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**Under pressure
Municipal innovations during the COVID-19 pandemic :
the case of a small German town**

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1 Introduction

In the course of his research, Schumpeter considered the role of innovation as an important engine and driver of the economy (Schumpeter and Swedberg 2003). Porter backed up this statement and described economies as innovation-driven. He concluded that advanced economies provide the most efficient methods for the production and development of innovative products and services - especially in the form of various incentive mechanisms (Porter 2003). In this context, the public sector is also in demand as a provider of the corresponding infrastructure. Thus, municipalities are referred to as "centres of innovation and creativity" in the sense of geographical unity. In classical sociology, these centres are particularly associated with rapid change, constant transformation and innovation. The delimitation of these centres is primarily oriented towards the size of the municipalities, building density and economic heterogeneity (Löw and Sept 2020). Mieg et al. (2011) explain in their work that the German sociologist Simmel already came to the conclusion at the beginning of the 20th century that municipalities flourish as spatial birthplaces of economic specialisation and provide the framework conditions for the infrastructure of companies. In municipal research, innovations are primarily studied in the context of economic renewal and heterogeneous challenges and differ accordingly in urban and rural regions (Kersting 2017). While the municipal landscape sets the framework conditions for local businesses, the municipality as an organisation also has to cope with the changes that arise for itself as an organisation due to the manifold challenges. Climate change, demographic change and segregation processes in the increasing competition between municipalities for business enterprises and residents require creative and innovative development strategies within the municipal organisation (Kersting 2017). Therefore, it should be noted at this point that municipalities should not only be considered as geographical units, but also as organisational units. In this paper, the focus is on the municipality as an organisation.

According to § 77 of the Baden-Württemberg Municipal Code (GemO BW), municipalities in Baden-Württemberg are obliged to manage their budgets in a sustainable and intergenerational manner in order to ensure the continuous fulfilment of their tasks. This results in an indirect obligation to also meet these requirements by means of corresponding innovations. At this point, it should be clearly emphasised that in the course of municipal innovations, not only technical innovations are to be understood, but also new organisational or political solutions for municipal services and challenges. This basic task means that municipalities are increasingly forced to react to changes in society and the market with innovative and creative approaches (Kersting 2017).

This circumstance has become necessary in the wake of the COVID-19 pandemic, the first infection of which was diagnosed in Germany in January 2020 and led to corresponding restrictions in everyday life due to the lockdowns from March and April 2020 (Bundesgesundheitsministerium 2022). Challenging framework conditions thus forced the municipalities to be agile and innovative. Therefore, in the course of this paper, a basic insight into innovation theory will be presented, from which a first transfer to municipal institutions will be derived and a

case study on innovative behaviour of a municipality in Baden-Württemberg in the COVID-19 pandemic will be presented.

2 Putting municipal innovation in an evolutionary economics' perspective

Cities appear as major economic and political actors of the twenty-first century. This development is due to demographic factors and the concentration of geo-strategical and environmental issues in cities, particularly climate change. Moreover, cities seem to be the place par excellence of innovation; Wolfe (2014) names cities "Schumpeterian hubs." Nevertheless, if there is no doubt that cities constitute the matrix of numerous, if not most, innovations, one type of actor is usually not associated with innovation in this regard. In the literature related to innovation, analyses of the introduction of innovation (as well as the processes enabling innovation) are mainly focused on companies and their supportive partners (e.g. research organizations, suppliers, clients, public and private services, etc.). In almost every case, firms and consequently markets appear to be the place of innovation and the analysis of innovation systems always put companies at the core of all concerns. This may sound logical, but in this paper another actor is considered as not only playing a supportive role but being itself a "place for innovation": municipalities.

Consequently, three core questions need to be addressed:

1. what is innovation? ;
2. what are the specificities of municipal innovation?
3. why do municipalities innovate?

Consequently, innovation is a strong explanatory factor for performance differences across firms, regions, and countries. Firms that innovate successfully thrive at the expense of less capable firms. In particular, innovative countries and regions result in higher productivity and income (Fagerberg and Godinho 2005).

Schumpeter defines innovation as the conversion of new combinations into reality, that is, doing new things or doing things that are already being done in a new way. This refers to the first-time implementation of an innovation. Thus, innovations are new and different combinations of existing things and forces. Extended by the delimitations and definitions, this circumstance again proves to be extremely difficult in the case of municipalities, since municipal activities usually relate to processes and services and not to products and technologies. This means that patenting (of newly developed products/processes), for example, is not very important. This is also because there is no formal way to determine whether an innovation is a novelty or whether

it imitates something similar that has already been introduced elsewhere (Shearmur 2019). Innovation in the public sector, on the other hand, primarily requires an idea or concept. This, in turn, must be developed, tested, and successfully satisfy customer demand or residents' needs, as well as legal requirements (see *ibid.*). However, this demand is not necessarily influenced by willingness to pay. Rather, an existing problem must be solved in an efficient manner. The problem may be social, environmental, or aesthetic. Challenges that arise, especially in the municipal sector, can thus not be conclusively reduced to purely economic factors (Anderson 1995). Based on these framework conditions and Schumpeter's approach to innovation, municipal innovation is imitative and incremental in nature. Municipal innovation can therefore also emerge through the diffusion of innovation. Diffusion of innovation is the process by which innovations are communicated and disseminated to potential social systems through communication channels (Rogers 2003). Therefore, the question of absolute novelty is not an exclusion criterion in the municipal field at this point. Therefore, it is stated that a municipality is innovative if it successfully introduces a product, process, or technology that is new to the municipality's services and processes and makes a significant contribution to achieving its goals. However, this novelty must be state of the art, which means that introducing an Internet home page for the first time in 2021 would not satisfy this circumstance. Innovative, on the other hand, would be a municipality that makes use of novel information channels such as digital council information systems or sophisticated document management systems, or offers existing services in a novel way. However, this also means that a municipality is also innovative if it develops new products/processes on its own.

Since this field of research was relatively weakly explored so far, it seems difficult to provide an exhaustive and detailed classification of all forms of municipal innovations. Nevertheless, a first explorative typology of the reasons why municipalities tend to innovate can be proposed. This typology is based on different examples that were observed over the past years in Canada, France and Germany. Five main motives can be stressed:

1. Improving the well-being of citizens.
2. Saving costs.
3. Resolving environmental problems.
4. Increasing the attractiveness of the town (citizens/companies/tax payers/infrastructure).
5. Increasing the attractiveness of the municipality as an employer.

In practice, these motives may overlap in some situations. For example, a municipality may wish to improve the well-being of its residents and improve environmental conditions at the same time. An illustration would be the installation of walls along some roads acting as noise barriers (nuisance reduction) on which walls particle matters filters would be placed (air quality improvement).

In addition to the motives to innovate, it seems meaningful to distinguish two types of attitudes related to municipal innovation. One may consider that these two attitudes are mainly context

dependent. The first context could be broadly defined as "business as usual" when municipalities are confronted to their day-to-day objectives and constraints. In this context, municipalities seem to be characterized by a proactive attitude. This means for instance a willingness to solve known issues that did not find a solution so far, to make a better use of limited internal resources or to adopt/transform external solutions. A second context leads mainly to a reactive attitude. This is the context of crises. In such a context municipal innovations are developed out of necessity. This is the context where solutions have to be found quickly since nobody else seems to be able to react fast enough. In such a context municipalities, become "last resort local innovators".

3 Municipalities under pressure : the COVID-19 pandemic crisis

With the onset of the COVID-19 pandemic in early 2020, municipalities faced challenges, the extent of which could not yet be conclusively assessed. In addition to expected tax losses, particularly in the area of business tax, the retail sector has also announced far-reaching closures in combination with job cuts. The psychological problems that arose in the population in the process could not be underestimated either. The result of all these circumstances was that municipalities had to adapt to the new framework conditions. In many situations, municipalities became "last resort local innovators". In the following we focus on the example of Germany to detail three dimensions of what the COVID crisis meant for municipalities : i) facing sharper economic constraints; ii) speeding up the digitalization process and iii) strengthening resilience.

3.1 Facing sharper economic constraints

In the case of Germany (as well as other European countries), the crisis was seen as extremely alarming for local economies, especially at the municipal level (Camarero et al. 2020). A survey conducted by the Kreditanstalt für Wiederaufbau (KfW) has shown that the financial situation and, in particular, the revenues of municipalities appeared even worse at the beginning of the crisis (Brand et al. 2021).

Due to the federal nature of the German political system, the reaction and constraints of municipalities follow different rules in order to comply with the laws of the respective Länder they depend from. In the case of Baden-Württemberg for instance, in order to meet the requirements of economical and efficient budget management and thus to be able to guarantee the continuous fulfillment of municipal tasks, the municipalities are required by Section 77 of the Local Government Code (GemO BW) to take account of macroeconomic requirements. This means that the municipalities are required to consolidate their budgets, reduce expenses and increase revenues.

Implications for municipalities : less resources for innovative activities at a time when they may be particularly important if not crucial. This requirement can be taken into account through innovations, for example in the form that innovative approaches and processes possibly lead to cost reductions and savings.

3.2 Speeding up the digitalization process

From the beginning of the COVID-19 pandemic, the rapidly advancing digitization of many processes and the associated reorganization of value chains were creating new potential for innovation not only in companies. In particular, there has been an accelerated digitalization in the public sector.

With the onset of the COVID-19 pandemic in 2020, many municipal processes whose digitization was in the planning stage were digitized on high speed. For example, new document management systems, digital council information systems and the possibility of home office were introduced without further ado in response to the need for workplace restrictions and the resulting rush towards reorganization of processes to be performed with home-office. This requested the introduction of new processes that did not yet exist, which in some ways have had a positive impact on the innovation behavior of municipalities. Meetings and seminars have increasingly been held in digital form, which has also resulted in financial synergy effects.

Implications for municipalities : new procedures and processes have been developed in response to the particular restrictions imposed by the COVID-19 pandemic (e.g. limiting the number of people who can gather).

3.3 Strengthening resilience

More generally, facing the challenges related to the pandemic meant increasing the resiliency of municipalities. The term resilience is not used consistently in the literature and describes either a capability (Williams et al., 2017), a developmental process (Sutcliffe and Vogus, 2003), or a mix of different approaches (Hillmann and Guenther, 2021). Basically, resilience refers on the one hand to successful responses in crisis situations. On the other hand, the resilience-induced learning process also strengthens the ability to respond successfully to future crises (Vogus and Sutcliffe, 2007). Wenzel et al. (2020) argue that actors in such prolonged crises have only two relevant courses of action: "Exiting," and thus laying down the current activity, or "Innovating," which is linked to a strategic renewal of the previous pattern of functioning. "Exiting" was not an option for municipalities at the difference of certain companies which choose to stop (at least provisory) their activities.

Implications for municipalities : manifold ad hoc innovations, mainly of organizational nature.

4 Case study : municipal responses to the COVID-19 pandemic in the city of Renchen (Germany)

In spring 2020, various federally mandated measures were ordered to combat the COVID-19 pandemic. For the municipalities, this was accompanied by particular challenges in their day-

to-day work. Six of these challenges are presented below from the practical point of view of a municipal administration and the innovative response of the municipality is also presented.

The city of Renchen with its approx. 7,400 inhabitants is located in the north of the Ortenau district in Baden-Württemberg and owes its city status to its history (Renchen 2022d). The town center of Renchen and the districts of Ulm and Erlach are located in the foothills of the northern Black Forest at the exit of the Renchtal valley into the Upper Rhine lowlands (Renchen 2022a; Renchen 2022b; Renchen 2022c). The city employs around 160 people to carry out municipal tasks.

4.1 Setting up a crisis cell in the administrative context

The spontaneous arrival of the health crisis took all organizations and institutions by shock and surprise. A crisis unit was therefore set up. Several initiatives emerged from this cell. This allowed the challenges to be gradually narrowed down (food security, education, volunteers, vulnerable people - mental health, seniors, homeless) by bringing together information, funding, resources, etc.

In light of the COVID-19 pandemic, the City adjusted its administrative structure at the beginning of the pandemic. As a result, the city created a novel hybrid structure to adapt its structure, which consisted of a cell composed of representatives from all departments. The goal was to create a holistic COVID-19 coordination unit, which basically included a weekly monitoring of the legal situation and, as a result, the city's challenges.

An essential element of this was to regularly inform the municipal council, as the decision-making authority, about measures taken. Since the municipal council meetings could no longer be held in person, the legal conditions were created to enable decisions to be made by written circulation. Thus, all municipal councils were sent the documents with the request for a statement. Online meetings could not be held due to legal difficulties (Kommunal 2022). Due to weekly monitoring, the City was not only able to take early action, but also to provide timely information to citizens and businesses via a sub-website created specifically for Corona issues.

This structure has allowed the municipality to continue many of its ongoing activities that go well beyond basic services to the public, such as assisting citizens and businesses with Corona-specific issues, hosting summer outdoor events, and more.

4.2 Digitization and modernization of the local administration

The fact that municipalities are not a shining example in terms of digitization and progress was confirmed once again at the start of the COVID-19 pandemic - but the response was an accelerated digitization of administrative processes. In principle, it should be mentioned in advance that Germany has always performed below average in international e-government rankings to

date (Bundesministerium des Innern, für Bau und Heimat 2019). Up to now, one of the main reasons for this has been the lack of acceptance among citizens to use digital services (EFI 2016). As early as 2016, however, it was noted that increased acceptance of digital processes and the associated generation of "open government data" could, from a theoretical perspective, "form the basis for innovative services and business models" (EFI 2016, B4-2).

It became apparent to municipalities and public institutions through the pandemic-related precautionary measures that, in order to meet citizen convenience, some processes would have to be digitized in a timely manner. The conversion and digitization work associated with the Online Access Act for more than 500 municipal services to be digitized by the end of 2022 was immensely accelerated with the onset of the COVID-19 pandemic (Federal Ministry for Economic Affairs and Energy 2021). In addition to these municipal services to be digitized, other internal processes were also digitized. Two of these processes are therefore presented as examples. For example, in response to the widespread fear that banknotes and coins could transmit the virus, cashless and digital payment, which had previously only been used in a few areas of (municipal) services, was increasingly introduced (Bundesministerium für Wirtschaft und Energie 2021). Thus, it was not surprising that the introduction and expansion of digital payment was also enabled with, for example, other payment formats such as Paypal, ApplePay and GooglePay. Another example is the progress made in digitization in the area of committee work and general administrative work. For example, paperless working (including from the home office) was introduced through digital document management systems, as was holding meetings through online conferencing as a further response to the reduced personal contact required. Both examples and the approach described therein can each be described as a process innovation. A process innovation can be defined as a structured approach involving a sequence of tasks and decisions that have a logical and temporal relationship to each other and result in a new product or process (Gerpott 2005; OECD 2005; Schallmo et al. 2018). This is true in both examples.

4.3 Digitization of school services

The municipalities in Baden-Württemberg are responsible for the maintenance of school buildings as a mandatory task and are therefore also largely responsible for the digital equipment of schools (Sixt et al. 2019). Before the closure of the schools providing general education in March 2020, school lessons were still largely held in analog form on the school premises. This circumstance was negatively underpinned by various studies showing that Germany performed poorly in international comparisons of the digitization of schools (Bundesministerium für Wirtschaft und Energie 2021). Although there were various funding programs for the digitization of schools (e.g. DigitalPakt), only half a percent of the largest of these pots had been used by summer 2020 (ibid.).

Since it was not possible to hold classes in present tense, the municipalities, as the providers of the schools, had to react promptly. Thanks to short-term funding from the state and federal governments, it was possible to purchase mobile devices and licenses for online instruction.

The fact that digitization is making rapid progress at schools cannot be taken for granted and is partly due to the lack of IT personnel at local authorities. This circumstance of nationwide discrepancies in school digitization was highlighted by a recently presented study by the Union for Education and Science. Thus, while a nationwide representative survey (n=2750) confirmed that there is a digitization push, only 57% of teachers surveyed said they had sufficient digital equipment. Only 29% said that rooms were equipped accordingly and only 70% reported available WLAN for all teachers (Gewerkschaft Erziehung und Wissenschaft 01.06.2021). From a practical point of view, this circumstance can also be observed. For example, there are municipalities in which the equipment is being carried out at an accelerated pace and likewise municipalities in some of which there is still insufficient equipment even in mid-2021. Since the rush on the market was already incredibly high in the early summer of 2020, creative solutions had to be used in the course of procurement and installation at the schools. Some municipalities decided, for example, to procure the equipment in an intermunicipal network and thus place larger or more profitable orders (Kinzig.News GmbH 2021). According to the author's practical experience, interns and trainees were primarily employed for the prompt installation of the corresponding end devices under the instruction of the IT specialists. This approach can also be described as a process innovation. Thus, in principle, the assumption can be made that municipalities with advanced digitization in their schools are more innovative than those with below-average equipment. Similarly, it can be hypothesized that municipalities with advanced digitization at their schools have a higher capacity for innovation than those with below-average digitization.

4.4 Ensuring public safety and order – monitoring of parks during a pandemic

Already on March 17, 2020, the state government issued the Ordinance on infection control measures against the spread of the virus SARS-CoV-2 (CoronaVO). A decisive role was assigned to the police: area-wide surveillance measures and controls with visible presence by police officers (Ministerium für Inneres, Digitalisierung Migration Baden-Württemberg 2021).

For staffing reasons, however, such announced checks were often not possible when requested by the municipalities. Thus, municipalities usually had to deal with the same problems and challenges in the course of exit and contact restrictions: crowds in public places, celebrations and events with too many participants. However, in accordance with the Ordinance on Responsibilities under the Infection Protection Act, there is an equal requirement for municipalities, in their role as local police authorities, to ensure that security and order are maintained and, where necessary, to carry out controls. In order to be able to limit and prevent the further spread of the Corona virus, it was therefore also necessary for the municipalities to carry out controls. Here too, however, the same challenge as with the police became apparent: a lack of personnel. In fact, especially in rural areas, an increased number of gatherings of young people were noticed. In the search for creative and economical solutions, it was decided, for example, that designated employees of the local public works department and the volunteer fire department would carry

out checks at certain places at regular intervals and issue warnings. This led to the desired success with the result that hardly any accumulations were recorded and the desired effect was achieved. In this case, too, there is a municipal process innovation that has emerged from the solution-finding process.

4.5 Swimming Pool - Ticket System

In the wake of the COVID-19 pandemic, the number of visitors allowed to be present in a public swimming pool at the same time was limited on the basis of the area of the public swimming pool. This requirement resulted from the Corona regulation for pools and saunas, which was first established on June 25, 2020 and has been continuously updated. The regulation stipulates that a corresponding number of square meters per visitor must be provided in the swimming pool as well as on the sunbathing lawns and other areas. In swimming pools, where in the past on high summer days up to 3,000 visitors were present, now no more than 1,000 people could be present at the same time. However, these general conditions resulted in fundamental financial issues, since the recreational pool sector is generally run at a high deficit and is a voluntary task of the municipalities. The restriction of visitors was accompanied by old-fashioned/analog cash register systems at the entrance of the leisure pools and the requirement by the CoronaVO to document the contact data of all visitors for tracking reasons.

From a financial point of view, it would have been most cost-effective to close the leisure pools, but in most municipalities, according to the author's experience, it was politically desirable to open the leisure pools in view of the difficult circumstances. In leisure pools without online booking options, it was decided to issue numbered morning and afternoon tickets in the form of season tickets and to note the respective number when entering and leaving the leisure pool. By providing personal data when purchasing a numbered season pass, tracking was guaranteed. Similarly, twice the number of season passes could be issued because the restriction on visitors was based only on actual admissions and not on total daily attendance. Still other municipalities that could nevertheless justify it financially in the face of major revenue shortfalls introduced digitized point-of-sale systems and enabled online booking of day passes with personal data. In such cases, single-day tickets were issued until the cap was reached. In both alternatives (with and without digitized cash register and booking system), these are process innovations by the municipalities.

4.6 Maintaining the mental health of employees and supporting local businesses

In the course of the COVID-19 pandemic, the municipal staff also suffered from the great pressure and additional workload caused by additional regulations. Therefore, the city of Renchen had considered how to show appreciation to the employees. Up to now, a bonus was paid out once a year with a fixed financial budget, but usually only 30% of the staff received a bonus.

Therefore, within the administration, it was considered to take a quarter from this budget and to use it to issue vouchers for local businesses to all personnel. From January 2022 on every three months, everyone receives a voucher of 50 €. Legal obstacles did not conflict with this procedure

One basic idea was that the local economy would benefit, because the so-called "Renchener Werbegutscheine" can only be used at local businesses. The town of Renchen does not incur any additional expenses as a result. Although the budget of the performance bonus is smaller, all employees now benefit.

5 Conclusion

The actual effects on the innovation behaviour of the municipalities cannot be conclusively recorded and analysed. This is particularly the case because the pandemic is still in swing and experience shows that new challenges will arise due to new circumstances, such as virus mutations. The examples given are also not the result of many years of research. They are based on practical experience and have arisen out of necessity. And yet these described processes are innovative in nature and, following the innovation process presented in chapter 2.1, have corresponding similarities:

1. idea generation out of problem solving
2. discovery/observation of interrelationships and dependencies
3. invention and development of a suitable new process based on collected experience, data and ideas
4. "market introduction" and ongoing exploitation in the course of the COVID-19 pandemic.

Under Section 2.1, research in particular was assigned an important role. This step is omitted in the present process, but it is by no means a mandatory basis for generating an innovation. Rather, the novelty generated at the end is decisive in the sense of a municipal innovation according to chapter 2.3.

In the wake of the pandemic, however, the task of the public sector will continue to be to counteract further challenges with new, innovative measures and to sustainably focus on stabilizing the overall economic balance.

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