

Legitimizing Involvement in Emergency Accommodations: Water and Wastewater Utility Perspectives

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Abstract: In 2015, 28 European countries cumulatively received over two million applications for asylum, almost three times more than in the previous year. This resulted in pre-existing accommodation facilities reaching capacity and requiring the provision of urban emergency accommodations in unconventional buildings. To meet this housing need, ad hoc task forces across multiple disciplines formed to mitigate the extreme uncertainty of providing infrastructure services in a short period of time. The involvement of water and wastewater utilities in this technical project was explored through employee perspectives from two German water and wastewater utilities using qualitative analysis techniques. Ethnographic interviews were iteratively coded for excerpts legitimizing the interviewee's involvement in providing water or wastewater services for emergency accommodations. Results show three emergent themes from utility employees: the necessity of improvisation during the design process, confidence in the situational response by individuals and the utility, and the necessity for improved coordination with other actors in the synthetic organization. In addition, this work provides a theoretical framework for the technical application of organizational legitimacy theory in the circumstances of extreme contextual uncertainty. Practical implications of this work suggest utility monitoring of emergency accommodations for improved design and better protocols for coordinating with other actors. DOI: 10.1061/(ASCE)CO.1943-7862.0001622. © 2019 American Society of Civil Engineers.

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Introduction

Twenty-eight European countries cumulatively received over two million applications for asylum in 2015, almost three times more than in the previous year (UNHCR 2016). This rapid increase in population represents the highest recorded displacement in history, even greater than that during and after the Second World War (UNHCR 2016). Germany, among European countries, received the highest number of asylum applications during 2015. German asylum law guarantees housing during the asylum application process (Law Library of Congress 2016). Although Germany has historically accommodated displaced persons seeking asylum (Eisenhammer 1991; Asian Wall Street Journal 1992), due to the scale and speed of the 2015 population displacement, they were unable to meet the demands in pre-existing facilities. Consequently, emergency accommodations were organized to provide additional temporary housing in renovated office buildings, unused military buildings, schools, sports halls, hotels, container housing, Tempohomes—prefabricated modules that can be interlocked, and light-frame structures.

The German response to the 2015 European refugee situation is one example of temporary disruption within an institution.

As a result, a cross-disciplinary response, or synthetic organization (Thompson 1967), was formed to ensure that those seeking asylum had access to shelter. One component of this ad hoc organization responsible for the emergency accommodation project is the provision of water and wastewater services. Several options for water and wastewater services were used in German facilities, including new or reinstallation of water and wastewater connections to the buildings, provision of bottled water and catering services, temporary sanitary facilities in containers, and portable toilets. The existing literature for German emergency accommodation methods primarily focuses on health outcomes (Kern 2016; Niedermeier and Dreweck 2011) and social aspects of emergency accommodations (Komaromi 2016), leaving a gap in understanding the technical impacts of such facilities on civil infrastructure. Due to the lack of information available regarding the institutional response of a synthetic organization, the authors framed this study through an institutional and organizational legitimacy lens to develop a theoretical framework for utility involvement in dynamic, unexpected environments such as the mass migration studied here. Understanding the involvement of water and wastewater utility providers gives broader insight to the synthetic organization responsible for mitigating impacts from situations of extreme uncertainty and its technical implications. This study highlights the perceived impact on the civil infrastructure systems that support emergency accommodations and how abrupt increasing demand in repurposed or new facilities has affected the water and wastewater utility companies and the services they are able to provide.

Points of Departure

Few studies have been done regarding the role of water and wastewater utilities in urban emergency accommodations (Faust and Kaminsky 2017). The authors acknowledge the various approaches to analyzing this phenomenon, including material and technological dimensions to the water and wastewater utilities' response.

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Another key dimension is the cultural norms, values, and beliefs that enable organizations to adapt within an institution (Suchman 1995, p. 571; Scott 2008, p. 71). The interdependence between the utility company and other actors within the task force of providing temporary accommodations can be characterized more acutely through legitimation. As such, this paper chooses to analyze the legitimation of water and wastewater utility employees' involvement in the provision of temporary accommodations. This section discusses the available literature regarding utility involvement with regard to population increase, standardization, and legitimacy theory (the theoretical framework used in this analysis).

Water and Wastewater Utility Involvement with Rapid Population Increase

As global population increases, water and wastewater utility management are forced to adjust in the provision of utility services. Although work has been done regarding emergency accommodations in postdisaster development (Hidayat and Egbu 2010; El-Anwar and Chen 2013; Hwang et al. 2015; Hosseini et al. 2016), literature specifically related to the impact of emergency accommodations on highly developed utilities and the water/wastewater network is limited. Similar contexts such as rapid urbanization did show relationships between population increase and water use (Bao and He 2015). With increased population, challenges exist in upgrading water infrastructure to meet the demand (Rojas et al. 2015; Qian et al. 2016). One example is the rapid urban population growth in Iran, which impacted its resource availability through increased industrial activity, creating difficulties in providing drinking water and wastewater treatment (Sheykhi 2003). Although these existing studies highlight the need to understand the relationship between rapid population increase and utility services, they primarily focus on water in developing countries that have a less-established built environment. Generally, the literature finds that rapid population change creates challenges for existing infrastructure. Still, a gap exists in understanding how near instantaneous population growth from disaster migration impacts affect highly developed water and wastewater utilities in urban environments. Therefore, in this paper, the authors explore how utility employees legitimize or de-legitimize their role in this technical project.

Standards

Infrastructure, including water and wastewater utilities, is designed and maintained using established federal and regional standards. When utilities use these standards, they achieve legitimacy in the services they deliver. This legitimacy shifts responsibility for the development of water and wastewater connections from individual employees in the utility, such as planners and engineers, by placing ownership on the established standards (Brunsson and Jacobsen 2002). Standards also provide universality and reduce variation in service by limiting reliance on individual expertise (Lampland and Star 2009). For example, in a water and wastewater utility, standard diameters for water connections are typically provided according to the type of building.

However, standards can sometimes limit adaptability in dynamic environments (Busch 2011). One example of this limitation is retrofitting commercial buildings for residential use and finding that existing design standards do not adapt to the modified use of water and wastewater services. When standards are not sufficient to meet the need, construction and engineering management professionals may be forced to work beyond those standards. As they do so, they need other mechanisms to legitimize their work. This study classifies these mechanisms using organizational legitimacy.

Legitimacy Theory

Due to the organizational role of water and wastewater utilities in the overall response of providing temporary accommodations, we follow Suchman to define legitimacy as a “generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman 1995, p. 574). Notably, definitions of legitimacy cross multiple disciplines, from political legitimacy (Coakley 2011; Jeffrey et al. 2015) to legitimacy in psychology (Tyler 2006) to organizational legitimacy (Suchman 1995). Whereas the former focuses on the discussion between sovereignty and consent of authority systems to act, Suchman more broadly defines the legitimation mechanisms of an organization within an institution. In this context, the subjects of legitimation are confined to “social entities, structures, actions, and ideas whose acceptability is being assessed” (Deephouse and Suchman 2008, p. 54), and the scope of organizations and institutions being analyzed in such studies need to be clearly defined by researchers. Such definitions have been provided in Appendix S1.

Legitimacy can exist internally within an organization or externally; for example, media can influence how the public perceives a company, affecting that company's external legitimacy (Deephouse and Suchman 2008). That same company might take measures to increase internal legitimacy by focusing on management interactions with employees. Researchers typically take either a strategic or institutional approach to internal and external legitimacy. In the strategic approach, legitimacy is seen as an operational resource—managers use it to gain societal support (Suchman 1995). An institutional approach takes a more detached stance, looking at the broader impact of how organizations relate rather than just one specific organization's influence (Suchman 1995, p. 576; Kaminsky 2014). This study utilizes the institutional approach to organizational legitimacy, acknowledging an interdependent relationship between stakeholders in the provision of emergency accommodations and the subsequent varying degrees of legitimacy that are exchanged both internally and externally. In the context of the current study, the role of the water and wastewater utilities—the stakeholders—impact the synthetic organization that is providing emergency accommodations. Legitimacy focuses on the pragmatic, normative, and cognitive factors that justify the acceptance of an institution and do not necessarily rely on successful response. For example, a hospital may experience the tragic and unfortunate loss of life, but this does not always impact the legitimacy the institution has in providing medical care. Identifying the ways utility providers legitimize their role factors into how the overall synthetic organization achieves legitimacy in their response to the situation (Deephouse and Suchman 2008).

Suchman (1995) outlines three major types of legitimacy (pragmatic, moral, and cognitive) and nine subtypes (exchange, influence, dispositional, consequential, procedural, structural, personal, comprehensibility, and taken-for-grantedness), defined in Table 1. For example, in one interview, a wastewater utility employee was asked if the utility had responded adequately to the recent increase in population. The employee replied as follows:

Absolutely, because we are the [company name]. This company . . . these are just my words . . . we are the caretakers for [the city]. The politicians, the mayor, the senator, my superiors, my managers . . . we're the main utility for water (Interview, City A, July 14, 2016).

This response was coded to structural legitimacy because the employee based the ability to respond to the increase in population on the capacity and responsibility of the utility in the city (Table 1).

Table 1. Organizational legitimacy theory definitions

Type of legitimacy	Definition
Pragmatic legitimacy	
Exchange	Exchange legitimacy represents support for an organization based on the direct benefit to the respondent or people/group with which the respondent is in direct contact.
Influence	Influence legitimacy is associated with the organization being responsive to larger interests. These larger interests benefit people/a group with which the interviewee is not in direct contact (e.g., the city).
Dispositional	Dispositional theory is associated with dispositional attributions (trustworthy, descent, wise). Usually, the organizations that are granted legitimacy are personified and must have “our best interests at heart” (Suchman 1995, p. 578).
Moral legitimacy	
Consequential	The organizations are judged on what they accomplish and answers to the question, What benefits are provided to others?
Procedural	Procedural legitimacy is expressed when the organization is considered “embracing socially accepted techniques and procedures” (Suchman 1995, p. 580).
Structural	Legitimacy is based on the judgment of structural characteristics within the organization.
Personal	Personal legitimacy is based on the charisma of individual organizational leader(s).
Cognitive legitimacy	
Comprehensibility	Comprehensibility is a mix between daily experience of the respondent and the larger belief systems (cognitive chaos).
legitimacy	The respondent relates the situation to a personal experience/example. The key factor is that the initial reaction is definitive.
Taken-for-grantedness	This type of legitimacy is applied when “an alternative is literally unthinkable” (Suchman 1995, p. 583) for the respondent. Statements are given in absolute terms without referring to experiences, as with comprehensibility legitimacy.

The authors have developed definitions for each of these types and subtypes of legitimacy based on Suchman’s (1995) work and a literature review of organizational legitimacy theory, which are provided in a coding dictionary available in the Supplemental Data. In addition to this resource, readers are referred to Suchman (1995) for a seminal explanation of legitimacy theory and Deephouse and Suchman (2008) for an expanded literature review of research built on this theoretical foundation.

Research Method

Data Collection

Data was collected through 10 semistructured ethnographic interviews (Spradley 2016) conducted in two German cities of differing sizes between June and August 2016; study participants included water and wastewater utility employees. Participants represented different areas of the utility companies, such as human resources, billing, managing new connections, or team leaders in coordination with other departments of the local government. A snowball sampling method was used to select study participants initially identified as key stakeholders in the accommodation process who provided referrals to other related contacts during the course of the interview (Given 2008); focus was made to interview those directly connected with the emergency accommodation project. Both cities received displaced persons; information representing the scale of asylum applications is shown in Table 2.

Table 2. Distribution of displaced persons in study sites

City	Population (not including asylum seekers), 2015	Asylum seekers received by state that city is within (%)	Asylum seekers received by city relative to that received by the state (%)	Estimated asylum applications per city, 2015 ^a
City A	3,500,000	5.0	100.0	24,000
City B	500,000	5.1	13.2	3,200

Sources: Data from UNdata (2015); BAMF (2015).

^aThis estimate is calculated from the preceding columns: (rounded population) × (% asylum seekers received by state) × (% asylum seekers received by city).

Interview questions were created to both understand the respondents’ role in the emergency response and to understand their attitude toward the current coordination efforts with government (Bernard and Ryan 2010; Spradley 2016). An interview template used for utility employees is included in Appendix S2. Questions covered the participants’ role; how their department or group was involved in providing water and wastewater services in emergency accommodations; how decisions were made for facility locations, renovation, and water utility services; and coordination with other stakeholders such as government agencies, nonprofit organizations, and the community. Lastly, each participant was asked about the overall response of the government in accommodating displaced persons and what they would like to improve, what went well, and what impact to the system network they would expect if a similar event of this nature occurred again in the future. Interviews were conducted in English, German, or French depending on the respondent’s preference, and the audio was recorded for analysis.

Data Analysis

Audio recordings from the interviews were translated into English as needed, then transcribed. Interview content was coded for excerpts expressing legitimacy (or de-legitimacy) regarding the role of the utility in providing water and wastewater services for emergency accommodations using the Dedoose version 8.1.8 qualitative analysis software. Codes and subtypes of legitimacy used in this analysis were defined with examples in a coding dictionary (Appendix S1), which was verified through intercoder reliability checks (De Vries et al. 2008). The coding process was iterative—definitions were refined for the codes and legitimacy types (Saldaña 2011). All code applications were reviewed by two researchers, one with an American background and one with a European background. Excerpts with coding disagreement were removed from the data set.

Results

The 10 interviews with utility employees resulted in 197 excerpts expressing legitimacy or de-legitimacy regarding the provision of water and wastewater services to emergency accommodations for displaced persons, specifically aligned with the interviewee’s involvement. The distribution of these excerpts can be found in

Table 3. Distribution of statements legitimizing or de-legitimizing interviewee involvement

Legitimacy type	Total code count	Code count relative frequency (%)	Legitimizing (de-legitimizing) count	Respondent count	Respondent count relative frequency (%)
Pragmatic	42	21	26 (16)	10	100
Exchange	28	14	16 (12)	9	90
Influence	13	7	9 (4)	6	60
Dispositional	1	0.5	1 (0)	1	10
Moral	82	41	64 (18)	10	100
Consequential	6	3	5 (1)	5	50
Procedural	57	29	45 (12)	10	100
Structural	14	7	10 (4)	6	60
Personal	5	3	4 (1)	3	30
Cognitive	74	37	63 (10)	10	100
Comprehensibility	52	27	42 (10)	9	90
Taken-for-grantedness	21	11	21 (0)	9	90
Total	197	—	197	10	—

Note: Boldface distinguishes main type of legitimacy from subtype of legitimacy.

Table 3, which includes the relative frequency of the code count and the associated frequency of respondents using the subtype with aggregation between frequency of excerpts legitimizing and de-legitimizing utility employees' involvement; definitions for the subtypes of legitimacy are provided in Table 1. Moral legitimacy had the greatest number of excerpts (82) and was referenced by all 10 respondents. Procedural legitimacy (57) and comprehensibility legitimacy (52) were the two subtypes with the highest number of references in excerpts. Given the small sample size, authors conducted a secondary analysis based on subtypes of legitimacy that had both a high relative frequency and distribution across participants (see Table 3, column entitled "Respondent count"). As such, procedural and comprehensibility legitimacy underwent a secondary analysis to identify thematic patterns (Bernard and Ryan 2010) related to *what* was being legitimized in each subtype (Table 4). Utility employees expressed technical assurance and confidence in responding to the general situation as well as their improvisation of standard operation and design processes in providing water and wastewater services to emergency accommodations, but expressed a need for strengthened coordination strategies with other actors,

exposing potential gaps in a complex framework for the synthetic organization.

Procedural legitimacy attributes legitimacy based on normatively motivated actions or appropriate processes. For example, when asked what potential technical challenges may stem from the coordination of emergency accommodations for displaced persons, one utility employee said the following:

Well I think the shelters that are planned as long-term shelters are well designed. And that's not just the building itself, but also the supply lines—water, electricity, gas. When they know that, so many refugees are supposed to live there, they also have to provide the needed lines (Interview, City A, July 18, 2016).

The affirmation was based on the design process and level of foresight integrated into technical calculations for the facilities intended for longer use.

Comprehensibility legitimacy was the second-most utilized subtype in interviews. This subtype attributes legitimacy from some form of understanding based on past experiences, or cultural-cognitive understanding of the situation. Statements typically used

Table 4. Summary of emergent themes from secondary analysis for procedural and comprehensibility legitimacy excerpts

Topic	Legitimization of interviewee involvement	De-legitimization of interviewee involvement
General	General perspective on receiving displaced persons Involvement in the accommodation process No change from normal responsibilities Quality of accommodations	Coordination with other stakeholders General perspective on receiving displaced persons Involvement in the accommodation process No change from normal responsibilities
Design	Connections for accommodations Drinking water usage/wastewater production patterns in accommodations Improvisation Installing connections in accommodations Meeting regulations Use of water amenities in accommodations Water amenities for accommodations	Connections for accommodations Drinking water usage/wastewater production patterns in accommodations Improvisation Use of water amenities in accommodations Water amenities for accommodations
Utility	Impact from displaced persons on wastewater/drinking water network Impact of general population growth on wastewater network Impact to utility company Preparedness for the situation	Impact from displaced persons on wastewater/drinking water network

past tense and definitive terms, accompanied with an explanation. For example:

People came and for us they were people who drink water and produce wastewater and that's what we were prepared for (Interview, City A, July 14, 2016).

The respondents expressed support, or legitimized their involvement, by comparing displaced persons to other existing consumer groups.

Discussion

Within these two legitimacy subtypes—comprehensibility and procedural legitimacy—excerpts were analyzed for emergent themes describing what aspect of the interviewee's involvement was being legitimized or de-legitimized. Three major themes predominated: (1) improvisation during the design process, (2) confidence in the individual and utility's situational response, and (3) the coordination with other actors in the synthetic organization.

Confidence in Situational Response

Water and wastewater utilities in this study did not have standards or quantitative data (e.g., water consumption, wastewater production patterns) available specifically for emergency accommodations used in housing displaced persons, making the justification of their involvement crucial for further investigation. Comprehensibility legitimacy was frequently used to legitimize the situation. In one interview, an employee used comprehensibility legitimacy to compare the proportion of emergency accommodations to the general housing supply:

[City A] has 260,000 [utility connections] in [the city]. Three hundred of those are shelters, and that's marginal; it basically doesn't change anything (Interview, City A, July 18, 2016).

Another comparison was made when describing any potential difficulties in responding to the increase in displaced persons:

Even if [there were difficulties], it would be difficult to connect that back to the refugees. Even if we have difficulties—there are always difficulties... (Interview, City A, July 19, 2016).

Whether relating to the individual's specific role or how they perceived the situation, respondents referenced what seemed understandable for the situation. One employee stated the following:

Concerning wastewater and storm water, I don't think you can even tell if there is any change for us (Interview, City B, August 1, 2016).

In the face of expressed confidence in handling of the population influx situations, situational response was still necessary; a task force was created in utilities for both City A and B to specifically handle requests for designing connections and contracts for emergency accommodations in 2015. Although this response was a priority for the employees, it was not one that was perceived as overwhelming. In fact, employees used past experience to legitimize their ability to respond:

This city has always been shaped by challenges. The wall, east and west, tightness ... When you're born here and when you've already ... I've been working at this company for

almost 30 years ... You don't think about it anymore; you do your job (Interview, City A, July 14, 2016).

Confidence in their involvement was supplemented by the actions taken by the utility to expedite response, as expressed by one employee using procedural legitimacy:

Just that this time, it had to be organized quicker ... we have processes that lay down how our work is organized, and we had to change that a little; I also asked two members of my team to especially focus on this job, and we reorganized some of the processes, just so that it goes a little quicker (Interview, City B, August 1, 2016).

In this example, the utility employee's role was legitimized due to taking appropriate actions to increase standard procedures. Comprehensibility legitimacy helps in understanding why the utility employees were confident in their work, using past experience and framing the crisis within their standard responsibilities. Procedural legitimacy is used to legitimize this framing and the technical outcomes. This reflects an internal degree of the utility's ability to respond to situations with extreme uncertainty, regardless of the need for a task force.

Improvisation in the Design Process

The utility's confidence in situational response capabilities did not negate the need for utility employees to respond to the situation; a lack of data and design standards for predicting water usage and wastewater production required them to improvise. This is consistent with the role of a synthetic organization, in which different stakeholders come together to achieve a common goal but compromise conventional frameworks for standards (Thompson 1967). In both City A and B, utility employees explained that their current programs and processes used to design water and wastewater connections were not equipped to determine connection size for emergency accommodations. In City A, utility employees involved with technical design referred to a software program used to design water connections to the emergency accommodations. They admitted that the software did not have features that encompassed water-consumption patterns for the various emergency accommodation types. One utility provided the example for Tempohomes:

How we calculate it. We have specific things for Tempohomes. There is no software, no. We have no special software program for Tempohomes. It is not usable. What we have is not usable. You have hotels, you have living rooms, but no Tempohomes (Interview, City A, July 29, 2016).

In summary, the software used was not equipped to design for various housing types used in emergency accommodations. The legitimacy that accompanies design standards was lost with the use of unconventional facilities, creating a space for other types of legitimacy to be used in justifying water and wastewater connections. One example of this is the legitimization of improvised standards through collaboration with a professional association. An employee in City B described two areas of improvisation in the design process using comprehensibility legitimacy (what understandable comparisons were needed to estimate sizing for water and wastewater connections):

They've worked closer together with the German Technical and Scientific Association for Gas and Water (DVGW), and one thing they have looked at is the calculation for the dimension of things and what patterns of usage they have to expect. Should they be looking at the shelter like a hotel or more like a

dorm, like a student dorm situation, so how much are they going to be using a day? Are they going to be using it all at the same time?—that's the more important question, so is it more spread out over the day? ... and now they're being calculated like hotels (Interview, City B, August 1, 2016).

An employee in City A described the process used in predicting calculations and later referred to safety factors as legitimizing their extrapolation but also seemed unsure of the potential impacts:

The big point is we have this developed, but we are not sure ... is it good or not? (Interview, City A, July 29, 2016).

Although employees were confident in their ability to improvise, a degree of uncertainty was expressed regarding the legitimacy of the techniques used to determine these new values for demand and pipe sizing. For example, when asked about calculating the number of water facilities needed in emergency accommodations, one employee expressed a lack of demographic information (comprehensibility legitimacy):

I think so ... [it was difficult] ... we could only guess. We didn't know how much a refugee consumes in a day (Interview, City A, July 18, 2016).

Their involvement was expressed as being less legitimate due to a lack of understanding the water demand in facilities. Inconsistent design standards across the region were also expressed:

Not just ... for it to be something decided by each state—that's complete rubbish. Imagine somebody from [one state] coming over to [here] and wanting to build something here according to the [other state's] guidelines. That won't work. We need unified guidelines (Interview, City B, August 8, 2016).

The ingenuity of utility employees was highly beneficial to the synthetic organization and was necessary for utility resilience in the response; however, the need for improvisation also highlights the need to develop standards or adaptive protocol to better ensure consistency and reliability of outcomes and processes in future instances of emergency response. Comprehensibility legitimacy was used to adjust to the uncertainty in calculations by comparing housing types and—as discussed subsequently—by coordinating with institutionalized organizations that provide legitimacy through association and by providing professional guidance.

Improved Coordination with Other Actors

Utility employees also used procedural and comprehensibility legitimacy to express their involvement in coordinating with other actors in the synthetic organization. Comprehensibility legitimacy shows the need for utility employees to understand their role in the emergency accommodation project in order to legitimize their involvement. Procedural legitimacy is used to justify the actions needed or taken in the technical coordination.

For example, when describing his or her general involvement with the emergency accommodation project, one employee—a team leader—expressed a lack of legitimacy from the team:

The problem is that also in my team a lot of people don't understand why we're creating one shelter after the other, but the asylum seekers aren't being sent there ... (Interview, City B, August 8, 2016).

In this example, the involvement of utility employees was considered not legitimate because their work was not impactful; displaced persons were not being accommodated in the facilities

for which they designed connections. Another employee expressed frustration in coordinating with government planners for the technical design of emergency accommodations:

Just today I got in a plan where I simply have to say, I can't understand that. They planned 153 toilets and 163 washbasins. And the shelter is planned for 150 asylum seekers. Full stop. That's something I simply can't ... I explained how it works generally in Germany, didn't I? (Interview, City B, August 8, 2016).

The employee from City B de-legitimized the provision of water and wastewater facilities in the emergency accommodations because they felt that the government planners did not understand an appropriate number of toilets and washbasins needed in the emergency accommodations. From an administrative stance, City A employees expressed legitimacy in working with the government for arranging contracts for emergency accommodations:

We're doing our best now to reorganize a regular exchange of information. Only then can we really be aware of and understand changes that are happening (Interview, City A, July 18, 2016).

This highlights the potential benefits of administrative coordination but expresses a gap in technical coordination, in which both government planners and utility employees are involved with the design of technical aspects for emergency accommodations. Tension exists in appropriate design techniques (procedural legitimacy); however, employee involvement was legitimized through consultation with professional associations, adding legitimacy to the technical improvisation (Meyer and Rowan 1977; Powell and DiMaggio 1991):

We also communicated with the German Board for Gas and Water, as this was something that we didn't really have enough experience with (Interview, City B, August 1, 2016).

Implications

In summary, utility employees expressed confidence in their ability to respond to the technical challenges presented in providing water and wastewater services for emergency accommodations; this is conveyed through definitive statements comprehending their involvement in designing and constructing water and wastewater infrastructure (see the section "Confidence in Situational Response"). However, discrepancies exist between the design standards and procedures used for business-as-usual and emergency responses. These discrepancies indicate that engineers and utilities are improvising existing design software, procedures, and standards to determine the right approach in providing services to refugees and asylum seekers (see the section "Improvisation in the Design Process"). This in turn leads respondents to question and seek legitimacy for these improvisations because they are outside legitimized technical guidelines. To do so, coordination with other stakeholders and clear expectations for involvement and knowledge sharing become necessary for legitimizing involvement (see the section "Improved Coordination with Other Actors").

Conclusion and Policy Implications

The German government arranged emergency accommodations in 2015 and subsequent years to provide housing for displaced persons during the asylum application process. One technical aspect of

the project of providing emergency accommodations is supplying water and wastewater services for housing facilities through coordination with utility companies. Although understanding utility involvement during rapid population increase has been identified as a topic for future studies (Faust and Kaminsky 2017), a gap in literature exists regarding the technical impact of coordinating housing in a short period of time, especially in locations with existing infrastructure and a highly developed built environment. This study takes an institutional approach to a technical challenge by analyzing how utility employees legitimize or de-legitimize their technical work of ensuring water and wastewater services within the larger project of providing emergency accommodations to a large displaced population.

Ten semistructured interviews with water and wastewater utility employees in two German cities were qualitatively coded for statements expressing specific types of legitimacy: exchange, influence, dispositional, consequential, procedural, structural, personal, comprehensibility, and taken-for-grantedness (Suchman 1995). Analysis of the interviews showed that procedural and comprehensibility legitimacy were most prevalent in all 10 of the interviews in both relative frequency and distribution among interview participants (Table 3). Three emergent themes were observed in a secondary analysis of these two subtypes:

1. Confidence in situational response. Utility employees expressed confidence in being able to meet the technical requirements of demands presented by the crisis. This was achieved by framing the situation in past knowledge and experience.
2. Improvisation in the design process. Existing design software and standard procedures were not equipped to calculate water and wastewater connections for emergency accommodations. Two factors create challenges for design: usage patterns of displaced persons and the unconventional usage of buildings (empty factories, converted office spaces, or structures specific to emergency accommodations, such as modular housing).
3. Improved coordination with other actors. When emergency situations exceed what existing technical standards can accommodate, improved communication and designation of responsibilities are needed to mitigate or avoid negative impacts. At times, utility employees had to provide technical explanations to government planners, or in reverse, explain the implications of their involvement with emergency accommodations to their teams within the utility.

A small sample size is a key limitation of this study; however, given the limited information available for the impacts of emergency accommodations on utilities within the built environment, it remains a valuable contribution to the literature (Abowitz and Toole 2010). Other limitations include cultural and language barriers during interviews; although translators were used, there may be instances in which context or cultural references were not picked up by the researchers or conveyed in translations. Finally, respondents may be predisposed to discuss certain aspects of their work in more detail than other employees, possibly producing emphasis on certain topics more than others. For example, employees responsible for designing water and wastewater connections are likely to mention more examples regarding water and wastewater connections. To address this, the authors provide the code count and relative frequency for the entire data set and also the number of interviews represented within each legitimacy type. To further address this limitation, relative frequency is not used in the secondary analysis. Instead, the authors report representative themes and quotes from multiple interviews to help readers better understand context.

This study presents findings from utility employees regarding how they legitimized or de-legitimized their work in the absence

of applicable formalized standards, and adds to existing literature treating organizational legitimacy theory as it relates to the provision of water infrastructure services within dynamic situations. The results provide insight as to how utility employees adapt to extreme contextual uncertainty and the mechanisms they use to legitimize or de-legitimize their technical work in a synthetic organization. In addition, the results indicate the need for a more concrete understanding of the water usage and wastewater production patterns of these types of emergency accommodations (such as Tempohomes, sports halls, and converted office buildings) through improved metering at water and wastewater utility companies. Additionally, more clarity regarding the synthetic organizational framework is needed to maintain the internal legitimacy of various actors in the emergency accommodation project. An example of this would include providing more clearly defined roles for stakeholders in the emergency accommodation project to improve knowledge sharing between actors that can define and support appropriate interpretive flexibility (Dossick and Neff 2014) as utilities respond to extreme events.

In sum, providing emergency accommodations to asylum seekers or other displaced populations requires water and wastewater utility involvement. This enables the continued provision of water and wastewater services even when events are more extreme than can be reasonably handled within existing technical and organizational frameworks—in other words, enhanced utility resilience (Faust and Kaminsky 2017). Unfortunately, to date, the very real impacts of displaced populations on utilities have gone largely unmeasured and thereby unseen. At a minimum, this research demonstrates that utilities and the governments that regulate them should establish protocols for how such extreme situations should be handled, and produce metrics to define when events are truly outside of the ordinary.

Data Availability Statement

Data generated or analyzed during the study are available from the corresponding author by request. Information about the *Journal's* data-sharing policy can be found here: [http://ascelibrary.org/doi/10.1061/\(ASCE\)CO.1943-7862.0001263](http://ascelibrary.org/doi/10.1061/(ASCE)CO.1943-7862.0001263).

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Supplemental Data

Appendixes S1 and S2 are available online in the ASCE Library (www.ascelibrary.org).

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