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Policy Ambiguity and Regulative Legitimacy of Technology: Legal Indeterminacy as Result of an Ambiguous Taximeter Regulation

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Abstract

Institutions influence the design, use and adoption of information technologies. The IS field has a long tradition in institutional analyses, especially concerning how ICT gains legitimacy in organizational settings. However, few analyses have been conducted on how legal reforms influence regulative ICT legitimacy. We studied the effect of policy ambiguity on regulative legitimacy through a revelatory case study of a legal reform concerning the taximeter regulation in Finland. The regulation changed from being specific and providing legal certainty to being ambiguous and resulting in legal indeterminacy. We contribute to the IS institutions and legitimacy research stream by arguing that the transition from specific to ambiguous regulation shifted the locus of regulative legitimacy from an inherent property of legal formulation to a processual form, and provide a framework to support studies on regulative change by distinguishing between type of policy and legal state of the technology. Our study has methodological implications.

Keywords: Regulative legitimacy, policy ambiguity, legal reforms, regulation, technology-in-use

Introduction

Institutions are central to Information Systems (IS) research (Mignerat and Rivard 2009) as they influence all IS phenomena: "the design, use, and consequences of technologies, either within or across organizations" (Orlikowski and Barley 2001, p. 153). In institutional analysis, a core concern is how things gain their legitimacy (Suddaby et al. 2017), defined 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). IS researchers have spent decades investigating how technologies gain legitimacy in organizational settings (Gosain 2004; Hsu et al. 2012; King et al. 1994; Levy and Bui 2019) and studied how ICT legitimacy affects the adoption and use of IS (Kaganer et al. 2010; Krell et al. 2016; Winter et al. 2009). Regardless, in the IS field, the influence of laws on ICT legitimacy has received scant attention, and institutional analyses have mostly been performed within organizational boundaries (Winter et al. 2014). While legal reforms have tremendous potential influence on IS phenomena through regulative legitimacy, there is not much research on this (Avgerou and McGrath 2007).

The premise of this paper is as follows. Government authorities possess the strength of legal authority and "set the context within which all other institutions may and shall operate" (King et al. 1994, p. 148). Institutional theorists call this the regulatory pillar of institutions (Scott 1995). When legislation or regulation

set by government authorities is specific and restrictive, and is driven by goals of certainty and predictability, legitimacy is a property of the legislation. In the parlance of jurisprudence, this is often referred to as the Rule of Law (Gosalbo-Bono 2010) or the principle of legality (Besselink et al. 2011). Written law must be clear, and people must live according to it or they will face sanctions. Courts must justify their decisions on the law and law only (Scalia 1989).

When legislation regulates the adoption and use of technology, the question is which old and new technologies it legitimates or not. When the law changes, how does it influence the (further) use of old and adoption of new technology? When studying legitimacy, three different approaches can be distinguished that differ greatly in their basic assumptions about what legitimacy is seen to be, where it occurs and how it occurs: legitimacy as property, legitimacy as process, and legitimacy as perception (Suddaby et al. 2017). In addition, several forms of legitimacy exist that lean on different institutional bases, and regulative legitimacy becomes especially important in the light of legal reforms. Regulative legitimacy is produced when organizations set up new practices in accordance with the relevant rules and regulations. From this follows that regulative legitimation for information technology can be achieved, for example, by emphasizing that the technology conforms to the effective laws that regulate the technology (Kaganer et al. 2010).

However, when a legal reform is driven by the free market ethos, that the invisible hand of the market rather than the government should be the ultimate judge (Määttä 2001), the written legislation becomes more ambiguous when it avoids making decisions for the market. A practical challenge appears. It is an intellectually curious question: How can regulative legitimacy be reached if the law is not specific about which technology is legitimate and which is not? IT policy affects the adoption and use of technology (Bernardi et al. 2017; Eaton et al. 2018). Thus, at the same time when investigating policy ambiguity in ICT policy, the researchers need to pay attention to the technologies the policy affects – and *how* it affects them. How does regulative legitimacy emerge in the relational space between ambiguous legislation and technologies? Given the fact that IT policy and technology legitimacy affect technology adoption and use, and the simultaneous lack of research on the influence of laws on regulative legitimacy of ICT, we ask the question:

"How does the change from specific to ambiguous policy affect regulative legitimacy of technology?"

To answer this question, we conducted an empirical case study in Finland, before and after the implementation of the deregulatory reform known as the Act on Transport Services of July 2018 (see also Lanamäki et al. (forthcoming)). As a part of this reform, the previous specific, unambiguous regulation regarding the use of taximeters in taxi cars was revised to an "enabling regulation"[1] to allow also other technologies such as smartphone apps to be used. However, the change of the Finnish taximeter law from specific to ambiguous led to a confused legislative state where it was no longer possible to determine for all technologies whether they are legal or illegal in the light of the currently effective law. This implies *legal indeterminacy*, i.e., that every legal question does not have a single right answer (Maxeiner 2006b). In our context, this refers to conditions where it is not possible to determine the legal status of various technologies used for similar purposes. In our study, we identified two types of ambiguity in the present taximeter law and analyzed how the identified policy ambiguity affects the regulative legitimacy of different types of technologies presently used by different actors on the market for calculating and/or giving the consumers information on the price of the ride. We refer to these technologies as "technologies-in-use" (Suchman et al. 1999).

We contribute to the IS institutions and legitimacy research stream in two ways. First, we show how the transition from specific to enabling regulation shifts the locus of institutional – and more specifically regulative – legitimacy from an inherent property of legal formulation to a more relational, performative and contested form. We put forward the proposition that when a technology law is ambiguous, legitimacy of technology takes the form of legitimation as a process (see Suddaby et al. 2017). Consequently, we advocate the methodological approach that settings where ambiguous policy regulates technology require simultaneous focus on the legal formulation of an ambiguous policy (i.e., the institutional context) *vis-à-vis* the technologies that are developed or adopted into use on the market. It is necessary to study *how* a policy is ambiguous in its formulation and its interpretations made by its stakeholders. Second, we propose policy

[1] "Enabling regulation" was a concept regularly used by Finland's Sipilä Government (2015-2019), which aimed "to create enabling regulation, promote deregulation and reduce the administrative burden." (Government Action Plan 2017-2019, p. 64, available at https://valtioneuvosto.fi/documents/10184/321857/Government+action+plan+28092017+en.pdf).

type and legal state of the technology as key dimensions when studying the regulative legitimacy of technology in the context of ICT policy reforms.

This paper proceeds as follows. First, we describe the theoretical foundation to ambiguity and regulative legitimacy and the key concepts we use in this study. We then describe our methodological approach, followed by a description of our findings where we present two types of ambiguity that we identified in the taximeter law, as well as seven types of technologies-in-use and their situation regarding regulative legitimacy. Finally, we present and discuss the contributions of our study and conclude the paper with practical implications, research limitations and suggestions for future research.

Theoretical Background

In this section, we first describe the theoretical foundation to ambiguity and more specifically *means ambiguity* in the context of policy making. We summarize how IS research has addressed policy ambiguity-related questions to date, concluding this is in an unexplored territory to IS research. Then, we develop the conceptual basis for our paper. We introduce the concepts of legitimacy from an institutional, regulative perspective and describe the relationship between regulative legitimacy, legal indeterminacy, and ambiguity. Finally, we summarize the key concepts that we use in the analysis of our empirical case study.

Policy Ambiguity

Ambiguity is "the state of having many ways of thinking about the same circumstance or phenomena." (Feldman 1989, p. 5). Cohen and March (1974) distinguished between three types of ambiguity: goal ambiguity, authority ambiguity, and means ambiguity. These categories have had profound influence for IS and organizational research on ambiguity (Denis et al. 1996; Jarzabkowski et al. 2010; Ravishankar 2013). Goal ambiguity refers to unclear objectives, whereas means ambiguity implies uncertainty and an unclear relationship between goals and the means to achieving the goal(s). In the context of policy, ambiguity of means can arise, e.g., when a law-mandated technology does not yet exist, or when it is unclear which organizations should play which roles in the process of implementing a policy. Furthermore, means ambiguity prevails when the choice or outcome of technology is unclear (Matland 1995). Authority ambiguity refers to "ambiguity created by the presence of multiple authority and power centers" (Ravishankar 2013, p. 317).

Ambiguity can be used strategically as a discursive resource (Jarzabkowski et al. 2010; Ravishankar 2013). In IS research, Ravishankar (2013) studied strategic ambiguity and shows that it is a "core aspect of public ICT innovations" (p. 327). He illustrates how a team utilized strategic ambiguity during the implementation of a project when establishing the project's scope, in the relationship with another organization, and in public communications. Best (2012) identified how IMF and the World Bank take strategic use of ambiguity as a coping mechanism to prepare for unforeseen events. However, even though (strategic) ambiguity may be used as an intentional and beneficial asset, it is more commonly seen as a problem. Matland (1995) synthesized policy implementation literature from an ambiguity perspective and identified four policy implementation processes that differ in their degree of ambiguity and degree of conflict. The rising of conflict requires that actors are interdependent, and that objectives are incompatible with each other. When organizations who see a policy to be directly relevant in the light of the organizations' interests have differing views, policy conflict exists. Matland (1995) distinguishes for each process situations where policy ambiguity is present regarding the goals or the means of policy implementation. Identifying ambiguous statements in information security policy, Buthelezi et al. (2016) argue that non-compliance with information security might be due to policy ambiguity. Stahl et al. (2012) conducted a critical discourse analysis on information security policies used in the UK's National Health Service. They found that there is considerable ambiguity in these policy documents regarding the policies' objectives and intended targets (i.e., who is supposed to implement the policy). Ambiguities caused by jargon and technical (and thus unfamiliar) language were identified as reasons why information security policy is not being implemented as intended. Lanamäki et al. (2019) demonstrate how the ambiguous Finnish taximeter regulation led to a number of contesting discourses about what a taximeter is for. Though being an established field in strategy research, in the information systems field, research addressing policy ambiguity is scarce.

The Concepts of Legitimacy, Legal Certainty and Legal Indeterminacy

Ever since the publication of Max Weber's *Economy and Society* (1968), social scientists have been concerned with the notion of ***legitimacy***. One of the most recent reviews on this construct is the one provided by Suddaby and colleagues (2017), who conducted an extensive review of existing legitimacy literature in eight highly ranked management journals. They identified three streams of legitimacy research that differ in their assumptions regarding what legitimacy is seen to be in each stream, where legitimacy occurs, and how it occurs. In the property stream, legitimacy is seen as a property/asset/thing that occurs between the legitimacy object and its external environment. In this view, legitimacy occurs mostly at the organizational and field levels when the legitimacy object fulfils the expectations of an external audience. In the process stream, legitimacy is seen as "an interactive process of social construction" (Suddaby et al. 2017, p. 453) that occurs between several different social actors, and specifically between those that either oppose change or support it. In this view, legitimacy occurs foremost at the field level (e.g., an industry) through the targeted efforts of different social actors. In the perception view, legitimacy is an evaluation or social judgement that occurs between individual and collective evaluators. In this view, legitimacy occurs through the actions, perceptions and judgements of individuals that are influenced by institutionalized judgements on a collective level, and it occurs mostly at the microlevel.

In the present research, we take an institutional approach to legitimacy (as opposed to the strategic approach), which sees legitimacy as a condition which reflects how well something is perceived to adhere to, for instance, certain rules or laws (Johnson et al. 2006; Kaganer et al. 2010; Scott 1995). Legitimacy can come from three sources, also referred to as "pillars of institution": the regulative, normative, and cultural-cognitive pillar (Scott 1995). In the present research, we specifically address ***regulative legitimacy***. Regulation by institutions such as government authorities refers to the intervention (either direct or indirect) in the behaviour exhibited by all those who are under the influence of that institution (King et al. 2014). Regulative legitimacy flows from such institutions when they define what is acceptable legally or procedure-wise with help of sanctions and requirements (Johnson et al. 2006) targeted to modify the behaviour of those who are influenced by the institution (King et al. 2014). Flickinger (2009: 14), referring to North (1990), defines that regulative legitimacy "originates from the adherence to laws, rules, and standards", and for new information technologies it can be achieved, for example, by emphasizing that the technology conforms to the effective laws that regulate the technology (Kaganer et al. 2010).

However, what happens when the law does not provide a ground for clearly presenting ones' technology as conforming to the effective law, such as can be the case when means ambiguity exists in a policy? ***Legal indeterminacy*** is a situation where "legal questions lack single right answers" (Kress 1989, p. 283). Its consequences for legitimacy are "prima facie the main reason why legal scholars do and should care about indeterminacy" (Kress 1989, p. 285). In this article, we apply the concept to situations where it is not possible to determine the legal status of various technologies that share the same purpose. In legal scholarship, the old tradition of legal formalism was based on a belief that legal conclusions should be drawn mechanistically and rationally from its premises (Dworkin 1977). Legal scholarship and practice in postwar America shifted from formalism to legal realism, which is a naturalistic approach to law. It transformed the role of courts from a logical to an empirical exercise (Leiter 2010). Through the mainstreaming of legal realism in the United States, the conception of legal indeterminacy became more popular and accepted (Dagan 2007). Maxeiner (2006b) argues that legal indeterminacy is largely an American phenomenon.

In Europe and particularly in Germany, the legal framework is built on the ***principle of legal certainty*** (Maxeiner 2006a). Under the European Law, the legal certainty principle requires that (Maxeiner 2006a, p. 519): (1) laws and decisions must be made public; (2) laws and decisions must be definite and clear; (3) decisions of courts must be binding; (4) limitations on retroactivity of laws and decisions must be imposed; and (5) legitimate expectations must be protected.

There are various ways to think about the implications of ambiguity in the context of regulative legitimacy and the indeterminacy it brings. For example, Hansen (2016) argues that ambiguity of legal text is the reason why global arms trade persists despite obligations in international law. McGoey and Jackson (2009) reported how legal ambiguity created a loophole for a drug company to withhold information about effects and risks. Ruohonen and Kimppa (2019) similarly identified that the failure to regulate against the sales of intrusion software and other offensive cyber security technologies originates in the difficulty to provide an unambiguous definition for 'cyber weapons' in the international Wassenaar Arrangement. Indeterminacy

is also seen as the source for legal loopholes facilitating corporate tax avoidance (Picciotto 2015). Maxeiner (2006b) argues that legal indeterminacy effectively erodes public trust in law.

In this paper, our purpose is to investigate how, in our Finnish context, the earlier enforced legal certainty of taximeter regulation turned into legally an indeterminate regime of various technologies-in-use. We study how a legal reform that introduces an enabling but ambiguous form of technology regulation the affects regulative legitimacy of the technology, i.e., how technologies gain their regulative legitimacy under ambiguous policy. Table 1 summarizes the key concepts we use.

Concept	Explanation
Regulative legitimacy	Regulative legitimacy defines what is acceptable legally or procedure-wise with help of sanctions and requirements (Johnson et al. 2006) targeted to modify the behaviour of those who are influenced by the institution (King et al. 2014). Regulative legitimation for new information technologies can be achieved, for example, by emphasizing that the technology conforms to the effective laws that regulate the technology (Kaganer et al. 2010).
Legal indeterminacy	The consequence of ambiguous jurisdiction for courts: "legal questions lack single right answers" (Kress 1989, p. 283)
Legal certainty	The consequence of unambiguous jurisdiction for citizens, enabling law-abidance: "people can know what the law is and can orient their conduct on what it requires" (Maxeiner 2006b, p. 525).
Ambiguity	Ambiguity is "the state of having many ways of thinking about the same circumstance or phenomena." (Feldman, 1989, p. 5).

Table 1. Key Concepts Used in this Study

Research Methodology

To answer our research question "*How does the change from specific to ambiguous policy affect regulative legitimacy of technology?",* we conducted a qualitative interpretive case study (Walsham 1995) in the Finnish taxi industry. This case was especially revelatory, as the policy reform turned a specific taximeter regulation into an ambiguous one. Numerous different types of technologies-in-use appeared after on the Finnish taxi market. Thus, it is a highly suitable case to study how regulative legitimacy of technology was affected by this change from specific to ambiguous policy. As we outlined in the Introduction, studying how policy ambiguity affects technologies-in-use requires simultaneous attention to both. Our research design is built on this logic. We collected and analyzed data regarding both the ambiguity of the regulation (mostly through interviews), and the different technologies-in-use (through interviews and desk research) to allow us an analysis of how regulative legitimacy unfolds in such a setting.

Data Collection

Our main source of data was interviews that we conducted with key stakeholders of the Finnish taxi industry and public authorities. We also collected information on the different technologies-in-use from online sources. Between January 2018 and February 2020, we conducted 3 rounds of interviews (round 1 before the new law that de-regulated the industry became effective, rounds 2 and 3 after the law became effective). Overall, we conducted 79 interviews with a broad range of key stakeholders involved in or affected by the de-regulation of the industry[2], including both organizations (64 interviews, interview length: 21-218 min) and taxi drivers (15 interviews, interview length: 10-36 min). We had started out with a few core organizations involved in and/or affected by the legal change, and then applied snowballing technique to identify further focus organizations. Through this, we covered a very wide range of different stakeholders. The organizations interviewed included: seven Finnish dispatch organizations, two taximeter producers, the Finnish Taxi Owner-Drivers' Federation (FTOF), two international ride-sharing platform providers Uber and Bolt (former Taxify), the Ministry of Transport and Communication (MTC), the Finnish Transport Safety

[2] Abbreviations of organizations are our own abbreviations for the sake of saving space. They are not officially used by the authorities themselves.

Agency (FTSA), the Finnish Safety and Chemicals Agency (FSCA), the Finnish Taxation Office (FTO), the Finnish Competition and Consumer Authority (FCCA), app developers, and taxi drivers. We interviewed most organizations two or three times over the 2-year timespan. In the interviews, we asked about the digitalization of the Finnish taxi industry, the effects of the de-regulation of the industry, the taximeter regulation, and the effect all of those had on the organization. In addition, we interviewed several taxi drivers.

Based on the information we gained from the interviews, we collected additional information online about different technologies-in-use for ride-hailing and for calculating and/or announcing the price of the ride to the consumer (i.e., about potential "other devices"). We triangulated the information from interviews with: documents received from the organizations or found online (e.g., presentation slides); official press releases; organization websites; law proposals made by the MTC; newspaper articles concerning the taximeter and its regulation; and newspaper articles concerning the interviewed stakeholder organizations.

Data Analysis and Validation of Findings

Our ***data analysis*** was a continuous and long process. During the first round of interviews in spring 2018, we noticed that the new taximeter regulation that would become effective in July 2018 was not interpreted the same way by different stakeholders regarding the possibilities to use devices or systems other than a certified taximeter. This was where we first realized that the new regulation might be ambiguous. Consequently, in the second (autumn 2018) and third round (autumn 2019) of interviews we more specifically addressed the taximeter regulation and interpretations of the regulation to find out why different interpretations existed. Then, between November 2019 and January 2020, we conducted the data analysis for this present article specifically. In the first step of the data analysis, we read through the interview transcripts, 47 of which were specifically relevant from the perspective of the taximeter regulation. We used NVivo (version 12) and extracted all text passages in the interview transcripts that referred in some way to the certified taximeter or other technologies used as taximeter. In the second step of the analysis, we analyzed how different stakeholders interpreted the new taximeter law, and through these different interpretations we were able to identify ***two types of ambiguity*** that the law gave rise to: (1) When is the price based on the measurement of time and/or distance (see Findings sub-section regarding Ambiguity 1), and (2) What is an "other device or system" (see Findings sub-section regarding Ambiguity 2). We e also took note that the old taximeter law did not allow for different interpretations. In the third step of the analysis, we identified technologies that give some price information for a ride to the consumer, either before or after the ride, and which were in use on the Finnish taxi market under the new taximeter regulation. We classified these technologies-in-use into seven types of technologies. We see these technologies as actual, concrete interpretations of the ambiguous law. By bringing them to the market and using them, actors express that they deem these technologies to be legal, or at least they "dare" to use them in the light of the prevailing policy ambiguity and do not see them as outright illegal. In the final step, we analyzed the ***regulative legitimacy*** of these different technology types, i.e., whether and how they conform to or are problematic in the light of the new, ambiguous taximeter law. We deducted four "yes or no" questions from the interpretations of the ambiguous taximeter law (see Table 2), and then analyzed whether legal certainty or legal indeterminacy existed for each of the seven technologies-in-use depending on what the answer to one or more of these four questions would be. We found that the ambiguous law lead to a state of ***legal indeterminacy*** for some technologies (see Findings sub-section "Legal certainty and legal indeterminacy of technologies-in-use").

Validation of findings. We wanted to validate our findings regarding our interpretations of whether and how/why different technological solutions that are currently used to give some price information to the consumer, and thus might be seen as "taximeter or other device", can be problematic in the light of the taximeter law. Therefore, we wrote a report about the ambiguity in the taximeter law (Väyrynen and Lanamäki 2020). In this report, we presented our analysis regarding the different types of technologies and what kind of problems we identified for them in the light of the ambiguous law. We sent the report of our analysis to 22 of the organizations (45 interviewees) we had interviewed and asked them whether they felt the report accurately reflected the current situation regarding the taximeter law and resulting ambiguity, whether they found any flaws in our analysis, whether they could think of any additional technologies-in-use that we might have missed, and whether they have any other comments. 18 persons from 13 organizations (including the FTOF, MTC, FSCA, FTO, FCCA, two taximeter providers, and several dispatch organizations) got back to us (either by email, or in person), some pointing out terminological issues, or clarifications regarding, e.g., the functionality of the certified taximeter. One interviewee pointed out that there potentially could exist one more category of certified taximeters (i.e., taximeters whose certification has

expired), but after discussing this question with the FSCA who is responsible for taximeters as measurement devices, we concluded that those expired taximeters still qualify as certified taximeters and thus do not represent a separate technology category. Most importantly, none of those interviewees and organizations who replied disagreed with our analysis or pointed out any flaws. The only change to the technology classifications between our report and this research paper is that in the present study we distinguish seven types of technologies-in-use (compared to six in the report). Due to our focus on regulative legitimacy, we here lifted Technology 7 as a separate category. In our report, it had been presented as one form of Technology 5, but because Technology 7 clearly is legal whereas Technology 5 could also be argued to be problematic in the light of the law ambiguity, for clarity purposes we present them here as separate technology categories.

Findings

First, we describe the previous unambiguous and present ambiguous taximeter law. Then, we describe the two types of ambiguity we identified in the new taximeter law based on our analysis of interviews and supporting data. Finally, we provide our analysis of the legal state of the technologies-in-use.

Taximeter Regulation

Legal certainty under the previous specific and unambiguous taximeter regulation

Until June 2018, the Finnish taximeter regulation stated that all taxi cars had to use a certified taximeter, and no other cars could use a certified taximeter. The certified taximeter is one that corresponds to the EU measurement directive[3], fulfills the technical requirements set by that directive, and has been approved by a notified body. The directive sets clear requirements for certified taximeters. The maximum permissible errors for measurement of the time elapsed is ± 0,1 % and for the distance travelled ± 0,2 %. The directive requires a certified taximeter to possess electromagnetic immunity and sets certain data protection requirements (e.g., it has to have an indestructible memory). In addition, a certified taximeter has to be fixed-installed in the car to qualify as certified taximeter. As certified taximeters have to undergo a strict testing process by this "notified body", i.e. an independent agency, to confirm whether or not the tested and evaluated technology fulfill the requirements set for a certified taximeter, there was no lack of clarity about whether a certain taximeter technology was legal to use as taximeter. If it was a certified taximeter it was legal, otherwise it was illegal. The specific, unambiguous regulation, which was valid until June 30th 2018, had an inherent regulative legitimacy that clearly determined the certified taximeter to be the *only* legitimate technology-in-use, and thus legal certainty existed for the technology-in-use.

The new and ambiguous taximeter regulation

The Sipilä Cabinet of Finland took office in May 2015 and introduced "Digitalization, Experimentation and Deregulation" as a focus area in its government program.[4] Within the transportation sector, the Finnish taxi industry was specifically targeted for the deregulation. In international comparison, the industry was relatively strictly regulated. Within this deregulatory reform, the Act on Transport Services, also the taximeter law was to be changed. In April 2017, the parliament accepted the opening of the taxi industry for competition, and with it, a new taximeter law to become effective on July 1st, 2018. The new law read:

"*If the price of the journey is based on measuring the distance or time, a vehicle used for transport requiring a licence shall have a taximeter[5], or some other device or system with which a similar level of measurement accuracy and standard of data protection can be achieved shall be used to determine the price.*"[6]

With this reformulated taximeter law, the legislators wanted to spur new innovations by allowing the use of technologies other than the certified taximeter for defining the price of a taxi ride. More specifically,

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014L0032&from=EN

[4] https://valtioneuvosto.fi/en/sipila/government-programme (Accessed 21 April 2020)

[5] In the law formulation, the term "taximeter" refers to a certified taximeter.

[6] This English translation was used by the Finnish Ministry of Transportation and Communications in an inquiry to the EU Commission in April 2020 (see p. 2): https://api.hankeikkuna.fi/asiakirjat/c4077dd3-865e-4b76-af24-5f945361ef18/9347bd74-c83d-476d-913e-dfb66259bea8/KIRJE_20200611064812.PDF (Accessed 12 August 2020)

many of the interviewees suspected that the law was specifically targeted at providing regulative legitimacy for Uber's operations in Finland without the need to use a certified taximeter. A representative of a taxi dispatch company commented: "*Now the ministry has to correct the formulation of the law. They attempted to legitimate Uber (on the market), that no certified taximeter would be needed. But the formulation of the law went awry*." However, as it turned out, the way the law was formulated was ambiguous, giving rise to several different interpretations as to what technology would be legal or not. The new law caused a situation of legal indeterminacy for some technologies-in-use, as we will describe below.

Ambiguity 1 – When is the Price Based on Measurement of Time and Distance?

The first ambiguity arising from the new, ambiguous taximeter policy formulation concerned the question of when the price is based on measurement of time and distance. All interviewees agree that according to the new law, no taximeter or other device is needed if the ride is a fixed-priced ride, where a binding price is agreed on before the ride, because the price of the ride then clearly is not dependent on the measurement of the actual amount of time or distance driven. The price will not change for reasons that are out of the control of the passenger, e.g., if the passenger changes the destination of the ride or wants to make additional stops, then these changes are in the control of the customer and thus can affect the price. However, the first ambiguity concerns the question *when* the price of a taxi ride is based on the measurement of time and distance, or in other words, when a certified taximeter or "other device" is required. This first ambiguity arises from the "if" condition in the law text that states, "if the price of a journey is based on the measurement of time and distance, then…". We identified this ambiguity specifically through the struggle between the FTOF and the FTSA over the interpretation of this part of the law. In spring 2018, FTSA, who had been given authority by the MTC to specify in more detail what an "other device" is, provided different interpretations about when a taximeter or other device is required: (1) *"If the customer is told the maximum price of the ride beforehand, then a taximeter is not required"* (March 2018); (2) *"If the customer is told a binding price range beforehand, then a taximeter is not required"* (April 2018); (3) *"The approach of FTSA is to comply with the vehicle law and interpret that an optional other device or system apart from a taximeter is possible. Certain options thus are the use of a taximeter that corresponds to the EU measurement directive, or the basing of the price on something else than measuring time and distance"* (April 2018); (4) *"If the measurement of the trip is based on time or distance, there has to be a taximeter that corresponds to the measurement directive in the car. If the customer is given a fixed price before the ride, then there does not need to be a taximeter or not necessarily any other device either."* (FTSA newsletter, May 2018). With "taximeter" the FTSA referred to a "certified taximeter". Thus, the FTSA first put forward the idea that giving a maximum price or price-range corresponds to a fixed-priced ride.

The FTOF challenged the FTSA's initial interpretation of the law that would free the service provider from the requirement to use a certified taximeter or other device in case a maximum price or price range is given: "*In our view it is completely clear that a taximeter or other device always has to be in a vehicle that is used for licensed passenger transport, when the price of the ride is based on measurement of time or distance. […] In our view, giving a binding price range beforehand does not free one from the taximeter requirement*.". According to the FTOF, when a maximum price or price range is given beforehand and the actual price is defined only at the end of the ride, it indicates that a measurement of time or distance takes place when determining the price, and this in turn requires the use of a certified taximeter or other device according to the new taximeter regulation. In May 2018, the FTOF filed a complaint with the Attorney General regarding the FTSA's interpretation of the law, arguing that the FTSA had overstepped their authority when providing these interpretations. In September 2018 the Attorney General responded to the complaint that the FTSA had not overstepped their authority when making these interpretations. The Attorney General's response was interpreted by the FTOF to mean that a certified taximeter is required when the price is determined based on a measurement of time and distance, and this interpretation was taken up by several other actors, as we will describe in connection to Ambiguity 2.

Ambiguity 2: What is an "Other Device or System"?

The second ambiguity arising from the ambiguous taximeter law concerns the question of what qualifies as an "other device". FTSA was issued the authority to define in more detail what an "other device or system" would be, but FTSA did not provide any specifications for the other system or device. One reason for this is

that the current Finnish taximeter regulation was suspected to be in contradiction with the EU measurement directive. If a country decides to apply the EU measurement directive for taximeters, then the country is not allowed to make any own specifications for devices that fulfill the same measurement task as the certified taximeter. The measurement task of the certified taximeter is to determine the price of a ride based on the measurement of time and/or distance. Thus, if the measurement task of the other device or system also is to determine the price based on the measurement of time and/or distance, it fulfills the same measurement task as a certified taximeter, and thus it is not possible to give more detailed specifications. As one representative of the MTC expressed: "*There is not really any official office who to ask about it.* FTSA *interprets the law in such a way that they cannot give any parallel specifications [for the other device or system] because the measurement directive in principle prevents it. So now we are in kind of a stalemate regarding this, as no one really has the authority to say what it means".*

More specifically, the ambiguity concerns what it means for a device to have a "similar level of measurement accuracy and data protection standard" to what a certified taximeter has. As a result of the lacking specification for what another device or system is, and what its measurement accuracy and data protection should be, there now are numerous different technologies-in-use as "taximeters" in the Finnish taxi service industry. In the strictest interpretation, only a certified taximeter can be an "other device or system". This is the interpretation that most official authorities took. For example, the FCCA said: "*At the moment we have such a law that if the measurement of time and distance is the basis for pricing, then a taximeter that fulfills the measurement directive has to be used.*" Similarly, one taxi organization expressed; "*If it says taximeter or other device, then it means specifically a device as defined by FSCA and the EU measurement directive.*" A taximeter producer said: "*Well I was very happy with the [law] text, because other device means that one has to proof that is has been [certified] in the same way, so with a notified body. […]*"

On the other hand, several actors interpreted the law differently, for example ride sharing platform providers. Bolt, e.g., commented: "*In my understanding, at least based on what also was expressed by the Ministry in some statement they had published, their goal, or the goal of the Act on Transport Services in general was to enable the market entry of those new payment types, new types of ride hailing. So, I am in the understanding that they specifically want to allow such mobile-based devices […]*".

Most importantly, by bringing to the market and using different types of technologies and solutions for calculating/giving the price to the customer, these actors indirectly expressed that they interpret these technologies to be legal.

To summarize, the new taximeter regulation with its ambiguities, and the interpretations put forward by different actors together with the technologies-in-use, gave rise to four questions (see Table 2). Regulative legitimacy of a certain technology-in-use is dependent on what the answer (yes or no) to one or more of these four questions would be. We refer to these questions and possible answers with their identifier (e.g., [Q1-Y]) in the next section. Next, we present the technologies-in-use and our analysis of whether and why some of these technologies face the situation of legal indeterminacy under the current taximeter regulation.

Q1	Is the ride fixed-priced where the price is not dependent on the measurement of time and distance **[Q1-Y]** (thus neither requiring a certified taximeter nor another device) or not [**Q1-N**] (thus requiring a certified taximeter or other device)? (Ambiguity 1)
Q2	Does a maximum price, price range or price estimate correspond to a fixed-priced ride (thus neither requiring a certified taximeter nor another device) [**Q2-Y**] or not (thus requiring a certified taximeter or other device) [**Q2-N**]? (Q2 rises from Ambiguity 1)
Q3	Does the new taximeter regulation even allow the use of any other technology apart from the certified taximeter to determine the price of a ride based on measurement of time and distance [**Q3-Y**], or not [**Q3-N**]? (Q2 rises from Ambiguity 2)
Q4	If other technology than the certified taximeter is allowed to be used to determine the price of a ride based on measurement of time and distance, does it possess a similar level of measurement accuracy and data protection standard [**Q4-Y**] or not [**Q4-N**]? (Q3 rises from Ambiguity 2)

Table 2. Questions arising from the two types of ambiguity

Legal certainty and legal indeterminacy of technologies-in-use

We identified seven different types of technologies that are currently used by providers of taxi services and ride-hailing services. For each technology type we identified whether and how the question of regulative legitimacy is problematic in the light of the possible answers to the four questions (see Table 2) that the ambiguous regulation gave rise to.

Technology 1: Certified taximeter

The certified taximeter – i.e., a taximeter that is fixed installed in the car and is type-certified according to the EU Measurement-directive 2014/32/EU – is still used widely in taxi cars, especially in cars that are being dispatched by one of the traditional Finnish dispatch organizations. There is no ambiguity related to this technology, and ***legal certainty*** in the light of the old and new regulation exists for Technology 1.

Technology 2: Uncertified taximeter that is fixed installed in the car, but for which EU Measurement-directive type-certification is in progress

One Finnish producer of certified taximeters sold their new taximeter model which was still in the process of being type-certified starting from July 2018. Before the change of the law, a taximeter that had not yet been type-certified could not have been sold: "*When the law changed so that the certification is not any more needed, we dared to offer it on the market sort of unfinished in the sense that we did not have to acquire the official certificate first.*" (A taximeter producer) This model has been sold on the market for almost 1.5 years in an "uncertified" state. This technology comes closest to the certified taximeter and has been type-certified in December 2019. It has been used by several non-traditional dispatch organizations as well as individual drivers whose rides are not dispatched by a dispatch organization.

It would be arguable that this technology had a similar (and most likely equal) level of measurement accuracy and data protection standard as a type-certified taximeter [Q4-Y], and it can attain regulative legitimacy in this perspective (but maybe only in hindsight). However, in the light of the possible interpretation that *only* a certified taximeter can be an "other device or system" [Q3-N], this technology could also be interpreted to face the situation of ***legal indeterminacy***.

Technology 3: Uncertified physical taximeter that is not fixed installed in the car

This type of technology is used by some of the independent drivers that do not belong to any dispatch organizations and that mainly take on customers from taxi stands or when being hailed down on the street. Such taximeters can be ordered, e.g., from Alibaba and eBay for about $70.

In the light of Ambiguity 2, this type of technology is problematic because there is no way to know whether they measure accurately the distance, and there is no standard of data protection that could be comparable to that required from a traditional taxi meter (e.g., indestructible memory) [Q4-N]. From the perspective of achieving regulative legitimacy, the fact that no clear regulatory specifications for the measurement accuracy and data protection standard have been given by the government or other regulative authorities against which the technology can be evaluated makes it also more difficult to "disqualify" the technology from being legal. Thus Technology 3 faces the situation of ***legal indeterminacy***.

Technology 4: "Taximeter" app downloaded from some app-store

Several independent taxi drivers whose rides are not dispatched from any dispatch organization use some taximeter app they downloaded from an app store. These apps are installed on the driver's phone, and the price of the ride is calculated based on a measurement of time and distance (e.g., via a GPS signal). Many of these apps can be integrated with other software, such as, for example, apps for secure payments including credit cards (e.g., Square Point of Sale) and PayPal. Some offer trip logs for drivers' personal bookkeeping and/or provide services where all trips are stored in the cloud.

These apps are especially problematic from Ambiguity 2 perspective. As they are designed to define a price based on the time and distance measured, they are used as "other devices". The problem in the light of the taximeter law is that it is unclear what the measurement accuracy of these devices is, and that they do not have a similar standard of data protection as a certified taximeter [Q4-N]. While the MTC argued that GPS measurement can be as accurate or even more accurate than measurement by a certified taximeter, a taximeter producer argued that GPS had been found to not provide sufficiently accurate measurement of distance to be qualified for use in a certified taximeter. Thus, Technology 4 faces ***legal indeterminacy***.

Technology 5: Internet-based ride dispatch platform where some price is given before the ride, but where the price can change

This type of technology refers to ride-hailing apps where there may be a difference between the price information given before the ride and the final price the customer actually pays. The price is not calculated by a certified taximeter. This type was represented in the Finnish market by platform providers such as Uber, Bolt and Yango. One of the goals of the new taximeter law was to enable providers of this type to compete in the Finnish taxi market.

Uber entered the Finnish market in July 2018 and announced the price of their ride to the customer in form of a price-range until November 2019. Starting from November 11th, 2019, it announced the price in form of a price-estimate. However, the final price of the ride could be higher (or lower) than the given price range or price estimate, e.g., if the car got stuck in a traffic jam and the actual time required for the ride was much longer than initially estimated. The discussion undertaken in the context of Ambiguity 1 – when is a taximeter or "other device" required – is relevant here. The discussion between, e.g., FTSA and FTOF revolved around the question whether a taximeter or "other device" is needed if a price range or maximum price is given to the customer beforehand. As an FTOF representative [representing the combination of Q2-N and Q3-N] said in one of our interviews: "*So they do not give the price, they give a price-estimate, in which case they would have to have a [certified taximeter in the car, but they don't, and no one is requiring them to [have one].*" Uber itself has positioned itself as an "other device". In one of their statements regarding an intended change of the taximeter law, Uber pointed out that their app "*is not a taximeter*", but that it anyway allows "*an exact and accurate measurement of time and distance*". (Uber statement on law proposal)

During its time of operation in the Finnish market between October 2018 and January 2020, Bolt provided its customers with a "fixed" price for the ride. However, as with Uber, the final price could actually be higher if the ride took longer than the estimation of time and distance that the beforehand given price was based on. Bolt, in one of the interviews we conducted with them, anyway stated that they are not a taximeter, but also not an "other device", as they provide the customer with the price before the ride. Thus, they argued to be a service that offers a fixed-priced ride, and in this interpretation, Questions 3 and 4 would not apply.

Yango – the localized brand name for the Russian Yandex.taxi – entered the Finnish market in November 2018. On their website they stated that "Prices shown are estimates. Actual price depends on time and traffic conditions". They present a pricing list that specifies how much each minute/km of the ride adds to the ride price. Thus, as the price shown is an estimate, and the actual price depends on a measurement of time, it can be seen to represent an "other system".

In the light of the prevailing taximeter law, regulative legitimacy can be argued to exist or not to exist – depending on how Questions 1-4 would be answered. Bolt can justify its regulative legitimacy by arguing it offers a "fixed priced ride" [Q1-Y], which would mean it would not require a similar level of measurement accuracy and data protection standard as a certified taximeter. However, this is contradicted by the fact that the final price might change based on the actual time and/or distance required for the ride [indicating Q1-N]. Yango and Uber, on the other hand, use Ambiguity 2 to justify their regulative legitimacy, indicating they see themselves to represent "other devices". However, they could be seen to be problematic in the light of the interpretation of the law that argues that only a certified taximeter is an allowed technology [Q3-N], but also when it comes to being able to "proof" that their measurement accuracy and standard of data protection is similar to a certified taximeter (Question 4), as – apart from the EU measurement directive - no specifications were provided by the FTSA against which this regulative legitimacy could be established. Thus, Technology 5 faces the situation of ***legal indeterminacy***.

Technology 6: Internet-based ride dispatch platform which gives a fixed price before the ride

Several traditional and non-traditional dispatch organizations offer their customers the possibility to order fixed-priced rides via a ride-hailing app. In contrast to Technology 5, the price given before the ride is fixed and will not change if the starting point and end point of the journey does not change, and this is strongly emphasized when advertising these apps. For example, one organization states on their website: "*By ordering the taxi with the app you always get a fixed price for your ride beforehand – whether there is a traffic jam along the way or not*." Another organization states: "*The app offers the customer the possibility to order the ride with a beforehand ensured price upon ordering the ride. The fixed price differs for example depending on the time of day and date, so it takes already into consideration, for example, peak times and seasons. In this way the customer knows the price of the trip already before jumping into the taxi, and no*

price surprises can arise." Thus, this technology type "counters" the operation model of international platform providers where the final price might be higher than the price estimate or range given by the app.

What is especially interesting about this type of technology in the context of the prevailing taximeter law is that the question of whether such an app has a corresponding level of measurement accuracy and data protection standard, i.e., whether it qualifies as an "other device", is irrelevant. As the price is fixed and not based on a real-time measurement of distance or time, this type of technology falls into the category of "not requiring any taximeter or other device" [Q1-Y]. Thus, ***legal certainty*** exists for this type of technology - it gains regulative legitimacy through the law text that is unambiguous regarding fixed-priced rides that are in no way dependent on measurement of time or distance.

Technology 7: Ride-hailing app where price is determined with certified taximeter

Several traditional taxi dispatch organizations provide their customers with the possibility to order a ride via an app, where the app gives a price estimate for the ride based on start and end address of the ride. The actual price, however, is then calculated with a certified taximeter. Thus, ***legal certainty*** exists for this type of technology as the measurement of time and distance happens via the certified taximeter.

In summary, under the new regulation, legal certainty can only be argued to exist for Technology 1, 6 and 7 can be argued to be legal, whereas Technology 2-5 face the situation of legal indeterminacy.

Discussion

In this study, we asked the question "How does the change from specific to ambiguous policy affect regulative legitimacy of technology?" We have studied this by investigating the ambiguous policy simultaneously with the technologies-in-use.

Empirical studies on policy are much needed in the IS community. The research community shares the social agreement that Information Systems research should be better attuned with policy concerns (Clemons and Wilson 2018; King and Kraemer 2019). With this study, we contribute to the IS institutions and legitimacy research stream in three ways. Our first contribution, in answer to our research question, is to demonstrate how the transition from specific to enabling regulation shifts the locus of regulative legitimacy from an inherent property of legal formulation to a more relational, performative and contested form. This puts forward the proposition that when a technology law is ambiguous, regulative legitimacy of technology takes the form of a process (see Suddaby et al. 2017). This results in a methodological implication that the study of regulative legitimacy in such settings, for example in neoliberal reforms, requires simultaneous attention to the ambiguities of the regulation vis-à-vis the emerging technologies-in-use. Second, our study contributes to research on adoption and use of (digital) technologies by providing a conceptualization of the connection between ICT policy and regulative legitimacy, both of which have been found to affect policy adoption and use in previous research. Third, we propose policy type (specific vs. ambiguous) and legal state of the technology as key dimensions when studying regulative legitimacy of technology in the context of ICT policy reforms.

From Regulative Legitimacy as Inherent Property to Process

Our study presented a transition from specific to ambiguous regulation. The study was conducted in the context of Finland's 2018 Act on Transport Services (see also Lanamäki et al. 2019; Lanamäki et al. forthcoming; Väyrynen 2020). When technology is explicitly and specifically regulated by a policy and thus the law mandates what is allowed or required and what is prohibited and thus illegal, then such policy strongly determines the technologies-in-use. Legal certainty facilitates law-abiding: "people can know what the law is and can orient their conduct on what it requires" (Maxeiner 2006b, p. 525).

Legitimacy literature includes different perspectives on what legitimacy is, one of them seeing legitimacy as a property that is "possessed in measurable quantity by some legitimacy object in relation to others" (Suddaby et al. 2017, p. 453). In the light of technology regulation, the legitimacy object usually is some technology or family of technologies, for example medical devices (Altenstetter 2003) or nuclear energy (Benz 2012). In our case, the technology was the certified taximeter and technologies to be used instead of or in combination with a certified taximeter. Based on our empirical data, we argue that from a regulative

legitimacy point of view, legitimacy is inherent in a specific, unambiguous policy. The policy offers a sufficient foundation to assess the regulative legitimacy of any technology-in-use. In our empirical case study, the previous Finnish taximeter regulation was specific and determined clearly that *only* certified taximeters that were fixed-installed in the car were legal, and that no other technologies were allowed for determining the price of a taxi ride based on measurement of time, distance or any other criteria. Thus, only the certified taximeter possessed regulative legitimacy (see Kaganer et al. 2010), and legal certainty existed for all "taximeter technologies" (i.e., all technologies except the certified taximeter were illegal). More generally, based on our empirical study, we argue that when a law provides legal certainty, technologies-in-use can possess regulative legitimacy as a property (see the left-hand box in Figure 1) – a technology either is legal, or it is not in the light of the valid regulation. The previous taximeter regulation did not allow actors to put forward different interpretations as to which technologies are legal or illegal.

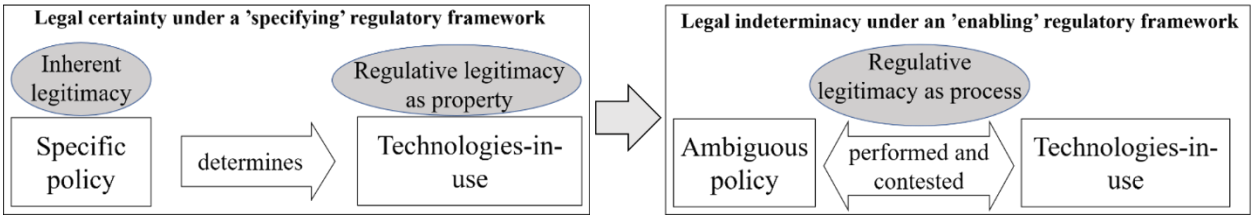

Figure 1. Regulative Legitimacy in the Context of Legal Certainty vs. Legal Indeterminacy

However, when policy that regulates the technologies-in-use is ambiguous, and especially when means ambiguity leaves open the exact ways and exact technologies allowed in the implementation of the policy (Matland 1995, Ravishankar 2013), it is not anymore self-evident for each technology-in-use whether it holds regulative legitimacy. In our study, for some of the technologies-in-use legal indeterminacy (Kress 1989) resulted from the legal reform that turned a previously specific policy into an ambiguous policy. In the light of the two types of ambiguity in the regulation, and the possible answers to the four questions we identified, regulative legitimacy was not any more a property that each technology-in-use either possessed or not. Instead, it turned to an interactive process of social construction (Suddaby et al. 2017) where different actors put forth their own interpretation of why – in the light of the identified ambiguity and the questions the ambiguity gave rise to – a certain technology or characteristic of how the price is announced would be legal or not. Previous studies have addressed the struggles and contexts over different interpretations of policy (Bernardi et al. 2017; Dewulf 2013), such as we also have observed in our case study. However, the struggles in our case were enabled only by the ambiguity in the new regulation. The previous taximeter regulation was so specific and clear that it simply did not allow for any differences in interpretation. Thus, leaning on Suddaby et al.'s (2017) distinction between (regulative) legitimacy as property vs. process vs. perception, we argue that in the context of ambiguous policy, regulative legitimacy takes the form of a process (see the right-hand box in Figure 1) rather than that of a property. This does not necessarily mean that *all* technologies-in-use face the situation of legal indeterminacy, but that the policy ambiguity does not any more provide legal certainty for all technologies-in-use. One specifically interesting example of this in our case was when different actors justified in different ways how the same type of technology had regulative legitimacy by making use of different types of ambiguity in their argumentation. While Uber positioned itself as an "other device" that accurately measures time and distance, Bolt positioned itself to be "neither taximeter nor other device", but instead a fixed-priced ride for which the technology does not have to fulfill any specific requirements regarding measurement accuracy or data protection standard. In our findings we demonstrated several more examples of technologies-in-use that were subject to legal indeterminacy under the new, ambiguous taximeter regulation.

In the study we presented here, different actors performed and contested regulative legitimacy of different technological solutions in the light of the new taximeter law, some opposing and others supporting the change that would allow the use of other devices than the certified taximeter. This is signifying for the approach of seeing legitimacy as a process (Suddaby et al. 2017). Suddaby and colleagues (2017) pointed out that many studies that take the process view of legitimacy – while providing valuable rich descriptions of the institutional context – remain short on the role that these contextual factors play. With the present research we contribute to this stream of research by addressing this shortcoming: we specifically focused on exploring the role of the contextual factor of ambiguous technology regulation. We illustrated how in a

policy reform that changed technology-regulating policy from being specific and unambiguous into being ambiguous, regulative legitimacy turned from being a property into taking the form of a process.

Towards identifying Key Dimensions for Studying Regulative Legitimacy of Technology in a Policy Reform

In this section, we build on the conceptual basis we developed in the theoretical background and on the findings from our empirical case study and conceptually extend these. We wish to provide a basis for future studies that are interested in exploring institutional, regulative legitimacy of technology (but possibly also for other legitimacy objects) in the context of legal reforms. We argue that the study of (regulative) legitimacy emerging from legal reforms requires attention to both the regulation (or policy) vis-à-vis the emerging technologies-in-use and their legal state. When studying regulative legitimacy, it is important to determine whether one looks at legitimacy in the light of specific regulation/policy or ambiguous regulation/policy. Figure 2 illustrates a 2x2 matrix with policy type (specific or ambiguous) and legal state of technology (legal certainty vs. legal indeterminacy) as its dimensions. Four different types based on the "combinations" of these dimensions are possible. We denote these types as A, B, C and D. Figure 2 gives an example of policy for each type. In a legal reform, the type might remain unchanged, but it also might change.

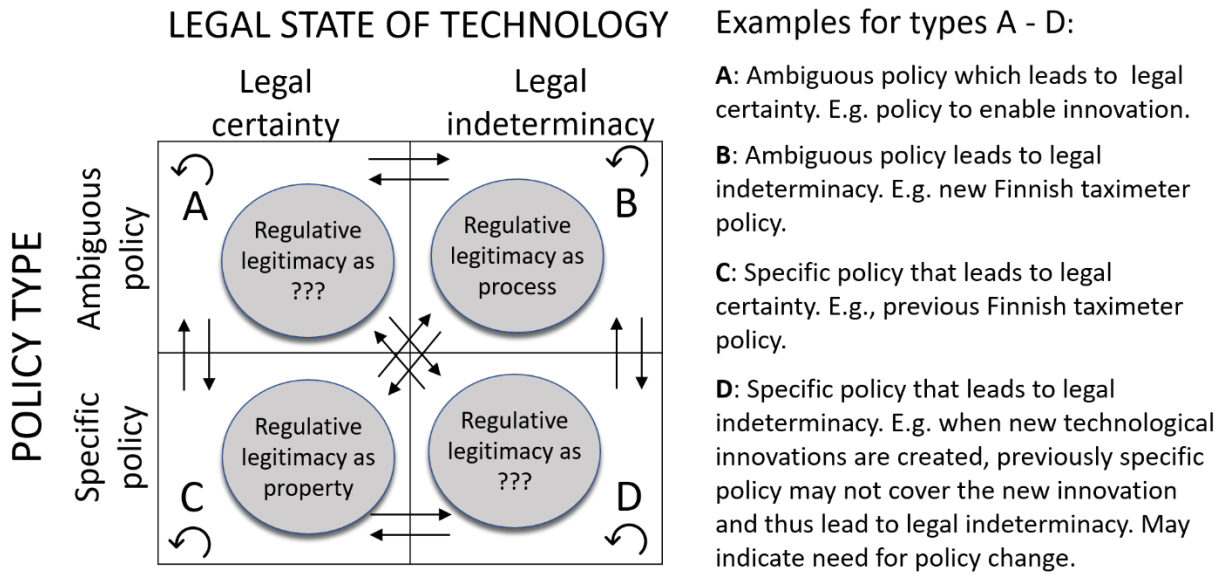

Figure 2. Key Dimensions and Resulting Combinations When Studying Legitimacy of Technology in the Context of Policy Reform

Our case study captured the transition from a specific policy with legal certainty for the technology-in-use (C in the Figure 2) to an ambiguous policy resulting in legal indeterminacy for many of the technologies-in-use (B in Figure 2). When studying legitimacy emerging from legal reforms, it is beneficial to establish what type of reform one is looking at. Does the legal reform represent a change from specific to ambiguous policy (C->A, C->B, D->A, D->B), ambiguous to ambiguous policy (A->B, B->A), ambiguous to specific policy (A->C, A->D, B->C, B->D), or specific to specific policy (C->D, D->C)? And how does the policy change affect the legal state of technologies-in-use? Does the legal state of all technologies-in-use change, or just a subset of them? For some research, the answer to these questions might affect the choice of legitimacy lens. Our 2x2 matrix can serve as a basis to systematically studying which differences arise between different types of policy changes regarding the regulative legitimacy of the technology-in-use. What are the mechanisms for gaining regulative legitimacy, for example, when moving from an ambiguous policy with legal certainty to a specific policy with legal certainty (A->C)? Some ride-sharing organizations such as Uber are known for "not waiting for the legitimacy that comes from changes in law" (Witt et al. 2015, p. 3). This may require changes to a specific policy that resulted in legal indeterminacy (e.g., because new innovations such as Uber were adopted on the market that do not fit into the existing policy frame) into a policy that results in legal

certainty (D->C or D->A). Another question to address in future research concerns where regulative legitimacy is foremost located in different combinations of policy type and legal situation of the technology.

Our findings are also relevant for studies regarding the adoption and use of digital technologies. As we outlined in the introduction, both ICT policy (e.g., Eaton et al. 2018; Bernardi et al. 2017) and ICT legitimacy (e.g., Krell et al. 2016; Winter et al. 2009) affect implementation and adoption of IT. With our study, we provide a conceptualization of the connection between ICT policy and legitimacy by emphasizing the role of regulative legitimacy. Our study demonstrates the large impact that policy ambiguity has on the adoption of different technologies on the market, arguably leading to unintended consequences in form of unwanted or unanticipated technologies. Policy ambiguity can represent a "loophole" (e.g., McGoey and Jackson 2009; Picciotto 2015) which can be used to adopt technology that was unintended by the policy makers on the market. We assume, for example, that the policy makers intended to allow Technology 3 and 4 to be used for determining the price of a taxi ride. For those interested in studying technology adoption and use in the context of ICT policy and regulative legitimacy, our study provides a strong foundation.

Conclusion

Against the backdrop of technology adoption and use being affected by ICT policy and ICT legitimacy, in the present study we explored how policy ambiguity affects regulative legitimacy of technology. With our empirical, qualitative case study on the change of the Finnish taximeter regulation that resulted in the adoption of an abundance of different technologies on the Finnish taxi market, we theoretically contribute especially to the IS institutions and legitimacy research stream. We propose that under ambiguous technology law, legitimacy of policy is not any more an inherent property of the legal formulation, but instead takes the form of a process (see Suddaby et al. 2017). The methodological implication of this is that when studying legitimacy in such settings, e.g., neoliberal reforms, attention must be put simultaneously to the ambiguity of the regulation and the technologies that consequently emerge into use. In addition, we propose a 2x2 matrix with the two dimensions of policy type (specific policy vs. ambiguous policy) and the legal state of technology (legal certainty vs. legal indeterminacy) that can be used to identify what type of legal change one is looking at and what the implications of the change may be. Our research also has **practical implications**. For policy makers, our study illustrates the possible unintended consequences of ambiguous policy making when legal reform is driven by the free market ethos. When making unspecific ICT related policy making to allow new innovations to be adopted, a thorough a-priori analysis of possible interpretations of the law might be advisable. As all research, also ours has **limitations**. Conducted in a very specific setting in one country, we recognize that the findings of our study might not be replicable in other contexts. Also, the present study neither focused on analyzing in detail the different factors that led to the ambiguity in the policy, nor why exactly those technologies that we identified as technologies-in-use were adopted on the market. In addition, we focused specifically on regulative legitimacy but did not consider other types of institutional legitimacy such as cognitive, pragmatic, and normative legitimacy (see Kaganer et al. 2010). These limitations also open **directions for future research**. In order to get a more nuanced understanding of why certain technologies are adopted under ambiguous policy, it would be necessary to study also the processes that take place between the point in time when a policy is decided and when it is actually becoming effective. When and how do these different technologies-in-use emerge? As outlined already in the discussion, future research could take our 2x2 matrix as basis for a systematic study of the differences that may arise between different types of policy changes regarding the regulative legitimacy of the technology-in-use.

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