

# WHICH BARRIERS HINDER A SUCCESSFUL DIGITAL TRANSFORMATION IN SMALL AND MEDIUM-SIZED MUNICIPALITIES IN A FEDERAL SYSTEM?

Markus Jakob<sup>1</sup> and Helmut Krcmar<sup>2</sup>

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## **Abstract**

*Digitalization nowadays is a frequently used buzzword in private industries as well as in the public sector. Digital services are not rocket science anymore. The technology is ready and concepts for using them in public administration exist. Recently, e-government laws were enacted all over Germany to foster and structure the digitalization of administration. Basically every authority is affected by the regulations. So are the small and medium-sized municipalities. Their structure is heterogeneous: Many of them have a small administrative organization and suffer e.g. from small budgets and a lack of experts. To develop an understanding of what the specific challenges regarding digitalization in small and medium-sized municipalities in a federal system are, we conducted a series of 12 expert interviews across municipalities of different sizes in one German territorial state. The analysis of the answers provides an idea of the municipalities' strategical and technical possibilities and their opinions on what would be beneficial for their further development in general and specifically with regard to the implementation of e-government laws. The acquired findings enable future research regarding a need for action and beyond to identify recommendations for action as well as to support municipalities in handling future digital challenges.*

## **1. Introduction**

Technical progress offers more and more possibilities for business and daily life. Consumers as well as companies have already gotten used to the skills and flexibility new technologies provide. Ordering goods online or communicating via diverse channels, where e-mail is one of the old-fashioned variances, are only basic examples. However, new technical opportunities are fostering higher expectations: Expectations regarding the daily life of working, shopping and enjoying one's spare time. Most of the time little technical helpers support one's daily doings. We can order tickets via smartphone and track our running distance, call friends and share pictures of a hiking trip with the world. If there is a problem, the fastest way to get a reaction from a provider of a faulty service is to complain via the social media channels of big companies. Normally there is a response in less than one day. Therefore, it is not surprising that expectations regarding the communication with and services of public authorities are also on the rise [9]. Subsequently, consumers and companies have specific expectations regarding the way they communicate not only with their friends or business partners, but also with public administration. Especially in Germany, there is substantial dissatisfaction with the progress and speed of digitalization within public administration [9] [18]. One way of communicating with public administration is by using the online services public administration offers. However, as the German political system is a federalism [3] and therefore the

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<sup>1</sup> fortiss GmbH, Guerickestraße 25, 80805 München, Germany, jakob@fortiss.org, www.fortiss.org

<sup>2</sup> Technische Universität München, Boltzmannstr. 3, 85748 Garching, Germany, krcmar@in.tum.de, www.winfobase.de

power is divided into different layers, public administration as one “single person of contact” does not exist in Germany. For example, the federal system alone has three layers with different areas of responsibility (“Bund,” “Länder,” “Kommunen”). Additionally, each layer has many departments or authorities (e.g. “Ministerien” or “Landesämter”). The layer in which consumers and businesses have the most points of contact is the municipality level (“Kommune”), where in Germany approximately 70 administrative procedures [14] exist. People need to contact the municipality when they need an identity document or when they move from or to a city. Therefore, municipalities are often at the forefront when something is not working as expected by the client, for example, when a citizen wishes to get in touch to make quick use of municipality services online.

Starting from this practical problem of dissatisfaction, a potential solution is a more digitalized administration that can offer flexible services to its customers - citizens as well as companies. German politicians have been conscious of the relevance of digitalization and therefore push digitalization in every sector. Also the digitalization of administration is fostered [15]. There were legal barriers like regulations or laws that hinder it or, make it at least harder to digitalize [2]. To face these issues, almost all state governments in Germany as well as the Federal Republic of Germany, recently came up with e-government laws (e.g. EGovG) to regulate and drive IT innovation within public administration and to communicate with citizens and companies [1]. The State of Bavaria also implemented such legislation, the Bavarian e-government law (BayEGovG). With some exceptions, the law applies to every kind of public administration, thus to ministries as well as to state offices and municipalities (Art. 1 BayEGovG). Among other duties, the law requires implementation of IT security concepts or digital access to administrative services by the year 2020. In contrast to private communication or interactions with private companies, implementation in public administration encounters diverse and very specific requirements. Of course there are legal regulations, but also the federal system, departmental sovereignty (“Ressorthoheit”) and local self-government (“kommunale Selbstverwaltung”) [10] come with certain provisions [12] that may hinder quick digitalization. As the majority of public administration consists of small municipalities [7], we decided to choose this group as our peer group. E.g. in Bavaria 1,831 out of 2,056 municipalities have 10k or less inhabitants; throughout Germany it is a quite equal ratio: 9,516 out of 11,092 are smaller than 10k inhabitants.

To get an overview of the possibility of implementation of the new legal regulations as well as the possibility of future changes, we investigate the vitality of the IT infrastructure and organization in small and medium-sized municipalities. We want to elaborate whether small cities are able to meet the requirements, and if they meet them on time, how they plan to comply with the plan and whether they are open for cooperating with other municipalities. The following parts of this paper are structured as follows: First, the research methodology of gaining empirical data via expert interviews is briefly described (Chapter 2). Second, the results of the interviews are presented and split into ten different barriers based on the interviews (Chapter 3). Finally, the conclusion (Chapter 4) and limitations as well as possibilities for future research in this area (Chapter 5) are appended.

## **2. Methodology**

### **2.1. Interview guidelines and interviewees**

The study reported here was designed to obtain knowledge about the vitality of the IT departments of municipalities. Among other results, we expect to find the status quo of the law requirements

municipalities have to meet regarding the BayEGovG, information about the question of whether support is needed and how well municipalities are organized regarding further IT innovations.

In designing the guidelines we basically followed the guidelines of Diekmann [8] and Gläser & Laudel [11]. One principle we followed is to first have a clear definition of what our objectives are; based on this, we could start to design the interview guidelines. However, the type of questions depends on the answer you want to get and the people you want to ask. The question should be short but accurate, the wording should not be too complicated and double negative questions should be avoided.

Due to the fact that we want to know how to assist municipalities on their way to digitalization and whether the BayEGovG provides a framework that assists this plan, the interview guideline is aligned to the requirements of the law. Therefore, we ask about the fulfilling of certain legal milestones that the law sets [e.g. implementation of e-government services (Art. 4 Abs. 1 BayEGovG) or an IT security concept (Art. 10 Abs 2 BayEGovG)]. Additionally, we are interested in facts like a dedicated implementation strategy or a vague plan or whether they would need guidance for assistance and if so, what kind. Beyond that, we want to know about general indicators of the IT organization, like the number of full-time equivalent (FTE), the IT budget, drivers of innovation, the motivation of the people (employees and politics) and whether the costs of IT investments are barriers that prevent the implementation of a certain technique. Further, we are interested in finding out municipalities' attitudes regarding any kind of IT cooperation [13]. Scientists from the field of e-government as well as other fields in the information systems sector have reviewed the interview guideline.

## **2.2. Interview partners and analysis**

In Bavaria, 2,056 municipalities with 232 inhabitants all the way up to 1.4 million run their services. The size of a municipality has significant impact on the number of people working in the IT department and thus on the level of know-how [16]. While using a classification for evaluating the questionnaire-based survey, we expect a more homogenous result over all questioned municipalities. Some literature exists for the classification of municipalities for different reasons, like classifying according to economic or social parameters [4]. In our case, the structure of the citizens is less important than the structure of the administration itself. Hence, we decided to classify the communities according to their size in terms of the number of inhabitants and believe that this is representative of the size of the administration. Following [19] and official statistics, we classified the Bavarian municipalities as follows: 1 to 2,000, 2,001 to 5,000, 5,001 to 20,000 and more than 20,000 inhabitants. We choose not to make a class for bigger cities, as the majority of municipalities (>96 %) has 20,000 or less inhabitants.

To get a representative number of interview partners, we choose to take 1% of all Bavarian municipalities, which is around 22. Additionally, we took one district ("Landkreis") and one county ("Regierungsbezirk") into consideration to cover all types of communes. The 22 municipalities were broken down by the regular distribution of all 2,056 within the Bavarian counties. At first, every chosen commune was contacted in order to get an appointment for a telephone interview. Therefore, an e-mail with general information about the scientific work, the interviewer and the topic was sent to the managing director of the chosen communes. Unfortunately, the response rate was poor, with only one out of 22 municipalities responding and offering an interview immediately. All other communes were called by the interviewer. Most of the called persons were open for discussion, but not all of them were willing to give an interview. Finally ten out of 22 completely

rejected the request for an interview. The given reasons for not taking part in the interview series were (a) not having enough time because of the workload or (b) no interest due to many recent interview and survey requests. Before the actual interview started, the scientist asked whether the conversation could be recorded for scientific reasons. All participants agreed and the interview started with the first question block, the general questions about the IT organization. In addition to the recorded interview, the scientist also took notes to have a first analysis, as well as to document which parts of the interview guideline have already been ticked off.

The recorded interviews were transcribed word-for-word and the interview texts were analyzed with the help of qualitative content analyses [17]. The categories for this article in which we want to investigate the barriers that hinder a successful digital transformation were close to the e-government's laws' targets. Indeed, if there was a target not fulfilled by a municipality, they usually named a reason and described it very well. These named reasons were our hints for the barriers they had. Subsequently, we continuously collected these causes and classified them regarding their topic (e.g. politics, strategy, resources). Afterwards, similar ones were clustered and framed in such a way that the original meaning was not lost, and we described each of them.

### **3. Results**

In the results section, we provide barriers that hinder small and medium-sized municipalities in developing an up-to-date status of digitalization. The following results do not mean that the mentioned barriers were named in each interview or that all or most of them always appear. If one of these barriers appears within a municipality, the chance that it hinders a successful digitalization is relatively high. For example, not every municipality we talked to has a missing awareness at the local politics level. But when politicians do not care about developing a digitalization strategy, it will not be pushed and will not happen. In summary, we found ten barriers that are categorized into two categories depending on whether their origin is internal or external. Hereby, internal means caused by the municipality itself and external means caused by some external organization, institution or political layer. Because of the high frequency of internally caused barriers, we made three subcategories. These subcategories describe the reasons of the internal origin: Strategic, politics and resources. Strategic in this context means that a barrier has to do with the strategy for future decisions and the task of the authority [5]. Politics relies on political decisions and resources means that there are not enough or not the right resources available. It can also be connected to the employees, the knowledge they have, the decisions they make or the attitude they have.

Barriers	Origin			
	External	Internal		
		Strategic	Politics	Resources
Frustration leads to a “Wait-and-see approach”	X			
Missing IT strategy		X		
No plan for implementation of the BayEGovG		X		
Little knowledge about the BayEGovG, its duties and deadlines				X
No priority at local politics level			X	
Uncertainty about how the challenge should be faced		X		
No strategic cooperation		X		
No budget for IT projects			X	
No relevance seen for citizens in smaller municipalities				X
Lack of IT experts				X

**Table 1: Results: Barriers and their origin**

### 3.1. External

One reason for a slow digitalizing of communes we found during our interviews is frustration – frustration that comes from unsuccessful past projects that were not completed in a satisfactory way, although the administration spent a lot of effort and resources. Some of the interviewed communities have already made bad experiences with the implementation of recommended IT services like DE-Mail. In this case, they invested resources to figure out how to implement and use the DE-Mail for their own administration. However, the technique is not in use. Communities are disappointed because of the lost resources. Therefore, they have decided to wait and see regarding future IT service projects. It became clear in the interviews that as soon as better or best practices exist, they will also invest in a new feature, which could be a service or technique. In summary, failed projects without responsibility for the failure lead to frustration and hinder a successful digitalization.

### 3.2. Internal

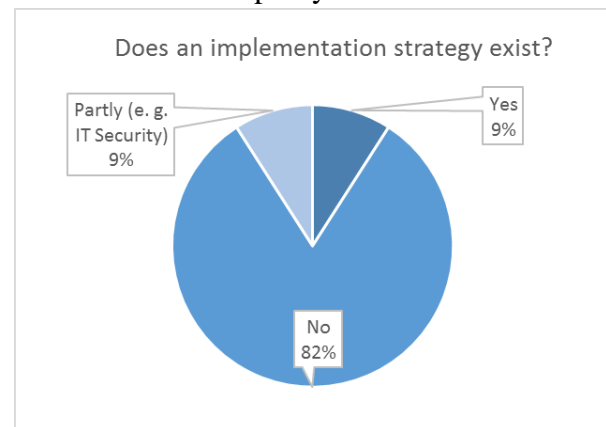
#### 3.2.1. Missing IT strategy

During the interviews, we asked the municipalities whether a strategy for IT exists in the broadest sense. We intended to get an idea about the strategic relevance of IT. Additionally, we wanted to know whether there is one and whether it is associated with political targets. Eight out of twelve interviewees stated that there is no strategy or that the strategy is not linked to politics. Existing strategies, in the broadest sense, can have different reasons. In bigger cities with a dedicated IT department, an IT strategy is common. Smaller ones also have created such a strategy, which includes an exchange of hardware and software, as well as implementation plans for certain applications. Another variance is that an auditing association determines some issues, and the fixing of these could be used as a medium-term strategy. As the auditing association [6] does not visit every municipality regularly and offers only a small variation of tasks regarding information

technology, this kind of strategy needs a bit of fortune to get planned. When there is no strategy or at least a low-level idea of what to do, the IT cannot act as an enabler [5]. Therefore, the complete absence of an IT strategy also hinders successful digital transformation.

### 3.2.2. No plan for implementation of the BayEGovG

A strong connection to the IT strategy overall has the dedicated implementation of the requirements of the BayEGovG, as they impact most of the IT concerns of a municipality. We have chosen the BayEGovG as a guideline for the interviews, as this law has certain duties and deadlines and thus all municipalities should face the implementation. Unfortunately, most of the interviewed communes do not have a plan for implementation. They partly know the requirements of BayEGovG, but have neither a plan with regard to the necessary steps nor with regard to the legal deadlines. Only one municipality in our evaluation stated that they have an implementation plan. Also, the option of a realization plan for the next step was among the answers. In this case, the next step is the implementation of an IT Security concept. More precisely, this task has the highest attention in our peer group so far.



**Figure 1: Existing IT strategy**

### 3.2.3. Little knowledge about the BayEGovG, its duties and deadlines

The very low number of plans to realize the requirements of the BayEGovG is not surprising if we look at the next barrier we found. In the replies to the question regarding the knowledge of the BayEGovG and whether its duties and deadlines are known, we experienced some hesitant responses. Most respondents, but not all, have already heard about the law and only a few really knew about the content. Nevertheless, they had good explanations like less time or low priority. For example, one stated that every week an increasing number of law changes arrive on his desk. As IT does not have the same status as construction in a municipality, IT laws have a rather low priority. In summary, one could say that if the people do not really know about the law or about the deadlines, it will be hard to meet them or even make progress or define an implementation plan (3.2.2.) or an IT strategy (3.2.1.).

### 3.2.4. No priority at local politics

At the state or federal layer, experts for information technology or digitalization are often employed to bring their ideas to the politicians. Also, in big cities politicians have a professional structure for open questions in different disciplines. The smaller the entity, the fewer personnel and thus IT experts. Thus, in small municipalities, the local politicians are often left on their own. If they have neither the knowledge nor the experience in terms of digitalization, these topics often have less or no priority. Additionally, they have top priority topics like construction of buildings, such as schools, or infrastructure, such as streets or water distribution. Consequently, low-priority topics won't appear on their agenda. Some of our interviewed communes of course have drivers at the political level, but local politicians not prioritizing digitalization projects is definitely a barrier that hinders a successful digital transformation at the municipality level.

### 3.2.5. Uncertainty about how the challenge should be faced

Most of the asked persons stated that they do not have an implementation plan because they don't know how they should really start. Not only the start, but also the continuous fulfilling of the requirements of, in this case, the BayEGovG is a huge challenge for them. Most of them also have stated that they have no IT strategy nor do they have an implementation plan. One reason for that is that they do not know how to start or how to act at all. And because of the low priority at the politician level and fewer resources, there is not a plan of action and no action is taken at all. This does not mean that municipalities, in general, do not know how to act. Thus, uncertainty about how the challenge should be faced does not necessarily have to be a barrier, but can be a barrier.

### 3.2.6. No strategic cooperation

In case there are no internal resources, one solution to gain targets is a kind of cooperation. Cooperation exists in many variations. A cooperation, seen as working together to obtain a better, cheaper, faster result, could be a service provider for certain tasks or a higher instance or federal layer that takes over certain responsibilities. And, of course, a service provider as a shared service center that only takes over tasks for the member authorities is a possibility, too. The interviewed persons stated that in their authorities, some examples exist. Most of the time, it is the punctual partnership with a IT service provider only for specified tasks. These kinds of cooperations are no real strategic cooperation in which new ideas or future processes or applications are developed. Solely one municipality has a cooperation with their district ("Landkreis"), where the district takes over some strategic work, like "how should we implement the requirements of the BayEGovG?".

### 3.2.7. No budget for IT projects

Of course, most of the IT projects have a strong relation to money. That means a server or software and external services need to be paid for and employees earn money. In contrast to other expenses like the construction of a street or the building of a school, the financing of IT expenses is not that obvious. These days, online services most of the time are only additional services in addition to the originally paper-based service. They therefore result in additional costs. The money that can be spent is normally defined in the municipalities' budget in advance. Every additional project that is not budgeted in advance is hard to realize. Only four of our interviewed municipalities stated that they have a dedicated IT budget. All others include the expenses in the authority's budget, if necessary. In our investigation, a missing budget for IT projects is a barrier because there is no steady investment and development in this area. But this is necessary and indispensable if a municipality wants to implement the requirements of the e-government law.

### 3.2.8. No relevance seen for citizens in smaller municipalities

Another barrier we have heard of in our interviews has to do with the general perspective of public officials. From their point of view, there is often no relevance for online services for citizens, especially in smaller municipalities. As a reason, it was given that in smaller municipalities, compared to big cities like Munich, there are usually no queues in the town hall when citizens have to visit the public office. Another named reason for the irrelevance of online services was the extension of the municipalities' opening hours, which is a special offer for employed citizens, which enables them to visit the authority after work and handle their business with the authority in person.

### 3.2.9. Lack of IT experts

Smaller municipalities often do not have more than one person responsible for information technology, nor do they have a dedicated IT department. Based on this reason, along with “How many full-time equivalents (FTEs) work in your IT department?”, we also asked “What percentage of FTEs are working in the IT department or are involved within IT topics?” At the municipalities we interviewed, on average there are 1.76 FTEs in IT personnel available. As the number of affected citizens is 20,216 on average and could be misleading, we reduced the IT FTE number to the common denominator of 10,000 citizens. Thus, in our investigation the number of FTEs responsible for IT topics is 0.85 IT FTEs per 10,000 inhabitants. This number even decreases to 0.33 FTEs if we only take the municipalities smaller than 10,000 inhabitants into consideration. In summary, they all found solutions to implement applications and run servers in cooperation or collaboration with service providers. But with a focus on the municipalities, IT employees have more tasks to fulfill, and so a lack of IT experts hinders successful digital transformation.

## 4. Conclusions

To sum up the identified barriers, one can point out some recommendations that would foster the implementation of the requirements of the BayEGovG in the short-term and, in the long-term, help small and medium-sized municipalities gain more competences and a higher degree of digitalization. The IT divisions no matter how big should have a better reputation and be integrated as an important member of the public authorities’ strategic board. This comes along with more competences regarding future decisions that should foster IT strategy development, and to which the definition of a budget for IT or digitalization belongs. To implement this and, as a result, overcome most of the barriers, the acceptance of local politicians is an indispensable requirement. Nevertheless, all communities work with IT and most of them have digital (online) services for their customers: the citizens. However, where do they gain the expertise for such projects? They use different possibilities. The most common way is to make use of the help of an IT service provider. The service providers, generally speaking, want to sell their product. Products like, for example, a special application for public administration, need to be installed and maintained and people have to receive training courses to use the new product. Consequently, the service providers have to deliver all of these services. Another possibility for smaller authorities to gain knowledge is to work together with other communes. The administrative unit above a municipality is a district. Often the district assists the municipalities with the hosting of their website or data backup. One district out of our peer group’s municipalities offers a dedicated agreement in which the district provides special IT services to the municipalities. In this case, 32 of 38 municipalities are taking part in this agreement. At the end, we have to state that the tasks of the Bavarian municipalities will be fulfilled anyway and in a very accurate way. It is not always very fast and with some circumstances for the customers, but the general work of the administration will be fulfilled. Moreover, it already works with IT because all of the officials we talked to stated that IT supports every department and almost every task. But that is not our focus. The focus of our study is how the service delivery can be handled more conveniently for both the sides of officials and customers with the help of digital assistance. The customers should not have double the work when entering their data, and the officials should be able to focus on tasks that are becoming more and more important for public organizations: Transparency, future strategy and further technical and organizational development.



## 5. Limitations and future research

One limitation of this investigation, of course, is the relatively low number of interviews that were conducted. Another issue that has an impact on the representativeness of this article is the view on just one state in one country. These limitations lead to the fact that it cannot be said that the list of barriers is final. Though both limitations should be targeted by future research to get a better overview on the reasons as to why digitalization in smaller municipalities is relatively slow developing.

To get a better overview and measure the efficiency, a broad-based study with more municipalities of different states in Germany could be useful. Further on, obviously the main target should be to find a solution to overcome the barriers this study came up with. A possible solution may be from an organizational matter from a higher federal level, which depends on political decisions. Also, it would be beneficial to have a maturity model to measure the actual status of e-government or digitalization depending on the size of the municipality or the authority in general.

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