platform provider (intermediary) and also the people sharing items want to earn money (Lamberton and Rose, 2012) This apparent contradiction is much discussed – profit-oriented enterprises are acting under the supposed social umbrella. Prominent examples are Airbnb (housing) facing legal litigation because of local housing laws and regulations as well as unclear insurance and tax laws at the moment (Coldwell, 2014).

Through an extensive literature review with the focus on the last five years due to the young status of the discipline, this thesis offers a holistic literature review instead of focusing on individual areas (e.g. sharing music). Also, this thesis contains an article with in-depth interviews with 14 entrepreneurs in the field of shareconomy. With our current knowledge, this detailed work with entrepreneurs is unique and constitutes a concrete added value for the research in this field.

2.3 Crowdsourcing and entrepreneurial opportunities

After presenting two kinds of digital collaborations, crowdsourcing is another important subspecies of shareconomy and therefore a logical continuation of smart city.

Like shareconomy, the term crowdsourcing is composed of two terms, “crowd” and “sourcing”. With crowd, the anonymous mass in the Internet is meant, often called community. Sourcing is, in the era of globalization, often equated with outsourcing, the issuing of tasks to third parties (Estellés-Arolas and González-Ladrón-de-Guevara, 2012). Outsourcing is mostly connected with the hope for variable costs instead of fixed costs, the involvement of experts, the use of competitive advantages, increased flexibility or gaining creativity. These arguments also apply to crowdsourcing, but with the major difference that the fulfillers of the tasks, i.e. the crowd, are mostly completely anonymous (Zhao and Zhu, 2012).

The origin of the movement can be found in the IT area, where open-source applications and operating systems were very popular during the late 1990s and early 2000s (Bagozzi and Dholakia, 2006; Doan et al., 2011). Individual changes and optimizations could be created and offered the broader user group, with the common goal of improving the general usability and functionality (Hars and Ou, 2002). Thus, the central aspect of crowdsourcing is well described. The anonymous mass knows more than the individual – the wisdom of the crowd represents greater intelligence, creativity and speed, more diverse opinions due to different cultural backgrounds and 24/7 implementation due to different time zones (Brabham, 2008).

The option to involve the crowd is based on a tripartite construct: first, the project owner who gives the job, assignment or problem away; second, an intermediary who presents the job on the platform to the crowd; and third, the community of Internet users with a common interest to participate in small assignments in various areas (Vukovic, 2009). The most popular areas are product development, design, research and development, and idea generation (Tripathi et al., 2014). In exchange for the service of performing a task or presenting a solution to a posted problem, the crowd expects some form of compensation. This has been studied by numerous researchers and fits some of Maslow’s basic needs: a financial reward, an opportunity to develop creative skills, having fun, sharing knowledge, an opportunity to take up freelance work, love of the community and an addiction to the tasks (Estellés-Arolas and González-Ladrón-de-Guevara, 2012).

The fields of activity for the crowd can vary. Crowdsourcing is divided into smaller fields of application. Generally the division into three types is supported in the existing literature (Vaca, 2015). The first approach is to integrate the customer in the development of products and benefit from the fusion of the pure consumer to a partial producer, a so-called prosumer. The concept of concrete, creative customer integration in the product creation is called *crowdcreation* (Tripathi et al., 2014). Concrete examples include the online graphic design marketplace 99designs, where users can

participate in contests to design logos, websites and other products (Tripathi et al., 2014) and the web-based T-shirt company Threadless.com, which realizes the design process for their products through an online competition in which everyone can participate and win a monetary award if their design is picked (Brabham, 2008). Howe (2006) adds a fourth component, crowdwisdom, which is more generally the whole concept of crowdsourcing and the intelligence of the anonymous mass.

A different aspect of integrating the community in the product development process is *crowdvoting*, where the crowd is able to vote for designs, features or colours (Tripathi et al., 2014). Scoring can be five-stage star-ratings or pure free text fields, but a first contact of the product to the market is secured through recommendations, evaluations and scoring. Examples are TripAdvisor evaluations for restaurants and hotels around the world (Kremer et al., 2014) or Digg, a website that allows users to vote for the most interesting news story that will then be published openly on the website (Malone et al., 2009). With the help of the crowd, entrepreneurs engaging in crowdvoting aim to organize vast amounts of information in an efficient manner (Noble, 2012).

Another sub-species of crowdsourcing is *crowdfunding*. Crowdfunding presents a new option for financing ideas and concepts, instead of using venture capital or the old-school way of banking loans credits (Mollick, 2014). Crowdfunding uses the community to gain mostly small amounts of money in return for small rewards, honouring the funding (Agrawal et al., 2014). Kickstarter, the largest crowdfunding community, probably constitutes the most prominent example of crowdfunding. The website connects entrepreneurs with funders that receive tangible but non-monetary rewards in exchange for their contributions (Kuppuswamy and Bayus, 2014). Project owners mostly aim to raise small amounts of capital for a certain project but also demonstrate demand for a product or create interest in a new product. People directing their funds at the posted project participate out of philanthropic motives or expect a reward in return for their contribution. This reward can take the form of a monetary reward, equity stakes in the business or granted access to the product prior to the official release date (Mollick, 2014).

Crowdsourcing fosters entrepreneurship at the individual level as well as entrepreneurship in an enterprise environment. This form of digital collaboration offers individuals participating in the crowd an opportunity for entrepreneurship by utilizing their creativity and ideas towards a certain project (Brabham, 2008). Furthermore, the creation of intermediary platforms and marketplaces such as CrowdSpirit and iStockphoto fosters opportunities for entrepreneurial activity (Vukovic, 2009) as well as models such as crowdfunding, which allow entrepreneurs to finance their business venture (Schwienbacher and Larralde, 2010). However, entrepreneurs outsourcing a certain task or problem to the crowd must pay attention to balancing openness for different user groups with quality of participation (Doan et al., 2011). Doan et al. (2011) identify four key challenges in engaging crowdsourcing models. First, how to recruit and retain members of the crowd. Second, defining the scale and scope of users'

participation. Third, identifying ways to combine users' contributions and evaluate them. Last, establish rules and procedures for system misuse.

While the fields of crowdsourcing and especially crowdcreation are almost scientifically untouched, the field of crowdfunding is booming right now. Two special editions of leading journals in the field of entrepreneurship covered crowdfunding at the start of 2015. It should be noted that these articles analyze American crowdfunding platforms, more concretely the biggest one "Kickstarter" with more than 50,000 data sets, and focus on the financial aspect such as microfinance, microlending or investment strategies. This thesis tries to identify success factors for crowdfunding projects. The data set comes from Germany and is significantly smaller than the compared article. This leads to new insights through the applying of new methods. In addition, concrete practical implications are developed, which are also new scientific territory.

2.4 Positioning of the study

This thesis is based on three main aspects: smart city, shareconomy and crowdsourcing. The starting point is the detailed analysis of the young construct smart city. From this point, the work focuses on the aspects of digitalization and collaborative work. Innovative approaches, collaboration and opportunities for entrepreneurs are central tasks which are developed. Therefore, the topics shareconomy and crowdsourcing (including crowdcreation and crowdfunding) can be viewed as a logical continuation. The following figure illustrates the relationships between the fields.

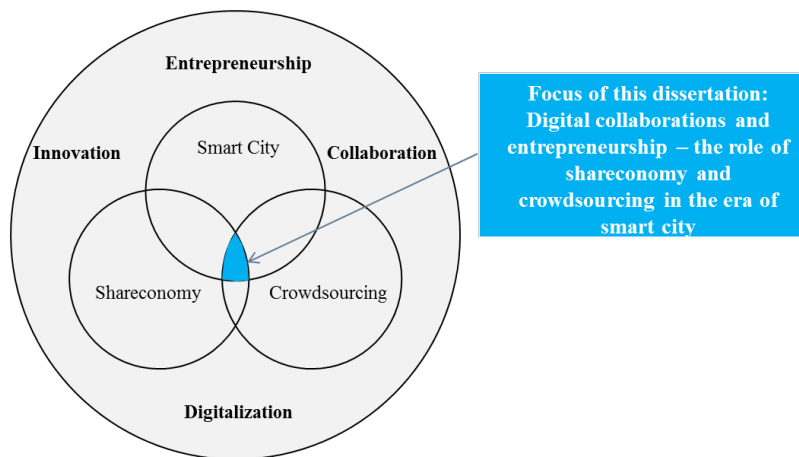


Figure 2: Visualization of the thesis scope

3 Methods

Research design and methods

This chapter discusses the methodological approach taken in this thesis. It consists of the research strategy, the research design, the sampling and data collection (literature review, qualitative and quantitative approach), used statistical methods, validity and reliability of the study and, finally, the research implications.

3.1 Research strategy

This thesis follows the general approach of scientific work. The use of qualitative methods is followed by the use of quantitative methods, according to the theory of empirical social research (Lazarsfeld and Oberschall, 1965; Punch, 2013). Making it more concrete for this specific case, the process of the research approach taken is as follows. First, a base for scientific work is generated with a detailed literature review and the forming of theories about certain aspects of the natural world (Olsen, 2004). Second, the theories are tested through qualitative approaches as well as by exploring so far unknown areas through real world experiences in expert interviews (Hyde, 2000). The last and third step is reviewing the findings of the qualitative approach through a quantitative research effort, benefitting from a larger case number and hence more generalizable results (Sandelowski, 2000). Therefore, this thesis follows the classical approach suggested by the theory of science: moving from the general to the more specific.

A second important aspect of this thesis's research strategy is the triangulation research strategy (Olsen, 2004). By combining different research methods the weaknesses of each method can be compensated and counter-balanced by the strengths of the other methods, leading to higher research effectiveness and validity (Jick, 1979). The field of triangulation research strategy is multi-layered. The author of this thesis follows the approach of using multiple data sets, sources, scientists and methods to gain better results than just following a one-dimensional research approach (Mayring, 2002).

3.2 Research design

The thesis's research design follows the classical theory of science approach. This involves building a literature base, defining fields of science, creating hypotheses, testing them qualitatively with a smaller circle of participants due the combination of deductive and inductive approaches and, finally, finding proof for the theories with a higher number of cases by a standardized quantitative process (Cooper and Schindler, 2013).

The foundation of this thesis is mainly based on three articles with the seminal work of existing literature on the subjects of smart city, shareconomy and crowdsourcing. This is a necessary step as these three fields are very young and largely unexplored in the academic world, as demonstrated by a lack of common definitions and a lack of empirical studies of these emerging phenomena (Caragliu et al., 2011; Estellés-Arolas and González-Ladrón-de-Guevara, 2012).

The qualitative approach employed in this thesis largely relies on two articles, the first one discussing 12 in-depth interviews on the topic of smart city (Publication 4: *Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany*), and the second one comprising 14 in-depth interviews on the subject of shareconomy (Publication 5: *Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries*). Gathering information and processing it through a qualitative approach involves describing a phenomenon in a very deep and comprehensive manner (Rhodes, 2014). The combination of deductive and inductive approaches creates the opportunity to gain new insights and to sharpen, confirm or even reflect previously gained insights which are presented in existing literature (Cooper and Schindler, 2013). Hyde (2000) describes the deductive approach as a theory testing approach, starting from the theory and the general existing knowledge on the matter and applying it to specific situations. The inductive research approach on the other hand is rather a theory building process, with empirical scientific work marking the starting point (Hyde, 2000). Here, research moves from a particular case and derives general statements and findings in support of the theory (Cooper and Schindler, 2013; Hyde, 2000). Combining these two elements in in-depth interviews is challenging, but simultaneously offers the best opportunity for gaining knowledge. The qualitative approach is able to provide a deeper understanding of new and so far more unexplored fields (Rhodes, 2014).

Two articles manifest the quantitative approach covered in this thesis. Both articles explore the area of crowdfunding. In the first article, the combination of success factors for the crowdfunding phenomenon are identified (Publication 6: *Strategies for reward-based crowdfunding campaigns*), while in the other article new and so far unexplored success factors for crowdfunding projects are examined (Publication 7: *Directing the wisdom of the crowd: Key success factors for crowdfunding-based financing opportunities for entrepreneurs*). The quantitative approach includes the gathering of information across a larger number of participants (in our case data sets) and applies statistical analyses to make stronger and maybe sharper derivatives (Rhodes, 2014). The applied statistical techniques are in one case the partially applied fuzzy set Qualitative Comparative Analysis (fsQCA), which is a new analytic form in scientific work in the fields of marketing and entrepreneurship (Wagemann and Schneider, 2010). The other method employed is a more standard approach. A binary logistic regression analysis was used to identify the most influencing key factors in crowdfunding projects. The quantitative approach enables the collection of a large number of participants and allows generalizing but is not suitable for little explored fields (Rhodes, 2014). Therefore it was used for the more popular part, crowdsourcing and its sub-category crowdfunding.

Internet research was started with the aim of identifying active entrepreneurs in the field of smart city and shareconomy. After listing and discussing the skill set of the potential interviews among the authors, shortening the list again and sending e-mails to the group, 12 (smart city) and 14 (shareconomy) experts were highly motivated to participate in this scientific work. With more than ten interviewees, a sufficient number of participants has been found to ensure reliable results (Groenewald, 2004). The interviews provided added value and the learning curve did not flatten too soon (Turner, 2010). The interviews were accomplished in person or via Skype to be able to see the personal reaction and emotions on both sides (Cooper and Schindler, 2013). The interviews were conducted in the German language, recorded, transcribed and finally coded. Coding was carried out according to the four-eye principle to avoid subjective influences and only then were the findings used and translated for the article in the English language. The goal in the interviews was the combination of testing already known aspects from the literature (deductive approach) and generating completely new findings (inductive approach) through real life experiences (Hyde, 2000).

The following table presents details about the 12 entrepreneurs who are interviewed for the smart city research. All interviews took place in Germany. Skype calls were used. The ration between male and female was mixed and not part of the research.

Table 4: Detail of the participating entrepreneurs - publication 4

#	Industry	Main product	Employees	Established
1	Transportation services	Application	5	2012
2	General services	Coding of applications	9	2011
3	Transportation services	Application	20	2012
4	Mobile Marketing	Application	13	2009
5	Transportation manufacturing	Electronic conveyance	60	2009
6	Sustainability services	Consulting	2	2011
7	Local retail services	Platform	6	2013
8	Sustainability services	Application	3	2011
9	Urban development services	Consulting	-	-
10	Energy service	Services	15	2012

11	Mobile Marketing	Application	7	2012
12	Transportation services	Application	3	2011

The next table presents the 14 entrepreneurs for the publication about shareconomy. 3 females were interviewed (out of 14 interviews in total), but now distinction was conducted. All 14 interviews were conducted in March and April 2014, the language was German and Skype calls were used in all cases.

Table 5: Detail of the participating entrepreneurs - publication 5

#	Business model field	Country	Employees	Established
1	Car-Sharing	Germany	11	2010
2	Community sharing of souvenirs	Switzerland	4	2012
3	Sharing of clothes	Germany	1	2012
4	Sharing of travel experiences	Austria	5	2013
5	Sharing of parking lots	Germany	5	2013
6	Sharing of parking lots	Germany Switzerland	33	2012
7	Sharing of utility objects	Switzerland	6	2013
8	Community sharing of souvenirs	Germany	3	2013
9	Sharing of all items	Switzerland	24	2012
10	Sharing of media items	Germany	5	2012
11	Sharing of children toys and clothes	Germany	6	2012
12	Sharing of utility objects	Austria	3	2012
13	Sharing of services	Switzerland Germany	35	2013

14	Sharing of camping mobiles	Germany	3	2013
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3.3.3 Quantitative work

The third and last stage of the thesis is comprised of two empirical articles in the field of crowdfunding with the data set created in the autumn of 2014. The basic framework of about 450 data sets was provided by a German crowdfunding platform and handed over to the author of this thesis for the research. Similar to Mollick's (Mollick, 2014) research design, the data set includes relevant information about the performance of specific crowdfunding projects. Examples of data collected are the number of supporters, achieved budget, or the name of the project owner, just to mention a few. The additional detailed manual work of gaining deeper insights of the individual projects without the technical assistance of the database was performed by the author himself. Objective supplements were carried out; the reason behind the manual work was the lack of automatism and new research ideas. Examples of the additions are personal information about the project owner (gender, picture), presence of pictures, videos, blogs or comments, or the support of other crowdfunding projects on the platform by the project owner. This intensive work with the data set and the projects was carried out according to the four-eye principle to ensure traceability, flawlessness, validity and reliability (Pasian, 2015). Because of two different statistical methods and different goals in the two articles, the final data set varies (446 and 432). Both data sets were calculated with the help of the statistical software SPSS. Used statistical methods are fuzzy set Qualitative Comparative Analysis (fsQCA) and a binary logistic regression analysis.

3.4 fuzzy set Qualitative Comparative Analysis (fsQCA)

fuzzy set Qualitative Comparative Analysis (fsQCA) is a relatively new methodology developed by the social scientist Charles Ragin for obtaining linguistic summarizations from data that are associated with cases (Mendel and Korjani, 2012). As qualitative comparative analysis (QCA) has been designed for the analysis of crisp sets, i.e. assigning each case to either membership or non-membership of a certain category, fuzzy set Qualitative Comparative Analysis circumvents the necessity of force-fitting cases into one of two categories by allowing for partial membership (Ragin, 2008). Whereas conventional statistical methods are mainly based on correlations, this method establishes rules summarizing the sufficiency between subsets of different combinations of the causal conditions and the outcome, thereby presenting a logical connection between causal conditions and an outcome (Korjani and Mendel, 2012). Analysis results are then presented in a so-called Boolean truth table, which presents the logical connections between combinations of causal condition, with each rule forming a possible path from the causal conditions to the outcome (Mendel and Korjani, 2012).

3.5 Binary logistic regression analysis

Logistic regression analysis models the relationship between a dependent (successful crowdfunding projects) and one or more independent variables (here the elements of a crowdfunding campaign), and allows an assessment of the fit of the model as well as the significance of the relationships between dependent and independent variables (Hosmer and Lemeshow, 2004). Binary logistic regression estimates the probability that a characteristic is present (here estimated probability of successful crowdfunding projects) given the values of explanatory variables, in this case single categorical variables like picture of the project owner or budget aim of the project (Cooper and Schindler, 2013; Hosmer and Lemeshow, 2004).

3.6 Validity and reliability of the study

The requirements for a thesis are multi-layered. Validity and reliability are key aspects of all research (Brink, 1993). A distinction is made in three parts: moral, stylistic and technical requirements. The first one is the moral requirement, the intellectual honesty. In fact, it is a commitment to independent work without plagiarism and improper methods that is closely linked to ethical behaviour in research design and implementation (Cooper and Schindler, 2013). The stylistic aspect is relevant for this thesis, but also for every single article included. Objectivity, simplicity of the structure, accountability and classical language without professional jargon are examples for the writing (Cooper and Schindler, 2013). Further requirements for linguistic style and the written presentation of the text are citation, fonts, spacing, passivation of texts among others (Hyland, 2004). Besides moral and stylistic requirements, the technical requirements are also to be considered. Technical requirements include objectivity, reliability and validity. To underline the trust in this thesis, various applications of these requirements are listed below and are to be separated between qualitative and quantitative approaches.

In the qualitative research theory, the central aspects are credibility, authenticity, transferability and trustworthiness instead of objectivity, validity and reliability, which are more connected to the quantitative approach (Janetzko, 2008). Selection of interviewees, coding and analysis are however also under the umbrella of objectivity, validity and reliability. For the selection of interviewees, the author followed the iterative process approach and sampling criteria suggested by DiCicco-Bloom and Crabtree (2006). The coding and the analysis were accomplished according to the four-eye principle to avoid subjectivity. Through the records, it would be possible to repeat the analysis by a third party.

In the quantitative research theory, the terms of objectivity, reliability, internal validity and external validity are relevant (Janetzko, 2008).

Objectivity or scientific objectivity is the highest goal for scientists and “addresses the question if the data collection is independent of the persons involved in data collection

and independent of the devices used” (Janetzko, 2008, p. 3). Researchers must strive to avoid bias and participants in surveys and interviews should not be influenced by including certain information that could lead to misinterpretation or the omitting of some form of evidence (Cooper and Schindler, 2013). The results should not be influenced by perspectives, values, commitments or personal interests and the researcher should take a neutral position (Payne and Payne, 2014).

Reliability means trustworthiness, steadiness and dependability and is “concerned with the question of whether one’s findings will be found again” (Merriam, 1995, p. 55). Used methods must present the same results in a potential repeating, especially accomplished by a neutral third party (Janetzko, 2008). However, especially in social science it is difficult to observe the same phenomenon several times due to changing human behaviours. Instead, researchers are advised to strive for what Lincoln and Guba, 1985) call “dependability” or “consistency” (Merriam, 1995). The scientific work needs to distinguish between facts, rumours, personal opinions, guesses or interpretations.

In terms of validity, several procedures have been identified by researchers and include methods employed in this thesis such as triangulation and close collaboration with participants during the research process (Creswell and Miller, 2010). Further, validity can be divided into internal and external validity (Campbell and Stanley, 1963). Internal validity is an often regarded aspect in research and is, “in terms of credibility and authenticity, often identified as a strength of qualitative research” (Weerawardena and Mort, 2006, p. 27) and hence refers to the degree of excellence a study was accomplished to. The research construction, the findings and the interpretation are under consideration in this aspect. Internal validity refers to the question of whether the derived conclusions of a relationship really imply cause (Cooper and Schindler, 2013). High internal validity allows a stronger self-confidence with the results. External validity on the other hand is the question about the capabilities of how well data and theories from one setting apply to another (Brink, 1993), in our specific case the destination selection of Germany, Austria and Switzerland. According to Campbell and Stanley, 1963, p. 5), “external validity asks the question of generalizability: to what populations, setting, treatment variables and measurement variables can this effect be generalized?”.

3.7 Research implications

Research in the field of entrepreneurship has greatly benefitted from researchers borrowing prominent theories from other fields, such as sociology and economics, and applying them to the entrepreneurial context (Zahra, 2007). But regarding the specific context in which the entrepreneurial activity is observed is an essential factor in understanding the motivation and considering the influence of external and internal factors on the phenomenon (Welter, 2011). In fact, Johns (2006, p. 386) defines context as “situational opportunities and constraints that affect the occurrence and meaning of organizational behaviour”.

Borrowing concepts from other research domains and applying them to new entrepreneurial phenomena leads to research suffering from inadequate context placement and obvious and inconclusive results (Zahra, 2007). As a consequence, academics often complain about the lack of good and valuable theory in the domain of entrepreneurship (Zahra, 2007). Hence, authors suggest contextualizing theory by “linking observations to a set of relevant facts, events or points of view that make possible research and theory that form part of a larger whole” (Rousseau and Fried, 2001, p. 1). Furthermore, researchers advocate and encourage the use of diverse and creative theory building to reveal novel findings (Phan, 2004), which includes “activities like abstracting, generalizing, relating, selecting, explaining, synthesizing, and idealizing” (Weick, 1995, p. 389). In order to contextualize theory in the field of entrepreneurship, Welter (2011) suggests considering situational, geographical as well as temporal boundaries in the process of framing research design. Here it is important to pay attention to the changing context and the resulting influence on setting, actions and behaviours (Welter, 2011).

The defined standard of scientific work is to generate new added value. Therefore, all seven publications were aligned to question old information and explore new aspects. The first three articles provided an overview of the current literature and delivered new, independent definitions of young research areas in two cases. A personal position in a young field of research was set. The interview article could present concrete fields of application and examples, which are interesting for managers and scientists. The last two articles about crowdfunding highlighted very concrete procedures for crowdfunding projects, which are also very interesting for managers and scientists for further research. The empirical articles stand out because they treat the German crowdfunding market, which is almost unexplored. Second, to the best of our knowledge the use of fuzzy set Qualitative Comparative Analysis (fsQCA) in this field is a world first. Third, individual findings are completely new, which allows a solid groundwork for further scientific work and interesting discussions.

4 Results

4.1 Summary of the publications and results

This section presents the results of seven publications included in this thesis. A table shows compactly the summary of the objectives, methods of analysis, research findings, main results and the main contribution of all seven publications. It is followed by a more detailed presentation of the individual articles, with a focus on the overall objective and the main findings. The section is completed by the summary of the overall results. Therefore, the “big picture” of the thesis is drawn and the relationships between the articles are made clearer.

The first article introduces the topic smart city and the novel field of application for entrepreneurial activities. The strong connection between the availability of ITC, big data, open source, the mindset of the citizen and necessary developments for cities and governments are analyzed. The term digital collaboration is introduced with the aim of creating a more liveable environment.

The second article deepens the idea of digital collaboration, with the focus on the new phenomenon shareconomy. The various forms of shareconomy are analyzed and the entrepreneurial opportunities are examined more closely. Furthermore, the question of short-term movement or sustainable change is discussed.

The third publication discusses the topic of crowdcreation as a sub-category of crowdsourcing or crowd moving on the Internet. The article analyzes the opportunities for entrepreneurs and established companies to use the wisdom of the crowd for product creation, opinion forming, or voting by anonymous Internet users.

The fourth article develops the entrepreneurial opportunities and challenges in the environment of a smart city in more detail. Concrete experiences of entrepreneurs are discussed and analyzed. The aspect of collaboration through the transformed urban development is part of this article.

The fifth publication included in this thesis also deals with entrepreneurial opportunities and challenges, but in this case in the environment of shareconomy. Concrete examples are discussed in which the necessity of interaction between several stakeholders is crucial. Even the term “share” suggests togetherness and in this specific case the digital togetherness of the sharing of goods, data and knowledge are examined.

The sixth article introduces the reader to crowdfunding as a sub-category of crowdsourcing. Financing projects with the help of anonymous investors through a crowdfunding platform on the Internet is an alternative way of funding and requires closer inspection. Concrete recommendations for action in order to increase success probability are identified. The interaction and the communication between the project

owner and the crowd are crucial – therefore it is also a co-working or digital collaboration theme.

Finally, the seventh publication adjoins the sixth article. In a different way of statistical calculation, concrete success factors for crowdfunding campaigns are identified and transferred into manager implications.

All presented articles are built on each other, in reference to content and method. Together, the papers form a fundamental basis of research in the field of collaborations in smart city and the area of shareconomy and crowdsourcing. The influence of these novel phenomena on entrepreneurial activity is analyzed and concrete fields of application are identified. The created fundament of this thesis constitutes the discussion base for further analyses, extensions, criticism and support. Since the fields of this thesis are young and therefore mostly unexplored scientifically, the articles can be used in particular for theory-testing as a starting point for further scientific work.

The table below summarizes the research objectives, theoretical perspectives, methods, data, research findings and contributions of the research papers of all seven publications included in this thesis.

4.1.1 Publication 1: The smart city as an opportunity for entrepreneurship

Overall objective

The first article focuses on smart city as a novel concept in urban development, knowledge economy, management and entrepreneurship. The article reviews scientific literature until the date of the publication and provides insights into the fields of application and existing definitions, thereby ensuring the overall understanding of smart city on entrepreneurial activities. Furthermore, digital collaborations are introduced using big data. .

Previous studies have mostly focused on individual aspects of the interdependencies that contribute to the global concept of smart city such as quality of life or human resources. The term smart city is associated with many fields of application and even branches; there is a danger of it becoming a buzzword without a concrete background and a commonly accepted definition of smart city (Allwinkle and Cruickshank, 2011). The article focuses on the six characteristics of a smart city with the concrete focus on entrepreneurial activities.

Main findings

Six characteristics of smart city are identified and analyzed in detail, continuing and expanding the scientific work of Hollands (2008). The availability of ICT infrastructures dominates the concept and will continue to be the central aspect of smart city, together with the willingness to cooperate and work together with foreign citizens,

companies or governments on the base of data exchange (Caragliu et al., 2011). The article provides an independent definition of smart city to contribute to the establishment of a commonly accepted definition in the focus of entrepreneurial activities in the environment of smart city.

The article limits the scope of the topic sharply, focusing mainly on the entrepreneurial activities in a smart city. This approach was novel at the time of publication. Further, this publication provides the basis for the thesis, as all other articles also rotate around the topic of collaborations in the digital new world with a focus on entrepreneurial opportunities and challenges.

4.1.2 Publication 2: The shareconomy as a precursor for digital entrepreneurship business models

Overall objective

The second article examines and discusses another kind of digital collaboration, namely the shareconomy concept. While the concept of sharing is as old as humanity, the economic principle of sharing instead of owning in the context of digital exchange platforms is rather new and emerged in 2013 as a guiding theme for the international and globally leading German high-tech fair CeBIT (CeBIT, 2013). So far, scientific work in this research area mostly dealt with individual aspects of sharing like music or knowledge, or the more global approach of the sharing culture, but did not draw connections to emerging entrepreneurial activities.

The specific connection between the concept of shareconomy and entrepreneurial activities were unexplored at the time of publication. Furthermore, a commonly accepted definition of shareconomy was also missing (Katz et al., 2014), a research gap that this publication intends to fill.

Main findings

The article identifies a trichotomy of shareconomy: sharing digital content, sharing physical content and participation in commercial, cultural or social projects. This approach confirms Kempf's (2013) point of view and is enhanced with additional components.

The article also presents a very sharp definition of shareconomy and subsumes already existing definitions in order to form a single holistic definition of the concept.

The connection between shareconomy and entrepreneurial activity is examined in more depth and practical examples are presented for illustration purposes. Shareconomy is identified as a promising opportunity for entrepreneurs, especially in niche-filling activities.

The study further contributes to research in this field due to the intensive literature review, which offers a holistic overview of scientific publications from recent years. The new definition of shareconomy is the foundation for further development, support or criticism. Yet, a very clear position on the topic is given and the concrete examples offer the opportunity to analyze the development in this field in the upcoming years.

4.1.3 Publication 3: Crowdcreation as a dimension of crowdsourcing: conditions for entrepreneurs

Overall objective

The third article analyzes crowdsourcing with a particular focus on the sub-category crowdcreation. Hence, a third concept of cooperation and collaborations in the digital context is introduced and analyzed. While the overarching phenomenon crowdsourcing was the subject of research of numerous articles and investigations due to its strong connection to globalization and the trend of shifting resources to low-wage countries, the sub-category crowdcreation was almost unexplored at the time of publication.

The aim of the article is to provide an overview of current activities in the field of crowdcreation and illuminate emerging entrepreneurial opportunities and challenges. Especially the advantageous position entrepreneurs are able to enjoy through the crowdcreation concept is highlighted.

Main findings

After a detailed literature review for the main topic crowdsourcing and the identification of three relevant sub-categories (crowdvoting, crowdfunding and crowdcreation), the sub-category crowdcreation is analyzed in more detail, which is linked to the idea of the collaborative knowledge (Geiger and Schader, 2014). Concrete fields of application are presented (generating ideas, adopting micro tasks, design drafting) and then combined with the identified advantages for entrepreneurs. These advantages include access to creativity and high flexibility, just to mention two – and exceed the disadvantages (e.g. potential quality loss or increased transparency of business models and business ideas) significantly.

The study contributes to the young field of academic research in several ways. First, crowdcreation as a separate theme was almost unexplored and this article contributes relevant findings. Second, fields of application could be defined on an individual basis, but have not been regarded in an overall framework. Third, this publication presents an overview of the identified advantages and disadvantages for entrepreneurs using crowdcreation, which were not known of at the time of publication. Fourth, the pure combination of the areas crowdcreation and entrepreneurship is new and adds value to this field of research. In summary, the article offers a basis for further scientific work, especially for future empirical work.

4.1.4 Publication 4: Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany*Overall objective*

The fourth publication offers additional and deeper insights into the first article about smart city. This article builds upon the detailed literature review of the first article and additionally integrates the new findings of in-depth interviews with 12 entrepreneurs. The components smart city, collaboration and entrepreneurial activities are in the focus of this scientific work. Also, the article offers a unique research approach of in-depth interviews with entrepreneurs in the context of smart city that was new at the time of publication.

The aim of the article is to prove the findings and theories in the existing literature with real life experiences of entrepreneurs and expand the findings with so far unknown areas of applications.

Main findings

Six relevant categories of smart city, as defined by Hollands (2008), are discussed in detail, always with a focus on entrepreneurial activities and innovation opportunities. Out of the six characteristics for smart city, four could be confirmed completely (availability and quality of ICT infrastructure and information management, closeness to high-tech and creative industries, the role of social and relational capital, and social and environmental sustainability), whereas the remaining two characteristics could only be confirmed partly (business-led urban development and social inclusion of urban residents in public services). One very interesting and new characteristic emerged from the interviews: the government-led development and support, which has not been a topic in the literature so far but was evaluated as extremely relevant for the success of the novel concept of smart city.

The study contributes to a critical discussion about the added value of smart city in the current state of research. The article provides clearly structured managerial implications in order to improve the current situation and serves as a basis for further empirical research on the themes of smart city, entrepreneurial activities and collaborations.

4.1.5 Publication 5: Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries*Overall objective*

The fifth article expands the existing research in the field of shareconomy. The second publication introduced in this thesis serves as a basis for this article. In fact, the detailed literature review is used as a base for 14 in-depth interviews with entrepreneurs. Similar

to the first four articles in this thesis, the approach of interviewing entrepreneurs in the field of shareconomy was, to the best of our knowledge, unique at the time of publication.

The aims of this article mainly correspond to the aims of the fourth publication: testing theories of the existing literature in the field of shareconomy with experts and real world experiences of entrepreneurs as well as finding unknown components, connections and fields of application in the areas of entrepreneurship, shareconomy and digital collaborations.

Main findings

The literature review highlighted three relevant characteristics of shareconomy: sharing digital content, sharing physical goods and participation in commercial, cultural and social projects. The 14 experts in the field supported the first and the second fields of application, but completely denied the aspect of *participation in commercial, cultural and social projects*. This finding is surprising because several articles about shareconomy only discussed the social movement and the radical change in the era of shareconomy. However, other relevant factors for shareconomy were mentioned in the interviews: customers as providers and consumers (prosumers), mindset, changed living conditions, urbanity, real win-win situation, added value and a trusting business model. These new characteristics, as mentioned by the entrepreneurs in the field of shareconomy, led to a new relevant cascade (or waterfall) in this scientific field: changed living conditions, business model and customer benefit.

Therefore, this publication contributes in several ways to the existing scientific work in the field of shareconomy. First, the existing literature has been tested and applied in a real life business environment. Second, findings conclude that the relevance of one of the most discussed characteristics can be neglected while seven other characteristics of shareconomy could be added. Third, this publication builds the base for further empirical research due to the proof of concepts with in-depth interviews.

4.1.6 Publication 6: Strategies for reward-based crowdfunding campaigns

Overall objective

Whereas the first five publications discussed in this thesis have largely focused on areas that are not yet subject to academic exploration, the sixth article takes a different approach. This publication deals with the subject of crowdfunding under the overall concept of crowdsourcing. This field has been intensively studied since 2013, but primarily based on American data sets coming from American crowdfunding platforms with more than 50,000 data sets (e.g. Kuppuswamy and Bayus, 2014; Mollick, 2014). While previous literature mostly identified individual factors of successful crowdfunding campaigns, this article combines crowdfunding with entrepreneurial

activities and considers the anonymous group of investors for the purpose of co-operation (or digital collaborations).

The particular aim of this publication is the transfer from American crowdfunding platforms to European, or more specifically to German crowdfunding platforms, with a significantly smaller number of data sets. Furthermore, this publication offers an identification of differences in the behaviour of crowdfunding project owners, based on a detailed literature review and the review of several empirical analyses based on American data sets.

This article does not differ in the structure of relevant existing scientific work, but rather differs in the method. The structure is a continuation of work by Mollick (2014), and employs the fuzzy set Qualitative Comparative Analysis (fsQCA), which is very rarely used in the field of crowdfunding and creates scientific added value (Wagemann and Schneider, 2010). fsQCA analyzes the individual components of crowdfunding and determines success combinations, unlike previous research which only considered individual components that increase the success rate of crowdfunding campaigns. The resulting combinations produce concrete managerial implications that are introduced in this publication.

Main findings

This paper is set to introduce a so far almost unused statistical method (fsQCA) to the field of crowdfunding. Three different combinations of success factors for a higher probability of success in crowdfunding campaigns could be identified. Furthermore, the paper offers practical implications for future crowdfunding project owners, based on the derived typology of crowdfunding campaigns. Along the axes of sales effort and project added value, three different terms of crowdfunding project owner were created: communicator, networker and self-runner. These terms are connected to crowdfunding strategies, concrete practical exercises and managerial implications.

Entrepreneurial approaches are discussed according to the specific personality, and the quality of the product and the interaction and communication of entrepreneurs within the crowdfunding community and the social networks are illuminated. Hence, the sixth publication considers the connection aspect of digital collaborations among entrepreneurs and regards this phenomenon from a new perspective.

The contribution to existing literature is fourfold. First, the almost unused method fsQCA is introduced to the field of crowdfunding. Second, concrete managerial implications for entrepreneurs in the field of crowdfunding are given. Third, three different traits of crowdfunder personalities are introduced and deposited with patterns of behaviour. Fourth, this publication builds the base for discussion, support and criticism in future scientific work.

4.1.7 Publication 7: Directing the wisdom of the crowd: Key success factors for crowdfunding-based financing opportunities for entrepreneurs

Overall objective

Similar to the previous article, the seventh publication adds to more scientifically considered areas. Using a data set of a German crowdfunding platform and a more often used statistical method (binary logistic regression analysis), the intensive work and comparison with already existing literature and empirical results is in the foreground. Furthermore, similar to the other articles presented in this thesis, the combination of digital collaboration, here in the specific case of crowdfunding, and entrepreneurial activities is the main focus.

The aim of this article is to identify individual success factors that enhance the probability of success for crowdfunding projects. The focus is put on so far unexplored features or not so often used variables. Lastly, concrete managerial implications for crowdfunding project owners are derived from the findings and presented in this publication.

Main findings

The article could identify eight concrete success factors for crowdfunding campaigns on the basis of a European crowdfunding platform. Some factors are known from existing literature and the dominant US examples could be confirmed in this study; furthermore, some so far almost unexplored factors could be added. Hence, the success factor “teaming up as crowdfunding project owners” and “supporting other crowdfunding projects on certain platforms” are newly added insights. Furthermore, this article offers a newly built categorization of success factors by dividing the eight factors found in two clusters: social factors and framework factors. Concrete practical implications are given and make the article applicable in a business environment.

Moreover, the article offers proof that the personality of the crowdfunding project owner affects the success of the project. Therefore, the presented managerial implications can assist entrepreneurs to perform better in the digital environment. Communication and co-working with other crowdfunding project owners is identified as crucial and underlines the connecting aspect of the thesis: collaborations in a digital world.

The seventh study contributes to the scientific work in several ways. First, the crowdfunding literature is dominated by projects about US crowdfunding platforms and data sets, whereas this article offers a European point of view. Second, the data sets from Kickstarter that previous studies utilize are very large. This article uses a smaller data set and is able to recognize particularities. Third, so far rarely described factors like “teaming up” or “supporting other crowdfunding projects” is part of the work, due to the high time investment and intensive work of the authors with the existing literature

and the data. Therefore, new aspects could be added to the broad field of crowdfunding literature. Fourth, two clusters of success factors could be introduced, social and framework factors, offering a new differentiation to the best knowledge of the author. Last, this article offers an opportunity for further scientific work, discussions, criticism and support.

The following table summarizes the main findings.

Table 6: Main findings of the publications

Publication title	Objective	Research method and data	Main results (Excerpt)
Publication 1: The Smart City as an Opportunity for Entrepreneurs	To provide basic knowledge of the young research field of smart city and identify potential entrepreneurial activities for further research	Literature review	<ul style="list-style-type: none"> • Confirmation of six characteristics of smart city • Creation of a definition of smart city with the focus on entrepreneurial activities • Greatly sharpening the research field for future work
Publication 2: The Shareconomy as a Precursor for Digital Entrepreneurship Business Models	To generate background knowledge of the shareconomy and identify potential entrepreneurial activities for further research	Literature review	<ul style="list-style-type: none"> • Identification of a trichotomy of shareconomy, confirming existing literature • Creation of a definition of shareconomy with a more holistic approach • Introducing entrepreneurial activities in the field of shareconomy
Publication 3: Crowdcreation as a Dimension of Crowdsourcing:	To produce background knowledge of crowdsourcing in	Literature review	<ul style="list-style-type: none"> • Analysis of the little explored sub-category crowdcreation

Conditions for Entrepreneurs	general and crowdcreation in a more detailed approach		<ul style="list-style-type: none"> • Identification of concrete entrepreneurial fields of application • Presentation of advantages and disadvantages for entrepreneurs using crowdcreation
Publication 4: Innovating and exploiting entrepreneurial opportunities in a Smart City: Evidence from Germany	To analyze the real world experiences of entrepreneurs from the field of smart city and compare them with the existing literature	Qualitative study; in-depth interviews; 12 entrepreneurs from Germany, Austria, Switzerland	<ul style="list-style-type: none"> • Real world experiences of entrepreneurs • Confirmation of six characteristics of smart city and finding one little explored field of application • Presentation of concrete managerial implication
Publication 5: Innovative Business Models for the Shareconomy: An Exploratory Study of 14 Entrepreneurs from the German-speaking Countries	To analyze the real world experiences of entrepreneurs from the field of shareconomy and compare them with the existing literature	Qualitative study; in-depth interviews; 14 entrepreneurs from Germany, Austria, Switzerland	<ul style="list-style-type: none"> • Real world experiences of entrepreneurs • Confirmation of relevant characteristics, refuting one of the most discussed arguments • Introduction of a waterfall model for relevant characteristics for further research
Publication 6: Strategies for reward-based crowdfunding campaigns	To compare crowdfunding campaigns and identify options for entrepreneurs which are success factors through a	fuzzy set/Qualitative Comparative Analysis (SPSS), 446 data sets from a German crowdfunding	<ul style="list-style-type: none"> • Identification of little-explored combination of success factors for crowdfunding campaigns • Introduction of three

	combination of platform features		types of crowdfunder • Concrete managerial implications
Publication 7: Directing the wisdom of the crowd: Key success factors	To identify options for entrepreneurs to optimize the crowdfunding campaigns and increase the probability of success for their future campaigns	Binary logistic regression analysis (SPSS), 432 data sets from a German crowdfunding platform	<ul style="list-style-type: none"> • Confirmation of numerous success factors of existing literature • Identification of little-explored, new success factors • Introduction of a new cluster for success factors: social and framework aspects

5 Conclusion

5.1 Introduction

Tackling the quote in the first lines of this thesis in the introduction chapter, which calls digitalization the most powerful change since the industrial revolution (Arthur, 2011), this thesis can partly support massive changes in the field of digital collaborations with the focus on entrepreneurial opportunities in the areas of smart city, shareconomy and crowdsourcing. The aim of this thesis was to extend the scientific knowledge in these fields, and was dominated by two research objectives:

First, reviewing existing literature in the fields of smart city, shareconomy and crowdsourcing with a focus on entrepreneurial opportunities.

Second, generating empirical data to prove the existing literature, confirm or reject existing hypotheses and build our own insights.

The thesis tackles the first research objective by providing a theoretical contribution to the existing scientific work in the fields of smart city, shareconomy and crowdsourcing in general. Also, the novel and additional added value aspects are the strong connection between the themes smart city (publication 1), shareconomy (publication 2) and crowdsourcing (publication 3) on the one hand and the aspects of entrepreneurial opportunities on the other. The first three publications are detailed literature reviews and are considered as fundamental basis work. They also provide a core for the second research objective, which asks for the generation of empirical data.

The thesis addresses the second research objective by collecting insights of real world experiences. The study generates context-specific findings in different ways. It starts with in-depth interviews with entrepreneurs about business opportunities, opportunities and risks from the fields of smart city (publication 4) and shareconomy (publication 5). It is followed by the quantitative approach of figuring out success factors for entrepreneurs in crowdfunding campaigns. Once combinations of factors for successful projects are identified (publication 6), concrete success factors for crowdfunding campaigns of entrepreneurs are analyzed (publication 7). This thesis contributes to the entrepreneurship literature by building a better understanding of entrepreneurial opportunities in the fields of digital collaboration in the areas of smart city, shareconomy and crowdsourcing.

5.2 Results

Considering the central research question of this thesis (“Are there business opportunities for SMEs in the fields of smart city, shareconomy and crowdsourcing, and what specific fields of application and recommendations of implementation are to be identified (especially in the countries of Germany, Austria and Switzerland)?”), it can

be stated that every single publication addresses this research question and delivers meaningful insights.

Picking up the rough framework of this thesis, it can be stated that the four major goals could be achieved.

The link between smart city, shareconomy and crowdsourcing could be confirmed. Conditions in these fields of research could be described and limitations, advantages and concrete fields of application could be identified. Finally, success factors and managerial implications could be delivered, which are highlighted in the results and in a short summary in this section. Figure 4 symbolizes the successful research work.

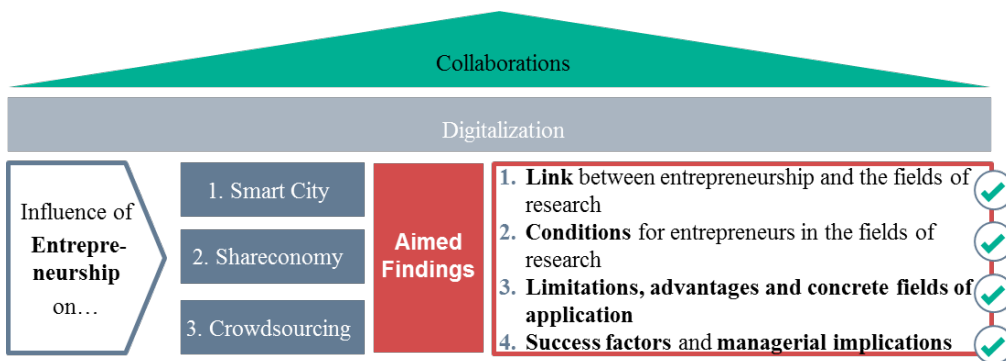


Figure 4: Achieved findings in this PhD thesis

The more concrete research questions within the seven publications are also mentioned in this section and confirm the strict answering of the research questions.

Publication 1 about smart city found the strong relationship between the concept of smart city and entrepreneurial activities or entrepreneurial marketing. The favourable conditions and characteristics of smart city like availability and quality of ICT infrastructure and usage, business-led urban development or high-tech and creative industries are a breeding ground for entrepreneurial opportunities and niches. Six relevant fields of application were analyzed and the publication highlights the opportunity for entrepreneurs and calls for a detailed analysis of these concrete fields of application in future research.

Publication 2 explored the research question “What are the connections between the up-and-coming field of shareconomy and entrepreneurship?”. First, the general base for entrepreneurial opportunities could be confirmed through the innovative, niche-filling activities in an environment of changing consumption behaviour from owning and now leading to sharing and renting. The sharing of digital and physical goods including concrete examples from real world experiences could be confirmed as business opportunities for entrepreneurs. A strong future consumer base and the possibility of

reducing individual consumption by sharing will open even more new opportunities for sustainability-driven entrepreneurship. Therefore another unexplored link to green entrepreneurship is also confirmed.

Publication 3 about crowdsourcing investigates the research question “What are the conditions for entrepreneurs using crowdsourcing in general and crowdcreation in particular?”. The publication can offer several concrete conditions for entrepreneurs in the field of crowdsourcing and crowdcreation. Crowdsourcing means the transfer of tasks to an anonymous crowd via the Internet. Crowdcreation is a sub-division and treats the creation of ideas, products and services through the crowd. Advantages (like access to greater creativity and innovations, external resources, high flexibility, market research and market testing) are offset by disadvantages (like loss of quality control, threat of ideas being copied through the crowd, more complex cost calculation). A consideration of these advantages and risks is important for entrepreneurship, but publication 3 recommends the usage of crowdsourcing for entrepreneurs due to their lack of resources and competences, which is commonly accepted as one of the greatest limitations for small and medium-sized businesses.

Through the first three publications, the first part of the superordinate research question can be confirmed positively: there are strong business opportunities for SMEs in the fields of smart city, shareconomy and crowdsourcing. The following four publications investigate more deeply the concrete fields of application for entrepreneurial opportunities.

Publication 4 about the real world experiences of entrepreneurs in smart city deals with the concrete fields of application and entrepreneurial opportunities (“To what extent do the six characteristics of smart city apply to the real world experiences, what other factors are of importance, and what are the interconnections between the identified factors?”). The current lack of a responsible player and a clear vision of smart city dominates the insights and represents an unexplored factor in the existing research. Four aspects of smart city which dominated the existing literature so far could be confirmed by our experts: availability and quality of ICT infrastructure and information management, closeness to high-tech and creative industries, role of social and relational capital, and social and environmental sustainability. Two main aspects in the existing literature could not completely find support from the experts: business-led urban development and the social inclusion of urban residents in public services. The publication offers several recommendations for further development in the environment of smart city: on the one hand hard factors like technological solutions, and on the other hand soft factors like cluster building, attracting further entrepreneurs or offerings subsidies.

Publication 5, with interviews of entrepreneurs in the field of shareconomy about their real world experiences and entrepreneurial opportunities, offers concrete insights into the so far unexplored research field (“Which factors of shareconomy are really relevant for entrepreneurs?”). Nine aspects could be identified, which are clustered into three

main topics by the authors: business model (including the factors sharing of digital content, sharing of physical content and customers as providers and consumers (prosumers)), changed living conditions (including mindset, changed living conditions and urbanity) and customer benefit (including real win-win situations, added value and a trusting business model). This trichotomy is a result of 14 interviews and serves as a basis for further research in the future.

Publication 6 is about crowdfunding and tries to answer the research question: “What makes crowdfunding successful? Which combinations of key success factors of crowdfunding are relevant?”. The data set of a German crowdfunding platform offers three different success paths for crowdfunding campaigns. Under consideration of the multi-layered options of crowdfunding campaigns, the deduction of three paths is very helpful and offers the option for further research in the future. Path 1 is the combination of the number of supporters and backers and the number of comments. Path 2 asks for the number of supporters and backers, updates and blog entries and rewards/incentives, but avoids additional web presence. Path 3 contains the same aspects, but in a different order: it asks for additional web presence, number of supporters and backers, updates and blog entries but avoids rewards/incentives. Strict application of these results increases the probability of a successful crowdfunding campaign significantly.

Publication 7 also deals with crowdfunding, but in this case the individual success factors for entrepreneurs during crowdfunding campaigns (“Which individual aspects of factors for crowdfunding projects ensure the success of crowdfunding campaigns?”). Eight different aspects could be identified, which partly support the existing literature, and partly represent new insights. The factors “funding as a team” and “supporting other projects on the specific crowdfunding platform” are unexplored features to the best knowledge of the author. An interesting aspect of the paper is the table “change in probability of successful (non-successful) funding”, which offers a statistically supported probability of success for crowdfunding campaigns for every single factor.

The seven publications included in this thesis offer a very concrete picture of entrepreneurial opportunities in the fields of smart city, shareconomy and crowdsourcing. The existence of entrepreneurial opportunities could be confirmed and concrete fields of application could be identified in detail. Partly, the developed results are completely new for this field of research and form the basis for further research. The research question could be answered in every single publication and therefore contributes to the overall picture and allowed us to gain deep knowledge. The following visualization presents the goal of the thesis and the developed findings.

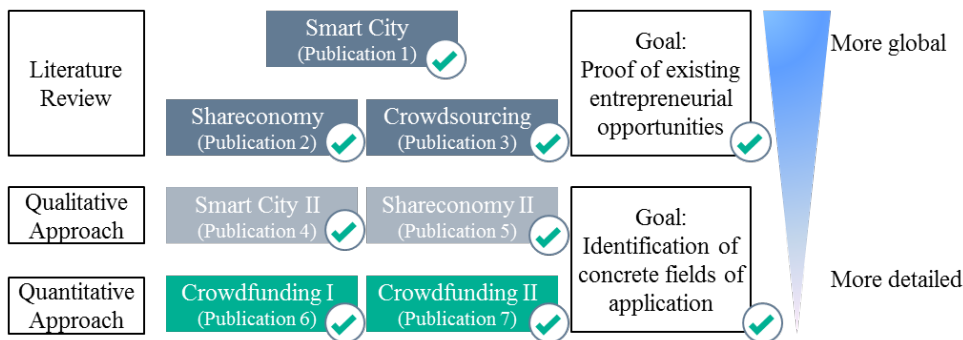


Figure 5: Research design and achieved goals

5.3 Theoretical contribution of the study

The findings of this thesis contribute to the scientific work on entrepreneurship in the fields of smart city, shareconomy and crowdsourcing. The work includes theoretical, empirical and methodological findings or unexplored areas, which are presented below.

First, after the basic work and the intense comparing with the existing literature, two completely independent definitions of the so far very broad and partly unstructured fields of smart city (publication 1) and shareconomy (publication 2) could be presented. Therefore, the research areas of smart city and shareconomy are now sharply limited for future research. Already existing literature and definitions are newly compounded and present more generally accepted definitions. The combination of basic work of literature reviews and the link to entrepreneurial opportunities is an important theoretical contributions.

Second, the publication about crowdsourcing and the sub-category crowdcreation (publication 3) underlines the necessity of a deeper theoretical analysis in this field. Crowdcreation as a separate theme was almost unexplored and was not analyzed in a holistic approach. A confrontation of advantages and disadvantages for entrepreneurs using crowdcreation was a new approach, which was not known at the time of publication. Another aspect is the pure combination of crowdcreation and entrepreneurship, which also had not been done in the past. Therefore the article offers a strong theoretical base for further research.

Third, the used method of the in-depth interviews with entrepreneurs in the field of smart city (publication 4) and shareconomy (publication 5) are the first empirical analyses in this field, to the best knowledge of the author. Relationships between the fields of smart city and shareconomy as well as entrepreneurial opportunities, opportunities, threats, confirmation of existing literature and gaining so far unexplored aspects contributes strongly to these very young fields of research.

Fourth, the publications about crowdfunding (publications 6 and 7) developed several so far unexplored features for successful crowdfunding campaigns through the empirical approach. These empirical results offer the opportunity for further research in this field, confirmation and refutation of the gained insights and a strong basis for discussion.

Fifth, one so far not used method in the field of crowdcreation demonstrates the novel approach of this thesis (publication 6, fuzzy set Qualitative Comparative Analysis). The fuzzy set qualitative comparative analysis offers several traits for successful crowdfunding campaigns. Therefore the selection of this method offers methodological novelties and therefore contributes strongly to future research.

Sixth, publication 7 compares the crowdfunding results of Germany, Austria and Switzerland with the dominating US market and delivers besides the regional comparison also so far not explored crowdfunding success factors. This is attributed to the strong manual work on the data set, which leads to a strong empirical contribution.

Summarizing the result section, this thesis makes a deep contribution to the young research field due to the listed insights. Partly, the base work for further research is built through this work and underlines the high level of new insights and innovations.

5.4 Limitations and suggestions for future research

The author of this thesis is aware of limitations in his work, which is very likely in a PhD thesis and especially in a very young field of research.

The first point which is to be mentioned is the fact that this work is focused on entrepreneurial opportunities in the fields of smart city, shareconomy and crowdsourcing. Deep technical, social, psychological or even more global analyses are not part of this work. Therefore, these fields of research strongly contribute to the field of entrepreneurship, but do not offer a holistic approach.

Second, the definitions in the fields of smart city and shareconomy were defined in 2014 and with the best knowledge of the author. The literature and the research in these fields develop rapidly, so it is possible that smart adaptations are already necessary.

Third, the empirical work in the fields of smart city and shareconomy are limited to in-depth interviews due to the young field of research and the lack of established or even easily recognizable companies in this field. Therefore, a larger number of interviews or even the opportunities of quantitative analysis were not available at the time of publication. These opportunities could strongly underline the gained insights of this work, which is also mentioned in the section on future research. More empirical work would be helpful to strengthen the newly established definitions as well. In a broader approach, the empirical work in different settings can discover more entrepreneurial

opportunities in the investigated fields of research. The fields of research are strongly heterogeneous, therefore a deeper base with sets of data are greatly welcomed.

Fourth, the in-depth interviews took place in Germany, Austria and Switzerland. The results are characterized by European countries, all respected and well-organized, economically stable and open for innovation. Therefore, the insights of this PhD thesis present an extract of the global development in the fields of smart city and shareconomy.

Fifth, the data for publications 6 and 7 come from a German crowdsourcing platform whose users are mostly German-speaking. Therefore, the results present an extract of the German crowdfunding market and the behaviour of German entrepreneurs, which can be understood as an approximation, but not as a global character. The identified differences between the German crowdfunding platform and the well-recognized US crowdfunding platform could be continued and deepened in particular ways.

Sixth, the generated data sets are strongly limited in context of quantity. Therefore, this work can be regarded as a snapshot and excerpt with meaningful insights, but further research with a higher quantity is absolutely necessary. The conducted qualitative studies are related to validity and reliability limitations due to the fact of almost impossible replication of the interviews.

Seventh, the thesis worked in the field of success factors and could identify concrete factors to improve entrepreneurial orientation. The academic theory of success factors is highly controversial, some researchers even deny the relevance of single factors. This critical opposite is not worked out in this thesis in depth and could be continued and deepened in particular ways.

5.5 Policy and managerial implications

This thesis provides several managerial and policy implications besides the strong theoretical contribution to the field of research.

The central aspect in the research about smart city is the lack of the leading position in the construct. Who is responsible in a city for further development, engaging the citizens to participate, motivating companies to support this movement? A concrete answer in the in-depth interviews could not be found because the predestined player, the city council, could not fulfil the expectations of the entrepreneurs. The urgent need for well-qualified staff in the municipal administrations is an outstanding result of this work. The concept of urban development is supported by the country, so the interplay between the city, the county and state has to be redefined. Clear responsibilities are necessary to lead the development from day one to avoid the loss of common goal alignment and taking advantage of bureaucratic clearances by large enterprises with high capital investments. Clear rules are needed at an early stage in order to stop the

fear of the residents of foreign rules by innovative companies (e.g. Google, Apple) and the handling of sensitive personal data.

Another very interesting aspect is the need for qualified staff in municipal and regional banks under control of the city, county or state. Investments in companies out of the fields of smart cities, shareconomy or crowdcreation are not comparable with classical investments in small and medium-sized enterprises like hairdressers, shops or car dealerships. Investments in young online companies are more abstract, more risky and partly not able to be documented in a serious business plan. Therefore, the chances of entrepreneurs in the fields of smart city, shareconomy or crowdsourcing obtaining a loan are very limited due to the lack of online skills among bank employees.

Third, the expected growth of the shareconomy movement asks for stronger regulations in terms of taxes and regulations for business models in this online field (e.g. shareconomy alternatives for cab services or room rentals). Otherwise, the negative impression of bypassing existing taxes and regulation in the “real world” should be limited by the government. This means that the responsibilities start immediately with the issues and raise profound laws and taxes.

Fourth, the idea of a social motivation for entrepreneurs in the environment of shareconomy is rejected (Publication 5); only the pure idea of monetizing an idea is the driving force. This aspect is crucial to note for further investments from governments. Shareconomy users are interested in social, urban and cultural ideas and development, but the entrepreneurs behind the business models are not interested in this. This small but crucial difference should be considered in questions of subsidies.

Having considered the policy implications, we now turn to the managerial implications.

First, the term “smart city” is negatively associated through inflationary usage and the very broad field of applications plus the lack of a commonly accepted definition. Therefore, entrepreneurs should be aware of labelling their business and their idea with the term “smart city” solely without having a fundamental business model in this field of business. Using the term frequently could be interpreted negatively because the content is still unclear for the broad public.

Second, crowdsourcing and crowdcreation offers a broad field of positive influences. The central aspect of the concept is the interaction with the crowd and therefore with potential customers. This access to clients is crucial for product and services development, feedback routines and ideas collection. One central aspect of failure of young companies is the implementation of an idea without considering the real needs and wishes of the potential customers. The very banal sounding key point, that the customer is at the centre of the business model, is a very rarely used one. Crowdsourcing offers an opportunity to prove the business concept at an early stage.

Third, in the first publication about crowdfunding (publication 6) the authors identified three different types of project owner: the communicator, the networker and the self-runner. The classification is underlaid with the two factors required sales effort and project added value as components for a successful crowdfunding campaign. Entrepreneurs have to be self-reflected and self-conscious to categorize themselves into one of the three types of project owner. The communication strategy and needed sales effort are derived, so very concrete instructions have been found. Five practical guidelines for future project owners could be identified: 1) Start creating new projects with the simple goal of generating added value for third parties, not for the project owner. 2) Start discussing the idea at a very early stage with your close peer group in an effort to identify market demand and optimize the project. 3) Keep the desire for continuous development, for example with the help of sample through-runs, fixed feedback routines, pre-testing, or re-designing the project if needed. 4) Start the communication with family, friends and colleagues early – they are crucial for the first stage of the campaign and therefore for the degree of attention to the whole project. 5) Create constant updates about optimization, news, innovation, experiences and feedback.

Fourth, the second publication about crowdsourcing offers additional success factors for crowdfunding campaigns. Eight very concrete success factors could be found and serve as highly recommended instructions in the future. They are divided into two clusters: social aspects and framework. Social aspects consist of five factors: a) supporting other projects on the platform, b) funding as a group not as a single person, c) supporting social projects, d) using Facebook in addition to keep the crowd informed and e) generating comments and replies to comments to attract the crowd. The framework aspects are as follows: a) setting small funding goals, b) setting up short project durations and c) offering rewards.

Summarizing the section on policy and managerial implications, it can be stated that several theoretical but also very practical recommendations could be identified in this work. Therefore, this work contributes strongly to the field of research due to the delivered base for further discussions and partly the first mover marking.

This thesis is a contribution to the very young discussion and analysis in the research of smart city, shareconomy and crowdsourcing with the focus on entrepreneurial opportunities through digital collaboration. Future work should shine light on several topics, especially contributing stronger empirical work to support the chain of reasoning with a greater amount of data. In the field of smart city the lack of a central leading position should be investigated more deeply along with the opportunities to expand the idea in rural areas to lift the quality of life and to avoid an even stronger cut between the city and the rural areas. The central question for shareconomy should be the next development stage of sharing in the digital world, and which aspects are entrepreneurial opportunities without purely copying existing business models. The same point applies for crowdsourcing. Summarizing, a stronger conceptual base for further research is

needed based on empirical data from several countries to strengthen the relevance of realignments.

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