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LEGITIMIZATION OF TECHNICAL PROCESS AND UNDERSTANDING UTILITIES' ROLE IN URBAN EMERGENCY RESPONSE FOR DISPLACED PERSONS

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ABSTRACT

This paper presents employee perspectives from two German water and wastewater utilities regarding their involvement in providing water and wastewater services for displaced persons in urban emergency accommodations. In 2015, 28 European countries received over two million applications for asylum, almost three times more than the previous year. According to the UNHCR, this rapid increase in population has reached the highest recorded displacement in the world's history, even greater than that proceeding the Second World War. The German utilities are meeting these new demands; however, we lack knowledge regarding the impacts on the utilities as they provide water and wastewater services to the suddenly increased population. As a result of this gap, this study looks at how water and wastewater utilities perceive their involvement in this process and in what ways they legitimize their provision of water and wastewater services to displaced persons. Understanding this legitimization equips both utilities and other stakeholders to better understand how utilities regard their role in urban emergency response. Results show that individuals use their past experience (comprehensibility legitimacy) and understanding of socially acceptable technical processes (procedural legitimacy) to legitimize their role in the crisis organization. Comprehensibility legitimacy is used to express certainty in managing the technical challenges of providing water and wastewater services, while procedural legitimacy is used to justify improvisation to navigate gaps in design and construction guidelines for water and wastewater connections. Implications of this study suggest that although employees are confident in their ability to handle the situation, there are also opportunities for improving response in the future, such as creating more technical guidance for design water and wastewater connections for displaced persons in renovated buildings and new developments.

KEYWORDS

utility, emergency housing, water, wastewater, refugee

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INTRODUCTION

Twenty-eight European countries received over two million applications for asylum in 2015, almost three times more than the previous year (UNHCR 2016). This rapid increase in population has reached the highest recorded displacement in the world's history, even greater than that proceeding the Second World War (CNN 2016; UNHCR 2016). In some of these countries, the government is responsible for providing emergency housing while applications are processed, meaning they maintain permanent accommodation facilities for asylum seekers. Despite this preparation, these existing facilities quickly reached capacity in 2015 and additional accommodations were required due to a rapid and unprecedented increase in the population of displaced persons. Governments partnered with private and nonprofit actors to renovate unoccupied buildings and provide accommodation in schools, sports halls, hotels and empty industrial buildings. One overlooked aspect of this process is the impact on the civil infrastructure systems that support emergency accommodations, and how abrupt demand increases in repurposed or new facilities have affected the water and wastewater utility companies and the services they are able to provide.

For various reasons, water and wastewater utilities may not monitor or actively process the impact that this rapid population increase has on the water and wastewater networks. As such, this study explores how utility employees' roles and work adjusted throughout the influx and coordination process. Semi-structured interviews were conducted to understand these organizational impacts and what technical impacts respondents discovered or predicted as a result of the population increase. Responses shed light into how utility employees perceive and legitimize their involvement in the crisis organization. This paper analyzes responses from two German water and wastewater utility companies regarding employees' involvement and perspective on the role of utilities in providing water and wastewater services to the temporary accommodations used to house displaced persons.

Understanding this legitimization equips both utilities and other stakeholders to better understand how utilities regard their role in urban emergency response. Migration is not a new phenomenon, but the level of displaced persons in the last two years is unprecedented and requires a rapid response. This urban emergency response requires collaboration between interdisciplinary groups of stakeholders, creating a complex organizational framework. However, little research exists on the relationships between urban emergency response and utility involvement. Before analyzing relationships between stakeholders, such as government agencies, private companies and these water and wastewater utilities, it is important to explore how utilities perceive and legitimize their own involvement. This creates a foundation of understanding that serves as a point of departure for stakeholders and researchers to better understand and manage the complexities of the built environment in urban emergency response.

POINTS OF DEPARTURE

Few studies have been done regarding water and wastewater utilities' roles in emergency accommodation within an urban context. This section discusses the available literature regarding the emergency accommodation process for displaced persons in Germany, as well as studies relating to utility involvement with population increase, and legitimacy theory, which is used in this analysis.

EMERGENCY ACCOMMODATION FOR DISPLACED PERSONS IN GERMANY

Germany has historically accommodated displaced persons seeking asylum. Beginning in the late 1980s, a wave of people seeking asylum from the Balkan countries and East Germany created an additional strain on housing in an already overwhelmed market, forcing localities to provide emergency housing in hostels, sports halls and empty industrial buildings (Eisenhammer 1991). After the Berlin wall came down, unification efforts between East and West Germany added additional stress to the housing market, leaving cities with limited capacity to house displaced persons and citizens alike (Hong Kong 1992). Presently, the German government requires people applying for asylum to reside in a reception center while their application is processed, as shown in Figure 1. Following a positive decision, displaced persons, now referred to as refugees, are relocated to collective accommodation centers managed by city districts while they engage in integration activities, such as employment or language programs (BAMF 2017). The final stage is permanent, decentralized accommodation which is secured independently from the government, but is funded through German social benefits. In 2015, the number of asylum applicants exceeded the available capacity in government initial reception centers. As shown in Figure 1, emergency accommodations were organized to provide housing for the surplus people. These accommodations were located in renovated office buildings, unused military buildings, schools, sports halls, hotels, container housing, and light-frame structures. A more in-depth analysis of the use of these housing types are discussed further in Faure's study of specific housing used for temporary accommodation in Germany (Faure, Faust, and Kaminsky 2017). Concerning the provision of water and wastewater services, several options were utilized, including: new or reinstallation of water and wastewater connections to the buildings, provision of bottled water and catering services, temporary sanitary facilities in containers, or portable toilets. A literature review resulted in studies primarily focused on health outcomes (Kern 2016; Niedermeier and Dreweck 2011) and social aspects of temporary accommodation in Germany cities (Komaromi 2016).

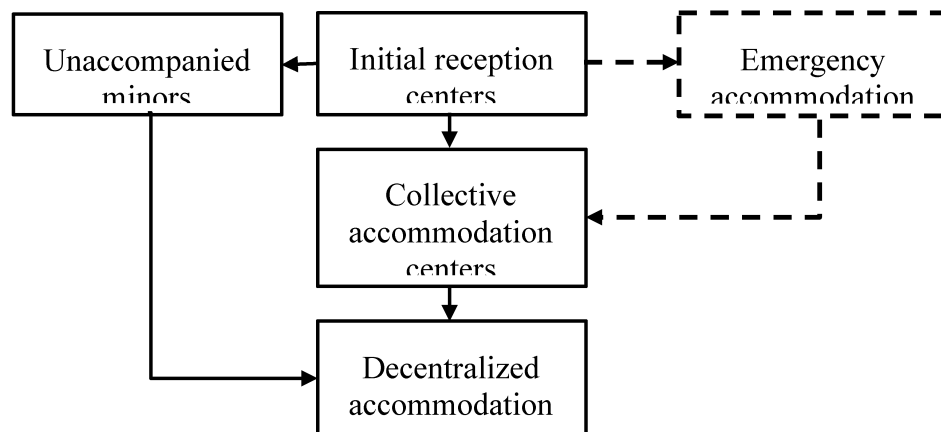


Figure 1: Overview of accommodations for people in the asylum process.

UTILITY MANAGEMENT

As global population increases, water and wastewater utility management are forced to adjust in provision of utility services. Literature specifically related to the impact of temporary accommodations on highly developed utilities and the water/wastewater network was not found during review. However, similar concepts such as rapid urbanization did show correlations between population increase and water use (Bao and He 2015). Many studies focused on the challenges of upgrading water infrastructure to meet the demands of population increase (Rojas, Meulder, and Shannon 2015; Qian Shi et al. 2016); however, these primarily focused on water in developing countries which had less established built environment. One study identified major challenges related to increasing population in megacities around the world, and expressed the need for maintenance and replacement of built water infrastructure in developed countries as a future challenge (Endter-Wada, Li, and Li 2015). While these studies provide the motivation for understanding the role that water and wastewater utilities play in offsetting or addressing potential future challenges from population increase, other work has been done to show action taken to bridge the gap in water services due to population growth, such as showing how villages or peri-urban settlements expand their water and sanitation services via wells and pit latrines as the population increased (Drangert et al. 2002). Rapid urban population growth in Iran has been shown to affect the ability for utilities to provide drinking water and wastewater treatment, along with impacting resource availability and increasing industrial activity (Sheykhi 2003). In summary, this existing work has used population increase as a motivation for mitigation strategies such as water reuse technology (Chen et al. 2017) and modeling strategies to better understand the extent of rapid urbanization (Zhou, Zhang, and Shen 2015), as well as highlighting challenges in communities with less established water and wastewater infrastructure. 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 we begin this discussion of impact to water and wastewater utilities by first understanding how utility employees perceive their role in the process.

LEGITIMACY THEORY

Definitions of legitimacy cross multiple disciplines, from political legitimacy (Coakley 2011; Jeffrey, McConnell, and Wilson 2015), legitimacy in psychology (Tyler 2006) to organizational legitimacy (Suchman 1995). According to Suchman, legitimacy is 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, 574). Water and wastewater utility companies, as well as government agencies are constructed systems, therefore this analysis focuses on the attribution of organizational legitimacy. Existing literature referencing organizational legitimacy theory has targeted internal versus external legitimacy in understanding how employees perceive management (Thomas and Lamm 2012; Mulligan 2006), how corporations use corporate social and environmental responsibility to manage legitimacy with the public (Bhattacharyya 2015; Palazzo and Scherer 2006), and how other institutions have gained or lost legitimacy (Deephhouse and Carter 2005; Deephouse and Suchman 2008; Minahan 2005). Specifically in regards to water-related studies, Kaminsky addressed how water and sanitation hygiene sustainability

frameworks expressed various forms of legitimacy theory (Kaminsky 2014). Although Suchman's definitions were not explicitly used, the role of legitimacy in developing adaptive strategies in integrated water resource management was identified in recent literature (Gearey and Jeffrey 2006). The most recent and most directly-related example of legitimacy was used in understanding how citizens in two U.S. states identified and legitimized the role of government in water governance (Edwards 2016). While Edwards used a survey to identify which level of government should be responsible for local water issues and what type of legitimacy they used to attribute to this allocation of responsibility, this analysis takes a more ethnographic approach (Spradley 2016) in allowing respondents to answer general questions then attributing specific types of legitimacy based on definitions extracted from literature. This study integrates both the strategic and institutional impact of legitimacy by understanding the internal and external influence of the utilities' involvement. In the literature, legitimacy is organized into three broad categories, with the referenced subtypes defined in Table 1:

1. **Pragmatic Legitimacy** relies on direct exchanges and interactions between the organization and its audience. This might look at "broader political, economic or social interdependencies" (Suchman 1995, 578) but ultimately affects the respondent's well-being. Specific subtypes include exchange, influence and dispositional legitimacy.
2. **Moral Legitimacy** focuses on what is the right thing to do (Suchman 1995, 579). Moral legitimacy evaluates normative outcomes, techniques and organizational frameworks. Specific subtypes include consequential, procedural, structural and personal legitimacy.
3. **Cultural-Cognitive Legitimacy** assesses legitimacy based on necessity or inevitability of the situation (Suchman 1995). This relates the role of the organization in terms of what is comprehensible, recognizable and culturally accepted (Scott 2008). Specific subtypes include comprehensibility legitimacy and taken-for-granted legitimacy.

Table 1: Legitimacy Theory Definitions

PRAGMATIC LEGITIMACY	
Exchange	Exchange legitimacy represents support for an organization based on the direct benefit to the respondent or people/group that the respondent is in direct contact with.
Influence	Influence legitimacy is associated with the organization being responsive to larger interests. These larger interests benefit people/a group that the interviewee is not in direct contact with (i.e. the city).
Dispositional	Dispositional theory is associated with dispositional attributions (trustworthy, descent, wise). Usually the organizations which are granted legitimacy are personified and must have "our best interests at heart" (Suchman 1995, 578).
MORAL LEGITIMACY	

Consequential	The organizations are judged on what they accomplish and answers 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, 580).
Structural	Legitimacy is based on the judgment of structural characteristics within the organization.
Personal	Personal legitimacy is based on the charisma of individual organization leader(s).
COGNITIVE LEGITIMACY	
Comprehensibility Legitimacy	Comprehensibility is a mix between daily experience of the respondent and the larger belief systems (cognitive chaos). The respondent relates the situation to a personal experience/example. The key factor is that their initial reaction is definitive.
Taken-for-grantedness	This type of legitimacy is applied when “an alternative is literally unthinkable” (Suchman 1995, 583) for the respondent. Statements are given in absolute terms without referring to experiences, like with comprehensibility legitimacy.

RESEARCH METHOD

DATA COLLECTION

Data was collected through ten semi-structured ethnographic interviews (Spradley 2016) conducted in two German cities of differing sizes between June and August of 2016; study participants included water and wastewater utility employees. Participants represent 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. Both cities received displaced persons; information representing the scale of asylum applications is shown in Table 2. Per the asylum procedure, applicants are required to stay in reception centers and temporary facilities until a decision on refugee status has been reached (BAMF 2017).

Table 2: Demographic information for distribution of displaced persons in study sites.

City	Rounded Population, 2015	% Asylum Seekers Received by State	% Asylum Seekers Received by City	Estimated Asylum Applications per City, 2015 ¹
City A	3,500,000	5.0%	100.0%	24,000
City B	500,000	5.1%	13.2%	3,200
<i>Note:</i> ¹ This estimate is calculated from the preceding columns. (Rounded population)*(% Asylum Seekers Received by State)*(% Asylum Seekers Received by City)				

Sources: UNdata (2015); BAMF (2015) This number represents the percentage that is assigned to each city based on the total received by each state.

Interview questions were created to both understand the respondent's role in the emergency response, and to understand their attitude towards the current coordination efforts with government (Bernard and Ryan 2010; Spradley 2016). Questions covered their role, how their department or group was involved in providing water and wastewater services in accommodations and how decisions were made for facility locations, renovation, water utility services and coordination with other stakeholders such as government agencies, non-profit organizations and the community. Lastly, the 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 in an event this type of influx occurred in the future. Interviews were conducted in English, German, or French depending on the respondent's preference, and were audio 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 delegitimation regarding the role of the utility in providing water services for emergency accommodations using Dedoose qualitative analysis software (SCRC 2016). Codes created for this analysis were defined with examples in a coding dictionary which was verified through intercoder reliability checks (De Vries et al. 2008). The coding process was iterative as definitions were refined for the codes and legitimacy types (Saldaña 2011).

For example, in one interview, a wastewater utility employee was asked if the utility had responded well to the recent increase in population. The employee replied with: *"Absolutely, because we are the [company name]. This company was founded... 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."* This response was coded to dispositional legitimacy because the employee based the ability of the utility to respond to the increase in population on personified characteristics that were attributed to the company (see Table 1 for definitions). Specifically, the utility is seen as the "caretaker" for the city.

LIMITATIONS

The small sample size is a key limitation of this study. However, given the limited information available for the impacts of temporary accommodations on utilities within the built environment, we feel it remains a valuable contribution to the literature. Other limitations include cultural and language barriers during interviews; while translators were used, there may be instances where 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, if an employee was responsible for designing water and wastewater connections, they are likely to mention more examples regarding water and wastewater connections. To address this, we provide the code count and relative frequency for the entire dataset and also the number of interviews represented within each legitimacy type. To further address this limitation, relative frequency is not used in our secondary

analysis. Instead, we report representative themes and quotes from multiple interviews to help readers better understand context.

RESULTS

The ten interviews with utility employees resulted in 253 excerpts expressing legitimacy towards the provision of water and wastewater services to temporary accommodations for displaced persons. The distribution of these excerpts across the various types of legitimacy using the relative frequency of the code count and the associated frequency of respondents using the subtype can be found in Table 3; definitions for the specific types of legitimacy are provided in Table 1. Moral legitimacy had the greatest number of references (103) and was referenced by all ten respondents. Procedural legitimacy (72) and comprehensibility legitimacy (71) were the two subtypes with the greatest number of references.

Table 3: Distribution of legitimacy references.

INTERVIEWEE INVOLVEMENT				
	Code Count	Code Count Relative Frequency	Respondent Count	Respondent Count Relative Frequency
PRAGMATIC	61	24%	10	100%
Exchange	44	17%	10	100%
Influence	16	6%	6	60%
Dispositional	1	0.4%	1	10%
MORAL	103	41%	10	100%
Consequential	14	6%	7	70%
Procedural	72	28%	10	100%
Structural	12	5%	6	60%
Personal	5	2%	4	40%
COGNITIVE	87	35%	10	100%
Comprehensibility	71	28%	10	100%
Taken-for-grantedness	16	6%	8	80%
TOTAL	253	-	10	-

Both subtypes were referenced by all ten respondents in the dataset. As such, excerpts coded for procedural legitimacy and comprehensibility have been further analyzed for thematic patterns (Bernard and Ryan 2010) related to what was being legitimized in relation to the specific subtype. These patterns and examples are discussed in greater detail in the following section.

DISCUSSION

Procedural legitimacy and comprehensibility legitimacy both had the greatest relative frequency from interviews with water and wastewater utility employees. This section provides a discussion of results from a secondary analysis of excerpts related to these two subtypes. Comprehensibility legitimacy was used in expressing the utility employee's technical confidence assurance in responding to the general situation. Utility employees employed procedural legitimacy in association with improvising standard operation and design processes in providing water and wastewater services to temporary accommodations, exposing potential gaps in a complex framework for crisis organization.

PROCEDURAL LEGITIMACY: IMPROVISATION IN THE DESIGN PROCESS

In the context of this study, procedural legitimacy expresses taking normatively motivated actions, or appropriate processes, while providing water and wastewater services in temporary accommodations for displaced persons. Seventy-two (22) statements, or 28 percent of excerpts coded to procedural legitimacy. Some themes within these 72 excerpts included how the utility employee described their specific responsibilities, their role within the utility for this situation, and their involvement in making sure the temporary accommodations had access to water and wastewater services; other themes are provided in Table 4.

Table 4: Summary of themes from secondary analysis, procedural legitimacy

PROCEDURAL LEGITIMACY	
Legitimization of interviewee involvement	De-legitimization of interviewee involvement
<ul style="list-style-type: none"> - Use of water facilities in temporary accommodations - How utilities are paid for - Projecting population growth - Network expansion - Treating wastewater - Organizational structure in utility - Coordinating with others - Improving treatment systems - Day-to-day responsibilities - Making sure temporary accommodations had access to drinking water and wastewater services - Renovation of buildings - Maintaining system network - Designing water and wastewater connections - Constructing water and wastewater connections - Creating design standards - Coordinating with government - Documenting consumption data in temporary accommodations - Creating contracts for temporary accommodations 	<ul style="list-style-type: none"> - Making sure temporary accommodations had access to drinking water and wastewater services - Renovation of buildings - Coordinating with government - Creating design standards - Designing water and wastewater connections - Coordinating with others - Constructing water and wastewater connections - Maintaining system network - Use of water facilities in temporary accommodations

- Modeling consumption in accommodations
- Distribution of temporary facilities/displaced persons

Most excerpts regarding procedural legitimacy were in support of, or legitimized, the respondent's involvement in providing water and wastewater services to temporary accommodations. Expression of procedural legitimacy took two forms: commenting on the success of the employee's involvement by referencing the techniques used and suggesting improvements to the process. For example, when asked what potential technical challenges may stem from the coordination of temporary 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"* (7.18.16, City A). The affirmation was based in the design process and level of foresight integrated into technical calculations for the facilities intended for longer use. The second type of justification was also present: *"Had we had more time, we could have coordinated it better, we could have said here is a [water connection] point for refugees, here is a point for refugees, and here is a point for refugees and we would have spread them across the city. This way it was all at once, everybody came in and then nobody knew where to go"* (Interview, City A, July 19, 2016).

Quite a few excerpts within procedural legitimacy (26) acknowledged the improvisation required in designing water and wastewater connections or revision of existing standards to better calculate flows or estimate water demand. 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 temporary accommodations. In City A, utility employees involved with technical design referred to a software program used to design water connections to the accommodations. They admitted that the software didn't have features that encompassed water consumption patterns for the various accommodation types. For example, when asked about how they design the water connection for a specific type of facility (Tempohome), one employee explained: *"I must say I do it a little differently. I do use the [software] program and then calculate it to fit for the Tempohomes. Let's say it's ... similar to a hotel. Because there are a lot of people there during the whole day. And that's a high consumption. So, I start with a hotel. The software calculates the consumption quite generously anyway. So, and if I add another calculation on top of that, then that's my prediction. I don't need to refer to anything, but... I then take that as empirical value or as 'the value' and if the same thing arises, I can go back to that and say it'll be exactly this connection that I already calculated"* (Interview, City A, July 29, 2017). The software being used wasn't equipped to design for various housing types used in temporary accommodations. While the employee later referred to safety factors as legitimizing their extrapolation, they 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). A degree of uncertainty was expressed regarding the legitimacy of the techniques used to determine these new values for

demand and pipe sizing, although employees were confident in their ability to improvise.

In City B, an employee described two areas of improvisation in the design process: *“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). Similar to City A, this employee is legitimizing their involvement by referencing the approach they took in sizing the connections and calculating water demand. Specifically, they collaborated with a German professional association to estimate water consumption and sizing calculations. Another employee expressed frustration coordinating with government for the technical design of 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 is de-legitimizing the provision of water and wastewater facilities in the temporary accommodations because the government planners were not using an accepted procedure for designing the number of toilets and washbasins in the accommodation. This expresses a gap in the coordination process, where both government planners and utility employees are involved with the design of technical aspects for temporary accommodations, but tension exists in appropriate design techniques.

Although the ingenuity of utility employees was highly beneficial to the crisis organization and was necessary for utility resilience in the response, it also highlights the need to develop standards to better ensure consistency and reliability of outcomes and processes in future instances of emergency response. This was also expressed by utility employees: *“Yes. I mean these guidelines I think should be put in place; they don’t necessarily have to come from the government. For example, the DVGW is allowed to set guidelines. We just have to set up something more up to date. And they are actually working on something for this whole asylum seeker subject at the moment. Because we’re really having problems. Especially because we’re constantly trying to... we want these guidelines to be used in the whole of Germany. 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)

Generally, utility employees from both cities expressed legitimacy in providing water and wastewater services to temporary accommodations for displaced persons, however two conceptual challenges required employees to legitimize their involvement with determining the “right” technique or procedure: (1) a lack of data for predicting water usage and wastewater production and (2) overlap in responsibility for the technical design of water and wastewater facilities with the contracting government department.

COMPREHENSIBILITY LEGITIMACY: CONFIDENCE IN SITUATIONAL RESPONSE

After procedural legitimacy, comprehensibility legitimacy was most utilized in providing water and wastewater services to temporary accommodations for displaced persons. Seventy-one (71) excerpts, or 29 percent of all statements expressing legitimacy, related to interviewee participation using some form of understanding based on past experiences or cultural-cognitive understanding of the situation. Statements using this subtype typically used 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 respondent expresses support, or legitimizes their involvement by comparing displaced persons to other existing consumer groups. Some specific themes using comprehensibility legitimacy included how the employee’s work responsibilities were impacted by the situation, how they coordinated with the government and designed water and wastewater connections for temporary accommodations. Other emergent themes using this subtype are provided in Table 5.

Table 5: Summary of themes from secondary analysis, comprehensibility legitimacy

COMPREHENSIBILITY LEGITIMACY	
Legitimization of interviewee involvement	De-legitimization of interviewee involvement
<ul style="list-style-type: none">- How their daily work is impacted- Impact of accommodating displaced persons on system network- How to calculate water facilities in temporary accommodations- Water use patterns of displaced persons- Planning for population growth- Comparing their work with other stakeholders- Comparing their work to other customers- Providing water services to temporary accommodations- General opinion of displaced persons- Coordinating with government- Distribution of displaced persons- Personal qualifications to respond to situation- Response of displaced persons to accommodations/assistance- Renovating buildings for temporary accommodations- How water services are used in temporary accommodations- Permanence of temporary accommodations- Setting contracts for temporary accommodations	<ul style="list-style-type: none">- Impact of accommodating displaced persons on system network- Water use patterns of displaced persons- How their daily work is impacted- Impact of their work- How to calculate water facilities in temporary accommodations- Meeting standards- Coordinating with government- Distribution of displaced persons- Response of displaced persons to accommodations/assistance

A majority of excerpts (59 out of 71) expressed support, or legitimized the respondent's involvement in the process. Generally, these excerpts also expressed a certainty in their ability to meet the need, regardless of the area of involvement. When asked about potential impact to their work, one employee stated, *"And so we hardly notice that there are maybe some changes"* (Interview, City A, July 27, 2016). In another interview, when talking about difficulties in responding to the housing situation, one respondent said, *"It's a challenge for the engineers, probably, for planning and everything that plays a role there but I think it won't be more difficult than usual"* (Interview, City A, July 14, 2016). Throughout the excerpts, whether relating to the individual's specific role or how they perceived the situation, respondents referenced what was seemed understandable for the situation. For example, one respondent said that, *"For us it's just important – it's not more complicated"* (Interview, City A, July 18, 2016). Situational response was a priority for the employees, but not one that was overwhelming. Another respondent expressed that, *"I didn't actually think of the people, the refugees in the first place, for me it was a technical problem that we had to deal with. I didn't really think about the people that were coming"* (Interview, City A, July 14, 2016). In this statement, focus was less on the specific situation of displaced persons and more associated with solving the technical challenge presented by the government.

Ten (10) of the excerpts associated with comprehensibility legitimacy delegitimized involvement in the process of providing water and wastewater services in temporary accommodations for displaced persons. Statements delegitimizing the accommodation process or the respondent's involvement using comprehensibility legitimacy seemed to lack an understanding of why they were reacting to the situation in a specific way. For example, in reference how well the process of designing water and wastewater connections worked, one employee said, *"I think so, [it was difficult]. Exactly, we could only guess. We didn't know how much a refugee consumes in a day"* (Interview, City A, July 18, 2016). This supports the conceptual findings from procedural legitimacy in the need to understand water use patterns for displaced persons in temporary accommodations. Another employee expressed, *"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). This reinforces the other finding that more clarity is needed in interagency coordination for technical challenges in providing temporary accommodations for displaced persons.

IMPLICATIONS

In summary, utility employees expressed confidence in their ability to respond to the technical challenges presented in providing water and wastewater services for temporary accommodations; this is conveyed through definitive statements comprehending their involvement in designing and constructing water and wastewater infrastructure (comprehensibility legitimacy). However, discrepancies exist between the design standards and procedures used for business-as-usual and emergency response (procedural legitimacy). 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. This

in turn leads respondents to question the legitimacy of these improvisations, as they are outside standard, legitimized technical guidelines.

CONCLUSION AND POLICY IMPLICATIONS

Emergency temporary accommodations have been arranged by the German government since 2015 to provide housing for displaced persons during the asylum application process. One technical aspect of this crisis organization is providing water and wastewater services for housing facilities through coordination with utility companies. Existing literature has discussed health outcomes (Kern 2016) and social impacts in German housing facilities for displaced persons such as neo-Nazi infiltration in employment within housing facilities (Komaromi 2016). However, a gap in literature exists to understand the technical impact of coordinating housing in a short period of time, specifically in a location with existing infrastructure and established built environment. This study initiates a dialogue about potential impacts to water and wastewater utilities by understanding how employees legitimize their involvement in the provision of water services to temporary accommodations. Ten (10) semi-structured interviews with water and wastewater utility employees were qualitatively coded for statements expressing specific types of legitimacy: exchange, influence, dispositional, consequential, procedural, structural, personal, comprehensibility legitimacy and taken-for-grantedness (Suchman 1995). Analysis of the interviews showed that procedural and comprehensibility legitimacy were most prevalent in all ten of the interviews (Table 3). Three emergent themes were observed in secondary analysis of these subtypes:

1. Existing design software and standard procedures are not necessarily equipped to calculate water and wastewater connections for temporary accommodations for displaced persons. 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 temporary accommodation such as modular housing) (procedural legitimacy).
2. Crisis organizational frameworks and interagency coordination requires improved communication and designation of responsibilities. At times utility employees had to provide technical explanation to government planners or in reverse, explain to their team within the utility, the implications of their involvement for temporary accommodations (procedural legitimacy).
3. Although utility employees utilized improvisation throughout various aspects of their involvement, they expressed a confidence in being able to meet the requirements of demands presented by the government. This showed a comprehension of resilience within the utility and the employee's technical capabilities (comprehensibility legitimacy).

This study presents findings from utility employees regarding how they legitimize or de-legitimize their role in crisis organization. While utility employees have expressed confidence in their ability to meet the demands of the task presented in a rapid population increase and corresponding demand for water and wastewater services to temporary accommodations, there remains an opportunity to reduce uncertainty in the design process by reassessing and revising standards and techniques to adapt within

an emergency context. This requires having a more concrete understanding of the water usage and wastewater production patterns of these types of accommodations, prompting the need for improved metering at water and wastewater utility companies. Additionally, more clarity regarding the crisis organizational framework is needed to maintain internal legitimacy of various actors in the accommodation process, in this study, utility employees. Based on the current German asylum procedure, ensuring availability of temporary accommodations to asylum seekers creates potential for a lack of capacity to occur in the future, requiring utility involvement for future water and wastewater connections in temporary accommodations. Understanding impacts to this infrastructure in the built environment begins with awareness that an impact may exist, then expanding the scope of future studies to gather more information about the subject.

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