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From eGov to sGov: Super-Applications as a Driver for eGov Transformation – a Case Study Research

Master's Thesis

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E-valitsusest Smart-valitsuseni: Super-rakendused kui Draiver e-valitsuse ümberkujundamiseks – Juhtumiuuring

Magistritöö

Juhendaja: Kuldar Taveter

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Author's Declaration of Originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

Author: Florian Lemke, B.A.

1st May 2018

Author's Statement on non-political Intentions

The author of this master thesis declares that any kind of political opinion or intention is not deliberate. This thesis does not try to position the influence of political ideas of any government and any kind of political and/or non-political institution on the development of e-services.

Its only intention is to show the socio-technical relationship between governments and their usage of the described e-service possibilities and applications. This work has neither pro-European/Western nor pro-Asian intentions and focuses on an independent objective research.

This supports the understanding of the constitutional principle of freedom of research and teaching at European universities.

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1st May 2018

Author's Thesis Acknowledgement

Abstract

From sGov to sGov: Super-Applications as a Driver for eGov Transformation – a Case Study Research

The daily use of social networking applications on mobile devices have had a major impact on how modern societies are connected. As well for governments, a new era of public service delivery has begun. Governments adopted super-applications to their current repertoire of channels for service delivery. Meeting the citizens' needs is part of the modern idea of citizen-centric service delivery. By combining modern technologies with government services, a greater acceptance and data driven, proactive services will be able to entirely change the role of governments in modern societies. The aim of this thesis is to explore this new phenomenon and attempt to gain a better understanding of the transformation process from e-government (eGov) to smart-government (sGov) due to the use of super-applications. An exploratory case study is conducted on the Chinese super-application WeChat, which is the most commonly used social networking application in the People's Republic of China (one billion monthly active users in the first quarter 2018). "China's use of social media is increasing faster than the rest of the world. Chinese consumers tend to consider products or services if they see them mentioned on a social media site." (Lien and Cao, 2014) Especially this case study of China has outlined the different framework for service delivery and the importance of implementing public services to commonly used applications. Due to the involvement of Big Data and data analytics, a proactive government decision-making will reach a new stage for eGov maturity. As a result, the research has been the extension of current eGov stage models which have been presented. This research is one of the first, that has been made and combined mobile applications on modern devices and citizen-centric government service delivery.

This thesis is written in English and is 90 pages long, including 6 chapters, 9 figures and 5 tables.

Annotatsioon

E-valitsusest Smart-valitsuseni: Super-rakendused kui Draiver e-valitsuse ümberkujundamiseks – Juhtumiuuring

Igapäevane sotsiaalmeedia kasutamine läbi interneti mobiiliseadmetes on avaldanud suurt mõju sellele, kuidas tänapäeva ühiskond on omavahel ühenduses. Valitsuste jaoks on alanud avalike teenuste osutamise uus ajastu. Valitsused on kohanenud praegusaja suhtluskanalitega, et pakkuda oma teenuseid läbi nende. Kodanike vajaduste rahuldamine on osa kaasaegsest ideest, mis käsitleb kodanikele orienteeritud teenuste osutamist. Kaasaegsete tehnoloogiate ühendamisega valitsuse teenustega, kohanemisvõimelised ja andmetega juhitud, ennetuslikud teenused suudavad täiesti muuta valitsuste rolli kaasaegses ühiskonnas. Selle väitekirja eesmärk on uurida seda uut nähtust ja püüda paremini mõista e-valitsuse (eGov) ümberkujunemisprotsessi smart-valitsuseni (sGov) tänu super-rakenduste kasutamisele. Uurimuslik juhtumiuuring viiakse läbi Hiina rakenduses WeChat, mis on Hiina Rahvavabariigis kõige sagedamini kasutatav suhtlusvõrgustik (2018. aasta esimeses kvartalis üks miljard aktiivseid kasutajaid). Eriti on käesolevas Hiina juhtumiuuringus välja toodud teenuste osutamise erinevaid raamistikke ja üldkasutatavate rakenduste kasutamise tähtsust avalikes teenustes. Suure andmesisalduse ja analüütika kaasamise tõttu jõuab uus etapp e-riigi valitsuse ennetavatesse otsustusprotsessidesse. Selle tulemusena on see uuring praeguse e-riigi etapi mudelite laiendus. See uuring on üks esimesi sellelaadseid, mis on tehtud, ja milles on kombineeritud mobiilside rakendusi kaasaegsete seadmete ja kodanike-keskse valitsuse teenuste osutamisega.

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 90 leheküljel, 6 peatükki, 9 joonist, 5 tabelit.

Abstrakt / Zusammenfassung

Von eGov zu sGov: Super-Applikationen als Treiber der eGov Transformation – eine Fallstudienforschung

Die tägliche Nutzung von Applikationen sozialer Netzwerke auf mobilen Geräten hatte bereits einen massiven Einfluss auf die Art und Weise der Vernetzung moderner Gesellschaften. Ebenso hat für Regierungen eine neue Ära begonnen. Diese haben Super-Applikationen in ihr Repertoire von Verbreitungskanälen aufgenommen, um Regierungsdienstleistungen bereitzustellen. Die Erfüllung der Erwartungen von Bürgern ist Teil eines modernen Verständnisses zur Bereitstellung bürgernaher Regierungsleistungen. Beim Kombinieren von modernen Technologien mit vom Staat bereitgestellten Dienstleistungen kann eine höhere Akzeptanz der Nutzer erreicht werden. Datengesteuerte und proaktive Dienstleistungen werden in der Lage sein, die derzeitige Rolle von Regierungen in modernen Gesellschaften vollständig zu verändern. Das Ziel dieser Arbeit ist die Betrachtung dieses neuen Phänomens und die Erlangung eines Verständnisses, inwiefern der Transformationsprozess von elektronischer Regierungsführung (eGov) zu smarter Regierungsführung (sGov) mithilfe von Super-Applikationen beeinflusst wird. Eine explorative Fallstudienforschung anhand der chinesischen Super-Applikation WeChat wird durchgeführt. Diese ist das am meist genutzte soziale Netzwerk in der Volksrepublik China (eine Milliarde monatlich aktive Nutzer im ersten Quartal 2018). Speziell diese Fallstudie hebt die unterschiedlichen Rahmenbedingungen für die Verbreitung von Regierungsdienstleistungen sowie die Notwendigkeit der Implementierung von öffentlichen Diensten in häufig genutzten Applikationen hervor. Durch die Beteiligung von Big Data und Datenanalysen, ein proaktives Regierungshandeln wird den derzeitigen Stand der elektronischen Regierungsführung auf einen neuen Level heben. Als Ergebnis dieser Arbeit kann die Erweiterung der bestehenden eGov Stufenmodelle gesehen werden. Diese wissenschaftliche Arbeit ist eine der Ersten, die eine Verbindung von mobilen Applikationen und bürgernahen Dienstleistungen wagt.

Diese Masterarbeit ist in englischer Sprache verfasst und hat einen Umfang von 90 Seiten. Sie ist in 6 Kapitel unterteilt und beinhaltet 9 Darstellungen und 5 Tabellen.

摘 要

从电子政府到智能政府：超级应用作为驱动力

—— 一个案例研究

在移动终端上日常使用社交软件对现代社会是如何连接这个问题具有重要影响。对于政府治理亦然，公共服务传送的新时代已经到来。政府接受超级应用程序成为其当前服务送达的常规通道。满足公民需求是现代以公民为中心的服务送达理念的一部分。通过连接现代科技和政府服务可以提升更多用户的接受度，而数据驱动和能动的服务将能够完全改变政府在现代社会中所扮演的角色。本文的目标是在探索这个新现象的同时，更好地理解由于使用超级应用软件所引发的，从电子政府到智能政府的转变过程。本文对来自中国的超级应用软件——微信进行了案例考察研究，微信是中国境内应用最广泛的社交应用软件（在2018年的第一季度每月活跃用户多达10亿）。这个对中国的案例研究概括出了服务传送的不同框架，以及将公共服务导入广泛使用的应用软件的重要性。通过参与大数据和数据分析，一个能动的政府决策将会到达一个电子政务完备期的新阶段。作为结论，本研究是对当前已经被提出的电子政务的阶段模型的延展。这项研究是最早将现代终端中的移动应用软件与以公民为中心的政府服务传达相连接的研究之一。

本论文用英语写作，共计90页常，包含6各章节，14个图表。

Аннотация

От eGov (электронного правительства) до sGov (интеллектуального правительства): Супер-приложения в качестве драйвера для трансформации электронного правительства - тематическое исследование исследований

Ежедневное использование приложений социальных сетей на мобильных устройствах оказало большое влияние на то, как связаны современные общества. Новая эра предоставления государственных услуг также началась для правительств. Правительства приняли суперприложения в свой нынешний репертуар каналов для предоставления услуг. Удовлетворение потребностей граждан является частью современной идеи предоставления услуг, ориентированных на граждан. Объединив современные технологии с государственными службами, более эффективные и ориентированные на данные, проактивные службы смогут полностью изменить роль правительств в современных обществах. Цель этого тезиса - изучить это новое явление и попытаться лучше понять процесс трансформации от электронного правительства (eGov) до интеллектуального правительства (sGov) из-за использования суперприложений. Исследовательское тематическое исследование проводится в китайском супер-приложении «WeChat», которое является наиболее часто используемым приложением для социальных сетей в Китайской Народной Республике (один миллиард активных пользователей в первом квартале 2018 года). В частности, в этом тематическом исследовании Китая были изложены различные рамки предоставления услуг и важность реализации государственных услуг для широко используемых приложений. В связи с привлечением больших данных и аналитики данных, активное принятие решений правительства достигнет нового этапа для зрелости eGov. В результате этого исследования было продолжено внедрение существующих моделей eGov, которые были представлены. Это исследование является одним из первых, которые были проведены и объединили мобильные приложения на современных устройствах и государственные службы, ориентированные на граждан.

Эта работа написана на английском языке и составляет 90 страниц, в том числе 6 глав, 9 рисунков и 5 таблицы.

List of Abbreviations and Terms

API	Application Programming Interfaces
App	Application
BBS	Bulletin Board System
CAICT	China Academy of Information and Communication Technology
CMB	China Merchant Bank
CPS	Cyberphysical Systems
e.g.	exemplī grātiā – "for example"
engl.	English
et al.	Et alii – "and others"
eGov	electronic Government
eID	Electronic Identification
EU	European Union
GaaP	Government as a Platform
GIF	Graphics Interchange Format
HQ	Headquarter
html (5)	Hypertext Markup Language – Level 5
ICQ	Instant Messaging Client: ICQ derives from the English phrase "I Seek You"
ICT	Information and Communication Technology
IM	Instant Messaging
IoT	Internet of Things
IoV	Internet of Voice
IT	Information Technology
JS	Java Skript
lGov	Lean-Government
MAU	Monthly Active Users
MB	Megabyte
mGov	Mobile-Government
MSP	Multi-sides Platform

OICQ	Open ICQ – Instant Messaging Client: ICQ derives from the English phrase "I Seek You"
OS	Operating System
PDA	Personal Digital Assistants
PRC	People's Republic of China
QR-Code	Quick Response Code
RSS	Really Simple Syndication
SDK	Software Development Kit
SME	Small and Medium-Sized Enterprises
SQL	Structured Query Language
sGov	Smart-Government
TV	Television
VPN	Virtual Private Network
vs.	versus
WLAN	Wireless Local Area Network
xhtml	Extensible Hypertext Markup Language

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1 Introduction

The super-application WeChat was developed in a unique surrounding, which is caused by the Great Firewall that can only be found in the People's Republic of China. IT solutions and their development in China are way much more focused on the needs and traditions of the users – the regional-cultural background has an important role in the development process of innovative IT solutions.

In the first quarter of 2018, WeChat (Tencent) has announced the actual number of monthly active users (MAU) and said, that it has reached the number of one billion users. WeChat has been developed towards a social networking application which combines functions, such as instant messaging, commerce and payment services. The Chinese government supports WeChat's ambitions on the development of the e-commerce market in China with its 12th and 13th five-year plan. (Chien, 2011; Central Committee of the Communist Party of China 2016) But how far does the support of the Chinese government go regarding specific functionalities especially in supporting governmental e-services?

In the Western World, applications such as WeChat that support government e-services do not exist. At the same time, several social networking applications that are used, could be developed towards a super-application, such as WeChat, in the near future. Especially developing countries have shown a greater interest and closer connection to innovation and technological change in the past. The acceptance rates for new technologies are higher then in mature and developed countries such as those in central and western Europe. The specific case study in the context of WeChat in the People's Republic of China will be used to outline the possibilities in this unique environment and stands as a perfect example for a mass market in the e-commerce sector that has huge possibilities for the development of public e-services.

With this research, the author intents to analyze the possibilities for implementing e-government services in super-applications under the idea of government as a platform (GaaP) and comparing them with the different approach of social networking applications such as WeChat, WhatsApp and the Facebook Messenger. The research of this master

thesis will look at the fundamental ideas behind GaaP, which in general will be the possibility to enable private enterprises to develop and publish services for e-government.

So far, there is a lack of research on e-government transformation in East Asia and especially on the transformation of eGov towards sGov. Research on the usage of GaaP has tended to take place under the aspect of the development of government e-service hubs that are controlled by the state itself. In this specific case, the super-applications will implement e-services. Those e-services are connected to the government, but at the same time not set-up and provided on government platforms as is usual. This research will be the first that analyzes the impact of super-applications on the transformation from eGov to sGov. Previous research was mainly focused on the transformation of eGov itself – due to the use of stage models. The use of super-applications and networking applications that can be developed towards applications with platform characteristics, are state-of-the-art innovations that will be able to show their possibilities of creative destruction as it already has been described by Schumpeter in 1943. (Schumpeter and Swedberg, 2003)

Technology and digitalization are moving on due to the made innovations and development that end up in updates as well as improvements for our society. This technological change of running processes in our society leads us to do specific research on this transformation and change. Therefore, this master thesis will try to answer the question on the impact of super-applications on the process of transformation from eGov towards sGov.

The hypothesis for this research that have been set-up can be formulated as follows: Super-applications are strongly influencing the process of transformation from eGov to sGov in East-Asia. Especially WeChat can be seen as a driving force of the described transformation regarding to its wide distribution and its special focus on the actual needs, traditions and culture of the Asian society. Similar applications in the Western World that are being development, will also be able to cover specific platform specifications to implement e-services and e-commerce possibilities alongside their existing messaging functions in the near future and will influence the living conditions of citizens in an e-environment.

2 Main research Method and Questions

For this research on the transformation from eGov towards sGov due to the help of the GaaP approach that has made its way into the development of super-applications in China, one main research question and two additional subsidiary questions have been created to lead this research:

Main research question: How can the approach of GaaP based on super-applications drive the transformation of eGov in East-Asian countries?

> **First subsidiary research question:** How can services of eGov be implemented through GaaP based on super-applications?
>
> **Second subsidiary research question:** How can services of eGov be used through super-applications?

The main research question has a high relevance to be able to outline the importance, efficiency and effectiveness of non-state developed applications for the acceptance of government e-services under the concept of sGov and the GaaP design approach. Most likely, it helps to verify that super-applications strongly push the transformation towards sGov and that they are able to enthuse citizens to use government e-services and to rise their acceptance. The research question will help developers of e-services to understand the transformation process towards sGov in the public and private sectors under the idea of the design of GaaP.

The research methodology of the master thesis will be a case study research which analyzes e-service possibilities in the social networking service WeChat in China, which is the most common and daily used application in a country of 1.3 billion citizens. Therefore, the author decided to compare the Facebook Messenger as well as the social networking application WhatsApp with the leading Chinese super-application WeChat. The comparison will be focus on the spread, functions, development and implementation possibilities for e-services with the idea of the design for e-services using GaaP with a quantitative research. For specific methods to analyze the needs of clients and users of e-government based on the given case on super-applications, problem domain analysis

models, such as goal models, role models, organization models and domain knowledge models can be used. (Sterling and Taveter, 2009)

To conduct a proper quantitative research – especially for the case study research – interviews with stakeholders, such as external WeChat software developers from Shenzhen and official project managers from the WeChat headquarters in Guangzhou in the People's Republic of China have been used.

The thesis has been structured as follows. After the introduction, which defined the need for this research and the relevance of the topic (Chapter 1) the main research question and the methodology of the research have been described in the second chapter (Chapter 2). After the introduction, theoretical approach to eGov, sGov and Smart Cities as well as the idea of GaaP will be defined. It includes the differences and common characteristics of the terms and it will describe the types of service delivery in e-governance (Chapter 3). In chapter four (Chapter 4), the stage models for describing the maturity level of eGov transformation will be described with the help of a literature analysis. This transition from eGov to sGov can be seen as the major theoretical approach of this thesis, which implies the other terms and their theoretical background that will be described in the preceding chapter (Chapter 3). The case study of the WeChat super-application (Chapter 5) will be based on the previously described theoretical framework. The summary of the findings and their discussion will follow in the last chapter (Chapter 6). It will resort to the hypothesis that has been presented in the introduction (Chapter 1) and will show whether this hypothesis needs to be verified or falsified. This will happen in the final analysis, which also intends to explain and raise emerging questions for further research on this topic.

3 eGovernment, sGovernment and Smart Cities, Government as a Platform (GaaP) – Theoretical Overview

Before a specific analysis of the case and the discussion on eGov stage models will take place in this master thesis, this chapter will focus on the terminologies of eGov, sGov and Smart Cities as well as GaaP.

Comprehensive surveys on the history, literature and definitions have been written and published over the past years. They mostly use different methods and extend from reviews of existing literature via a key-word-analyes towards a comparing analysis by different scholars and schools of thought. (Yildiz, 2007; Palvia and Sharma, 2007; Grönlund and Horan, 2005) At first, the terms eGovernment and its relationship with the term eGovernance will be focused on, in order to gain deeper insights in to the terms Smart-Government and Smart Cities. The last part of this chapter will define and describe the design of Government as a Platform which has been described as a new generation of digital government.

3.1 eGoverment

This chapter has a specific focus on the definition of the before named terms. At the same time, there are difficulties in defining those terms. Especially for the eGov definitions, several scholars have tried to set-up definitions that might gain general acceptance. This leads to the problem of specification. Therefore, the author is going to introduce some examples.

eGov is a concept that defines itself by the objectives of its activities. Basically said, the transfer of information and services between governments and citizens, as well as between governmental institutions and suppliers. It has tended to be defined by the technology employed or by the provider of the service as well as the information to be transferred. Another factor impeding our ability to define this term is that the concept of e-government includes several different parts that have their own specific actions and even their own definitions. The concept of eGov also involves ideas of e-service delivery,

e-democracy and e-governance. Due to the rapid change in the field of ICT it is difficult to "fully grasp the meaning, opportunities and limits of the concept." (Prins, 2001)

All the different definitions that have proposed in the past have a specific viewpoint on which they are focusing. Some definitions focus on transparency, interactivity, interoperability, participation, the cost effectiveness or even the accountability of eGov. (Yildiz, 2007) Owing to this broad understanding of the eGov term, the definitions that have been given in all official- and research papers are similar to the ones given by Sharma and Gupta (2003) and Sharma (2004, 2006)

"E-government is a generic term for web-based services from agencies of local, state and federal governments. In e-government, as the government uses information technology in particular the Internet to support government operations, engage citizens, and provides government services. The interaction may be in the form of obtaining information, filings, or making payments and a host of other activities via the World Wide Web." (Palvia and Sharma, 2007 after Sharma and Gupta, 2003; Sharma, 2004, 2006)

The World Bank has defined the term as follows*: "E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interaction with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions."* (The World Bank, 2015)

Due to the rapid technological development and change, the topic of mGov has come up. mGov does not replace eGov, it rather complements it. It is connected to the use of mobile and wireless technologies like cellular or mobile phones, laptops, PDAs and smartphones. (Palvia and Sharma, 2007)

In some literature the terms of eGov and e-governance have not been separated at all or they have been defined as similar things. This shows again that there is a lack of standardization in the definition of the eGov term. Some authors even content that eGov consists as a sub-disciplin of e-governance. Due to their definition, e-governance is an even broader concept. (Grönlund and Horan, 2005) It "includes the use of ICT by government and civil society to promote greater participation on the part of citizens in the running of political institutions." (Palvia and Sharma, 2007)

The present authors understanding of e-governance differs from such aporoaches and supports the understanding of Palvia and Sharma. (2007) This authors understanding is neither based on the idea of e-governance as promotion of greater participation nor as a possibility for constitutional change.

- **E-government** concentrates on constituencies and stakeholders other than organizations be they government or public sector at the city, county, state, national, or international level.
- The concept of **e-governance** focuses on administration and management within an organization, whether public or private, large or small.

In the eyes of Bedi, Singh and Srivasava (2001), Holmes (2001), Okot-Uma (2000) e-governance uses "ICT at various levels of government and the public sector and beyond, for the purpose of enhancing governance." (Palvia and Sharma, 2007 after Bedi, Singh and Srivasava, 2001; Holmes, 2001; Okot-Uma, 2000) Backus (2001) adds that "e-governance is defined as the, application of an electronic means in (1) the interaction between government and citizens and government and businesses, as well as (2) in internal government operations to simplify and improve democratic, government and businesses aspect of governance."

UNESCO defines e-governance with a really broad and easily understandable definition: *"E-governance is the public sector's use of information and communication technologies with the aim of improving information service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance can bring forth new concepts of citizenship, both in terms of citizens needs and responsibilities. Its objective is to engage, enable and empower the citizens."* (Palvia and Sharma, 2007 after UNESCO – original source does not exist anymore)

For the classification of the deployment of eGov interaction, six categories have been developed by Hiller and Bélanger (2001). (Carter and Bélanger 2005)

1) Government delivering services to individuals **(G2IS)**
2) Government to individuals as a part of political process **(G2IP)**
3) Government to business as a citizen **(G2BC)**
4) Government to business in the marketplace **(G2BMKT)**
5) Government to employees **(G2E)**
6) Government to government **(G2G)**

Other classifications have been developed that mostly consists of only three or four categories. They have been described in Palvia and Sharma (2007) and Yildiz (2003, 2007).

Due to the change that has been driven through introducing e-government in the public sector, the change from a bureaucratic, inward-looking approach to a citizen-centered, outward-looking approach that from now on will prioritize the needs, opinions and concerns of the users and clients. This has shown, that especially the managerial impact, such as the re-engineering of business processes in governments, increasing efficiency and reducing administrative costs are of high importance for the development of eGov. (Nam, 2014; Grönlund and Horan, 2005)

Five types of understanding the major use of eGov have been identified:

1) **Service use:** using transactional services.
2) **General information use:** looking up general information.
3) **Policy research:** looking up information related to government policies.
4) **Participation:** participating in decision-making and discussion processes.
5) **Co-creation:** co-creating policies, information, and services with government and other citizens. (Nam, 2014)

The current use of e-services has shown that this innovation in government also excludes certain members of the society. "Benefits from the new mode of e-government may mobilize only the technically savvy [people], while disenfranchising those with less experience and technical know-how." (Nam 2014)

Therefore, new channels and platforms that enable interactive and collaborative technologies such as the IoT can develop and drive the process towards smart-government.

Table 1: Future-oriented Themes identified by eGovRTD2020

Themes	Description
Data privacy and personal identity	pertain to the policies, protocols, and to data management mechanisms needed to balance individual privacy protections with effective and efficient use of that information by government.
Trust in e-government	encompasses the process by which trust is built, destroyed, used, or if used in different cultures as well as the conditions and mechanisms needed to build and maintain trust in government processes and services.
Information quality issues	arise from the need for governments, the market, and individuals to find, select, evaluate, and authenticate information that is appropriate for a given use.
E-participation	citizen engagement and democratic process raises concerns about the openness and accountability of elected officials and civil servants as well as assurance that those individuals and groups who wish to participate in democratic processes have the opportunity and means to do so.
Ontologies and intelligent information and knowledge management (KM)	concerns address the need for standards and mechanisms such as search, which rival, visualization, text mining, and intelligent reasoning to be exploited to archive information quality and economy, and to support knowledge-driven processes.
Governance of public-private-civic sector relationship	is concerned with the principles and frameworks needed for sharing responsibilities and exchanging information among networks of diver's organizations in a place that to generate public value and satisfy public requirements for fairness, accountability, and competence.
Assessing the value of government ICT investments	pertains to frameworks, methods, and metrics to appropriately mind money toward her, evaluate, and communicate the costs and benefits of these investments for different stakeholders.
Mission oriented goals and performance management	addresses the inadequacies of a technology-driven approach to e-government by substituting a mission-centric view of priorities, investments, practices, and assessments of results.
Crossing borders and the need for government capabilities	involves looking at issues that reach beyond local, regional or national borders and devising ways to communicate and act through governance networks that encompass diverse cultural, technical, and political context.

Government's role in the virtual world	includes concerns for governments roles, responsibilities and limitations in an emerging world that is increasingly non-physical and borderless.
e-government in the context of socio-demographic change	addresses demographic trends with global consequences (such as age distribution, wealth distribution, immigration, and mobility and distribution of workers) the generating pressing issues in both developed and developing countries.
Semantic and culture inter-operability of public services	recognizes that globalization and population movements are making societies increasingly multicultural. Yet, cultural and language differences continue to block effective communication and action across different countries, groups, and governmental functions.
Cyberinfrastructure s for e-government	contemplates a future technology infrastructure build from reliable, ubiquitous, readily-available, re-usable components, architectures, building blocks, and standards.

Source: Table found in: (Dawes, 2009, p. 259)

Sharon Dawes (2009) has pointed out future-oriented themes that have been identified by the eGovRTD2020. (Wimmer, Codagnone and Janssen, 2008) Those future-oriented themes (Table 2) show that cross-boundary governance and eGov's role in the virtual world regarding to trust, privacy and identity issues will define the future impact on research of the changing role of government in our today's world.

This change in the current role of government is driven by six dimensions that describe the e-governance term as an open-social-technical system and extends the concerns of the term to an even wider term that has a more future-oriented approach. The purpose and the role of government, social trends, interaction and complexity, information management, changing technologies as well as the human elements. Platforms will change the role of governments and states in society, but as Grindle (1996) stresses, governments are the only ones that are able and will also be able in future to provide the conditions for further economic and social development – law and order, effective macro-economic policies, infrastructure development, investment in human capital, and greater equity. Therefore, one must stress that with the implementation of platforms, "an absent or minimal status is not the answer to social problems but needs to encourage sustained development. The idea of an intelligent, highly effective state, intervening at strategic moments" (Kliksberg, 2000) will be the only answer to a platform that has an open government approach.

Figure 1: E-governance as a dynamic and open socio-technical system

Purpose and Role of Government	Societal Trends	Human Elements	Interaction & Complexity	Information Management	Changing Technologies
• Public Value • Information Stewardship • ROI • Intergovernmental Relationships • International Law • Mission • Legal Framework • Role of Private Sector • Role of Private Sector & NGO's • Accountability • Capabilities of the Public Service • Transparency • Outsourcing • Diversity of Governmental Units • Business Process Design & Integration • Nature and Scope of Public Services • Fairness and Equity	• Demographics • Economic Development • Information Economy • Mobility • Migration • Sectarian Conflicts • Privatization • Multi-Culturalism • Globalization • Political Participation • Institutional Change • Social Tensions • Digital Divide • Distribution of Wealth across Social Groups and Generations	• Integrity of the Individual • Trust • Choice • Privacy • Autonomy • Identity • Access • Information Overload • Adjustment & Learning • Role of Users • Acceptance of Change	• Drivers Stakeholder = Interest • Distributed and Multi-Agent Systems • Collaboration • Self-Organizing Systems • Cooperation • Competition • Risk Management • System Interoperability • Governance Mechanisms • Multi-Channel Access & Delivery • Dynamics among Subsystems • Self-Organizing Systems • Distributed and Multi-Agent Systems	• Information Quality & Integrity • Knowledge Management • Metadata • Information Forensics • Ontologies • Reference Models • Digital Archives • Digital Preservations • Digital Libraries • Information Search & Retrieval	• Cyberinfrastructures • Architectures • Ambient Intelligence • Building Blocks • Intelligent Interfaces & Reasoning • Visualization • Authentication • Sensors • Automatic Data Gathering & Monitoring • Social Software • Virtualization • Intelligent Agents • Mobile & Wireless Technologies • Forensics • Security • Shared Services • Artificial Intelligence • Cloud Infrastructures

Source: Own diagram based on: (Dawes, 2009, p. 261)

The above table shows future-oriented themes for eGov research and outlines the specific use of new channels and the use of mobile technologies to connect citizens and clients even closer to the e-services. "The increase in citizens' use of e-government, nevertheless, becomes a discernible long-term trend because a growing number of people have recognized and experienced greater efficiency, effectiveness, and convenience in using various government functions via e-government and digital connections with conventional channels." (Nam, 2014; Yang and Wu, 2016)

3.2 Smart-Government (sGov) and Smart Cities

It has been said, that smart-government will especially be able to effectively address the three grand challenges of the 21st century. Scholl and Scholl (2014) have named those challenges of the century as follows: "The Third Industrial Revolution with the information revolution at its core, the rapidity of change and the lack of timely and effective government intervention, and ineffective government spending and the lack of experts in public debt financing."

"Defining the term Smart Government has been challenging for all scholars in the field of future orientation for eGov. Harsh and Ichalkaranje define the term of smart-government according to which "governments utilize the power of "data" in their attempt to improve public services; to enable an integrated, seamless service experience; to engage with citizens; to co-develop policies; and to implement solutions for the well-

being of the community." (2015; Sirendi and Taveter, 2016) Their focus on data that has been used in smart-governments forces their understanding towards a more technical view. Other authors such as Janowski (2015) and Cornadie and Choenni (2014) supported this so-called definition of "data-smart-government." (Anthopolus, 2017) Gil-Garcia, Helbig and Ojo (2014) have focused on the challenge of defining the term "smart" itself. The existence of synonyms of the term "smart" shows that even a definition that has gained a high level of acceptance in its field of research struggles with alternatives such as, percipient, astute, shrewd and quick. Due to this, they have created a definition of smart-government centered on the changes and challenges for public administration and society. "As smart-government, or the organizations and networks within the political jurisdiction (e.g. a city, a town, a nation), will use emerging and nanotechnologies and various innovative strategies to gain a sound understanding of their communities and constitutes (being percipient), they would use that ability to accurately assess situations or people (being astute), show sharp powers of judgement (being shrewd), and then make decisions and respond quickly or effectively (being quick)." (Garcia, Helbig and Ojo, 2014; Gil-Garcia, Pardo and Aldama-Nalda, 2013; von Lucke, 2015; Mellouli, Luna-Reye, and Zhang, 2014)

The definition by Harsh and Ichalkaranje (2015) is based on Thom Rubel's definition, introduced at an early stage and so far, being most accepted and refered to in smart-government research. Thom Rubel (2012), who describes the maturity model of smart-government from a private consulting company's perspective. Even though, his model lacks an academic background, his thoughts and findings are included in the present study because they have been used by other scholars on a more academic level and who have supported his model and thoughts. He defines smart-government transformation with the help of his four-stage model "that enhances citizen participation, information transparency and service integration and improvement." (Anthopolus, 2017)

Due to this maturity model, Clarke and Rubel (2013) and the IDC defined smart-government as follows: "The implementation of a set of business processes and underlying information technology capabilities that enable information to flow seamlessly across government agencies and programs to become intuitive in providing high-quality citizen services across all government programs and activities domains."

Thom's maturity model aims at better serving the citizens under the aspect of transition from open to smart-government. Therefore, his model focuses on (1) citizen participation in government business processes, in which "agencies are required to

engage the public to enhance decisions through widely dicussed knowledge and increase public participation in government." (Clarke and Rubel, 2013) (2) It urges agencies to utilize technology to make their decisions more transparent as well as to set-up modes of discussion by the public. And lastly (3) to increase collaboration across government agencies with the help of innovative tools, methods, and systems of cooperation among all existing levels of government in order to be able to involve the public as well.

The in this field well-known authors Gil-Garcia and Sayogo (2016) point out that smart-government is especially based on the creative mix of emerging technologies and innovation in the public sector. Public sector innovation refers to the ability to handle the complexities and uncertainties by coordination, continued engagement, access to open data and shared information. (2016; Gil-Garcia, Helbig and Ojo, 2014) Hence, smart-government is more likely to be seen as a "continues effort and not a specific goal, supported by a set of emerging technologies (e.g., Big Data, open government data, social networking, blogs, Really Simple Syndication (RSS) feeds, web design and programs (e.g. html5, xhtml, SQl, and more), mobile government, smart phone applications, cloud computing, sensors etc.)." (Anthopolus, 2017)

The development of smart city initiatives has shown that especially the boarders between the terms of smart city and smart-government are overlapping. "Therefore, the authors call a city smart when it takes action towards innovation in management, technology, and policy, all of which entail risks and opportunities. (Nam and Pardo, 2011) […] To answer the challenges that have emerged from rapid urbanization, cities need to operate in innovative ways to avoid continuous chaos and navigate through crises." (Gil-Garcia, Zhang and Puron-Cid, 2016; von Lucke, 2015) The discussion of attempts to define the sphere of each of the terms has developed two different understandings, which on the one hand state, that the term of smart city is only a subset of smart-government and on the other hand, scholars see smart-government within the smart city nexus. Scholl and Scholl (2014) "view smart government as a smart city government. Where city-wide ICT operates smart service delivery and where the local government implements policies of smart local development and stakeholder's engagement." (Anthopolus, 2017; Anthopolus and Reddick, 2016) They come up with a set of smart-government elements supporting the process towards a mature smart-government. Those elements are: openness and decision-making, open information sharing and use, stakeholder participation in collaboration, and improving government operations and services, also

the use of intelligent technologies acting as facilitators of innovation, sustainability, competitiveness, and livability. (Scholl and Scholl 2014, found in Anthopolus, 2017)

Of course there is a discussion of what differentiates smart-government from smart-governance as described in the preceding in the chapter. In his contribution, Anthopolus concludes that "smart governments implement smart governance initiatives. […] Smart Government is not synonymous with smart city but, either the smart city is considered an area of smart government practice or smart government is the source for smart city development." (2017)

Gil-Garcia et al. (2016) have come up with a framework including 14 elements to describe smart-governments in the area of smart cities. The 14 elements are put together to form a government framework which has been developed by Anthopolus (2017). As supposed to the 14 elements discerned by others, he prefers a more unified system, developed by himself, in which only 12 elements describe the notion of the framework. The elements developed by Gil-Garcia et al. (2016) are: (1) Government smartness and integration; (2) Government smartness and innovation; (3) Government smartness and evidence-based decision-making, (4) Government smartness and citizen-centrality, (5) Government smartness and sustainability, (6) Government smartness and creativity, (7) Government smartness and effectiveness, (8) Government smartness and efficiency, (9) Government smartness and equality, (10) Government smartness and entrepreneurialism, (11) Government smartness and citizen engagement, (12) Government smartness and openness, (13) Government smartness and resiliency, (14) Government smartness and technology savviness.

Even though those elements describe the smartness of governments today, there is no single path to become smart or smarter by adopting more of these elements. "Every step towards sustainable, open, transparent, resilient, integrated, creative, and participatory government, among other dimensions, is a step towards a smarter State." (Gil-Garcia, Zhang and Puron-Cid, 2016)

In smart and sustainable cloud-based ICT meta-architecture, especially the benefits of smart-governments and its actions described by government platforms can be evaluated. They show the advantages of smart-governments for public administration and citizens as well as stakeholders in the process of open government service delivery. Lower software development, support, and maintenance costs; provision of higher application portability and interoperability; enhancing smart services; and a shortened time-to-market strategy for services describe those benefits. The involvement of Big Data Management,

the Internet of Things, sensor networks, smart devices, embedded systems, and cloud computing technologies in public administration and therefore, smart-governments will be able to create entirely new ways of governing cities, states or nations. "By introducing [a] new type of knowledge processes such as information collection and processing, real-time forecasting and alerting, collectives and crowd-sourced intelligence, cooperative distributed problem-solving and learning from it." (Reforgiato Recupero et al., 2016; Sun, Strang and Pambel, 2018), smart-governments will reach a new level of interconnection between all kinds of stakeholders for public service deliveries.

Jörn von Lucke (2015) has developed a design showing an integrational approach to smart-government in the area of public administration. The core of this model shows that cyberphysical systems will involve intelligent networking objects such as sensors, actuators and M2M communication in order to enhance the development of future public administration. Cyberphysical systems are heterogeneously networked entities that link and combine real physical objects with digital information and communication systems. These are IT systems as part of devices, structures or processes that directly detect physical data via sensors and act on physical processes through actuators, but above all that evaluate and store the acquired data. In addition, they can actively or reactively interact with the physical and digital world. For this purpose, they are connected via digital communication devices (M2M) and in global networks. This offers the possibility to use the data and services that are available worldwide. (von Lucke, 2015)

In order to provide investment security, compatibility and future viability for governments and stakeholders the smart-government approach must be integrated. The major question in the development of smart-government service delivery is to identify what intelligently connected objects the public sector actually needs and in which CPSs these have to be embedded. Lucke outlines that one must ensured that the objects not only function in a closed ecosystem but that they are also integrated into the Internet of Systems (Web 1.0: World Wide Web and Management Networks, the People's Internet (Web 2.0: Social Media) and the Internet of Data (Web 3.0: Semantic Web – Big and Open Data). The design of the Internet of Things with its sensor and actuator networks and the Internet of Services with its Web services (Web 4.0: Smart Ecosystems as well as, Internet of Things) from the state's point of view are essential. (von Lucke, 2015)

Figure 2: Integrational Approach of Smart-Government
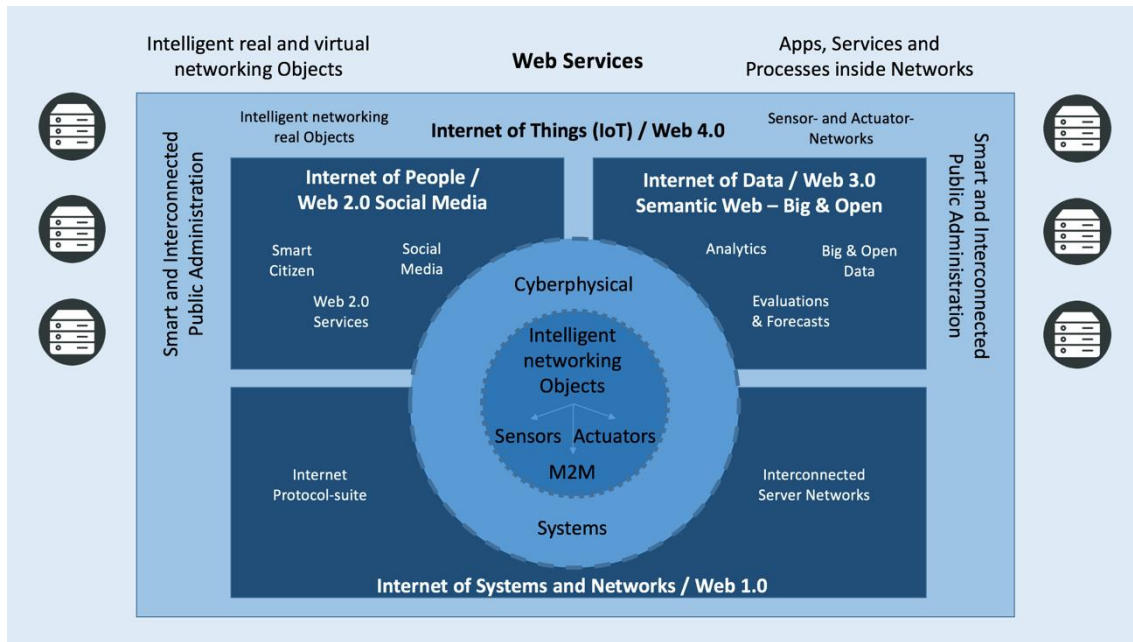
Source: Own diagram based on: (von Lucke, 2015)

In his analysis of smart-governments, von Lucke (2015) has outlined strengths, weaknesses, chances and risks regarding future public administration. Weaknesses of smart-government, as he pointed out, are the specific efforts and time for the development of software solutions that requires financial expenses, and insufficient scientific background. Also, its lack of political prioritization, as well as the lack of research and development capacities of new solutions will be considered as weaknesses. Risks that von Lucke's system wanted to eliminate are the lack of creativity and design, the uncertainty of successful implementation, the disruptive nature of changes arising from innovation, the fears resulting from the distorted image of "Glass Citizen", which especially in Germany is an issue of privacy, the lack of permanent funding, acceptance, as well as participation of citizen in early stages. Chances for smart-government are the potential for innovation and the given impulses for society, new intelligent networking of things, services and cyberphysical systems, increasing efficiency and effectiveness, and in the long run reductions in fees and charges for public administrational services. He supports his argumentation with an integrated approach to IT, an intensification of networking and interconnection of agencies, as well as a demand of mission statements by smart authorities, smart management and for smart citizens.

3.3 Government as a Platform (GaaP) – its Components and Infrastructure

"The traditional view of government is that the culture of the state is resistant to innovation: bureaucrats have little incentive to innovate, given the lack of competition or profit surrogates." (Margetts and Naumann, 2017) Governments that operate and provide platforms need to show their citizens, and clients what can be done with the platform. Therefore, major applications need to illustrate developers how powerful those platforms are and what kind of potential they have for their own work.

Platforms that support governments are described as a new generation of digital government. The design of GaaP enables developers "to build innovative services that connect government to citizens [G2C], give citizens insights into the actions of government and even allows citizens to participate directly in policy-making [C2G]." (O'Rielly, 2009) "Government 2.0 will require deep thinking about how to terminate programs that no longer work, and how to use the platform power of government not to extend the reach of governments, but instead, how to use it to better enable its citizenry and its economy. […] Government 2.0 requires a new approach to the design of programs, not as finished products, perfected" within the administration […] and working in such a way that the , executed order, or but as ongoing experiments whose procurement of information remains within legal bounds. (O'Reilly, 2011) GaaP supports the understanding of government 2.0 which can be described "as a technology [that helps to] build the kind of [democratic] government a nation's founders intended: of, for and by the people." (O'Reilly, 2009) GaaP heads in the direction of improvement of outcomes and increasing the efficiency of governance. GaaP is currently the most innovative way of delivering e-services to citizens and clients. It allows the assembly of different packages of individualized services that meets people's multiple needs and provides new ways to interacting with the government and its offered e-service possibilities. The approach of GaaP means optimizing the delivery of services and enabling government agencies to promote collaboration and to reach common goals. Therefore, GaaP is a tool to enhance the communication across the entire ecosystem of government and results in the improvement of service-delivery and increases the efficiency of public-sector services. Hence, governments can better serve their citizens and whole communities. It can be said, that GaaP offers better results then systems in isolation.

As has been outlined in part 3.1, eGov – which is also called digital government or open government, involves the so-called open data concept which does not mean it is open for everyone but accessible for specific groups only. This slightly paradox understanding of those terms has widely affected the understanding of e-democracy. "Government information resource sharing [on government platforms] generally encompasses the following considerations: (1) a sharing platform and directory which includes information about the data content, sharing methods, and timelines for sharing, (2) data collection, (3) data provision (4) information use, (5) security, and (6) supervision and elevation."(Chen, Dawes and Chen, 2017) As Netchaeva (2002) has said: "Providing the e-government system cannot change the established order and make the police or totalitarian states much more open. Moreover, there is a danger that due to the implementation of new technologies in governance, society may become more transparent and liable to control and, consequently, more controlled." Especially interconnected systems that have a wide range of public-private partnerships and collaborations, such as GaaP, are likely to become objects of misuse of their new and innovative ways for governments. Throughout the involvement of mobile technologies which have shown that they nowadays function as a fundamental tool for the transformation of the relationship between government and their citizens. Platforms will help to direct government information to the citizens by involving mobile technologies and guiding and ensuring the accessibility of digital government services for all especially by vulnerable groups. (Janssen and Estevez, 2013; Reforgiato Recupero et al., 2016)

As Margetts and Naumann show, that "platforms generating the highest economic activity are the most open ones, where did decentralization and low entry barriers for participation make it easy for users and developers to add value to the existing platform, while open standards encourage new innovation." (2017) Especially for government platforms it is highly important to find the right track between control and generativity which means that on the one hand, open standards that foster innovation have either low barriers for entrance and push innovation or they have high barriers and are thus likely to preclude innovation. (Glick, 2015; Dunleavy and Margetts, 2015; Brown, Fishenden and Thompson, 2014) On the other hand, „vibrant platforms become less generative overtime because the platform vendor begins to compete with the developers ecosystem." (Margetts and Naumann, 2017)

The characteristics defining GaaP are much more then just the usual government webpage which gives information and delivers e-services. Those characteristics for GaaP

are (1) that platforms deliver products, services or technologies that connect to different types of clients to each other (Hagiu and Yoffie 2009); (2) that platforms are customer oriented; (3) that platforms are focal points for various types of actors involved in the joint environment. (Janssen, 2017; Brown, Fishenden and Thompson, 2014)

One of the major advantages of platforms is, that people and private institutions can create their own applications. They are mostly equipped with automatically gathered information that uses technical possibilities of multiple devices. The company that controls a successful platform as well controls the interface between the players and the users, and it is able to dictate their rules of engagement. (Hagiu and Yoffie 2009, von Lucke, 2015) Put in basic terms, if you own the platform and its infrastructure, you can guide the direction in which the platform is going and what "common" goal it is going to serve.

For the development of government platforms an analysis of the expectations of providers and users is important. Due to their different understandings on the idea of GaaP, providers and users differ in their expectations. Those different expectations are shown in table 2.

Table 2: Providers and Users Expectations for Government Platforms

Providers Expectations	Users Expectations
Have the Time	Minimal Time Consumption
Have the Knowledge	Easy to Understand
Know what they want	Clear Usability
Being Critical	No technical Knowledge
Deep Knowledge of Analytics and Statistics	Showing them the Needs
Contribute to Social Value	Providing the Knowledge to them

Source: Table found in: (Janssen, 2017)

GaaP is a possibility to share data and collaborate in creating knowledge by using platforms. Datafication is transforming the way we interact with citizens. For understanding the user's types of behavior and needs by making a design concrete and comprehensible, the involvement of a small number of users helping to continuously improve the platform is highly important. From a more technical point of view, it may be said that from now on, the working algorithms in GaaP can be used to create smartness

of systems, the possibility to proactively relate to the citizens and clients. "Algorithms do not operate on their own which complicates understanding them and their impact. Algorithms are inherently rationale and begin with human endeavor and operate with the knowledge of the people to whom they serve. […] Algorithms dynamically co-evolves with data, systems and humans within the complex socio-technical system. […] In effect, decisions produced by the algorithms are as good as the data upon which such decisions are computed and the humans and systems operating them." (Janssen and Kuk, 2016)

In the classification algorithms based on their level of automation and their complexity four categories can be perceived:

1) Simple algorithm that can be manually operated
2) Simple and often automated algorithm
3) Complex and manual operated algorithm
4) Complex and automated algorithm

Platforms do only work with automated algorithms. They are either simple or complex and automated. Simple and automated algorithms are most effective in calculating the social benefits. The input data given by the individual and the situation will be used by the algorithm to calculate the resulting output e.g. the social benefits. A complex and automated algorithm is used to analyze the outcomes and to initiate all kinds of decision-making process. In complex and automated algorithms, the data provided by different agencies in specific databases will be used to combine them and to result in the proper outcome that may lead to action in the policy-making process. (Scholta et al., 2017)

"The rise of big and open linked data, and algorithm for dealing with the data results in technocratic government in which traditional administrative processes are replaced by processes run by algorithms." (Janssen and Kuk, 2016) This replacement of government functions due to the implementation of algorithms has lead to the so-called concept of "lean government" introduced by Janssen and Estevez (2013). It "is about 'doing more with less' and is it about the changing role of government in responding to complex political, managerial, and democratic challenges. […] [lGov] focuses on the coordination of information flows, mobilization of actors to stimulate collaboration and innovation, and to monitoring what is happening." (2013) In the change and re-development of government business processes, lGov is leads to this process

development into a more rationalized, complexity reduced direction which leads to a decreasing variety of business processes that accrued in past eGov development stages. (Scholl and Scholl, 2014)

The infrastructure and data interoperability are key conditions to make GaaP work. Therefore, as follows, the key components and infrastructure of GaaP will be described. Platforms have been created to reach common goals especially for governments. Platform security issues play a major role in the development process of those new and agile systems. The infrastructural set-up of platforms, as seen in the following figure (3), is difficult to be control centrally, so that a specific policy for those government platforms is needed to preserve the security and order of the platform. At this point, it is important to mention that any involvement of politicians in the development process should not be permitted. It is more likely their task to figure out what needs to be done with the platform to reach the common goal for the society, but it is definitely not their task to define how that goal should be reached. "Platforms can, like a type of infrastructure, be viewed as socio-technological systems that emerge and evolve through the interplay of technology, users, and policy-makers." (Janssen, Chun and Gil-Garcia, 2009) The figure below illustrates this interplay of stakeholders, users and policymakers. For the development of GaaP it is important to realize the needs of all participants to succeed in terms of trust and use of the platform and the delivered services itself. During the development of platforms, the existence of several interacting, networked and collaborative actors and partners needs to be take into consideration.

"An essential characteristic of infrastructures is that they are used by many different users, with the use and evolve over time, as may the type of users. Another characteristic is that the infrastructure offers value to the users only when the certain critical mass of users has been reached." (Janssen, Chun and Gil-Garcia, 2009; Scholl and Scholl, 2014) The digital infrastructure is the foundation for a platform to make it usable for a wide range of users and opportunities so far not known. A vital GaaP infrastructure facilitates flexibility and ensures the security and privacy of data involved. A properly working platform offers technical possibilities for functions that have the possibility to read e.g. eID, payment methods, security- and visualization systems. "The whole point of government as a platform is to encourage the private sector to build applications that government didn't considers or doesn't have the resources to create. Open data is a powerful way of enabling the private sector to do just that." (O'Reilly, 2011)

To keep the ability of delivering a flexible platform for the users, the use of API's is highly important. Application programming interfaces are used to install new services, to offer possibilities for verification log-in functions, giving access to meta-data, having access to user preferences or even to visualize the geographical maps for location services. Using API's makes it easier for the developers and designers to have a specific focus on the user experience. Modern government infrastructures will "provide mechanisms to intelligently deal with the collecting, processing and dissemination of information." (Janssen, Chun and Gil-Garcia, 2009; Yang and Wu, 2016)

Government platforms have been described as multi-sided platforms which have different mechanisms that define their six dimensions. Based on their business model, those platforms have different attitudes and mechanisms to deliver their services. Using the business model that described as (1) social network (Facebook and WeChat) will be interesting for our work. The other business models are either (2) merchant (Alibaba), (3) service platform (Airbnb and Uber) or (4) application platforms (Google Play Store and Apple App Store). Regarding the dimension of the governance structure, it can be said, that it "contains decision rights and the ownership status of the company", or in our case the government. (Schreieck et al., 2018; Brown, Fishenden and Thompson, 2014) Low platform ownership rights and regulations can cause a loss of control over the platform itself. On the opposite side, a high number of regulations and rules cuts-off creativity and leads towards a restriction of user interactions.

Nowadays, platforms are described as multi-sided platform that create value by facilitating interaction between the stakeholders and participating actors. (Yang and Wu, 2016) They are intermediaries among various providers and requestors and are meant to create network effects. Those networks effects or network externalities do refer to the dependence and value of a quality delivered service and the number of users that are participating or using it. (Katz and Shapiro, 1985)

Figure 3: Overview of I-Government and the use of Platforms described by Janssen and Estevez (2013)
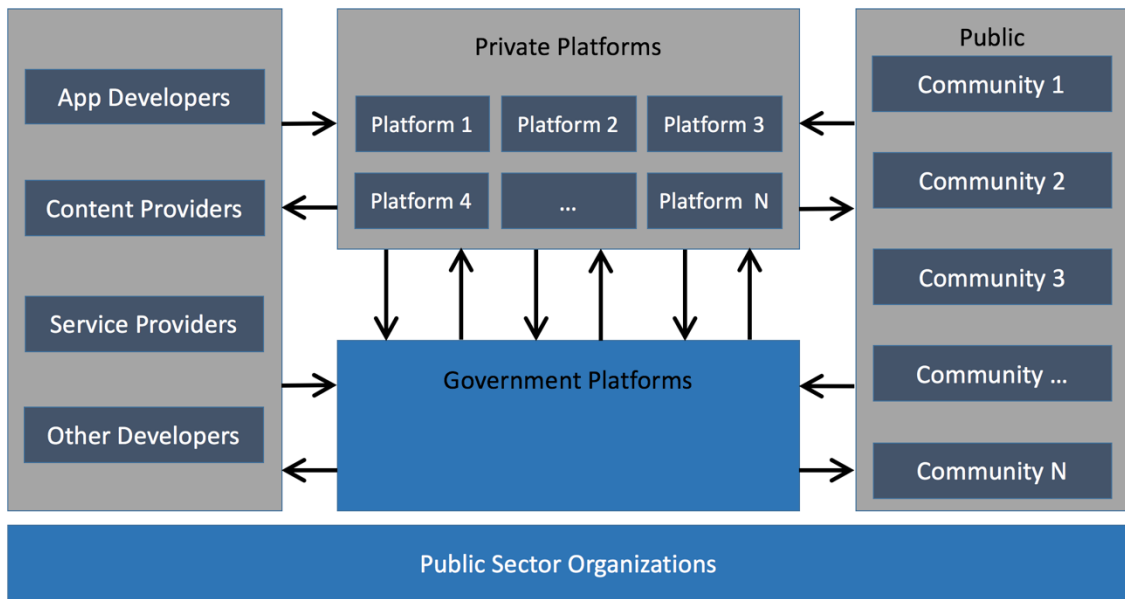
Source: Adjusted Figure based on: (Janssen and Estevez, 2013)

"The centerpiece of each [multi-sided platform] MSP is the platform governance, which orchestrates the interaction between the different parties. For example, they describe weather the overall structure is organized centrally or decentrally, which resources like APIs or SDKs are used or what restrictions are in place to control the openness and of products and services offered on the platform." (Schreieck et al., 2018) Due to this, the government as an orchestrator does not just control the platform itself, but it also is in charge of controlling the resources to coordinate the actions and developments of all participating stakeholders. "No control gives too much power to users or third-party developers, while too much control leads to and narrow range of products and services." (Schreieck et al., 2018) This new role as an orchestrator opens up a new field of policy-making, because the government needs to keep the vast technological development in mind and to adjust the platform characteristics, channels and policies to stay attractive for all the participating stakeholders. "The risk in not developing a platform is that others take over and the relationship between citizens and businesses is weakened. For governments, platforms provide a strategy of getting a better grip on what is out there and regaining some level of control. Platforms aim at to interconnect people, allowing them to actively observe, report, collect, analyze, provide and disseminate information. Platforms empower citizens and cities, interconnect parties, analyze related events, and

provide policy makers with recommendation and feedback reports and in this way ultimately provide insightful information." (Janssen and Estevez, 2013)

For the government that from now on works as a platform provider, the specific tasks have changed. "The platform provider builds essential infrastructure, creates core applications that demonstrate the power of the platform and inspire outside developers to push the platform even further, and enforces 'rules of the road' that ensure that applications working well together." (O'Reilly, 2011)

In contrast to what John Gall said: "A complex system that works is invariably found to have evolved from a simple system that worked. The inverse proposition also appears to be true. A complex system design from scratch never works and cannot be made to work unless one builds upon a simple system." (1977) For government systems this seemed to be one of the most difficult things, when thinking of innovate and develop working citizen-centric systems. "Getting the philosophy of simplicity into your work, understanding that designing foundations that others can build on is an important part of platform thinking. It's about creating the starting point, something that others can reuse and extend." (O'Reilly, 2011)

4 Transition from eGov towards sGov – eGov Stage Models in Practice

The transformation of government is a wide term. Due to the involvement of information technologies, governments have been pushed towards the implementation of those technologies.

Especially in the years between 2000 and 2015, several academic books and articles have been published regarding to the understanding of eGov and e-governance, in most of those studies on the transformation of public administration and government through e-service deliveries have described similar maturity models for eGov. Especially Kakabadse et al. (2011) focus on the process of smart transformation and therefore outline specifications for transformation processes in the ICT-paradigm. (Perez, 2009)

The wide range of possibilities for changes in governments have shown major improvements in organizational structures of government. eGov has been a way of better serving the citizens by the use of new technologies and through new channels. It has also changed the entire process of services that governments provide and has changed the entire organizational structures of governments.

Therefore, stage models have been used to divide the different ways of development in government. Those stages have some basic features in common. "all of them bring to bear a differenciation in describing the development from the simple information service to a more refined one-stop government." (Anders and Goldkuhl, 2005)

Several different stage models for e-government have been developed by scholars in the past. To be able to find the right stage model for Asia, those major models have been analyzed and compared with each other. The aim of understanding weather or not they comply with the developments based on super-applications in China or finding out if there is a need for a different e-government stage model for those cases in China and South-East Asia. Some scholars especially worth mentioning are Layne and Lee. They offer the general bases of analyzing stage models in present work, because it has been the most general but as well the most often referenced model over the past years. Several others have been used to shape the right understanding for developing a stage model extension for a new and innovative way of government that is mainly data-driven and

proactive. (Affisco and Soliman, 2006; Andersen and Henriksen, 2006; Hiller and Bélanger, 2001; Klievink and Janssen, 2009; Layne and Lee, 2001; Netchaeva, 2002; Siau and Long, 2005; West, 2004; Scholta et al., 2017)

The most important literature describing the transition from eGov towards sGov has been created in the Middle East, such as the United Arab Emirates, Qatar, Bahrain, Saudi Arabia (Figure 4), and in Asian countries, such as Singapore, South Korea, China and Taiwan (Figure 5). Those studies describe theory of transformation and use examples. (Harsh and Ichalkaranje, 2015; Anthopoulos, 2017; Jiménez et al., 2014a; Jiménez, Solanas and Falcone, 2014b; Aiyadurai, 2015; Kim, 2011; Rodríguez-Bolívar, 2015)

Several contributions have pointed out problems that need to be overcome to be able to reach the next stage of eGov. Some of them have shown that government officials on lower and higher levels are likely to resist any changes and development in established systems and processes.

"The closed culture within government, which is caused by a general fear of the disclosure of government failures and any resultant democratic impact, is the biggest challenge for transforming into an open government." (Harsh and Ichalkaranje, 2015) Being able to overcome this barrier will drive the transformation of government towards a more digitalized and future oriented government that can have the ability to serve their citizens better then it did ever before. Action areas to become more open and as well predictive are the community engagement and co-production of services, financial investment, automation, collaboration and governance. To be able to transform government service delivery from e-government to smart-government, agencies have to collaborate and provide a seamless integrated service delivery across all domains.

4.1 Existing eGov Stage Models

Governments do not change for intrinsic reasons but are lead by visions of eGov emerging in society. Those visions are shaped by ideas and a new understanding of governance based on a citizens-centered concept instead of a traditional bureaucracy-centered vision. These kinds of vision are driven by a result-centered and market-centered ways that are actively promoting innovation. (Siau and Long, 2005)

There are four objectives that describe the change in governments due to the help of information technologies. From an organizational point of view, it can be said, that governments try to internally enhance the cooperation and collaboration between several

government divisions among several levels and various locations. The new way of government will as well provide better services to external entities such as businesses (e.g. elimination of redundant data collections and their reduction of transaction costs). Focused on the delivery of services to individuals, governments have set their visions to provide services to their citizens that are satisfying in order to improve the government-citizen relationship that has been difficult in the past. Lastly, from an individual perspective, governments try to improve their internal processes to boost efficiency and effectiveness of their own administration. (Siau and Shen 2002)

Based on those four objectives, scholars have developed stage models, each having a different approach and therefore, differing in the number of stages. Some stage models consist of four (e.g. Layne and Lee, 2001); five (e.g. Hiller and Bélanger, 2001); and six stages (e.g. Deloitte, 2001). "Measuring the effective use of technology within the design, operation and delivery of public services is likely to mature into a comparative measure of how successfully governments have move towards an open architecture model." (Brown, Fishenden and Thompson, 2014) In what now follows, the Hiller and Bélanger and the Deloitte stage models will be presented in a more summary way before the Layne and Lee model will be described in more detail.

4.1.1 The Deloitte Six-Stage Model

The Deloitte six stage model is based on the understanding of the citizen as a customer, with whom it is important to establish a long-term relationship. In their view it is possible that both sides do benefit from the development of e-services. The six stages that Deloitte has set-up are: (1) information publishing and dissemination, in which governments improve the provision of any kind of access to information for their citizen. (2) Secondly, "official" internal interaction and communication between government agencies and users (two-way transaction) by using information and communication technologies such as digital signatures and security keys. (3) The third stage is based on the delivery of services on multi–purpose portals which means that governments utilize the delivery of services by different departments of governments on just a single portal. (4) The portal personalization that follows in the fourth stage enables users to customize government portals according to their own needs and desires. (5) The fifth stage is defined as the stage for clustering common services to be able to enhance collaboration and reduce intermediaries between operational processes to provide unified services for the user. (6) The sixth and last stage consists of the full integration of eGov-services in Government

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transactions. It also focuses on the implementation of transactions among enterprises. Therefore, an ideal vision for this last stage is that governments provide sophisticated unified and personalized services that are shaped for the citizens taking into account their needs and preferences. (Guo and Lu, 2007)

4.1.2 The Hiller and Bélanger Five-Stage Model

Hiller and Bélanger present their five-stage model. Moon (2002) refers to the five stages and adopts them. Hiller and Bélanger's five stages are: (1) information, (2) communication, (3) transaction, (4) integration, and (5) participation. The first stage is the one-way communication of providing information by the government to the citizen online. The second stage follows with a two-way communication (request and response) that enables communication and cooperation between governments and users. The third stage occurs between governments and individuals. This means that it extends its ways of communication for enterprises as well. It is defined as a service and financial transaction. In the fourth stage of the model, a vertical and horizontal integration takes place. In the fourth stage the integration of separate systems at different levels (vertical) and on different departments inside governments (horizontal) will occur. This anticipates the corresponding stage in the Layne and Lee model. The final stage of the Hiller and Bélanger model includes the political participation of citizens in such forms as the integration of services such as surveys and e-/ i-voting. Stating the importance of political participation makes this model unique and implies a move from an indirect democratic approach towards a direct democratic one. (Of course) this fifth stage could have also been part of the second stage, which offers the two-way interaction between government and citizens. Political considerations motivated them to introduce this new stage, because politics has not just an impact on the way of interacting with the government, but moreover has a general impact on society. Dahl (2000) argues that new ways of democracy such as the idea of Hiller and Bélanger "must build on more than formal possibilities of influence […]. Information knowledge, resources and influence are […] important prerequisites for democracy." (Persson and Goldkuhl, 2005; Siau and Long, 2005; Lee, 2010)

4.1.3 The Layne and Lee Four-Stage Model

Layne and Lee (2001) have developed their stage model on the basic understanding of eGovernment as a chaotic and unmanageable development of

government-citizen interactions. In this sense, they claim the importance of dividing the development into distinguishable stages. Therefore, they have developed the four stages: (1) catalogue; (2) transaction; (3) vertical integration; and (4) horizontal integration.

The integration of government agencies, as described by Layne and Lee, has been unique. "In Layne and Lee this is divided into vertical; cross-hierarchical integration and horizontal; cross-functional integration. The other models do not separate the cross-functional and cross-hierarchical integration from each other." (Persson and Goldkuhl, 2005; Siau and Long, 2005; Lee, 2010)

The model is based on technical, organizational and managerial feasibility. The authors do define their model as a framework for an evolutionary phenomenon that is called – eGov.

The first stage of the model delivers static or just basic information by using websites. Besides basic information delivery the functions of the stage are the publication of documents and the possibility of downloading form sheets. Therefore, this information is of a general nature and mostly pays attention to the agency or department itself. The established online procedures of government departments and their agencies tend to be created in a mainly decentralized way. There will be no interaction between government and citizens and there no cooperation among agencies. The move into this stage is initiated by external pressures arising from client (e.g. citizens and businesses) expectations. (Persson and Goldkuhl, 2005; Siau and Long, 2005; Lee, 2010)

The second stage of the Layne and Lee model extends the previously established possibilities of the catalogue stage. In general, it allows citizens to fill in online forms for governments. This shows that a transaction between government and citizens has been established. For Layne and Lee this stage represents an internal focus shift that moves agency systems onto the existing websites. Examples of this stage are the renewal of the residence parking permits (e.g. in the Federal Republic of Germany), the renewal of licenses and the possibility of paying fines and to checking evidence online (e.g. in the United States of America and the Federal Republic of Germany). A full integration of agency systems has been archived in the next stage of the model. This full integration allows the citizens not only to view information but helps them as well to post their own information and responses directly into the agency systems. Direct and personal interaction with government officials will be reduced and a greater location-independence can be seen. (Persson and Goldkuhl, 2005; Siau and Long, 2005; Lee, 2010)

In the third stage of the model, a vertical integration has been introduced. This stage differs from the several other stage models proposed in literature. The vertical integration most likely focuses on the transformation of the delivered services rather then on the automation of already existing business processes. It describes the process of integration into a vertical cross-governmental way. In comparison to the first two stages this stage focuses on the development and the integration of agency systems with the help of web interfaces. In addition, the Layne and Lee model focuses on organizational changes. This is highly important to promote the change in government structures using information and communication technologies. In this third stage, the possibility of connecting government agencies on different levels occurs and offers practical functions such as the "integration of local level business license application [that] is being linked to state and government level to obtain an employer identification number [(e.g. in the United States of America)]." (Persson and Goldkuhl, 2005) A linkage of local- and state-systems on higher-levels and brings this stage to its maturity.

The last and fourth stage of this model describes the horizontal integration and focuses on the integration of systems on the same level of government. Several agencies offer one system for their service delivery to their clients. Even though several agencies deliver different services and functions, the information, regarding to the client that they have in common, can be communicated and shared. A functional example is the possibility for the clients to pay their business fees and taxes to several government entities on a single. This will be possible due to the interconnection of agency systems that makes it possible to divide the payment and deliver it to the right agency. (Persson and Goldkuhl, 2005; Siau and Long, 2005; Lee, 2010)

For the Layne and Lee stage model, the importance of outlining the change of organizational structures due to the implementation and interconnection of agency systems shows, that the transformation of government systems does not only include the delivery of services that they provide. It as well underlines the internal aspect of change that needs to be done to reach the expectations of modern government.

4.2 Extension of current eGov Stage Models

The presented and explained stage models that have been frequently used, the author of this thesis is going to extend the Layne and Lee model based on this done research. Andersen and Henriksen, have as well developed their extension of the Layne

and Lee stage model but it has a different approach and focuses on the re-orientation of e-governance "maturity models by focusing at IT applications to improve the core activities and name the end-users as the key stakeholders for the future e-government investments." (2006)

55 years of computers and government, 25 years of the Internet and World Wide Web and 15 years of social media has imported a range of organizational cultures to government that ultimately can underpin a new stage for eGov transformation.

Next to organizational changes that can be seen in the past, new ways and models to interact with their clients have pushed government agencies on an entire new level. With the implementation of super-applications in the delivery process of government services, the terms "fast and effective" have become a new definition and understanding. It is above the so far seen eGov approach that delivers information and services to their citizens over the Internet. Since the wide distribution of smartphones all over the world, the Internet has become part of people's life's. The Internet is now accessed directly from the people's pocket and it has become mobile. It has become part of our daily life.

All this has made it possible to access government services over the browser on the clients' smartphones and entirely new problems occurred that have questioned the accident accessibility and verification functions for government e-services. They had to update old services and new verification systems had to be developed. "With a rapid proliferation of smartphones, public smartphone applications have emerged as a new technology and innovative way to achieve smarter government. […] The maturity of public applications can be interpreted as showing that government agencies have followed the trend of the rapid proliferation of public applications without considering how high-level citizen-centric services could be delivered through the public applications." (Garcia, Helbig and Ojo, 2014) This lack of consideration of how a high-level citizen-centric service had to be delivered – governments had to face the lack of acceptance of their mobile e-services. The use of data, that has been given by the clients, has made governments to a powerful stakeholder regarding to Internet technologies in a data-driven world.

Data-driven government that will also be able to proactively use and deliver information to their clients would be the next generation of government. Sirendi and Taveter even argue that "designing proactive services of e-governance should be seen as the next stage in service design for e-governance. […] [P]roactive public electronic services should be designed in a way that supports the automation and intelligent

processing of already available information to reflect the purpose of meeting the needs of different stakeholders yet maintaining a people-first-policy" (2016, Scholta et al., 2017) This new type of government is able to serve its peoples needs in a better way than they where able to deliver services ever before. At the same time, they will be able to forecast a decision-making to serve their people even before they know that they need to be served by the government. "Data-driven approaches have less to do with building mutual understanding and peace than with supporting governments strategic interests and ambitions. The danger is that the data-driven approaches will lead officials further away from public diplomacy's humanistic capabilities." (Bean and Comor, 2017)

Based on this new understanding of government, a new stage for describing this transformation of government will follow. In this case, it can be said that due to the rapid growth in demand of government e-services for mobile devices and the occurrence of data-driven government that will be able to proactively serve their citizens and enterprises requires a new stage to define the maturity of governments in the transformation process from eGov to sGov. "From a similar viewpoint, Linders et al. (2015) consider the transformation of e-government services to pro-active ones, as a means towards smart-government, which will drive smart development too, meaning that ICT innovation can in fact serve as an enabler for national growth." (Anthopolus, 2017)

Therefore, the author of this thesis proposes an extension of the Layne and Lee stage model. This fifth stage extends the existing stage model and focuses on the delivery of this service and the use of government data. This stage will be named as the "forecasting" stage. Due to the use of analytics, the new way of governing citizens will be implemented. Data-driven governments are current in this stage and they will, on a more mature level of this stage, actively invest in deep data analytics. Its decision-making is based on Big Data and will be able to proactively serve its citizens in the future. (Sun, Strang and Pambel, 2018) The delivery of e-services in this fifth stage supports the use of smartphones and developed mobile government applications.

As the approach of this thesis is to implement super-applications in this transformation from eGov towards sGov, archiving this stage will be possible by implementing eGov services in daily-used super-applications. In this stage, organizational structures of government will not be entirely changed anymore. Policy adjustments and new legislative procedures will help to legally connect third-party applications and data-security laws for government databases. Data gathering due to the help of those implemented e-services will offer new possibilities for governments to

predict economic changes and movements of society on the long, as well as short-term scale.

This new way of implementing e-services and analyzing the way they input data will surely have an impact on the policy outcomes. By implementing agile delivery procedures that are based on the citizens given data, new ways of customization for e-services will occur. "In the context of an architecture of consumption, agile delivery is an extremely powerful approach, since it allows the recombination and reuse of standard building blocks, closely customized to user's requirements." (Brown, Fishenden and Thompson, 2014)

This newly and fully citizen-centric approach for government e-services has become a goal for the delivery of those services. This proposed extension of the Lyane and Lee stage model shows, that even though the general stage model will reach its maturity due to the development of technology and its implementation by government agencies.

5 Case Study Research – WeChat: A Chinese Super-Application

In this fifth chapter, a more practical explanation and the case study will take place. At first, the unique conditions for the development of applications and the development of government e-services will be looked at. Secondly, the definition of the term super-application will be introduced and explained, and it will be outlined, what the terms of application implements for the transformation process that this thesis is focuses on. The last part of this chapter will look at the case itself. The author will present the information that he gathered in the interviews over the entire part 5.3. This has its reason in the methods of the interviews itself, which have not been standardized due to the different type of background of the stakeholders.

5.1 The Chinese Web, its Policies and Regulations

As it has been mentioned before, China has developed its Internet into a unique position that has – for the development of network applications and other software developments – entirely different characteristics then any other country in the world. It has developed a "Chinese Intranet" that can block any kind of information that is defined as state and citizen endangering material. „What has been designed and implemented […] is called the "Golden Shield" or the "Great Firewall" […]. The firewall explores all the data packs and dynamically detects packs which contain the forbidden keywords, and then disconnects the link […]. The infrastructure can also be applied to emails, blogs, online boards and search engines […]. The Chinese government considers such a system an essential factor in helping create a healthy cyber environment for Chinese people […]." (Bashir and Nasrollahi, 2018) "Chinese people own numerous mobile devices and are always looking out for the best apps. For this reason, they prefer to integrate all of their applications into one to establish a single digital identity." (Parks, 2016)

The 12th and 13th five-year plan of the People's Republic of China has named the direction of development of the Chinese web and its major use for the people and the government. (Chien, 2011; Central Committee of the Communist Party of China, 2016)

Social networking applications that have still been able to be used in Mainland China a few years ago, have now been blocked. Major social networking applications such as LINE, WhatsApp, KakaoTalk or the Facebook Messenger reflect this regulation. Even though, some applications disappeared in the app-stores in Mainland China, such as Skype in December 2017, the application network connections have not been blocked or shut down. They can still be used regularly. Furthermore, VPN-applications in app-stores have been removed due to new regulations. One of those new draft regulations have been introduced in 2016. "Domain Name Management Rules" for example, which should take place of registration of a domain into account, so that Chinese Internet users can only access domains that have been registered in China. (Schell, 2016) An American based IT company such as Apple has decided to entirely store the information and data accounts that have been registered in Mainland China on Chinese servers to follow those new regulations.

The People's Republic of China has gone through four major administrative reform stages, which all had an impact on the development of e-governance. "Before 1978, reforms followed a cycle of centralization and decentralization alternating between downsizing expending central vs. local government." (Chen, Dawes and Chen, 2017) The first stage took place before 1990 in which the main purpose it was to improve the internal government management by especially defining the functions of local and central government. This development of a stronger centralization that was seen at this time was followed by starting to build first eGov applications and to set-up infrastructures such as networks and hardware. This first step towards eGov in China was underlying national technical infrastructures to support administrative effort for modernization and reform in Mainland China.

The second stage that took place between 1990 and the millennium change had its major purpose on economic reforms and the transformation of government functions. Due to the transformation of state-owned enterprises and the adjustment of resources to the market, this reform pushed China's economic development onto a higher level. The government started shifting public services and especially monitoring functions to social intermediate organizations. In the eGov sector, the government focused on three large-scale "golden projects": Government Online, Enterprise Online, Family Online. With the purpose of eGov in this stage to develop a mature infrastructure and to improve transparency by providing information via government websites, the eGov support for the administrative reform was given. (Chen, Dawes and Chen, 2017)

Between 2000 and 2005 the third reform stage took place and had a bigger impact on the development of government e-services. This stage had a specific focus on the management perspective of government. The transformation and clarification of functions of central and local governments got into a commensurate level and the beginning of re-inventing government business processes and re-organization of government structures took place. The general management improvements and reduction of customary Chinese high administration examination and approval requirements happened at this stage. Due to this so-called "big ministry reform" and the delegation of the decision-making process to lower levels of government and the evaluation of civil servant's performance, the governments were able to support eGov purposes as well. The improvement of internal management and supervision, revenue and expenditure management and the social management and public services were put into practice due to the help of the "twelve golden" initiations that were related to management, finance and services. The Implementation of internal office administration systems pushed this step towards the process of transformation. The transformed functions, that appear in this stage, improved civil servant's efficiency and quality and social and public affairs. It made government decision-making processes more accurate, scientific and especially efficient.

The last and fourth stage of Chinese administrative reforms that that is happens since 2006 combines policy change, technological development, management improvements and data use analytics. This fourth stage purpose is to accelerate and promote a modernized national Chinese governance system and it as well promotes a streamlining with aspects of decentralization, delegation and already transformed government functions. By delegating more functions to local authorities and their specification of service responsibilities in government and the new setup of responsibility and approval of regulations, the implementation of e-services and eGov functions became more local-oriented and focused on the specific needs of the citizens and enterprises. The major purpose of eGov in this stage can be defined as the provision of greater accountability and delivery of more services online. This stage emphasizes transparency, standardization and it improves the interagency collaboration. Using the most advanced and modern information and communication technologies has made this stage immensely versatile. The current implementation of government data centers and Big Data applications, the one-stop administrative examination and approval systems and the implementation of anti-corruption systems have made this step unique and improved

efficiency and effectiveness. Government information resource sharing and open government data made a move towards more openness and transparency in governance. With the help of eGov, "the current reform stage has improved public services through a decentralization and reduced administrative examination and approval requirements." (Chen, Dawes and Chen, 2017) As corruption has always been a major issue in developing countries, the People's Republic of China has created new anti-corruption tools due to the help eGov. This specific focus which has high Presidential support has shown, that especially internal processes will be influenced by the implementation of eGov services.

Summarized, the described first two stages focus only on policies and technology. The third stage adds a management perspective and the fourth and so far, last sage adds the data perspective, which has a specific focus on data analytics.

"In the years since major reform effort started in the foundation of new China, the goals and types of reforms have changed from economic reform, a cultural and social transition to reforms that have shifted from internal government operations towards open and transparent public services. At the same time, several characteristics have been consistent: (1) Reforms flow from the top to the bottom of government. (2) Rules-orientation is shifting to service-orientation. (3) Government structure and organizational adjustment are primary considerations since reforms demand change in bureaucratic culture and every civil servant's practices and habits. (4) The core of reform has been steadily moving towards meeting individual and business demands for improved services." (Chen, Dawes and Chen, 2017)

China has faced new trends in the eGov development and adopted them to their ongoing reforms. The three major areas that slow down the development and implementation of the government can not only be seen in the People's Republic of China – "the lack of technical capability, Government staff resistance to changes that threaten their habits and authority, and lack of mechanisms to horizontal collaboration and information sharing across different organizations." (Chen, Dawes, Chen, 2017) The Chinese government has set-up an "Internet Plus Strategy" which's goal it is to facilitate the process of transformation due to the development and modernization of government and entire industries due to the involvement of ICT's. The term "Internet Plus" was first articulated by Tony Ma, CEO of Tencent. The concept was able to be realized with especially Tencent's products at the beginning – predominantly WeChat. "Internet Plus was included in the Government Work Plan as an important national strategy at the annual

Chinese People's Congress on 5th March 2015, and presented by Prime Minister Keqiang Li. (Liu, 2018)

"Big Data" is another focus of the Chinese government to serve as a bridge of collaboration between government and society by promoting data analytics to support decision-making, policymaking, smart city management and of course to create more convenient public e-services. The development of open data platforms in Chinese major cities such as Beijing, Shanghai, Wuhan, Guangzhou and other developed provinces such as Zhejiang, Guangdong and Jiangsu, have helped to increase the use of open government datasets to create new value for government and society. New policies, practices, technical and analytical skills that are entirely interconnected make this value creation possible.

5.2 Super-Applications and their Features to support the Transformation of eGov

Super-Applications enable possibilities to implement services under the idea of Government as a Platform (GaaP). Therefore, they will be able to provide data information for smart cities and innovative administrative government processes.

Sensors are able to gather various types of data. Smartphones are great examples for this type of data-gathering. The location, temperature, 3D movements, fingerprints, light, atmospheric pressure and even camera sensors with possibilities for face recognition as well as the recognition of handwriting have built into the new types of smartphones. All those gathered information will be used to improve the user-experience and to measure the behavior of the user. In the next step, analytics will be able to predict user preferences and calculate risks of decision-making. Analytics help to define new levels of verification to securely store any kind of information on the users personal device. This type of data and predictive analytics are often used in the car industry to predict which automobile part will fail first and how fast wear parts need to be renewed to keep the highest level of user-satisfaction and safety. In the logistics sector, analytics will be able to almost exactly predict a delivery date of the parcel. By implementing specific algorithms into the predictive decision-making process, parcels with a high priority will be able to be dispatched even faster than ever before. With the help of super-applications, which combine several tools and the use of sensors to analyze and predict information, on the government as a platform approach, will be used to define more

specifically the maturity level of the transformation process. "With the mobile internet extending to IoT in recent years, Chinese internet enterprises have emerged as the most dynamic actors in the development of IoT, and have been strongly influencing the patterns, models and industrial ecological system of China's IoT development. Major Chinese internet companies have entered the field of IoT through wearable intelligent terminals, smart home, mobile health care, IoV, security, and other businesses, and have made rapid development in some of these areas." (European Commission and CAICT, 2016)

One of those examples is the Chinese super-application WeChat, which "can communicate with home appliances, toys, routers, wearable devices, sports equipment and other types of smart devices, and help to interconnect intelligent devices and hundreds of millions of Wechat users." (European Commission and CAICT, 2016; Scholta et al., 2017) With WeChat, not only people can be connected, and relationships maintained, but also connections between people and objects or connections between objects can be made. IoT has become reality in China through WeChat. (Liu, 2018) As follows, the Chinese super-application WeChat will be used to define this new stage of transformation of government e-services.

The involvement of data analytics and the implementation of mobile government in the set-up, but agile system that can be used on cloud services, as well outlines the before mentioned definition of smart-government. The in this thesis developed new *forecasting stage* uses the data that is gathered by governments to better serve the citizens and clients needs. Hence, this stage plays a major role in the transformation process of government. The implementation of emerging technologies and innovation that can be driven by IoT in the public sector has shown a move towards a more digitalized and especially more open and interconnected type of government. This shows, that governments will be able to push their transformation on the new level, due to the implementation of super-applications to reach the most advanced type of government – smart-government.

5.3 WeChat

WeChat is this international name for the Chinese-developed super-application "微信 - Wēixìn," which literately stands for "short message or micro-message." This application does exist since 2011 and it is just one really successful product of the Chinese Tencent company. WeChat has been delivered in over 20 different languages and it has been used

in almost 200 countries. (Liu, 2018; Lien and Cao, 2014) "Tencent (or Teng Xun "腾讯控股有限公司" in Chinese) was founded in 1998 by Huateng Ma "马化腾" engl. Pony Ma, Yidan Chen "陈一丹" engl. Charles Chen, Chenye Xu "许晨晔" engl. Daniel Xu, Zhidong Zhang "张志东" engl. Tony Zhang and "曾李青" Zeng Liquing in the city of Shenzhen (Silicon Valley of the People's Republic of China). Its first product was Open ICQ (OICQ), essentially a Chinese version of ICQ, the world's first instant messaging (IM) software." (Shih, Yu and Liu, 2015; Mei, Hu and Zeng, 2013) This Chinese version of ICQ has been renamed as QQ in 2000. It provides social games, music, shopping, microblogging, movies and a group- and voice-chat software. The rapid growth of the QQ social networking service was its technical background. Tencent developed QQ to a user-friendly interface which – unlike ICQ – stores all user information, such as chat histories and contact information on Tencent's own servers to offer the possibility to use QQ on non-personal devices. Cyber cafés in Mainland China emerged, "where visitors spend hours using public computers to chat with their friends and play online video games." (Shih, Yu and Liu, 2015)

Less attractive are the traditional social networks in China. While the local providers Kaixin and RenRen experienced a long time strong inflow, the user numbers are currently decreasing parallel to the growth of the microblogs that have been used by WeChat, Weibo and QQ. (Hart and Holznagel, 2013) "Sina Weibo was initially a Chinese Twitter but later started to incorporate more Facebook-like social features. Weibo is the only vibrant micro-blogging platform nowadays in China, with 175.7 million monthly active users. Baidu Tieba is a BBS-like chat forum with an average of 50 million new posts posted per day." (Stockmann and Luo, 2017)

WeChat and QQ are two social messaging applications, owned by one company. It is important to outline the major difference between them. Due to the earlier development of the QQ service, it has been developed as a desktop service and therefore, it has not been ready for any kind of mobile use on smartphones or other mobile devices. Since the beginning of QQ-IM, the wide range of features has made it to that most commonly used online service in China and can be seen as the "cash cow" of Tencent. (Liu, 2016)

The market in China is particularly dynamic. There are always new start-ups creating new platforms every year. The competitive pressure is enormous. Everyone is fighting for users and some are disappearing from the market again. Especially rankings

of popularity and the number of users are changing year by year. (Liu, 2018) The development of the mobile market over the past years has had a major influence on the decision-making for the future development of the Tencent company. Their direct and logical response to the market development and their move towards a new mobile application showed that specific technical requirements were needed to make it possible to deliver a similar service for use on the customer's mobile devices. In comparison to QQ, WeChat was developed right from the beginning for an mobile purpose. It was faster, and a lower data volume had been generated. Therefore, it has been optimized for mobile use at the beginning. "The application cost less on Internet traffic than competing instant messaging mobile applications. Pictures, voice and videos will be sent after optimization is complete, by consuming 1 MB Internet traffic, you can send nearly 1,000 text messages or 1,000 seconds of voice information or nearly one-minute video. Also, if you run WeChat in the background of mobile system, it only costs about 2.4KB/hour." (Mei, Hu and Zeng, 2013)

The possibility to send to entire folders, as it is possible in QQ, does not exist in WeChat. On the other hand, QQ does not have the possibility to define different user-accounts. This makes it hard to especially control the advertisement and traffic inside the system. Due to the introduction of the new products, Tencent was able to technically generate the QQ-user towards the new WeChat application without losing them to similar social networking applications. (Liu, 2016) This so-called cannibalism-effect has helped Tencent to keep their already existing users and to generate even more due to the new features and the indirect social pressure. (Burmann and Kirchgeorg, 2018) One of the founders of Tencent refers to the development of the QQ service and the development of the WeChat application as follows: "Some say that mobile Internet just means adding "mobile" in front of Internet as an adjective: Internet has been around for decades, so mobile Internet is just an extension of Internet. My feeling was, that it was much more it than merely an extension. It was a revolution. – Pony Ma" (Shih, Yu and Liu, 2015)

Recently, Tencent employs more than 30,000 highly skilled people. The company founded a research and development institute for Internet technology, the Tencent Research Institute "腾讯 研究院", with offices in Beijing, Shanghai and Shenzhen.

WeChat has been described as the "Swiss army knife" under the most common and daily used social networking service applications. It is not the variety of things you can do on WeChat that makes it so powerful – it is the fact that they are all in one application. (Kessel and Mozur, 2016) This powerful approach of WeChat has as well

mentioned in an interview for this research paper. Author Liu, which said: "I've seen the power of WeChat, the functions and the differences to the Western social media, such as WhatsApp" has made him focus on his research on the Chinese super-application. Especially the open development platform could help the government to spread the use of e-services and to drive the transformation from eGovernment (eGov) towards sGovernment (sGov). This possibility for WeChat to become the most commonly used social networking application in the People's Republic of China has had a major impact on the development of the Chinese market. This major impact on the market did not just cover the Internet market, such as online games or any kind of mobile application services. It covers the entire internal market economy, which means that transport and delivery, payments, administration, education, as well as the entire shopping sector will be covered.

It has been developed towards a platform that enables the users to book doctor's appointments, paying electricity fees, traffic fines and booking transportation services in major cities. Services have been developed for Chinese universities to manage library services and the entire administration of student services and to process student data more convenient. Especially this focus on the younger generation of Chinese Internet users has influenced this change of the market. By using this one application for so many different things, it is interesting to outline the major reasons for using this application.

"WeChat is much more than a simple messaging application. It is basically an ecosystem on a mobile platform. That is used by millions of Asian users for shopping, following individuals and brands, accessing news and information and even organizing their daily lives." (Parks, 2016)

Chinese IT companies, such as Baidu, Alibaba, and Meituan are all based on American developed business models, which they have taken as an inspiration for the development of their business model as well. They have transformed those business models towards a business model that meets the expectations of their Chinese users by adding the right features with a specific traditional touch.

The satisfaction of the offered services in one application, the switching reasons have shown a lower level due to the possibility to customize offered services for every user. Since the implementation of government services and direct communication possibilities between government officials and citizens, the number of users for especially this type of services increased. "Studies show that applying emerging technologies to

existing administrative processes, even to the relatively small degree, can have a substantial impact." (Jin and Lee, 2013 found in: Gil-Garcia, Helbig and Ojo, 2014)

The founder of WeChat, Allen (Xiaolong) Zhang, has set four principals since the beginning of the development of WeChat. Zhang outline said that those four principles sound quite simple, but they require a higher amount of market research, creativity, testing and even courage. The WeChat application does have its focus on the users. This seems to be easy to understand but in practice, WeChat has several partners that try to monetize the large number of users for their own business purpose. Possibilities to send advertisements to a group of people does not exist.

The second principle is to insist on creating value to the users. With the help of public accounts, which allow users to subscribe it as a newsletter creates valuable content rather than endless traffic. This has been regulated and ruled due to the account requirements. WeChat encourages original content and therefore, it gives the possibility to voluntarily donate to the author. This makes it possible to have a specific focus on the content and not on the amount of traffic – it provides something useful to their subscribers. (Sun, 2016)

The third rule is to use the product and leave it alone. Zhang outlines, that a good product is more likely a tool for the users to efficiently achieve their goals and then stop using it. This is truly contradictory but "Zhang worried about the users spending too much time on WeChat every day which prevented them from doing other more valuable things." (Sun, 2016) There is no possibility to add all phone contacts right from the beginning to maximize network effects, but WeChat asks to accept requests before being added.

The fourth principle is to make commercialization invisible. In general, it can be said that good commercialization does not spam the users and it for sure will only reach the relevant users. Therefore, advertisements that have been placed in Moments and it has been important not actively recognize them because they do not appear as pop-up or banner advertisements. – This makes WeChat unique. An added coupon feature of WeChat offers an indirect usage of coupons. Coupons will only be available for the users, if their friends have shared them. Only then, a cashback will be given to both. This is one way of commercializing WeChat under the idea of a networking application. (Sun, 2016; Liu, 2018)

So far, we can already define WeChat as a super-application, but at the same time, it can be seen that the WhatsApp application also tries to develop itself towards a platform that offers possibilities to implement business e-services with a new layout, new functions

and innovative possibilities which define its first steps into this new direction. The transformation process is evident, and those new features have been given to the users in the latest update.

"Platforms such as Facebook, Twitter, and WeChat represented global tools that bring in the potential to transform the interaction between government agencies, businesses, and citizens." (Medaglia, Loukis and Scholl, 2018) As well the WeChat platform as a non-Western possibility has shown that with an even more traditional and user/citizen-centric development process of mobile software solutions an even closer connection between governments and citizens can be archived.

The WeChat platform offers three different types of accounts to define roles and to control their access and traffic to the users – two of them are defined in the table (3) below. This is part of the before mentioned WeChat philosophy that has been described by Allen Zhang. In October 2014 those three accounts have been set-up and taken into action. A possibility for account-verification has as well been developed to allow even more functions for those accounts, which in this case becomes a legal base and refers to the policies and regulations in China. Especially for Tencent, the issue of security and privacy of their user's information has been a general principle. "WeChat for example, provides several services such as the business verification process or a security deposit for using the API to increase trust for their platform. Therefore, users are likely to use the platform due to the protective mechanisms." (Schreieck et al., 2018)

Tencent promised to ask for permission before transferring private user information to third-party institutions or businesses, based on the rules and regulations of the People's Republic of China. They confirm to transfer and store relevant data always in a highly-professional encrypted way. (Liu, 2018)

First, the subscription account for media and individuals. Those accounts most likely are set-up to inform the users about enterprise news such as new products or services. Second, the service accounts for airlines, banks and merchants, which offer more functions. Lastly, the enterprise account, which especially focuses on corporate communication with employees. It has been developed to structure company's internal communication, which as well include supply chains. During the registration process for companies they will be able to decide between those three choices. For private users, only the subscription-account will be able to chose from.

The basic functions of official WeChat accounts have generally been the same since they emerged in 2014. Those basic functions are the broadcasting of new sent

messages, thereby, specific criteria can be chosen from to be able to deliver it to the right user group. Criteria like this are in general information such as sex, geography, or even customer group-oriented categories, such as sales manager or VIP-seller or buyer. Another basic function is the automatic reply, which allows to set-up welcoming messages or automated answers, which will be generated due to the scan of keywords and other random messages. The direct reply function to questions of the followers can be used as well. The possibility to sort and structure followers and assigning an alias to a specific group of followers is described as a follower management service. The content management, which allows to upload pictures, sound- and video-files and that offers possibilities to create multimedia maps, is next to the analytics of the followers, their content-usage and the message-traffic analysis the most important feature of the official accounts. (Liu, 2016) Extended functionality settings for verified official accounts do exist and offer new possibilities to boost companies and official account owners marketing efforts to an even higher level. Especially the service accounts benefited from the verification feature. A customer menu, which allows up to 15 menu options, will be offered and possibilities for setting up questionnaires and components for market research can be used. A WLAN hotspot manager offers the possibility to analyze the use of open company WLAN services to precisely target advertisements to the right user group; and surely the possibility to create and distribute advertisements that exist for both verified service- and subscription-accounts.

Features that only exist for a verified service account are the multi-agent software, which offers the customer service software for a multi-agent, push messages and pre-setup answers. The payment method that accepts the mobile payment functions over WeChat on- and offline is as well one of the verified features for those service-accounts. The WeChat online shop, which offers the entire ecosystem for e-commerce possibilities, such as online shops inside of WeChat shows that it covers the entire business process for the market. A transaction-based messaging service, which pushes messages to the account holder to confirm orders, bookings, reservations, payments or status reports offers a secure way for the seller and makes the payment process more efficient and effective. Lastly, a hardware interface has been implemented to connect smart-devices with WeChat accounts. (Liu, 2016)

Table 3: Basic Framework of existing WeChat Official-Accounts

Service Account	Subscription Account
Access to advanced features of the WeChat public platform.	Advantageous for business that upload new content on a regular basis.
A total of four monthly broadcasts. Broadcasts are received in the form of a business contact.	No push notifications.
The business has to reply to user messages within 48 hours.	The business has to reply to user messages within 48 hours.
Push notifications are allowed.	The WeChat API must be used by the businesses and the business must be verified.
Custom menus are available for all service accounts.	No provision for customization.
All verified accounts are supported for payments (API).	No payment support.

Source: Own table based on (Parks, 2016; Liu, 2018)

"Each category has its own set of templates and examples to showcase best practices and results achieved on WeChat. By the end of 2014, 8 million users were connected to [China Merchant Bank] CMB through the WeChat official account. Starbucks was one of the first western companies to open its official account on WeChat in 2012. Beijing-based mobile start-up Xiaomi reportedly sold 150000 of its latest phone models in ten minutes via its WeChat official account. And Mercedes-Benz sold 6777 limited edition Smart cars in just a few hours." (Shih, Yu and Liu, 2015)

Even though a high amount of official accounts can be connected to the users personal WeChat, most of the contacts that they are connected with over the social networking application refer to their private life. Hence, it can be outlined that in 2016 WeChat users have defined their contacts as follows: Classmates (88,2%), private friends (87,6%), family members (86,3%), colleagues (83,0%), teachers or supervisors (66,8%), friends from the web (without personal contact) (39,7%) and random people (29,5%). (Liu, 2018 based on CNNIC 2016)
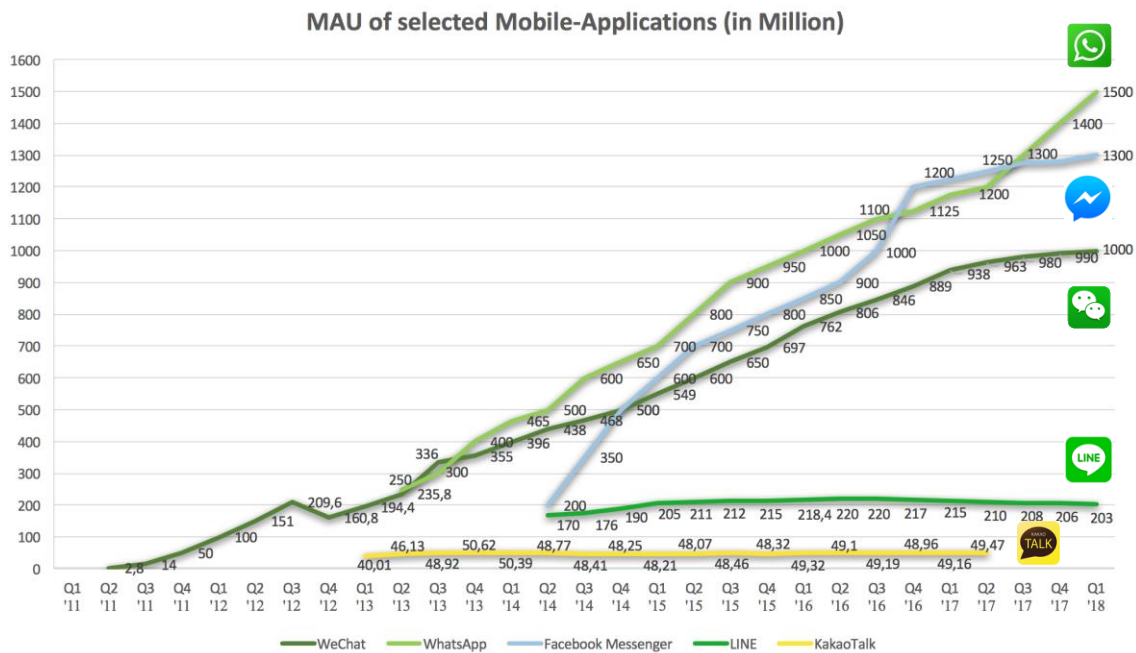
5.3.1 Development of the WeChat Application and its Implementation in the Tencent Company

"WeChat was a simple replication of WhatsApp Messenger with push-to-talk […] feature. But now it has evolved as a mixture of WhatsApp, Instagram, Skype, Apple Pay and many other apps you are familiar with. […] But under the hood it was carefully crafted to penetrate the Chinese market." (Zhe, 2018)

Since the launch of Tencent's WeChat development project in 2010, the WeChat application has gone through major changes and improved and restructured its user accounts to be able to keep its user-focus based on the idea of an almost advertisement free social networking application. (Zhe, 2018) In January 2011 the WeChat application first went online in the iOS app-store with its version 1.0 for iPhone. In May 2011, it launched its version 2.0, which introduced the often-used voice message function. With its version 2.5 and the "Look Around" function, which "provided location-based service, enabling users to find other nearby users. The app was called 'one-night-stand tool' for a while." (Zhe, 2018) With its version 3.0 and the new "Shake Drift Bottle" function, the focus became more likely to provide a user-friendly social networking application than a dating-app. In the first quarter of 2012 the number of users reached a number of 100 million. (Figure 4) The in December 2011 implemented QR-Code function (version 3.5) became one of the most important tools in the further development of the application. 2012 was as well for the software development of the application an important year. Due to the implementation of the video-chat function, WeChat for Windows (desktop) and the launch of the WeChat Open Platform and the implementation of the networking-tool "Moments" the number of users reached a new high of 200 million in September 2012 (Figure 4) and 300 million in mid January 2013. (Liu, 2018) In the same year, WeChat introduced its version 4.3, which included at "Walkie-Talkie" function, the possibility for group chats and a navigation function. The "Moments" function that works most likely like the Western mobile application "Instagram" offers the possibility to share photos on the user's personal stream and to watch other users streams at the same time, while liking and commenting them. Those changes and major improvements made it possible to reach the amount of 400 million users in July 2013. (Figure 4) For the author Liu, in the it was also surprising that WeChat became so successful at a short time and especially that the amount of MAU is increasing steadily.

Together with the as well by Tencent developed QQ Mobile Messenger, WeChat started their game center and WeChat Pay. As well "other ways to enhance communication include a sticker-shop copied from the famous Asian chatting app LINE and a 'game center' for users to compare their mobile game scores [have been added]. […] According to data company iResearch, the market shares of Tencent's payment platform in China rose from 10 percent in 2014 to 40 percent in 2017, while Alipay shrank from 80 to 54 percent during the same time." (Zhe, 2018) During the organizational improvements, in version 5.0, the Open Platform and its user accounts were separated into service- and subscription-accounts to improve the service they wanted to deliver to their users. In August 2013, WeChat reached a number of 100 million users outside Mainland China. The implementation of third-party services, such as private and public services, started in the beginning of 2014 by implementing the taxi function "DiDi Dache". "The size of the app bloated from just 2MB to 58MB during the merging process." (Zhe, 2018) Since March 2014 WeChat Pay has been available for business accounts. Due to the implementation of the, by Pony Ma (CEO of Tencent) introduced Internet Plus Strategy and it implementation in the policy for the development of the People's Republic of China, the consolidation of the application has begun and started to focus on security and efficiency of the application. The trust in the application can be seen by the number of users (200 million in 2015, 4th Quarter) that have set-up their accounts with the payment function, due to connecting their private bank accounts with the application. (Liu, 2018) "As WeChat became a must-have for Chinese mobile users, Tencent went on to stabilize its monopoly by merging even more features into the app, including car hailing, hospital appointment, civil service and many, many more." (Zhe, 2018) Even for the future, WeChat tries to keep its level of innovation and its idea to implement all existing applications into the WeChat application and to make the others unnecessary. The in 2016 introduced "Mini Programs" that have been developed in the Tencent ecosystem, have shown that a personalized super-application will be the future of the next generation of Chinese mobile application software development.

Figure 4: MAU of selected Mobile-Applications over the past Years

MAU of selected Mobile-Applications (in Million)

1600
1500 — 1500
1400 — 1400
1300 — 1300 1300
1250
1200 — 1200 1200
1100 — 1125
1100
1050
1000 — 1050 1000 1000 990 1000
950
900 — 900 900 980
800 — 800 850 889 938 963
800 806 846
762
700 — 750 697
700 700
600 — 650 650
600 600 600
549
500 — 500 500
465 500 468
438
400 — 400
336 396 350
300 — 300 355
250 235,8
209,6 194,4
200 — 151 160,8 200 205 211 212 215 218,4 220 220 217 215 210 208 206 203
100 — 100 170 176 190
50 46,13 50,62 48,77 48,25 48,07 48,32 49,1 48,96 49,47
2,8 14 40,01 48,92 50,39 48,41 48,21 48,46 49,32 49,19 49,16
0

Q1 '11 Q2 '11 Q3 '11 Q4 '11 Q1 '12 Q2 '12 Q3 '12 Q4 '12 Q1 '13 Q2 '13 Q3 '13 Q4 '13 Q1 '14 Q2 '14 Q3 '14 Q4 '14 Q1 '15 Q2 '15 Q3 '15 Q4 '15 Q1 '16 Q2 '16 Q3 '16 Q4 '16 Q1 '17 Q2 '17 Q3 '17 Q4 '17 Q1 '18

— WeChat — WhatsApp — Facebook Messenger — LINE — KakaoTalk

Source: Own diagram based on (Statista, 2018a; Statista, 2018b; Statista, 2018c; Statista, 2018d; Statista, 2018e; Ding, 2017; Millward, 2017; Molla, 2018)

5.3.2 WeChat Functions and Features

The WeChat application consists out of several different functions and features. Necco (2015) has named the most general functions in his presentation and outlines that the main communication functions are basically voice chat, group chats, Moments, free internet-based calls, image messaging, video calls, sticker gallery and download, broadcasting messages, friend radar, favorite messages, group chat QR-Codes, chat history backups, Web WeChat, shake, people nearby, live location sharing, the translation function that translates messages into the receivers set-up phone language and has customized wallpapers. "The voice messaging service is widely used throughout China. Users currently prefer sending voice messages which resemble a walkie-talkie kind of interaction; one of the most popular features. The 'Moments' feature lets users have their own timeline where they can post updates which can be followed by their friends. WeChat allows the user to choose what can be viewed by their select group of friends on the Moments page." (Parks, 2016)

Another function are the official accounts that combine full services, which include opening bank accounts, credit checks, payment reminders and customer relationship management promotion in the finance sector. By having a look at

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applications of airline companies, they offer for airport information and flight services such as buying tickets, offer self check-in, seat choosing, flight status updates and security passing. The WeChat payment function is the basic function that allows users to pay with bank accounts using WeChat. This works online, while using payment methods in official WeChat accounts or within apps. Off-line, the payment method is based on scanning QR-codes and by presenting payment codes.

This WeChat payment function has enabled the possibility for the especially in Asia traditional function – Hong Bo. "During Chinese New Year, the Chinese traditionally offered envelopes containing money to children and youngsters. In January 2014 WeChat launched an electronic Red Envelope, which allows users to send money to family and friends through WeChat or to put up a defined amount of cash that would then be distributed randomly among as specified group of friends. […] Tencent made a clever and innovative marketing move by transforming the manner in which dutifully gifting family members could be done with the click of a button. This led to a major growth in the use of the group chat feature. More than 32 billion packets of digital cash were sent during the last [2015] Chinese New Year celebrations by over 400 million users." (Parks, 2016) By using agent-oriented modeling in the service-design context as it has been purposed by Sirendi and Taveter, "it would be possible to address more precisely human aspect and gain a better understanding of the existing issues in public electronic services." (2016)

Another function is the developer platform which covers login, payment and information sharing features. It concludes that WeChat official account development, the website development and the mobile app development.

The device connecting function serves the Internet of Things and it allows to develop WeChat services to be able to control and register third-party hardware with the user-device.

WeChat as well offers functions for smart recognition to get detailed knowledge from scripted or unknown codes. It recognizes music and TV-shows due to listening and searching for similar information in its database. Using the camera function of the device, WeChat will be able to scan codes and numbers and give information regarding to product warranty, offer subscription, card-pack offerings, lottery, retail shop management or even connecting to WeChat small shops.

The built-in gaming function offers multiplayer games and the possibility to compare players with each other. This adds a social networking character to the gaming function.

Advertising functions have only been offered to official accounts and have the possibility to publish advertisements on microblogs and in the Moments feature. Inside the Moments feature, advertisements can be published as normal posts that will have the possibility to show a portrait with the name, a promotion tag, a link for details, upload up to nine pictures, and it offers the possibility for social interaction.

The WeChat WLAN function offers customers to access the WeChat official account while using the WeChat account login without using WLAN passwords. For the official service, a possibility to share the advertisement page for further service, customer behavior tracking, and a customer relationship management will be given.

The by Apple introduced iBeacon function has as well become a function of the WeChat application. The iBeacon function offers a proprietary standard for in-room navigation to locate the users and direct them straight to the place they need to go. This especially helps them to locate users in bus stations, hotels, while signing in or vote for something and giving allowance, due to the right of location they have entered.

The mentioned cards and offer function combines the stores and organizes coupons, memberships, movie tickets, zoo tickets, air tickets and service cards. Especially this function has been developed to an excellent example for a customer relationship management tool.

A nearby function helps users to find rest runs or retail stores they will be able to recommend and rate them.

With the JS SDK, the developer will be able to enable native features on HTML5 pages. With the JS SDK, WeChat offers twelve interface functions for the development of official WeChat webpages. Whit those functions, known WeChat functions can be implemented into official WeChat pages. (1) Sharing – sharing information in Moments, chats, QQ-Messenger, Qzone or Weibo. (2) Picture functions, (3) voice message functions, (4) intelligent interface functions, that are able to automatically transform a voice message into a text message. (5) Another interface function is the device information function to inform users about the technical requirements for downloads or services they want to use. (6) The location gathering interface function, (7) the function to find other devices nearby and (8) a function for explorer interface settings that help to identify the settings of the webpage. (9) The function to scan QR-Codes, (10) an interface

to connect the WeChat online shop, (11) an interface for maps and map services, and (12) the probably most important interface that is able to implement that WeChat payment functions.

Figure 5: WeChat Features (some examples, mostly WeChat terms used)

Source: Overlook based on own analysis of current WeChat features.

For a further development of the WeChat application, some of the interviewees mentioned that minor adjustments in the voice message function, which would include fast-forward and rewind functions, would improve the usage of the function. They as well mention that it is good to have a time-limitation for recordings. The interviewed book author, Liu, mentioned that "functions such as official accounts should be also possible for foreign people or for people out of China. Functions like personal profile of contacts (such as CV) may be helpful, just like those on the platforms of professional social network, such as LinkedIn." An interviewed woman outlined in the interview that especially e-health possibilities for people in central China would be important due to their long ways to the hospitals. One interviewee outlined that for him it would be great to write down and translate spoken foreign languages inside the application. It would better help him to learn and understand foreign languages. Regarding to the future of WeChat in the People's Republic of China, some of the interviewees answered that they

could not imagine a competitor of WeChat, which performs even better and makes life even more convenient.

5.3.3 WeChat Platforms

Tencent offers five platforms for the development of the WeChat application. All five platforms offer different functions or structured authorization for their specific purpose. To be able to use one of their platforms, the users needs to register with register data that will be given by the WeChat / Tencent office. All platforms – except the Hardware Platform (in Chinese: 微信硬件平台) that just offers information to the hardware developers, regarding to WeChat API's and application possibilities – offer possibilities for marketing purposes. (Liu, 2018)

The WeChat Official Account Admin Platform (in Chinese: 微信公众平台) is designed for businesses, organizations and influencers. It focuses on the communication with the wide range of uses to support products, brands or even lifestyles. It exists since 2012 and runs under the motto: "Everyone can be Heard" (international motto) and the Chinese motto: "再小的个体, 也有自己的品牌" which says: "No matter how small an individual is – it has an own brand." Everyone that registered with a Chinese phone number will not be able to access international user accounts. The opposite with the international phone number, those accounts will be able to access both user groups – Chinese and international users.

Another platform is the WeChat Pay Platform (in Chinese: 微信支付商户平台) for business purposes. This platform organizes all issues regarding to the WeChat payment function. Users will be able to check the asset management function and will be able to connect bank accounts to their business profiles. Every user will get the bank account number and access information to their accountant to be able to work with it. For international purposes, temps and has developed an English plot for him to use the same services under different international regulations.

The WeChat Platform for Advertising Services (in Chinese: 微信广告服务商平台) focuses on the platform advertisement functions that can be set-up. It will be able to specifically reach user groups to sell and advertise new products and services.

The last platform is that WeChat Open Platform (in Chinese: 微信开放平台). (Liu, 2018) On this platform "services can be integrated into mobile applications in order

to attract followers by using WeChat's Application Programming Interface. Consumers who are followers of a business must be given an incentive in order to sign up. Conversion rates can be increased by offering discounts, entertainment, sales, promotions and pictures." (Parks, 2016) Several functions can be realized due to the use of this platform. "WeChat also offers more flexibility and capabilities, as well as features for users of public accounts who have programming skills such as JavaScript and want to make their own customizations or enhancements to the system." (Liu, 2018)

For WeChat developers, this is the most commonly used platform because it offers the possibility to integrate WeChat functions into third-party applications, it offers login services due to the use of the WeChat login on an even non-related WeChat webpage, it offers feature enhancements for public WeChat accounts and as well as for third-party developers.

"We have WeChat logon, Open Platform, the Official Account Platform, Hardware Platform and Smart Platform open to the public. All third-party developers can get access to our services and user base through open API. They are doing this, the whole Internet society and traditional industry can tailor their services to suit our user base. Meanwhile, we checked extends their influence on every aspect of people's lives. By building an open and fair "ecosystem" we believe we can continuously bring values to users in the sustaining model. – Ying Zhang, Vice general manager, open business platform division, WeChat Business Group." (Shih, Yu and Liu, 2015)

"Its widely acknowledged that the western mobile ecosystem is very different from what exists in China. It is difficult to replicate the influence that WeChat has on consumers as the application is strongly entrenched in the Chinese market" (Parks, 2016) The ecosystem, which has been set-up by WeChat and the framework for developers have created the base for the future development of the application. Due to the platforms, especially the ecosystem of the open platform (Figure 6), has offered to wide range of possibilities for a creative and innovative development of the application. Hundred thousand of developers from all over the world have started to develop new possibilities to connect businesses and governments with people and to introduce new ways for networking in our modern society.

Two of the interviewees have picked up this thought and outlined, that WeChat has not just influenced the existing business models, but it as well has had a big influence on the job market. WeChat has created huge possibilities for the e-commerce market and people have gotten the possibility to even make a living out of their WeChat

developments. Liu has focused, that because of WeChat, many people have decided to use online shopping and online payment and will tend to use it in the future; because of WeChat, many people use smartphones and those things are only a few examples of many influences of WeChat on the Chinese society. As the WeChat project manager, Eva Fu, in the interview summarized: "We have created the entire WeChat ecosystem over the last years, several platforms will help users to implement their services into our application. This is exactly what makes it so flexible and user friendly. It seems that we have developers that are working on every situation of life. They are creating amazingly good things and they will never stop. It is great."

Figure 6: The Ecosystem of WeChat Open Platform
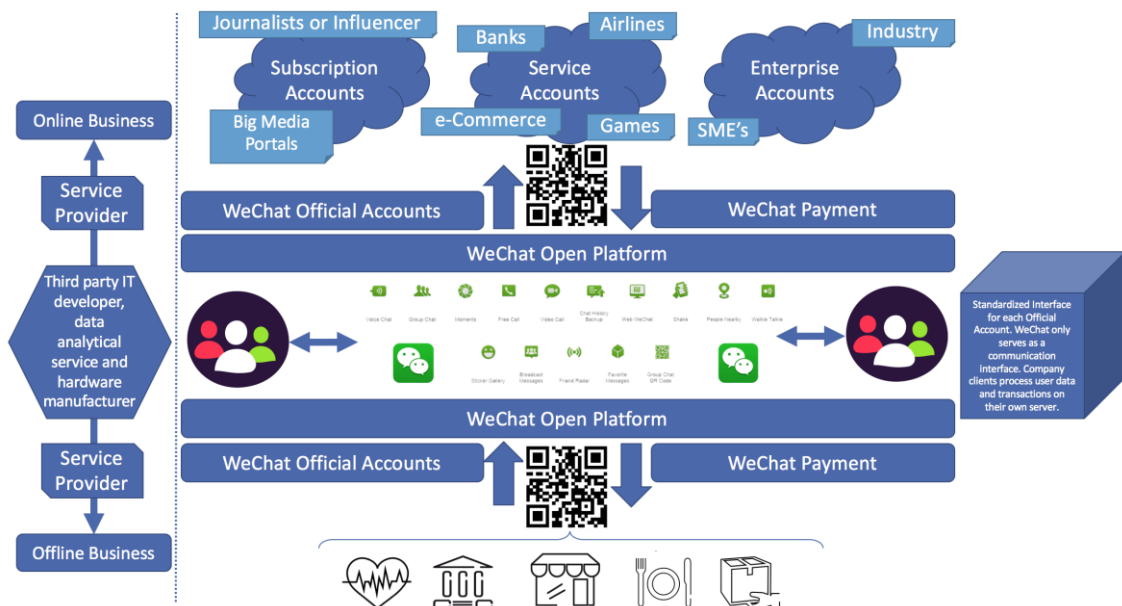
Source: Own figure adjusted and improved but based on (Shih, Yu and Liu, 2015; Necco, 2015).

5.3.4 WeChat and eGovernment

The before mentioned "Internet Plus Strategy" of the Chinese government has been introduced in 2015. "Internet Plus" has been a policy that was first created by the Tencent company. Their intention to implement Tencent services, due to this strategy, has had a major influence on the market development in the People's Republic of China. The main objective of the "Internet Plus Strategy" is to boost the economy in the country's traditional industries due to the use of applications and online technologies such as mobile Internet, cloud computing, Big Data and the Internet of Things. (Liu, 2018)

This strategy consists of five topics that outline the major areas they are focusing on. Its general idea is to connect to the Internet, not just with people, but also with things and organizations.

The producing industry, the financial sector, the medical system, agriculture and as well public administration. The Internet Plus Strategy and its focus on public administration has the intention to set-up eGov services for citizens and to enable governments to serve their citizens right in their home – straight from their personal devices. Citizens can register, pay government services and fines and apply for visa right over their smartphones. The WeChat application tries to cover all five topics and it has already played a major role in realizing this strategy in Mainland China. (Liu, 2018)

For public service delivery in the WeChat application, especially the focus on citizen-centric service delivery and the focus on a more comfortable and efficient use for public transportation services has been set up. WeChat has made it possible for every citizen to use it as a personal ID in China. Smart living, online public administration, and the implementation of transportation planning combined with payment functions has driven this change of mobile service delivery due to this innovative kind of verification possibility.

As Sirendi and Taveter have pointed out in their article, the Taiwanese change in their fourth e-government policy has moved from a current traditional e-government "pull" approach towards a "push" approach "where government proactively and seamlessly delivers timely, customized, and relevant services to its citizens." (2016, Scholta et al., 2017)

Especially this proactive and mobile close-to-citizen service possibility has been implemented into the WeChat Wallet. It offers payment functions for money transfer to WeChat contacts, mobile phone recharge functions, asset management and the recharge of QQ-Coins (Tencent's virtual currency) and to daily payments that are connected to public services and based on a set-up location.

The daily payments that can be found in the WeChat Wallet (Figure 9) are defined by the topics and services they are able to cover. Services for daily life use are gathered under the section for public services. Healthcare offers the possibility for setting up doctor's appointments online as well as the payment service for medical treatment and the function to find the location for medical treatment and have been implemented. Insurances cover the payment and policy information for Chinese citizen and offer services for social security. Car and vehicle services cover toll fees, parking fees, and

offer registrations and the recharge for fuel cards that can be used at gas stations. It as well gives information about the car. Weather and an environmental protection gives information on whether, weather forecasts and air quality as well as environmental issues. Transportation and travel gathers all related topics on transportation either public or private. Information on congestion queries, hailing taxis, the actual city traffic situation, bus services and ticketing, public bike rentals and flooding. Government related services that have been offered and support a variety of services from taxation, education, administrative registration, court services, notary services and access to services from the industrial and commercial bureau. Due to this, it is possible to apply for a visa, plan and prepare administrative requirements for a marriage and to apply for a notarization of documents. The last section is defined as convenient daily services and offers postal services, charity, a report center – to directly contact the government call centers – and life payments. The life payment functions offer a billing- and information managing service for payments for the supply of water, electrical power, gas, telephone, Internet, cable TV, fines for traffic violation and licenses. Figure 9 shows this part of the WeChat application and it offers a better understanding of the user interface.

Nowadays, the development of the online city service on WeChat that can be implemented in the Wallet is taking place in many Chinese cities. By the end of 2014, there were already over 40.000 public WeChat accounts held by Chinese authorities at different levels (see Tang, 2015; Liu, 2018). Especially in the interviews it has been outlined that, since the first eGov services had been implemented, they have used them because it is much more convenient. They will not wait in line at the government office and all the needed information can be easily given over the smartphone. It saves time and especially money for the citizen and the government officials will be able to focus just on the information – this will cause a higher efficiency.

"Platforms such as Facebook, Twitter, and WeChat represent global tools that bring in the potential to transform the interaction between government agencies, businesses, and citizens." (Medaglia, Loukis and Scholl, 2018) Due to the Internet Plus strategy in China, this change has been guided by the government but operated by the major IT-companies such as Alibaba Group (阿里巴巴集团控股有限公司, pinyin: Ālǐbābā Jítuán Kònggǔ Yǒuxiàn Gōngsī), Tencent and JD.com (京东, pinyin: Jīngdōng).

5.4 European/Western Possibilities – WhatsApp and the Facebook Messenger

The increasing and unstoppable number of WeChat's MAU (Figure 4) has shown that it is a serious competitor on the social networking market. (Liu, 2016) The Facebook Messenger and WhatsApp have had different ideas and developed in a different way over the time. Since WeChat has become one of the most used social networking application in Asia and maybe in the future also worldwide, WhatsApp has started to develop new features that makes it unique. Its focus on high security standards and the implementation of end-to-end-encryption, which is regarded as an even safer way to connect two users and their devices due to the reduction of the number of parties who might would be able to interfere or break the encryption.

The major differences between those three different social networking possibilities can be seen in Table 4.
"WeChat has been successful due to its excellent problem-solving approach and its many different features. This has attracted the attention of competitors including David Marcus, an executive of Facebook Messenger. WeChat's success inspired him to transform Messenger into a platform where people can communicate with businesses to make hassle-free purchases." (Parks, 2016) The WeChat application has shown that it has a closer and especially more traditional connection to its users. That application has especially been developed for the purpose of the Chinese market after it realized that the European market was too challenging.

In the interview, Liu outlined that: "The Chinese Great Firewall has played certainly a role for growing WeChat. But I don't think it is the main factor of success of WeChat. The internet company Tencent, which developed WeChat, is very innovative. The success comes mainly from the cutting-edge features of WeChat, such as the official account. WeChat is not only an instant messaging service but also an internet platform."

Innovations are done in an entirely different way in China then they can be seen in Western IT-companies. "When it comes to innovation, foreign companies can study how local enterprises constantly update and augment their products and capabilities, making them capable of penetrating and taking over entire high-technology sectors from the bottom up, as Huawei has done." (Parks, 2016; Ge and Gretzel, 2018) This shows, that WeChat's business model is highly flexible and easily adjustable. It can react to the market situation faster than any other European or Western application has done over the

past years. Asian competitors, such as KakaoTalk (most commonly used in the Republic of Korea) and the LINE application that's especially focuses on the Japanese and Taiwanese market, have shown similarities in terms of their business model that tend to be highly flexible and effective, while responding to the market change.

For WhatsApp and the Facebook Messenger, their Western users had a more general approach for communication than the Asian community. "Western clients do not want complicated functionalities. They only need basic functions such as sending text and photos. […] The gap between the rapid development of the company and the readiness among Western countries to adopt new mobile behaviors was a constant challenge. We are facing a cultural divide. It goes back to the basic cultural differences in the west and in the east. In the West, working family, as well as colleagues and friends are clearly separated. Chinese culture is inclusive. The boundary between work and life, or colleagues and friends is vague. It's easily mixed." – so Juliet Zhu. (Shih, Yu and Liu, 2015) Especially this mixture makes it hard to adopt to the WeChat application for European/Western societies. Privacy issues and the divide of work and private life seem to be manifested. In the interview with Zhiwei Tang, it has been outlined that this process of adopting modern technologies has especially been easy in China due to the lower level of awareness on privacy and personal data.

Table 4: The essential Framework Data for WeChat, WhatsApp and the Facebook Messenger

	WeChat	WhatsApp	Facebook Messenger
MAU	1 Billion	1,5 Billion	1,3 Billion
Costs	free of charge	now free of charge (not in the past)	free of charge
Profiles/Roles	User Accounts Service Accounts Subscription Accounts Enterprise Account	User Accounts	User Accounts Business Accounts
Major Communication functions	Text Messages Voice Messages Video Calls	Text Messages Voice Messages Video Calls	Text Messages Voice Messages Video Calls
Connecting Policy	Request to Connect before	No Request to Connect before	Request to Connect before accessing full Communication

	Communication, Blocking function	Communication, Blocking function	functions, Folder for Junk-Messages Blocking function
Networking Possibilities	Moments-Function Comments and Likes	Status Sharing Reply function	Status Sharing Facebook Platform Reply function and Likes
Contact Information Sharing	Sharing of Contact Data via QR-Code	Exchange of phone numbers	Connection via phone numbers, Facebook Friendship status
Emoticon Possibilities	WeChat Emoticons, Stickers Store, Creation of own GIF's	Standardized Emoticons by the OS and GIF search	Standardized Emoticons by the OS, GIF search, Facebook Stickers

Source: Own table based on (Liu, 2016) and personal research.

As "WeChat is to China what Amazon, Facebook, Twitter and WhatsApp are to the West. It is a highly multi-functional platform that, while it may appear to be just a messaging application, offers a huge range of features. It gives them the opportunity to directly reach more than […] [one billion] active users, and more importantly, WeChat drives traffic back to a company's website which creates lucrative sales opportunities." (Parks, 2016) "Even similar business models like Airbnb and Uber, delivering services and described as shared economy, are different in terms of services like accommodations and transportations. This is also true for WeChat and Facebook. While WeChat concentrates on the digital market of mobile social networks, Facebook tries to cover the classical online- and mobile market." (Schreieck et al., 2018)

"American Internet companies such as Twitter or Facebook-owned WhatsApp taking inspiration from the best ideas of Chinese companies such as Sina Weibo or Tencent's WeChat. Foreign Companies can also learn from the way in which Chinese companies focus on their customers, constantly updating and modifying their products to keep pace with changes in needs and tastes." (Parks, 2016)

Compared to the other applications, WeChat has an even closer connection to its users in China. Eva Fu has mentioned this close connection in the interview at the WeChat headquarters and showed a general feeling that Chinese people have regarding to research and development in the People's Republic of China. "WeChat has its own part of the story of a new, modern and strong China. People are proud of what they have done and

what they have developed over the past years. Surely, it has been tough time and intense over the last years, but we have all become wealthier and China has changed its image towards an innovative and future oriented country. The development process of new ideas and features has shown that China offers a great potential for innovation in Asia. Therefore, especially Chinese people will appreciate this story, the development in the business models and the changes in their daily life. WeChat has become part of their life."

6 Summary and Conclusion

The innovative idea of combining super-applications and the use of eGov service delivery has shown a remarkable change in the way of how future governments will deliver and interact with their citizens and country-based enterprises. As the case study has shown, new ways of interaction between governments and citizens have been developed and used by the citizens. This adoption of mobile government service delivery has reached a new stage of the currently used and widely spread eGov stage models. The forecasting stage, which has been developed and introduced in this thesis, outlined the move from eGov to sGov due to the use of super-applications and the hardware that will be supported. Being able to understand this transformation process, this thesis has introduced the terms of eGov, sGov, GaaP and it as well has defined the term super-application for the first time. This given theoretical background has shown that super-applications have been a driver for the transformation process from eGov to sGov. This innovative way of software development and the implementation of new sensor technologies and tools into just one application has made it possible to support almost every personal situation of life. In this case, it has adopted peoples needs and their circumstances of life to reach any of the needed reasons to be used on the people's mobile devices. Those super-applications have become part of their daily life over the past years and especially young Chinese can not imagine a life without WeChat anymore.

Regarding to the main research question on how the approach of GaaP based on super-applications will be able to drive the transformation of eGov in East-Asian countries has been explained at the example of the WeChat application. As it has been said in the conducted interviews, that this application has had a major influence on the development of the entire Chinese market and the development of the Chinese society over the past years. It has changed online and offline business models, it has created entirely new business models and it was able to implement already existing models. Their existence has increased the users will to easily communicate with friends, businesses, and governments. The implementation of public services in WeChat has created the first steps for governments to directly interact with their citizens over their personal mobile devices.

This implementation process for eGov services specifically explains the first subsidiary research question that asked for the ways of how to implement government services though GaaP based on super-applications. The platforms, that have been developed to offer several services on WeChat, have created the possibility for individuals from all over the world to develop microblogs, games, remote controls for any kind of hardware in the area of IoT and many other innovative ideas. By using location services, the service delivery has been shaped especially for the users and just offer services that have been available in their area. As it has been discussed in the chapter on GaaP, the ownership of the service delivery platform is from high importance due to their possibility for state interventions. In the Chinese case, the platform ownership is given by the Tencent company which offers the possibilities to implement government services in its super-application. Surely this can be different in the Western/European sphere due to the higher separation of state and private-sector economies.

Regarding to the second subsidiary research question, which focused on how services for eGov can be used through super-applications, has been outlined and shown in this thesis. Due to the implementation of public services in the WeChat application, the possibilities they have offered have reached a wide range of users in China. Western/European applications still tend to separate the major services they offer from new government business models. This surely has its reasons in the existing mobile ecosystem that is very different to the one that exist in China. WeChat has a major influence and is strongly entrenched in the entire Chinese market due to the consumer satisfaction that is caused by the widely the offered services in that only one application.

While having a look at the before set-up hypothesis of this thesis, it can be said, that especially the first part that has been focusing on the transformation process from eGov to sGov can be verified. The research of this thesis has outlined that especially the use of super-applications, the transformation process has lead towards a mature level of eGov. While introducing a next stage for the Layne and Lee eGov stage model – that has especially been focused on Big Data and proactive service delivery due to Non-Stop-Shops – the use of super-applications on next-generation smartphones has been a driver for this process of transformation towards smart government. For the second part of the hypothesis, it can not be entirely verified. Western/European applications that have been developed in the past do not focus on major changes in one specific society because they try to cover the entire world with just one application. WhatsApp and the Facebook Messenger have not been able to set-up the same ecosystem, which especially focuses on

specific regions or markets. Surely, due to the Great Firewall that exists in China, the Chinese Market has never had a high relevance for the development process of their services. The Facebook Messenger is widely used in Thailand and the Philippines, but it does not offer services that have only been created for the users of the Southeast Asian market. Their more general approach on connecting people and offering mobile social networking services has not made them focus on payment services or similar functions that have been created on the Chinese market.

Summarized it can be said, that due to this research the understanding of mobile service delivery needs to become part of the policy-making process of Western/European governments and supranational organizations in the near future. Innovative ways of service delivery will guide public administration towards a more interconnected, efficient and effective approach on how to govern a country in the 21st century. Making governments smart will increase the trust and attitude of citizens towards government and their service delivery.

6.1 Recommendations for further Research

For further research, regarding to the topic of this thesis, it will be highly important to define the specific case studies and locations of their use and development. Verifying the definitions and establishing them for further research will be necessary to make use of standardized research in this field. Further research will have to focus on just one application and it will need to question the entire ecosystem in which it has been developed in. Moreover, future research will need to focus on possibilities for Western/European applications to implement eGov services. This thesis has given a deeper insight on how a transformation process will be able to be driven and it has offered the possibilities for the reader to improve and develop platforms for government service delivery. Especially for Western/European governments it will be a major issue to keep the high privacy and security standards of personal-data from leading global-interacting IT companies such as Google, Apple and Facebook. As a recommendation for further research in this field of studies, the importance of government service delivery to the citizen's personal smartphones should be analyzed.

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Appendix 1 – List of Interview Partners and attended Presentations

Janssen, M. (2017): Government as a Platform (GaaP): Opening the government. Presentation at Tallinn University of Technology, TUT Ragnar Nurkse Department of Innovation and Governance. Tallinn. [30. April 2017].

Table 5: List of Interview Partners

Name	Sex	Position	Date	Place
Xinrui Wang	F	WeChat User	24.03.2018	Beijing, Chaoyang, China
Zhiwei Tang	M	WeChat User	19.03.2018	Shanghai, China
Shuangyi Song	M	WeChat User	09.03.2018	Beijing, Daxing, China
Luyuan Tian	M	WeChat User	24.03.2018	Beijing, Haidian, China
Qiu Yu	M	WeChat User	28.03.2018	Beijing, Haidian, China
Yinyuan Liu	M	Book Author	06.04.2018	Berlin/Augsburg, Germany
Eva Fu	F	Project Manager WeChat	14.12.2017	WeChat HQ, Guangzhou, China
Jiagang Mu	F	WeChat Developer	02.04.2018	Chengdu, China

Appendix 2 – Geographical Maps

Figure 7: Physical Map of the Middle East

Source: (Mapsland, 2018) Description: Physical Map of the Middle East showing the boarders of Armenia, Bahrain, Djibouti, Georgia, Iran, Iraq, Israel, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, Turkey and the United Arab Emirates.

Figure 8: Physical Map of the People's Republic of China and Taiwan

Source: (Ezilon, 2015); Description: The Physical Map of China showing major geographical features like elevations, mountain ranges, deserts, seas, lakes, plateaus, peninsulas, rivers, plains, landforms and other topographic features.

Appendix 3 – WeChat Application Screenshots

Figure 9: Screenshots of the WeChat Wallet and its focus on offered Public Services