

Enacting EdTech Uncertainties

How uncertainties give rise to actions that shape the EdTech market

Abstract

The purpose of this paper is to study what uncertainties there are in the complex Swedish EdTech market for instructional tools, what supplier actions they give rise to, and how these actions shape the market. To find this out, a qualitative abductive study was conducted, where the primary data source was semi-structured interviews with eight EdTech suppliers of instructional tools. We find that the market consists of high uncertainties that give rise to direct, indirect, and avoidance actions from suppliers. These actions then contribute to suppliers shaping the market in five different ways. First, suppliers engage in *norm-creation* by influencing other actors' behaviors based on successful direct actions. Second, suppliers engage in direct actions that shape the market, *one customer at a time*. Third, suppliers shape the market (consciously or not) by *working with partners* that are often incumbents with potential incentives to performatively shape market practices. Fourth, suppliers shape the market through indirect actions by *supporting the trade organization* that educates and legitimizes the market. Lastly, suppliers shape the market by *attempting to avoid uncertainties*, which in turn opens up the scope for how the market is perceived. Many of these practices reduce uncertainties in the market, but also have the potential of increasing them through the interrelatedness of different market practices.

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Keywords: Uncertainties;
Market shaping;
Market practices

Acknowledgements

First of all, we would like to give a special thanks to our supervisor, Per Andersson, for his exceptional support, thought-provoking comments, and endless enthusiasm. We would also like to thank all participants for clearing spaces in their schedules to speak with us, especially given that these have been hectic times.

Definitions

EdTech	EdTech is short for “educational technology” and refers to technical products that solve educational problem (in the context of this study, often digitally)
Instructional Tools	Tools that are used for instructional purposes or for facilitating learning. Everything classified as “undervisning” on Edtechkartan.se is included here
Buyer	A buyer is the department or person in charge of procuring solutions. In this thesis, the buyer is often the people in charge at a municipality or school
User	A user of a product. In this thesis, this usually refers to teachers as users of products
Customer	Umbrella term for all stakeholders on the buying side. In this thesis, this refers to buyers, users, ICT pedagogues, and other stakeholders
Suppliers	Suppliers of EdTech solutions. In this thesis, mostly used to refer to EdTech suppliers of instructional tools
K12	Including every school year from when kids starts preschool to upper secondary school

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1. Introduction

Sweden is one of the world leaders in terms of digitalization (OECD, 2018), but not all aspects of society have evolved at the same pace. One of the markets that is still in its early phase of digitization is the education sector (Carlberg, Hylén, & Jeppesen, 2017). It was not until 2017 that the public sector developed a national digitalization strategy for the education sector (Utbildningsdepartementet, 2017) and the Swedish market for digital products within education appears to be in its forming stages.

This is especially interesting, because the global EdTech (short for “education technology”) market is estimated to grow to 341 billion USD by 2025 (HolonIQ, 2019) and was in 2016 recognized as one of the fastest growing markets in the world (EdTechXGlobal, 2016). This growth is not expected to slow, as EdTech is one of the markets that have become more relevant than ever as a result of the (ongoing, at the time of writing) COVID-19 crisis.

In Sweden, the EdTech market is extra interesting because it is currently in its forming stages. The educational market for digital products saw a large increase in growth in Sweden between 2010 and 2016 (Carlberg et al., 2017), with about 50 new registered EdTech companies in contrast to about 10 during the time period 2000-2009 (excluding hardware companies). In conjunction with this increase of companies, EdTech as a concept was established in 2015 (Carlberg et al., 2017) and an industry trade organization – Swedish EdTech Industry – was created in 2017.

“There is no school that is easy to get into, there are only schools that
are less difficult to get into”

Anonymous EdTech Supplier

While the EdTech industry in Sweden is growing, its problems are growing just as rapidly. Our prestudy interviews suggest that the education sector in general is slow at adopting new solutions, making the market difficult to penetrate and disruptive innovations rare. The market is also immature and segregated on the buyer side (Carlberg et al., 2017), meaning that municipalities and schools differ in how they work, making market change a challenge. Individual schools can be approached, but then both teachers and other stakeholders need to be involved – the first of whom is often lacking in time. On top of this, schools have low budgets (on average approximately 650 SEK/pupil; Wallin, 2020), making it financially unfeasible for many EdTech suppliers to target them exclusively. Instead, EdTech suppliers may decide to sell directly to the municipality, but that presents its own problems. One of those problems is the Swedish Public Procurement law (*Lagen om offentlig upphandling, LOU*) stating that an official tendering process must be completed before the public sector initiates an exchange over approximately 600 000 SEK (Konkurrensverket, 2020; Swedish EdTech Industry, 2019-a). The resulting tendering process can be time-consuming and costly, especially for startups, or as one report describes it: a “steelbath” (Carlberg et al., 2017). Time-consuming as this official tendering process can be, the situation is made even worse by the low buyer competence that most municipalities appear to possess (Carlberg et al., 2017).

EdTech suppliers selling to schools are thus left with a difficult situation. They can either sell to individual schools with a low pay-off, or sell to municipalities and be dragged into complex buying processes where several stakeholders need to be managed (Prestudy Supplier). Surely, suppliers need to do something in order to address, reduce, or avoid these uncertainties; and, surely, what they do must impact the shape of the market somehow.

The market literature suggests that markets constitute ever-changing practices (Kjellberg & Helgesson, 2007) that both can take and retain form (Nenonen et al., 2014). Storbacka and Nenonen (2011) argue that markets can be positively changed by market actors engaging in various practices. However, these practices are not necessarily conducted to intentionally change the market (Nenonen et al., 2014). At the same time, if markets are “ongoing socio-material enactments that organize economized exchanges” (Nenonen et al., 2014, p. 271), it logically follows that exchanges, when customers and suppliers meet to consummate exchanges, is a central aspect of the EdTech market. Perhaps this is why some researchers are calling for research regarding how exchanges contribute to shaping markets (Mele, Pels, & Storbacka, 2015). In this study, we aim to fill this theoretical gap while exploring what actions suppliers take to cope with the uncertainties on the market (i.e. what suppliers do), as well as what influence these actions have on the shape of the EdTech market.

1.1. Purpose & Research Questions

The purpose of this study is to explore what role customer and supplier uncertainties and the resulting supplier actions play in the shaping of the Swedish EdTech market. Hopefully, this will give practitioners a better understanding of the current dynamics in the EdTech markets, as well as what is being done about them, while also creating a better understanding for how exchange dynamics contribute to the shaping of a market. To explore this, three research questions have been formulated:

- (1) What uncertainties exist in the EdTech market?
- (2) What actions do suppliers take to cope with these uncertainties?
- (3) What role do market uncertainties and their resulting actions play in the shaping of the EdTech market?

To answer these questions, the main point of data collection has been interviews with suppliers, where they were asked what uncertainties they perceived on the market and how they coped with them. The identified uncertainties and actions from the interviews were then combined with secondary research to explore and attempt to explain the causal flows between different market practices.

1.2. Scope

The EdTech market can be split into at least three different segments (Swedish EdTech Industry, n.d.-b): (1) instructional tools (“undervisning”); (2) managerial process solutions (“huvudmannaprocesser”); and (3) school administration solutions (“skoladministration”). There are also different segments that can be targeted within each of the three areas (Carlberg et al., 2017): (1) Direct to consumer; (2) K12 (“förskola till gymnasieskola”); (3) university (“universitet och högskola”); and (4) private and public sector.

The instructional tools segment focused on K12 stands out here, because it involves all of the complexities described in the introduction and is directly linked to how education is carried out. For this reason, the main focus of this study will be on instructional tools suppliers, especially startups, targeting the K12 segment. Narrowing it down further was judged as non-necessary, as prestudy interviews suggested that it was not needed, because suppliers within that same segment compete for the very same customers, even if their solutions differ.

2. Literature Review

This section will first give an outline of previous research regarding uncertainties and markets, before moving on to constructing a theoretical framework.

2.1. Previous Research

This section will outline previous research concerning uncertainty-related theory and markets.

2.1.1. Uncertainty Theory

There is plenty of literature regarding the uncertainties in a market. According to Slovik (2010), the uncertainty in a market economy is that the “known information set” (p. 430) could change substantially. Pfeffer and Salancik (2003) also argue that uncertainty is linked with future changes which can not be anticipated now.

2.1.1.1 Relational Uncertainties

In a market, buyers, or customers, have different uncertainties in the cooperation with sellers. Urbany, Dickson, and Wilkie (1989) argue that consumers have uncertainties about what alternative they can choose, while Horton (2019) suggests that buyers have uncertainties about seller’s capacity, meaning that they are uncertain about whether or not the sellers are able to deliver what they promised. A similar uncertainty is discussed by Dimoka, Hong, and Pavlou (2012), who state that buyers have difficulties valuing the sellers and predicting what they will do. Similarly, Pavlou, Liang, and Xue (2007) discuss the uncertainties customers have related to how sellers might default in the transaction, etc.

Suppliers are also facing multiple uncertainties in the relationship with the customers. Suppliers, as well their customers, are facing uncertainties in their relationship (Barney, 1996). They have uncertainties because they are not fully aware of each other's goal and internal resources. Sharma (1998) also distinguishes between three types of uncertainties, namely: goal uncertainty, resource uncertainty, and process uncertainty.

Furthermore, Eriksson and Sharma (2003) identify three types of uncertainties that are based on buyer-seller cooperation, uncertainties that apply to both parties in a relationship. In the study, the authors drew the conclusion that relationship uncertainty and decision making uncertainty directly and strongly influence buyer-seller cooperation, while contextual uncertainty indirectly influences buyer-seller cooperation. Furthermore, it is worth noting that the authors listed uncertainty about the environmental context as something that also affects cooperation.

2.1.1.2 Non-Relational Uncertainties

There are uncertainties that lie outside the cooperation of buyers and sellers and these uncertainties can be referred to as non-relational. Gao, Wang, Sirgy, and Bird (2002) present three non-relational factors that will affect buyers' decision-making uncertainty. First, tacitness of product attributes, which denotes the inherent difficulty of understanding the product before using it. This difficulty is not caused by lack of knowledge for the product. Second, customer knowledge, which means how familiar a customer is with the product or the service. Third, the external environment is the surrounding environment and also a type of uncertainty. Urbany et al. (1989) argue that customers have uncertainties about what product features will be available,

a view that also adds another dimension to tacitness attributes and customer knowledge of Gao et al. (2002), as well as what Pavlou et al. (2007) define as product quality uncertainty, meaning the products might not meet expectations.

External environment uncertainty (Gao et al., 2002) can also be connected to other previous research. Oosterhuis, Van der Vaart, and Molleman (2011) suggest that one source of uncertainty for suppliers is that the technology might change in the industry and that suppliers need to adapt their products to such changes. Such changes could be reflected in a larger environmental context and can be unpredictable and complex.

2.1.1.3 Supplier Behaviors in Buyer-supplier Relationships

The interaction between buyers and suppliers has a heavy impact on their relationship (Leuthesser, 1997). As our study has a focus on the actions suppliers take to cope with uncertainties, literature regarding supplier behaviors in buyer-supplier interaction is also of interest. Leuthesser and Kohli (1995) argue that realizing mutual goals is essential in the interaction of suppliers and buyers, and suggest that three different supplier behaviors can lead to buyer satisfaction. First, by understanding the customer's needs and helping the customer become more competitive. Second, by providing information in advance to changes they are going to make. Lastly, by providing sensitive information about themselves. Leuthesser (1997) suggests that on top of leading to buyer satisfaction, these behaviors can also contribute to the quality of buyer-supplier interaction.

Brennan and Turnbull (1999) argue that both parties in a relationship will make adaptations to some extent, and that such adaptive behaviors are performed to better meet the partner's needs or to develop the relationship. Their findings suggest that adaptive behaviors can increase trust and build a closer relationship. In the same vein, Wuyts (2007) argue that suppliers go beyond their duties and provide buyers with extra support, with the purpose of decreasing switching cost, increasing relationship profitability, winning competitions, etc.

2.1.1.4 Uncertainties and Tactics

"The uncertainties and abilities of buyers and sellers" (Ford, Gadde, Håkansson, & Snehota, 2003, p. 45) model adds another important aspect to uncertainty theory, involving which specific abilities sellers and buyers need to develop to lower each other's uncertainties. The model is constructed around the uncertainties and abilities from both the buyer and supplier side. The buyers' or suppliers' abilities can then be applied to influence and cope with each other's uncertainties.

According to Ford et al. (2003, p. 45), there are three buyer uncertainties. First, need uncertainty, meaning that a customer has difficulty knowing and communicating its requirements. Second, market uncertainty, meaning that buyers are uncertain about the characteristics of the market. Lastly, customers also face transaction uncertainty, denoting that they may be faced with suppliers they do not trust or that they are concerned about not receiving the functionality they ordered.

Suppliers also face three types of uncertainties (Ford et al., 2003). First, capacity uncertainties, meaning they are uncertain about the amount they can sell in the future. Second, application uncertainty, meaning that it may be difficult for a supplier to know how a product is going to be used by a customer and that this may change. Lastly, transaction uncertainty denotes that suppliers are uncertain if the buyers will actually use what they ordered and pay for it.

Furthermore, suppliers have two types of abilities (Ford et al., 2003). First, problem-solving ability denotes the ability to provide suitable offerings and to help customers' express their needs. Second, transfer ability refers to how well a supplier can deliver a solution to a customer's problems in a timely manner. Customers also have two abilities. The first one is called demand ability, referring to how well the customer can express its needs and support supplier's in building solutions. The second one is called transfer abilities, which refers to how relationally skilled the customer is.

The different uncertainties from the Ford et al. (2003) model can be linked to other research. For instance, the transactional uncertainty of both customers and suppliers is highly relational and is connected with the counterpart's future action, while customer market uncertainty and supplier capacity uncertainty are both connected to the surrounding environment of the market. The ability side in the model, on the other hand, can be further exhibited in the actions of customers and suppliers, out of which the supplier actions can be linked to the supplier behavior theory.

2.1.1.5 Conclusion

The different reviewed uncertainties complement each other and provide different perspectives. The theories of supplier behavior in buyer-supplier relationships provide guidelines for understanding supplier actions in their interaction with customers. As this study focuses on both uncertainties and supplier actions, the uncertainties and abilities model from Ford et al. (2003) will be used in the theoretical framework as it offers a good linkage between uncertainties and abilities, which can be further connected with actions.

2.1.2. Market Theory

What a market is has been under wild debate in the literature (Araujo, Kjellberg, & Spencer, 2008). Some scholars focus on markets as a result of ongoing social interactions (Granovetter, 1985; Granovetter & McGuire, 1998), arguing that markets are results of social interactions. Others claim that markets are simply knowledge structures in the minds of people that are shared by customers and suppliers (e.g. Rosa, Porac, Runser-Spanjol, & Saxon, 1999). Other scholars perceive markets as something constituted by institutions (North, 1991) and something that is shaped by stability-seeking market actors' interests (Fligstein, 1996). Yet another stream of scholars focus on how market actors can shape the market in their favor (e.g. Jaworski, Kohli, & Sahay, 2000).

2.1.2.1. Introduction to Markets as Practice

Lately, there has been another interesting set of research that suggests that markets are in fact entities that are continuously in the making (Araujo et al., 2008), rather than something static. This perspective stresses the performative nature of markets: efforts to describe markets are defining the markets themselves (Araujo, 2007). Markets are continuously enacted (Kjellberg & Olson, 2017) and there is a reflexive relationship between its structure and processes (Araujo et al., 2008), where chaos and enactment is the norm and structure is the exception (Kjellberg, Azimont, & Reid, 2015). As such, several configurations of a market exist at the same time and markets continuously take and retain form (Nenonen et al., 2014) in different contexts. Only temporarily do markets take form, for instance for different exchanges. In other words, markets constitute a set of interrelated practices that continuously interact with and shape each other (Kjellberg and Helgesson, 2007).

One of the influencers of this perspective is Callon (1998) who argues that market exchange is made possible by the act of framing (stabilizing the context and isolating the exchange). This frame then isolates the exchange and protects it from the complex disentanglements of practices of which it is surrounded (Araujo, 2007). From the frame, overflows may emerge, which are effects of the exchange that reach outside of the frame. The surrounding context of frames can be described as one where a constant stream of qualification and requalification occur (Callon, Méadel, & Rabeharisoa, 2002). Products are processes that at some points in time are stabilized to become goods, for instance for the purpose of finalizing exchanges. There are many efforts to shape these qualifications and requalifications, from actors both within and outside the market.

The markets as practice perspective puts doubt on the distinction between market-making and marketing practices (Araujo et al., 2008). Market-making practices are usually seen as actions that shape the market, while marketing practices are actions performed by actors in the market. When perceiving markets as practice, these two types of practices become one and the same, because practices constitute the continuously enacted market and only temporarily are these practices stabilized (Rinallo & Golfetto, 2006; Nenonen et al., 2014). Kjellberg et al. (2012) elegantly summarize this dynamic characteristic of markets: “markets are not, they become” (p. 220).

Within the literature, there is an ongoing discussion of how markets take and retain form. Nenonen et al., (2014) criticize the neoclassical view of markets by arguing that markets are plastic: they both take and retain form. In this sense, markets retain form during individual exchanges and for longer periods of time when different kinds of practices work together without conflict. This is what can be referred to as a market configuration.

2.1.2.2. Market Configurations

Storbacka and Nenonen (2011) suggest that actors can use four different ways to achieve a higher configurational fit within a market. Value sensing is one aspect, referring to how suppliers can sense value in the market and then performatively influence the market through that image. Previous studies of the Swedish EdTech market identified this as a source of business model transformation, but did not go in depth into its performative capability (Badhani & Mut, 2017). A

second way to achieve configurational fit is by establishing a means to measure value creation within a market. A third way to achieve configurational fit is to influence how price is set. A fourth and last way to achieve configurational fit is by market scripting (Andersson, Aspenberg, & Kjellberg, 2008), defined as consciously influencing the market configuration.

Interestingly, influencing the configurational fit in a market can be seen as a kind of market innovation. Using the markets as practice perspective, market innovation is not about “the opening up of new markets alone” (Kjellberg et al., 2015, p. 6), but is about changing how business is conducted. This involves creating and retaining networks as well as configuring the networks in certain ways to create desirable interaction. The author suggests four ways of engaging in market innovations by stabilizing and directing markets: "institutionalizing norms & rules"; "building devices and technical infrastructures; "generating, and disseminating images, models and representations", as well as "enacting practices, routines, and habits" (p. 4).

2.1.2.4. Practice Model

So far, we have described what a market is and how markets can be shaped, but we have paid little attention to what practices constitute a market. Kjellberg and Helgesson (2007) suggest that markets can be split into three practices: exchange practices, representational practices, and normalizing practices. Exchange practices refers to activities that contribute to the fulfillment of specific or groups of transactions (e.g. advertising). Representational practices refer to activities that depict the market in some sense. This could for example be the distribution of an industry report, lobbying, or even something as simple as a discussion of what the Swedish EdTech

market is. In this sense, the paper you are reading is an example of a representational practice of the EdTech market. Lastly, normalizing practices refer to activities that give rise to rules or norms, such as standards or laws (e.g. the Swedish Public Procurement Law). An activity is never purely one type of practice: what kind of practice it belongs to depends on the context in which it is enacted. The practices also interact with one another. For instance, public procurement laws (result of normalizing practices) may influence how buyers act when purchasing something (exchange practices).

Kjellberg and Olson (2017) take this a step further by arguing that markets are affected by adjacent markets. They describe how the market for joints was influenced by other markets in its formation. Four concepts influence the formation of markets: legitimacy, regulations, representation, and the enactment of markets. Legitimacy refers to making a solution; regulations to (in)formal regulations that affect how a market is run; representation about the import of a socially shared image of the market; and enactment refers to the constant enactment of markets that we have already touched upon. The authors' paper also shows how markets are influenced by adjacent markets and thus are part of a larger market system.

2.1.2.5. Conclusion

No one perspective of markets is optimal and all-comprehensive. The perspectives complement each other and the markets as practice perspective does not contradict other perspectives in all respects (e.g. it recognizes the importance of institutions for market configuration; Storbacka & Nenonen, 2011). However, for the purpose of this thesis, we will focus on the markets as practice

perspective, as that captures the complexity of markets and the effects that individual actions can have on the broader market system.

2.2. Theoretical Framework

Based on the literature review, a theoretical framework has been compiled that will serve as the lens through which this study's empirics will be analyzed. Mele et al. (2015) have argued that there is a need to further study how exchanges contribute to market making and which practices "market actors deploy to shape markets" (p. 109). This is part of the theoretical gap that we are trying to fill and is the reason that the theoretical framework will consist of an interaction model (Ford et al., 2003), consisting of supplier and customer uncertainties and abilities, that is placed in a greater market model (Kjellberg & Helgesson, 2007).

The motivation in choosing the interaction model (Ford et al., 2003) as the base to analyze the uncertainties and actions taken is that EdTech is a relatively new and immature market in Sweden, meaning that the market is facing a lot of uncertainties from both the buyer and the supplier side. Even more importantly, the model provides a tool to understand and group uncertainties and the abilities that are used to tackle the other party's uncertainties.

Uncertainties in a market are only ideas, unless enacted by someone (Akrich, Callon, Latour, & Monaghan, 2002; Kjellberg & Helgesson, 2007). As the identified uncertainties are ones that are acted out in interactions with suppliers (Ford et al., 2003), this means that they are enacted at the

level of exchanges, when suppliers and customers interact in one way or another to consummate transactions. Using the same logic, we argue that abilities to cope with customers' or suppliers' uncertainties (Ford et al., 2003) are also enacted on the exchange level.

If uncertainties are enacted in exchanges, the question is where they come from. We argue that the roots of uncertainties often come from normalizing practices and representational practices, as well as results of previous exchange practices (Kjellberg & Helgesson, 2007). Normalizing practices define how things are done and in this context consist of laws such as the Swedish Public Procurement Law or of other normalizing practices that have resulted in things such as a low digital competence for teachers. Representational practices define how the market is depicted and consist of devices such as EdTech industry reports, or the general perception that educational tools should be cheap (see headline 4: Empirics). When attempting to consummate a transaction, both of these practices are translated into uncertainties as exchange practices. These uncertainties in turn influence what actions are taken by suppliers. With this reasoning, we are left with the theoretical framework below.

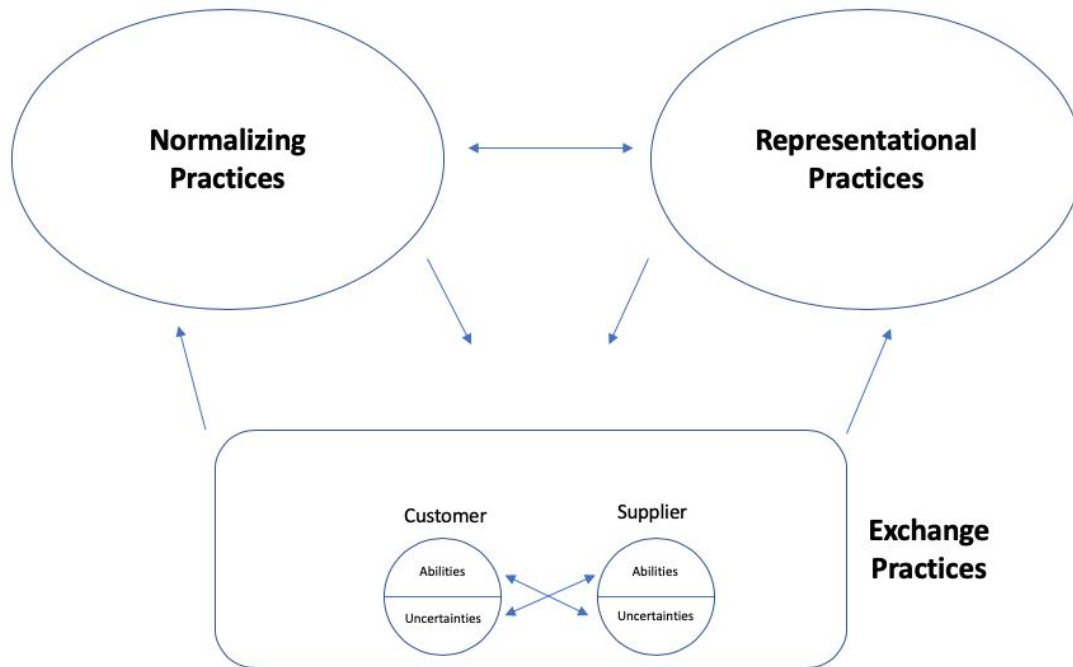


Figure 2: Theoretical Framework

Using systematic combining (Dubois & Gadde, 2002), we will later discover how this framework is expanded as theory meets reality. It should also be noted that an earlier version of this theoretical framework included the buying structure and buying organization as well, but this was later removed because those aspects were deemed to not fit the study. Furthermore, it will become apparent later that we assume that the low customer abilities in the EdTech market give scarce help for dealing with supplier uncertainties.

3. Methodology & Methods

This section will outline the research approach, the method used, the data collection, the analysis of the data, the research process, as well as considerations concerning research quality.

3.1. Research Approach

We have followed an explorative abductive research approach when conducting this study. Our aim has been to generate new theory (Dubois & Gadde, 2002) by studying the rather unexplored Swedish EdTech terrain. To allow the empirical world to shape our theory and thus let theory be derived from reality, we followed an approach called “systematic combining” (Dubois & Gadde, 2002), allowing us to jump back and forth between the literature and empirical data as we conducted the analysis. In this study, we take a practical constructivist stance (Andersson et al., 2008; Kjellberg & Helgesson, 2006), where we perceive reality as something emerging and enacted, yet something that is real and not limited to social perceptions of reality (though social constructions enact different perceptions of reality). In this sense, the ontological stance taken in this paper is relativist, while the epistemological stance is realist (Kjellberg & Helgesson, 2006). This approach is in line with previous research connected to the markets as practice perspective (see Andersson et al., 2008 or Kjellberg & Helgesson, 2006).

3.2. Research Method

This study used a case study (Bryman & Bell, 2011) of the instructional tool segment of the EdTech market, where eight EdTech suppliers were investigated, interviewing one person from each supplier. Talking to several EdTech suppliers allowed us to get several perspectives on what the uncertainties were in the market and how suppliers handled them. By talking to multiple suppliers, our findings are more likely to be representative of enacted versions of the segment of the EdTech market that we investigated.

Dubois and Gadde (2002, p. 558) argue that when analyzing “a number of interdependent variables in complex structures, the natural choice would be to go deeper into one case instead of increasing the number of cases”. We agree with that notion, but do not perceive our study to use too many cases. Indeed, eight EdTech suppliers were within the scope of the study, but they all operated in a similar context. In this sense, the context is the segment of the EdTech market that we refer to as “instructional” tools for education (based on the “Undervisning” classification description at [Edtechkartan.se](https://edtechkartan.se)). When making the supplier screening, we also ensured to not include any companies owned by publishing houses, based on a recommendation from our first supplier interview, suggesting that these would not be representative for the market. Within this market segment for instructional tools, we then interviewed eight sub-cases in the form of EdTech suppliers. The aim was to interview emerging EdTech suppliers that had either established themselves on the market or were in the process of doing so. A large majority of the

interviewed suppliers had a turnover under 10 million SEK, while all suppliers were started during the last ten years.

One argument against this approach was that we might miss the context of the particular sub-cases. This is true to some extent: it was not possible to get a “thick description” (Langley, 1999) of the sub-cases per se, but the approach allowed us to get that for the market segment under study. By using several sub-cases and only conducting one to three interviews with each for the main study, however, the possibility of making a longitudinal study was limited. This is because it was difficult to obtain “retrospective” perspectives from just a few interviews, especially seeing that it took time to build rapport (Guest, Namey, & Mitchell, 2013) during the first interview.

3.3. Data Collection

One to three interviews per EdTech supplier was conducted as part of the main study (see Appendix 1 for a list of the interviews). These interviews were semi-structured and in-depth, focusing on what the customer uncertainties were in the market and how the suppliers dealt with these uncertainties (see Appendix 2 for the interview guide). Because we were interested in how suppliers have dealt with and currently deal with uncertainties, founding members and/or CEO:s were exclusively interviewed. The interview guide for the first interview was designed to ask questions about customer uncertainties, supplier abilities, and supplier actions. However, themes

concerning supplier uncertainties and, partly, customer abilities also emerged from the questions and we asked questions concerning both subjects in follow-up interviews, when held.

Moreover, because the aim was to make the results somewhat comparable, the interview guide for the first interview of each supplier looked the same. The questions were then asked, though we also allowed ourselves to probe the interviewee concerning interesting things they said (Guest et al., 2013). Using fully structured interviews would have been an alternative if we used a cross-sectional design approach (Bryman & Bell, 2011). We did not, however, find this fitting, given that we were not certain which the buyer uncertainties were, nor exactly how the suppliers dealt with them, making the result difficult to analyze quantitatively. As such, we were dealing with “a number of interdependent variables in complex structures” (Dubois & Gadde, 2002, p. 558) and thus resolved to study one case, instead of aiming to statistically infer something.

At the beginning of each interview, the interviewee was asked if the interview could be recorded. If the interviewee agreed, which all interviewees did, the interview was recorded and transcribed to provide us with “a textual version for analysis” (Guest et al., 2013, p. 53). We recorded and transcribed all interviews except for two prestudies and one main study interview. Two of the prestudies were not recorded because we did not want to intimidate the participants when asking them what problems there were on the market. The main study interview was not recorded because of technical difficulties.

All interviews were conducted via video or phone calls. Face-to-face interviews would be preferable to capture body cues (Guest et al., 2013), but were made unfeasible by the ongoing COVID-19 situation. Guest et al. (2013) argue that video recordings are good approximations of face-to-face interviews, which is why that was our preferred choice, but not always possible to conduct. There are some disadvantages to engaging in video and phone interviews. One of these is that “cross-talk” can occur, meaning that the interviewee talks at the same time as us. We took extra care to prevent this from happening, by consciously waiting an extra moment after the interviewee had spoken to continue the interviewee.

Case data was complemented and triangulated by secondary data collection, in the form of industry reports, news articles, and other material that helped us map out the state of the EdTech market. The secondary data collection was of extra importance when evaluating the state of the market.

3.4. Analysis of Data

The data from all of the interviews were divided into first-order categories, where themes from all of the interviews emerged (Bryman & Bell, 2011). These were then analyzed from the lens of the theoretical framework (Bryman & Bell, 2011). In general, our process consisted of three steps.

First, we identified first-order themes. To limit the influence of theory on the first-order themes, the theoretical framework was not used during this first-order coding process. The purpose of the first-order coding process was to find challenges, uncertainties, and actions that suppliers took to combat them. At this stage, NVivo was used to facilitate first-order coding of the transcripts (Bryman & Bell, 2011). See Appendix 3 for the initial thematic analysis conducted.

Second, after first-order categories had been created, they were analyzed through the lens of the theoretical framework and consequently divided into second-order categories. At this stage, uncertainties were coded as supplier or customer uncertainties, while corresponding actions and abilities to cope with uncertainties were identified. We then grouped similar actions together under different headlines.

The third and final step consisted of identifying how uncertainties and the resulting actions shaped different aspects of the EdTech market. Here, secondary data was used to triangulate (Bryman & Bell, 2011) the empirics. The process was by no means linear (Bryman & Bell, 2011) and we continuously went back and forth between theory and empirics (Dubois & Gadde, 2002). Even so, this step was particularly messy as we ended up changing the model multiple times, until we concluded that an expanded version of the original model was most in line with the literature and empirics. This step also included the largest amount of logical reasoning where we attempted to spot connections between different parts of the empirics and draw conclusions based on that.

Furthermore, it could be argued that there was a risk of cross-level misattribution error (Bryman & Bell, 2011) in our analysis, because we used organizational level actions to draw conclusions about the market. However, because markets are made out of practices (Kjellberg & Helgesson, 2007) according to the markets as practice perspective, actions and practices are what constitute and shape the market. As such, switching between different levels of analysis was necessary and pivotal for this paper.

3.5. Research Process

We began the research with a focus on the decision-making process of the buyer side. In order to get insights about the industry and to get an understanding of the pre-existing empirical gaps, we conducted three prestudies with stakeholders from different parts of the markets: one supplier, one expert, and one municipality. The prestudies made it clear that there were many uncertainties on the buyer side, thus making the decision-making process worth investigating.

However, as the COVID-19 spread in Sweden, we were unable to secure new interviews from EdTech buyers as we lost contact with the industry expert and the municipality. As a result, we decided to rapidly shift focus to the supplier side to investigate how suppliers perceive uncertainties, develop abilities to cope with them, and what they concretely do to cope with uncertainties.

With the new focus, we reached out to one company with the hope of doing a case study with them and potentially another company, conducting two in-depth comparative case studies. It turned out, however, that EdTech suppliers were also busy as a result of COVID-19 and that in-depth case studies with one or two companies were unrealistic.

For this reason, we decided to conduct a broader investigation where we instead focused on a specific portion of the market as our case study, with less focus on procuring retrospective longitudinal data. To find suitable suppliers to interview, we began mapping all suppliers in the “Undervisning” part of EdTechkartan.se. Based on recommendations from prestudies, we decided to set the scope to include any instructional tools used for “undervisning” (as defined on [Edtechkartan.se](https://edtechkartan.se)).

After the mapping of suppliers, we started contacting the suppliers and in the end received a total of 12 interviews from 8 suppliers, excluding the three prestudy interviews. When possible and deemed appropriate, follow-up interviews were booked with the interviewed companies. We tried to procure interviews with more people from the same companies, but it proved difficult given that EdTech companies had limited time to offer during the COVID-19 crisis.

In retrospect, the interviews could have been designed more flexibly, as the one used for the first interview for the suppliers was practically always the same. This was done in order to explore whether suppliers had similar or different perceptions on the same questions, but it could have been more interesting to dig deeper into emerging themes. The time management of the

interviews could also have been improved to maximize the information received in the interview time, though building rapport efficiently is a difficult, if not impossible, task.

3.6. Research Quality

Bryman and Bell (2011) suggest that there are two ways to judge the quality of qualitative research: trustworthiness and authenticity. Trustworthiness is most relevant for this study and will be addressed here, while authenticity will be omitted because it has “not been influential” (Bryman & Bell, 2011, p. 399) as a quality criteria.

Trustworthiness consists of four dimensions. The first is credibility and refers to the feasibility and realism of the results. To achieve credibility, we have – to the extent possible given the limited data available on the Swedish EdTech market – triangulated (Bryman & Bell, 2011) and complemented our results with secondary sources. Furthermore, we adopted “respondent validation” (Bryman & Bell, 2011, p. 396) by sending the quotes included in this thesis to the participants for validation.

The second criteria is transferability, meaning how transferable findings are to other contexts. This study is arguably transferable to similar contexts to that of EdTech, though our theorized market shaping findings require further investigation. To explain the context of the study, we attempted to provide a thick description (Langley, 1999) of the market in the empirics section. Moreover, a mix of a purposive (Bryman & Bell, 2011) and practical sampling was conducted:

purpose in the sense that we concentrated on one market segment, yet practical in the sense that we only interviewed suppliers who responded to our messages and concentrated only on CEO:s and founders. Furthermore, the sample of eight case companies could be representative for certain enacted configurations of the market segment studied, though it is possible that we were only given limited insight, as we conducted 1-3 main study interviews with all suppliers and used their perspectives as the primary data source. In the same sense, abductive studies are difficult to confirm deductively, making generalization an issue. To mitigate this issue, we have attempted to make the logical coherence of our conclusions clear, thus strengthening the “analytical generalization” (Dubois & Gadde, 2002, p. 559) of our results.

To make the study dependable – how replicable and dependable the results and process are – we have in this thesis been transparent about our research process, the limitations of the study, and the reasoning behind our results. Furthermore, both of us attended all interviews and were active in conducting all parts of the analysis, meaning that we audited each others’ work. Indeed, it would have been preferable to have a third party to audit us, but given our limited resources and that our interview data is anonymous, that was not an option.

Lastly, this study is confirmable (Bryman & Bell, 2011) in the sense that we have tried to establish transparency in the thesis and that we have had no interest conflicts incentivizing us to act in bad faith.

4. Empirics

In this section, an introduction to the market is first given, based on secondary research and interview data. After that, the current state of the market is presented, primarily based on interview data.

4.1 Intro to the Market

This section aims to complement the short introduction that has already been made to the EdTech industry. It has already been established that many uncertainties exist in the EdTech market, but one thing that has not yet been explored is its history and the actors active in the market. Unless otherwise noted, all information in this section is based on aggregated data from three suppliers.

4.1.1. A Short History of EdTech

EdTech started out as an informal market that was about selling hardware (e.g. laptops or tablets) to schools. This was part of the still ongoing 1:1 initiative that aims at giving every pupil in school one computer. According to one supplier, this represents one of the major hurdles in education today: that the focus is too much on the solution, rather than on the problem that the solution is trying to solve. This went on for a few years, with empty hardwares being sold to school, often as a “bribe” to new students.

Nevertheless, the market eventually evolved and the focus shifted to collaboration and administration platforms. Now, schools were trying to fill the hardware they had purchased with value-adding tools. During this time-period, there was a heavy focus on Learning Management Systems (LMS) that tried to make school administration easier for the students (see Appendix 4).

After a few more years, however, EdTech solutions in the form of instructional tools started to appear. These solutions either acted as platforms, as a way to develop and distribute content (e.g. as a substitute or complement to books), or a mix of the two. During the initial stages of this development, few people understood what these tools aimed to do, but this has since changed. Today, many teachers and schools know what EdTech is. While the focus may still be too much on the solution over the problem, the trajectory appears to point towards EdTech solutions as value creation rather than as means in themselves.

4.1.2. Actors in the Market

Today, there is a growing number of support organizations in the EdTech market. Swedish EdTech Industry, formed in 2017 (Carlberg et al., 2017), is the trade organization for the industry. They promote EdTech in favor of Swedish education (Swedish EdTech Industry, n.d.-c). There are also other organizations such as Swedish Edtest that brings users and suppliers together (Swedish Edtest, n.d.) or EdTech Southeast Sweden “the innovation system where

users, companies and academia co-create new EdTech-solutions” (EdTech Southeast Sweden, n.d.).

Other influential actors include lawmakers, as Swedish EdTech relies heavily on public procurement, politicians, municipalities, and even actors from other markets. As we will discover, adjacent markets and actors from there also play an important role in the EdTech market.

4.2. Current State of the Market

After an introduction to the market, this section will now expand on the current state of the market. The interviews conducted made it apparent that the current state of the market is characterized by several factors from both the customer and the supplier side, and those factors will be revealed in detail in this section.

4.2.1. Small pie of the market

“You can see that the market is really small and it's not mature yet”

Prestudy Expert

That the market is small, is confirmed by many suppliers, with one saying “so basically the pie is quite small and there is a lot of competition around the pie” (Supplier 6). The small size of the

market can also be reflected in the small size of the Swedish EdTech companies. As both a supplier and the industry expert told us, only a few companies have a turnover over one hundred million SEK per year. Two suppliers raised the problem that there are very few private schools in Sweden, and those schools are the ones that potentially have more budgets and flexibility in using those budgets. Furthermore, there is a problem of low willingness to invest in the industry according to one supplier, which makes the conditions even tougher for suppliers. One supplier claimed that compared to fintech and medtech, the capital in the EdTech market is rather small: “Find the absolute amount that has been invested in EdTech and compare them with any other tech industry and I’m quite sure it will be quite small” (Supplier 1). Another supplier stated that some investors are sceptical about the industry and are unsure if they would be profiting from investing in it.

“And there are also many companies fighting for the same pie”

Supplier 6

Not only is the competition fierce and broad in the EdTech market, but there is also a low budget for digital solutions. One supplier defined competitors as those who are competing for the same budget, in the words of the supplier: “However I think that we are still competing, if competition is defined as if someone else is trying to grab the same budget as you are to solve an equivalent problem, then of course, we do have competitors in that sense” (Supplier 1).

The same supplier also pointed out the limited budget for digital tools: “The budget for educational resources is extremely limited at the moment”. Several other suppliers confirmed that there is a limited budget for digital tools. This low budget could be a result of the perception of EdTech products as pieces of content rather than systems. One supplier suggested that “it’s a transition moving from something that is pure content to something that is more of a system and so a system is always centrally decided, whilst the other thing can be decided upon by the individual” (Supplier 1). The old perception that education resources are pure content is still having an impact and schools appear to have a common limited budget for teaching aids, leaving the buying power to the central level in municipalities. As one supplier said, one important aspect of the future of the EdTech market is whether “the schools diverge part of their budget towards digital tools or not” (Supplier 6).

4.2.2. Steelbath for Entrepreneurs

“When anything is low price it needs to be high volume to be feasible”

Supplier 1

In a low price sector like EdTech, suppliers have to sell their solutions to the municipalities to be profitable, as a deal with municipalities guarantees a large volume. However, over the direct procurement threshold, there is a requirement to publicly procure products, and such a public procurement process, for many suppliers, can be described as a “steelbath” (Carlberg et al., 2017). Not only is the process long and complex as one supplier claimed, but there is also a

major problem that lies on the buyer side that adds to the difficulty in the process – the buyer-user disconnection, “I think the buyers are so disconnected from the products (...)” (Supplier 1). Another supplier agreed with this statement, claiming that in some municipalities, decision-makers do not take teachers’ interests into consideration, leaving a big buyer-user discrepancy issue. The same supplier also admitted that there are other municipalities where teachers have more decision power and are in better positions to express what they want. This illustrates how segregated the market is (Carlberg et al., 2017).

Additionally, as confirmed by four of the suppliers in the interview as well as experts from the prestudy interviews, low customer procurement competence is one of the major hurdles for suppliers in the Swedish EdTech industry. As one of the suppliers stated, “I wouldn't say that the competence is low, I would say that there is massive incompetence” (Supplier 3).

In some municipalities, the buyers are also adapting old ways to procure for new types of products as one supplier told us. As a means to cope with such low buyer competence, suppliers are trying to educate the buyers and influence their understanding. This is done through contact with individual customers, but also through cooperation with other players such as Swedish EdTech Industry to help publish guides for purchasing EdTech products.

Another issue in the industry is that the market is highly segregated, with some municipalities being more centralized than others as the industry expert stated. Besides, not all customers of EdTech products seem to have the same knowledge about digital solutions. This segregation

makes educating the market extremely difficult and costly, as different municipalities and schools need to be educated individually. With this factor and the low price pushed down by public procurement, the suppliers need to find other ways to get into the market.

4.2.3. No School is Easy to Enter

To avoid a steelbath, many suppliers instead use resellers to have the chance to sell their products through an existing deal, as to circumvent the costly procurement processes, according to the prestudy expert and three suppliers. Five suppliers also claimed to seek partnerships to gain legitimacy on the buyer side. Integrations with giants such as Microsoft and Google give suppliers more exposure, and this approach is seen as one way to gain customers, as one supplier said. Interestingly, the same supplier also claimed that such a cooperation mainly helps them on the selling side but not much else.

“There is no school that is easy to get into, there are only schools that
are less difficult to get into”

Supplier 1

However, the reseller approach is not helping another underlying problem: the low budget for digital tools. As mentioned earlier, there is a very limited budget for digital tools, with an allotted teacher budget of approximately 650 SEK (Wallin, 2020) per student that is spent on teaching aids.

“Sweden is a big exception here because we are so used to having almost everything paid for by the government through our taxes”

Supplier 2

Even if the budget for pedagogical tools were higher, that would not escape the low willingness to pay that exists for educational products in Sweden. The history of the Swedish education market, as well as the pressure from free LMS (Learning Management Systems) from giant players such as Google and Microsoft, as one supplier stated, are together contributing to customers having a low willingness to pay for educational solutions. Free or cheap trial periods was something widely used by suppliers to cope with this issue, which was confirmed by three suppliers. Long and flexible trial periods were given so that teachers have enough time to experiment and decide.

Another commonly raised challenge was the complex customer structure, mentioned by the expert and five suppliers. One supplier told us about the complex structure from the buyer side that the person needed to interact with; all the way from the end users (teachers), to principles and ICT pedagogues, to the head of education in the municipality (“grundskolechef” in Swedish). The supplier mentioned that it is frustrating to have all those touchpoints at once, but that this also creates opportunities for suppliers as they then can use multiple touchpoints to

influence the buying process. In the words of the supplier, “one person can be a touch points along the whole spectrum but that the person in turn doesn't necessarily have a budget or mandate to decide on purchasing” (Supplier 1). It is an option to get in touch with the direct users, for instance teachers; it is also possible to be in direct contact with municipalities, who have the purchasing power and who are powerful in terms of distributing the products. Most often, however, it appears like all actors on the buyer side must be interacted with.

Moreover, the prestudy expert and two suppliers stated that the buying process is long and complex and, as one supplier said, sometimes up to 18 months in length. This long process is partly influenced by the lack of a formal decision-making process on the buyer side, “neither side [referring to teachers and municipality personnel] feels fully it is their responsibility to decide or implement certain EdTech solutions” (Supplier 1). The supplier's response to this problem is to have a bottom-up approach by helping teachers “sell” the supplier’s solution to the municipalities. “I think it’s extremely important to have super users and champions (...) the early adopters are often champions and so on, and they are the ones who see a vision with the product” (Supplier 1). In other words, a champion is a user who shares the vision of a product and thus is more devoted. Such champion users, for instance teachers and ICT pedagogues, will then sell the solutions to municipalities, just like one supplier said, “then it becomes sort of a bottom up approach, you find someone in the organization that influences the leadership” (Supplier 6).

“Time is crucial here, because the number one thing teachers don’t have is time”

Supplier 2

However, lack of time makes it really hard to onboard teachers and to find champions, according to three suppliers. One supplier even initiated its business to create a more time efficient solution for teachers. Teachers have limited time for the huge amount of workload they have, resulting in reluctance in testing the new product even if given a free trial. As a solution to this, four suppliers claimed to have flexible prolongation times for trial periods for the product until the teachers finally have time to try it. Constant and close customer relation, and being patient are also keys here to keep the teachers from giving up trying to use the product, suggested by six suppliers. As one supplier said: “You actually have to have long relationships with the customer in order to make them take the leap” (Supplier 6).

Despite these challenges, it goes without saying that EdTech suppliers sometimes manage to sell their solutions. But unfortunately, even when sales are made, there are still many challenges to be dealt with.

4.2.4. Adoption is a Major Challenge

“So if you manage to sell inside the school, it’s not a given all the teachers will start using the tools.”

Supplier 6

It was claimed by five suppliers that adoption of their solutions from teachers in schools can be tricky, even after the purchase of the product. Two suppliers said that even when products are well perceived by the teachers, it is still not a given that they will start using the products.

“The classrooms still look pretty much the same as they did 100 or 150 years ago”

Supplier 2

As four EdTech suppliers stated, it is undeniable that the market is traditional and slow-moving. According to them, the education sector is a place where things stay the same way for a long time and where there is massive resistance for change. EdTech is not necessary for success according to one supplier and the rigid and fixed system of the education sector, according to another supplier, also makes it very hard for innovation to penetrate it. One supplier said that the incentive for teachers to find something novel is limited and claimed that too much innovation of the product was not preferable, as it would be too radical to gain any adoption. The prestudy interviews also suggested that school is not a place for disruption, as it is rigidly regulated by laws and the wish for change is rather low. Additionally, the customers also have a low digital competence, as one supplier pointed out: “I got the impression that they hardly know anything about EdTech” (Supplier 3). These factors contribute to the low adoption rate.

To cope with this problem, a lot of interaction and communication with the customers are required, along with educating them on how to use the products. However, one supplier told us

that sometimes the attempts still cannot guarantee successful adoption, with another supplier claiming that low adoption is often the result of unclear direction-giving from the school management.

4.2.5. External Factors Influencing the Market

There are some other factors that are also having an impact on the Swedish EdTech market. One of them being politics. The market is heavily influenced by political decisions, in terms of law making and investments. For instance, one supplier said that “schools are not companies, they are quite rigid ecosystems that are politically governed, and that means they have very limited flexibility in terms of how the budget works, what they have the money on” (Supplier 5).

Besides that, there are ambiguities as in what the market really is. The services in the industry cover digital learning, materials, IT systems, administrative systems, hardwares such as computers and tablets, and actors range from startups to big publishing houses. Several interviewed suppliers also had different views on how the market would develop (e.g. through partnerships or not), while the concept of EdTech is only 5 years old (Carlberg et al., 2017). Therefore, there are still many misunderstandings and confusions concerning what the market really is – the definition of what the EdTech market is and how it will evolve is broad and ambiguous.

During the interviews, several suppliers mentioned publishing houses. The large publishing houses selling teaching aids may be reluctant to change and may have incentives to maintain the status quo of selling analogue books, though no supplier explicitly mentioned something the publishing houses had done to sustain the status quo. As such, this is a preliminary conclusion that should not be exaggerated. Some suppliers were not as concerned about competing with the publishing houses as others, because they focused on a niche market and thus avoided the risk of direct competition, yet they still highlighted the influence publishing houses had on the market.

Given the plethora of challenges on the EdTech market for suppliers, not all of them decided to tackle the challenges directly. Instead, some of them decided to circumvent the challenges.

4.2.6. Ways to Circumvent the Market Challenges

There are several common ways suppliers utilize to circumvent the challenging market. Certain suppliers sell below the direct procurement threshold to avoid the costly public procurement process, while some target corporate customers to compensate for the challenges in the school sector. One supplier diversified its revenue streams by not only focusing on the Swedish school system, but also focusing on the corporate markets. At the same time, four other suppliers were selling to, or experimenting with selling to, markets outside of Sweden. For instance, two suppliers had the plan to internationalize even in the beginning stage.

5. Analysis

In this section we will present the result of analysis based on the empirical data. We will use the analytical framework as our theoretical lens to demonstrate the findings of this study.

Based on the state of the market, we analyzed the identified actions and uncertainties in the context of our theoretical framework. First, the (Ford et al., 2003) model was used to identify the customer and supplier uncertainties. Second, supplier actions taken to combat these uncertainties were identified. Both of these are summarized in table 1 and 2 below and will be elaborated upon in this section. Lastly, we analyzed how the customer and supplier uncertainties, and the resulting supplier actions, contribute to shaping the EdTech market.

Table 1: Customer Uncertainties, Supplier Actions and Their Connection to Abilities

Uncertainty Category	Uncertainties	Supplier Actions	Customer ability influenced by supplier actions	Supplier ability
Need	Low purchasing competence	Educating the buyers and users Close and high-touch contact with the customers	Increase customers' ability to specify needs (demand)	Supplier develops and applies problem solving ability to help teachers and municipalities specify needs
	Low digital competence	Supporting Swedish EdTech Industry		
	Buyer-user disconnection	Focus on B2C		
Market	Difficult to evaluate and compare EdTech products	Supporting Swedish EdTech Industry Give free or cheap trial periods for long periods	Increases customers' ability to specify needs (demand)	Supplier develops transfer ability to meet customer needs and gain exposure
	Many alternatives and new ones emerging	Educate the buyers and users Contact customers on a regular basis		
	Many different ways to solve the same problem	Close and high-touch contact with the customers		Supplier develops and uses problem-solving ability to help the customer navigate the market
	Different types of EdTech available	Internationalize business Focus on B2C Partnership		
	Ambiguous definition of market (and unclear boundaries)			
	Some stakeholders have little time to explore offerings			
Transaction	Low trust of startups	Legitimizing the market Get exposure to brand	Customer becomes better counterpart by working with supplier (transfer)	Supplier develops transfer ability to meet customer needs and gain references (e.g. giving high service)
	Long commitment period required for transactions	Form partnerships with powerful resellers Give free or cheap trial periods for long periods		
	Unclear performance of EdTech products	Close and high-touch contact with the customers Using references to gain trust Focus on B2C Bottom-up Approach Partnership		Supplier uses transfer ability to gain trust

Table 2: Supplier Uncertainties, Actions and Their Connection to Abilities

Uncertainty Category	Uncertainties	Supplier Actions	Customer ability influenced by supplier actions	Supplier ability
Capacity	Uncertain about future sales	Educating the buyers and users	Increase customers' ability to specify needs (demand)	Supplier develops and applies problem solving ability to attract customers
	Swedish market is small and there is broad and fierce competition	Support Swedish EdTech Industry		
	Low budget for digital tools	Give free or cheap trial periods for long periods		Supplier develops transfer ability to meet customer needs
	Tedious public procurement	Close and high-touch contact with the customers		
	Too few private schools in Sweden	Using references to gain trust		
	Large dominant incumbents from adjacent market	Contact customers on a regular basis		
	The market is slow moving and traditional, there is a strong resistance to change	Form partnerships with powerful resellers		
	Segregated and decentralized market			
	Low willingness to pay			
	Public procurement pushes the price down			
	Low capital in EdTech market			
Application	Do not know what all teachers want	Give free or cheap trial periods for long periods	Increase customers' ability to specify needs (demand)	Supplier develops and applies problem solving ability to understand customers needs and help customers adopt the EdTech solutions
	Low digital competence	Educating the buyers and users		
	Low adoption rate at schools	Close and high-touch contact with the customers		
	Segregated and decentralized market	Contact customers on a regular basis		
Transaction		Support Swedish EdTech Industry	Customer becomes better counterpart by working with supplier (transfer)	Supplier develops transfer ability to help customers in the transaction process
		Data to Improve Product		
	Low purchase competence	Close and high-touch contact with the customers		Supplier develops and applies problem solving ability to cope with different challenges
	Long and complex buying process	Educating the buyers and users		
	Complex buyer structure	Go below the direct procurement threshold and target schools/teachers directly		
	Teachers and ICT pedagogue need to sell solutions to municipalities	Form partnerships with powerful resellers (e.g. use gatekeepers to circumvent costly procurement process and to decrease risks)		
	Public procurement above direct proc. threshold, making sales difficult	Support Swedish EdTech Industry		
	Lack of formal decision making process			
	Limited private schools in Sweden			
	Segregated and decentralized market			

5.1. Customer and Supplier Uncertainties

This section will outline the customer and supplier uncertainties identified.

5.1.1. Customer Need Uncertainties

Customer need uncertainties are those that are linked with the customer's difficulty in identifying and specifying its requirements. One need uncertainty is the low purchasing competence of the buyers. The low procurement competence of buyers diminishes the interest of exploring the solutions in the EdTech market and also reflects the lack of understanding of the real demand. This leads to another uncertainty: the buyer-user disconnection. The buyers with actual purchasing powers are not the actual users of the products. As a result, the decision makers in the buying process are very likely to ignore or misunderstand the needs of the end users (teachers). Another uncertainty is the overall low digital competence, as in that customers are not very familiar with digital tools and offerings. As a result, teachers are not sure about the benefits of implementing digital solutions, and they have limited knowledge of what products would be the best solution to their problems. As customers have such high difficulty knowing what they want, their need uncertainty is high.

5.1.2. Customer Market Uncertainties

Customers in the EdTech market are also unsure of the supply market they face. One uncertainty is the difficulty to evaluate or compare EdTech products. The teachers have limited time to test

out one given product, let alone to try different ones and compare the functions. However, there are many alternatives and new companies are constantly emerging, and they all together make it even more difficult for the customers to develop a holistic view of the market. Additionally, there are many different solutions to solve similar problems. Instead of spending time comparing and evaluating an EdTech product they are not familiar with, teachers could instead choose to buy traditional printed materials from publishing houses. This lowers the motivation to learn about the EdTech market.

Different types of EdTech products are available, and this in a way distorts customers' understanding of the market. Customers have a hard time understanding if an EdTech product is a hardware, a learning material, or a system. The ambiguous definitions of the EdTech market and its unclear boundary as a market (e.g. are all teaching aids included or only EdTech solutions?) seem to confuse customers even more about what they should be looking at when trying to explore the market.

The overall low knowledge of the supplier market and how to navigate it indicates that the customer market uncertainty is high.

5.1.3. Customer Transaction Uncertainties

Customers in the Swedish market also appear uncertain about if the suppliers they work with will be able to deliver products with the performance they expect. One such uncertainty is the low

trust of startups. Due to the newness and small scale of many EdTech companies, finding reference customers can be difficult. As four suppliers claimed, lacking reference customers is a major hurdle to convince customers that they are capable of delivering the solution in the early phase of the business. Another uncertainty is that the commitment periods of EdTech products are usually long, starting from one year. Customers bear a risk of not being able to terminate the contract with a product that is directly linked with education performance. As such, customer transaction uncertainty is high in the market.

5.1.4. Supplier Capacity Uncertainties

Suppliers, on the other hand, are uncertain about the volume they are likely to be able to sell in the future. The Swedish EdTech market is rather small in size, and the competition around this small market is extremely fierce and broad. Suppliers need to compete with other EdTech companies and publishing houses with other incumbents, the latter of which may have a strong influence on the market. The low budget for digital tools means that suppliers need to sell large volumes to survive, but the low budget in turn means only few companies will be chosen, putting much pressure on the competition. Above the direct procurement threshold, suppliers will have to be involved in the long, complex, and tedious public procurement process, a process that is pushing prices down and is making sales extra difficult. Targeting private schools could potentially help suppliers avoid the public procurement process, but there are relatively few private schools in Sweden.

Another uncertainty comes from the culture of the market: the Swedish educational sector is slow moving and traditional. As such, attempts to digitally disrupt it are not well received and are met with resistance. The Swedish market is also highly segregated in nature – with each municipality having its own unique buying competence, user number, and digitalization level – making it difficult to predict and anticipate sales. The low willingness to pay also adds to the uncertainty, as suppliers become less certain if they can succeed in convincing the customers to pay. It is also important to note that the Swedish EdTech market is characterized by low capital, putting suppliers at financial risk and forcing them to keep a low budget, as indicated by a few suppliers.

As a result of all those factors, the supplier capacity uncertainty is high in the EdTech market.

5.1.5. Supplier Application Uncertainties

How the product will be used by customers is something suppliers are uncertain about as well, albeit to various degrees. What all teachers want is not very well understood by suppliers, and it could mean that the products are not meeting teachers' needs. Many teachers, who are the end users, have low digital competence, and need a long time to understand the products and get used to them. The segregation of the market causes additional difficulty to understand customer needs and make generalizations. Even after a sale is closed, there is still no guarantee the products will be used, as the low adoption rate reflects. However, as many suppliers appear to have developed

their solutions from real needs and teacher interaction, this uncertainty is mitigated somewhat. As such, suppliers are facing moderate to high application uncertainties.

5.1.6 Supplier Transaction Uncertainties

Suppliers may be also uncertain if the customers will take the volume they agreed upon and pay for it (Ford et al., 2003). One such uncertainty is that customers have a low purchase competence, making the buying process subject to a large risk of procuring non-optimal solutions. The sometimes up to 18 months buying process also makes the transaction vulnerable, as the long time span adds to the uncertainty. The complex buyer structure is another factor, because it is confusing for the suppliers to decide with whom they should negotiate or interact with. Additionally, the suppliers are relying on the bottom-up approach on the customer side, meaning that they sometimes rely on the teachers and ICT pedagogues to sell the solutions to the municipalities – an approach that can not guarantee success and that increases the length of the decision-making process. Moreover, a formal decision making process is missing on the customer side, because no one appears to be willing to take responsibility for making buying decisions. The private schools, as mentioned, normally have more flexibility and a larger budget space, but those schools are very scarce in Sweden, limiting the opportunities to operate in the private sector. Yet again, the market is segregated, even one successful sale in one municipality does not imply suppliers can make a positive assumption about another municipality. However, as the education sector is public and mostly funded by tax money, this reduces the transaction

uncertainty for suppliers. With that said, suppliers can be certain that the customer will pay, once they sign an agreement, as they are working with the public sector.

For this reason, the supplier transaction uncertainties are moderate to high.

5.1.7 Conclusion of Customer and Supplier Uncertainties

Using the Ford et al. (2003) model, we picture the Swedish EdTech market as one where customers are perceived to have high need and market uncertainties, while having moderate to high transaction uncertainties. At the same time, suppliers have high capacity uncertainties, as well as moderate to high application and transaction uncertainties.

5.2. Supplier Actions to Cope With Uncertainties

The identified uncertainties in turn lead to a number of supplier actions being taken. This section will discuss the actions that the six types of uncertainties give rise to. As the empirics suggest, customers fail to develop abilities to help suppliers with their uncertainties, thus forcing suppliers to develop those abilities themselves or to find alternative solutions. As we will discover, the abilities by Ford et al. (2003) are sometimes not enough, but need to be complemented with market shaping abilities (Storbacka & Nenonen, 2011).

We have found that, with some overlap, actions that suppliers take are of three different kinds. A first kind of action attempts to cope with market uncertainties *directly* by facing them head on without addressing their root causes. A second kind of action leads to long-run market changes in uncertainties by *indirectly* influencing how things are done or how the market is represented. A third and last kind try to *avoid* market uncertainties by engaging with new markets.

5.2.1. Direct Actions

The first and most straightforward type of action is the *direct action* that attempts to cope with an uncertainty directly. This kind of action involves utilizing and improving the supplier's own abilities in order to cope with the market uncertainties. In a way, some of these actions manifest the suppliers abilities in the Ford et al. (2003) model, as suppliers directly use their abilities to cope with customer uncertainties, though some actions fit less well in this scope (e.g. using partnerships). Direct actions also go beyond the Ford et al. (2003) model in the sense that suppliers engage in them in order to cope with their own uncertainties.

5.2.1.1. Give Free or Cheap Trials

The little time of teachers and the low trust of EdTech suppliers make selling a difficult task in the EdTech industry. To cope with this, EdTech suppliers tend to be generous with suppliers by providing them with free or cheap trials. Often, teachers do not have enough time to test the trials during the periods and thus receive extensions that EdTech suppliers are often happy to give.

Trials also act as a means to overcome the EdTech suppliers' own uncertainties. In order to compete with each other and gain future sales, EdTech suppliers need to let teachers try their services, because every other supplier is doing it. This is especially apparent at the time of writing, during the COVID-19 crisis, when a significant amount of suppliers have opened up their platforms for free during the time period of the crisis.

Furthermore, free trials may make individual teachers accustomed to EdTech products and in the long-run improve their proficiency with digital solutions and thus improve their ability to express their needs (demand ability).

5.2.1.2. Gaining References and Exposure to Brand

Another way that suppliers gain trust from customers is by providing existing customers with excellent solutions and excellent service, as a way to gain references. References were mentioned by many of the suppliers as an important way of procuring new customers and of gaining trust. In the same sense, suppliers need to build and get brand exposure in order to gain trust from the buyers in the municipality. When asked how teachers know that their solutions worked, the same supplier said that they usually want references from others.

To do this, suppliers heavily rely on and develop their abilities to help the customer (problem-solving ability) and provide them with excellent solutions (transfer ability).

5.2.1.3. High-touch and Regular Contacts With Customers

The high need uncertainties of customers lead suppliers to keep a close relationship with the customers, in order to learn what the user needs and help the buyer identify what the users really need. Furthermore, the ambiguous decision-making process on the buyer side and the teachers lack of time makes customers less likely to contact suppliers, forcing suppliers to be pushy and regularly checkup with them. As one supplier said, "in some cases you as a vendor manage to avoid all those hurdles or climb all those mountains and you succeed, but in many cases it's quite labor intensive to push the customers into the option" (Supplier 6).

In a sense, it could be argued that suppliers develop customers' abilities through these contacts. Regular contact with customers is likely to lead teacher's to learn something, if only about the EdTech product itself.

5.2.1.4. Bottom-up Approach

To cope with the complex structure and lack of formal decision-making process on the buyer side, suppliers utilize a bottom-up approach, meaning that they convince people on the bottom of the pyramid of the solution's value first (e.g. teachers or ICT pedagogues), and then these people "sell" the solution to the municipality and convince people with actual purchasing power. This requires suppliers to motivate, for example, teachers to become champion users, or early adopters, who share the passion of the product and are well aware of the benefits of the product.

To do this, suppliers develop the customers' transfer skills by pushing the users to interact with the buyers, thus accelerating the decision-making process and mitigating the user-buyer disconnection.

5.2.1.5. Data to Improve Product

One aspect that was mentioned a few times in the interviews was the use of data in order to improve the product and to visualize and monitor the effects of the product. In other words, suppliers learn more about how their product could be applied by using data and sometimes even use this data in order to help users (e.g. teachers monitoring progress of pupils; or municipalities monitoring progress in the municipality).

In this sense, suppliers develop their problem-solving abilities by gathering more data and thus manage to reduce their own application uncertainties. It is also possible that suppliers use this data to later prove the legitimacy of their product, but we have no support for that from the empirics.

5.2.1.6. Using Partnership

Sometimes, giving free trials is simply not enough, leading EdTech suppliers to other means for selling their solutions. One action EdTech suppliers engage in is to work with partners, especially the tech giants in the market. Such cooperation helps the suppliers to gain exposure, legitimacy, and to be more easily accepted by customers.

Additionally, EdTech suppliers cooperate with already established resellers that have public procurement agreements with municipalities in place. This way, suppliers manage to influence municipalities through an extra market actor, gain legitimacy for their product, and can circumvent the long and costly official public procurement process. One supplier referred to this as engaging in “fake public procurement”.

The resellers in question are often established companies from adjacent markets. They are either providers of hardware, distributors of publishing materials, or other large companies in the education sphere. This illustrates the influence and power that adjacent markets have on the EdTech sector.

Working with resellers does not influence customer abilities directly, but is a way for suppliers to reduce their own uncertainties while engaging with the same kinds of customers.

5.2.2 Indirect Actions

While direct actions cope with uncertainties directly, not all actions address them directly. *Indirect actions* address uncertainties by engaging in shaping the market through either normalizing or representational practices.

5.2.2.1 Educating the Market

The most obvious example of an *indirect action* is educating the market. While educating the market is in one sense a direct action, because it is necessary in order to sell EdTech solutions (e.g. teaching teachers how to use digital products), it is also an indirect action in the sense that suppliers engage in it outside individual exchanges to influence the market. This illustrates that there is some overlap between the different action types.

Suppliers are forced to educate users regarding how to express their needs, regarding how buyers should procure in an intelligent manner, and regarding what alternatives are available on the market. However, because the market is heavily segregated with the decentralized municipality system and because many EdTech suppliers lack capital, it is not feasible for the suppliers to educate the whole market by themselves. For that reason, suppliers come together in joint efforts to educate the market by supporting the trade organization Swedish EdTech industry. Swedish EdTech Industry in turn educates the market by issuing industry reports (e.g. Carlberg, 2017), providing guidance for customers and suppliers alike (e.g. guide for procuring EdTech solutions; Swedish EdTech Industry, n.d.-a), aggregating information on its website, and providing guidance on what alternatives are available on the market through “Edtechkartan” (the “EdTech Map”, see Edtechkartan.se). As such, the market becomes easier to navigate, it becomes easier to purchase goods, and EdTech as a recognized concept for providing educational solutions becomes stronger.

Another way that suppliers educate the market is by teaching them how to use digital procurement tools. It is well recognized that digital competence in the school sector is weak, creating a problem for the adoption of EdTech solutions. Again, one way to overcome this uncertainty is to educate them through close and regular customer contact and by supporting Swedish EdTech Industry that actively works on educating the market.

In this sense, suppliers increase the customers demand ability by educating them about what technology can do, how customers can express their needs, and how buyers can procure EdTech solutions intelligently.

5.2.2.2 Legitimizing the Market

Another important action that suppliers engage in is to legitimize the market. Again, the way they do this is by supporting Swedish EdTech Industry that in turn influence decision-makers and, as one supplier said, “(...) to some extent maybe this group can help form opinion and so on, on the market, so such efforts will not help us directly, but they can help us indirectly for longer term” (Supplier 1). As such, one reason that suppliers support Swedish EdTech Industry is to legitimize (Kjellberg & Olson, 2017) the EdTech market. This kind of action is unlikely to influence customer abilities.

With that said, suppliers likely contribute to legitimize the market through its direct actions, i.e. by influencing teachers and decision-makers, one customer at a time.

5.2.3 Avoidance Actions

The third and last set of actions is something we refer to as *avoidance actions*. These actions cope with market uncertainties by ignoring them altogether. Many suppliers decide to avoid customer uncertainties by changing what customer group they target. For instance, one supplier perceived the future of EdTech being a diversified segment. The supplier stressed that the corporate segment was prosperous and growing. However, the person also mentioned that not all EdTech suppliers were able to enter that area: platforms are easier to diversify to other segments than content, because the latter is often specific to a customer group.

One supplier targeted only schools and teachers with products that were below the direct procurement threshold. As such, they did not need to engage in costly public procurement processes. This is in stark contrast to one supplier that stressed that it was not a feasible strategy to target only teachers, because their budget was too low. However, the first supplier also appeared to have reseller agreements in place, placing doubt on the feasibility of only selling solutions below the direct procurement threshold. With that said, it appeared like most suppliers used mixed strategies to find customers.

Yet another action that two of the eight case companies engaged in to circumvent the challenging market situation was to target consumers, rather than municipalities and schools. One supplier was just starting up and explicitly mentioned targeting B2C as a way to circumvent the school segment, while another supplier began its journey with a B2C approach and then later entered the

B2B arena. When asked about the potential of B2C, a third supplier answered that it was an exciting area, but not something that they considered entering for focus reasons. In other words, entering the B2C arena appears to be an action that some suppliers take to cope with the challenging school market.

Lastly, some suppliers went so far as to internationalize their business. Two suppliers had internationalization inherent in their business models, while most of the other suppliers either experimented with or had entered international markets to complement their current business. The two small early-phase suppliers interviewed did not engage in any international activities, but did not appear to exclude the option either.

5.2.4. Conclusion of Supplier Actions

The Ford et al. (2003) model is reactive in nature, probably because it only reflects static images of uncertainties and thus concentrates on abilities that are needed to reactively cope with customer uncertainties in interactions. Our results suggest that many *direct actions* use these abilities and consequently deal with uncertainties, while also developing individual customers' abilities.

Going beyond the Ford et al. (2003) model, there are other *indirect actions* that proactively shape the root cause of customer abilities (e.g. not knowing what EdTech or digital tools is, or how to procure them). These actions require a different set of abilities that is not reflected in supplier

problem-solving and transfer abilities (Ford et al., 2003). This is a topic we will come back to in the discussion.

Lastly, *avoidance actions* do not make use of the Ford et al. (2003) abilities directly and do not directly change customer abilities. However, they may indirectly do so by shaping the market. This is the topic we turn to next.

5.3. How Supplier Uncertainties and Actions Shape the Market

Thus far, we have established that most uncertainties are quite high on the EdTech market and that suppliers engage in direct, indirect, and avoidance actions to cope with them. This section will address how these different uncertainties and actions create an interesting market dynamic.

As we established in the theoretical framework section, some uncertainties are fostered by normalizing or representational practices (e.g. tedious public procurement norms giving rise to reseller agreements), that in turn lead to supplier actions. In this section we will discover how some actions also lead to new practices. This interplay is depicted in figure 3 below.



Figure 3: Market Practices and Uncertainties Interplay

Before evaluating how actions shape the EdTech market, we will give a brief note to how external factors influence the market in the section below.

5.3.1. External Factors and EdTech

External factors have significant effects on the EdTech market. EdTech as a market is part of a broader market system (Kjellberg & Olson, 2017) that consists of all suppliers and other actors engaged in the realization of education in Sweden. As we can see in the empirics, publishing houses appear to play an important role in this market system, because they compete for the same customers as EdTech suppliers. Another aspect that make publishing houses key actors in

the EdTech market is that they may dominate the market for instructional tools and may have little incentives to digitize their operations. Moreover, EdTech has inherited (Kjellberg & Olson, 2017) many aspects from other markets, such as education being perceived as something that should be free (Swedish society) and educational tools consisting of content rather than being platforms. This affects how exchanges are done and how EdTech companies compete.

Furthermore, hardware companies also heavily influence the EdTech market. Here, the demarcation of the EdTech market becomes blurry. Reading an industry report from 2017 (Carlberg et al., 2017), one might guess that hardware companies are not part of the EdTech market as it has consciously been left out from the mapping of the field. Yet, when examining Edtechkartan.se, hardware providers are clearly listed as one of the market segments. In either case, many large hardware companies have existing deals with municipalities and our interviews suggest that some act as resellers for suppliers. As described in the history section, selling hardware for schools can also be counted as the birth-stage of the EdTech market.

Besides adjacent markets, other external factors also heavily influence the EdTech market. For instance, the recent COVID-19 outbreak has led to a boom in EdTech usage (Swedish EdTech Industry, 2020). Some suppliers hope that this will lead to permanent positive changes, while one supplier took a more sceptical stance. No matter the outcome, it is likely that an external event like COVID-19 will influence the market positively as it forces schools to digitize.

5.2.3. How Actions Shape the Market

We have previously established that there are three kinds of actions that suppliers take in order to cope with uncertainties. In this section, we will go through each kind of action and suggest how they shape the EdTech market.

5.2.3.1. Direct Actions

Direct actions attempt to cope with uncertainties directly, without addressing their root causes. When uncertainties are enacted, direct actions are given rise to in order for suppliers to consummate exchanges. These actions require suppliers to use, and sometimes develop, their abilities to deal with the uncertainty. If these actions are successful, uncertainties for the current transaction are temporarily reduced.

Given that the action is new (i.e. not often seen on the market before) and are engaged in by one or a few suppliers repeatedly, two things might happen. One alternative is that suppliers engage in the action in silos, without influencing each other and thus – after repeating the action a sufficient number of times – create a new normative practice directly.

Another alternative is that a selected few suppliers engage in the action in the beginning and then influence other suppliers to start doing it. In this case, the actions are likely to first be translated to a representational practice (as other suppliers and customers hear of it). After this, two further things happen. First, the new representations may lead to further uncertainty reductions of

suppliers as other customers hear of the action and approve (the brands of the suppliers are strengthened). This reduces uncertainties for the suppliers in question (e.g. reduction in capacity uncertainties as the company gains a competitive edge). Second, other suppliers may hear of the action and copy it, leading to further uncertainty reductions in these new suppliers' exchanges.

If a sufficient number of suppliers engage in the action repeatedly, the action is likely to be translated into a normative practice, as it becomes an industry norm to use the action to combat uncertainties. This norm in turn translates to new representational practices (customers and suppliers alike learn of the new norm) creating a reinforcing cycle (Kjellberg et al., 2015) that strengthens the norm.

Here, something interesting happens. As the norm becomes stronger, the action's capability to reduce suppliers' capacity uncertainties is weakened, because the action no longer represents a competitive edge. The action still, however, serves the purpose of reducing the customer uncertainties that triggered it to begin with, and because this uncertainty-reducing action is now a norm, the incentive for actors on the market to fix the root cause of the problem is reduced. In summary, the direct action gives rise to a norm that strengthens the concept that customers do not need to mend the original problem. This dynamic is illustrated in the figure below.

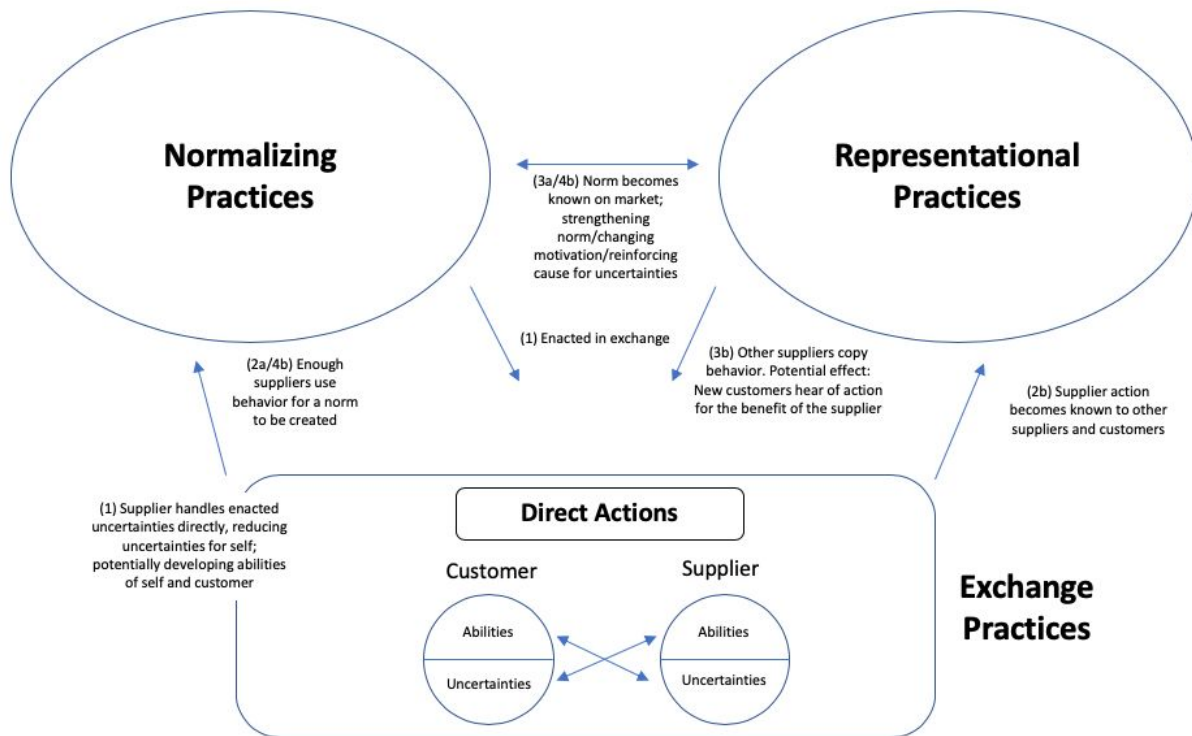


Figure 4: Market Dynamics for Direct Actions

A concrete example is when suppliers give out free trials. This need arises from normalizing practices such as teachers having a low knowledge of EdTech and the culture in nature being traditional and thus resistant to change. Representational practices also play a role. For instance the perceived low legitimacy of EdTech products and the perception that educational tools should be free/cheap. These practices are then converted into uncertainties in exchanges, encouraging other suppliers to give out free trials.

When a sufficient amount of suppliers give out free trials, it becomes a norm to do so. Stories from our suppliers show that this is what happened when suppliers started giving out free trials as a response to the COVID-19 crisis. The norm is then translated into new representational

practices, where industry organizations start to report that giving out free trials is the norm (Swedish EdTech Industry, 2020), creating a feedback loop that strengthens the norm. The strengthened norm in turn raises the capacity uncertainties of the original suppliers that gave out free trials, because it is no longer a competitive edge to do so, but something that everyone in the industry engages in. Another interesting thing also takes place. Other uncertainties of suppliers are also increased as the action becomes a norm, because customers' perception of education being something that should be given for free is strengthened. The incentive for teachers' to make time to evaluate digital products is also lowered, because they can easily extend their trials. One supplier shared the fear that if the price was low before, it will become lower now that many suppliers are offering their solutions for free. As such, responding to supplier and customer uncertainties through direct actions is a double-edged sword. In one sense, it reduces the uncertainties, while it also increases them, partly by reducing the incentive for customers to change.

All direct actions can be logically inferred to fit the described patterns, though we do not have empirics to support that each direct action follows the exact described patterns. Furthermore, as in any continuously enacted market, there are bound to be other patterns that direct actions give rise to.

5.2.3.2. Indirect Actions

Indirect actions attempt to cope with uncertainties by changing the root cause of the problem (see figure 5 below). As such, indirect actions are enacted as normalizing and representational

practices. They may be a response from suppliers, as they realize that their direct actions are not working, or they may be preemptive actions of suppliers not liking how something is done. These indirect actions then result in new normalizing or representational practices that in effect decreases the supplier uncertainties, customer uncertainties, and even manages to increase customer abilities. When engaging in indirect actions, suppliers use other abilities than the one in the Ford et al. (2003) model. This is something we come back to in the discussion.

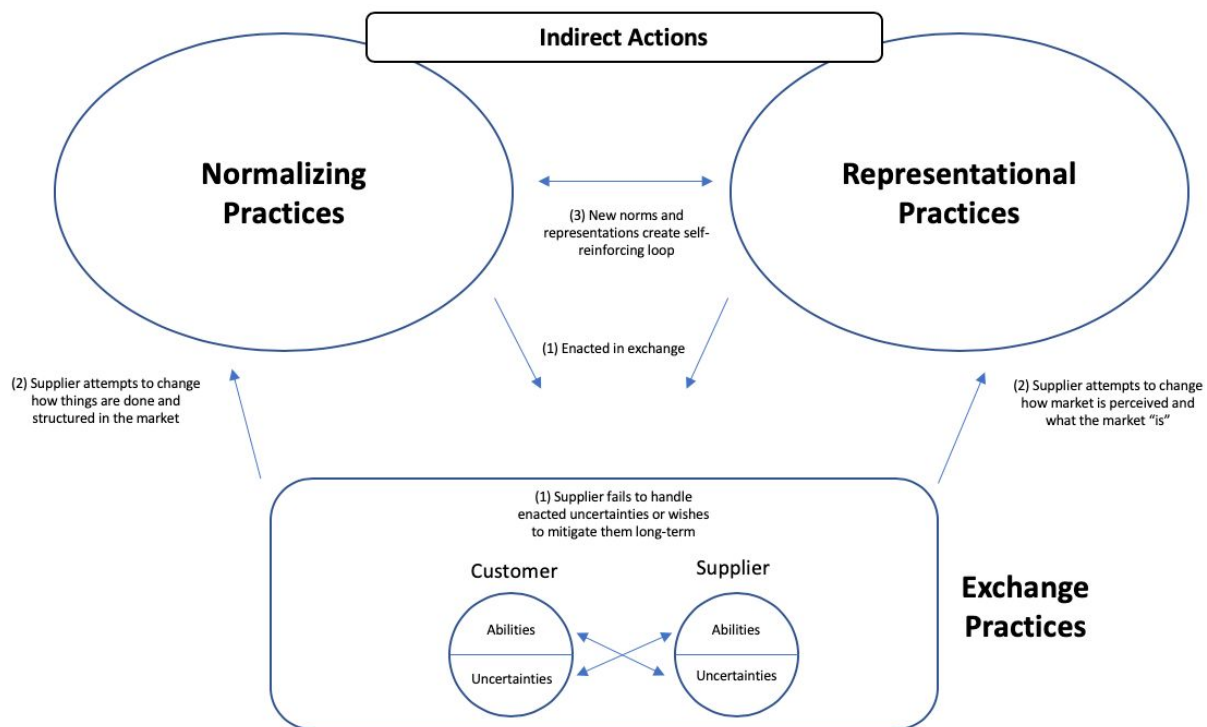


Figure 5: Market Dynamics for Indirect Actions

An example of this is when suppliers educate and legitimate the market by supporting Swedish EdTech Industry. Swedish EdTech Industry engages in activities such as creating public procurement guides (Swedish EdTech Industry, n.d.-a). These new guides then change the

practices for how procurement is conducted (normalizing) and thus improves the customer abilities and decreases customer uncertainties (e.g. demand abilities going up and need uncertainties going up as customers learn what they need and how to express that). This in turn decreases supplier uncertainties as customers learn how to express their needs and what EdTech products are. On the other hand, it also makes the market more lucrative by improving the conditions and thus opens up for new players to enter the market. As such, suppliers' uncertainties are indeed decreased, but their capacity uncertainties are also potentially increased, as the uncertainties in the market are also what create the opportunities in it. To illustrate this tension, one supplier called the opportunities and challenges a double-sided coin.

5.2.3.3. Avoidance Actions

Avoidance actions attempt to cope with customer uncertainties by avoiding them completely. This is usually a result of the supplier perceiving the market to be too uncertainty-filled. This perception could be influenced by previous experiences of exchanges, existing normalizing practices (e.g. tedious public procurement), or more generally other market representations. In either case, the action is based on the supplier's perception of the market and must thus come from the result of some kind of representational action. These actions may then influence the market through effects from adjacent markets (Kjellberg & Olson, 2017).

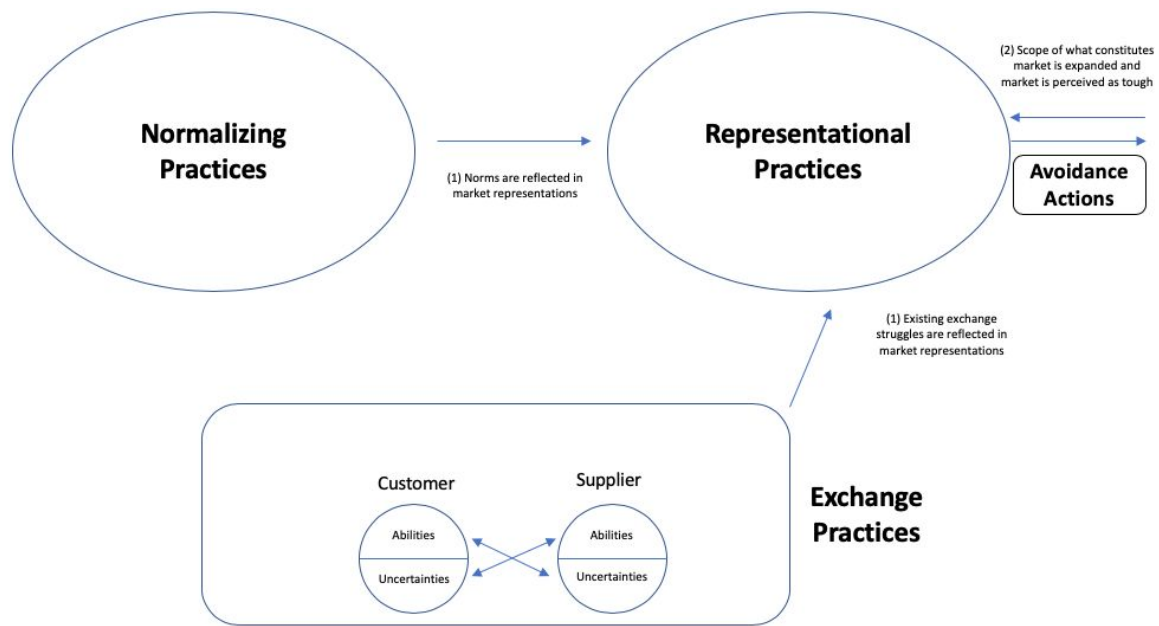


Figure 6: Market Dynamics for Avoidance Actions

When a supplier engages in an avoidance action, the supplier engages outside the frame of the market. In this thesis, that frame is the K12 market for instructional tools, but that frame is performative and ever-changing (Kjellberg & Helgesson, 2007), meaning that it must not be that way. In either case, the supplier's action may impact the existing market. For instance, the frame of the market may widen. From an industry report (Carlberg et al., 2017), we can see that suppliers' actions to target international markets have resulted in international operations being depicted as something desirable for other actors (representational practices). As a result, the market that suppliers perceive when considering EdTech may have been widened to not only include the Swedish market for instructional tools, but other countries' markets as well. As Kjellberg and Olson (2017) suggest, adjacent markets may influence other practices than just representational ones. However, with the empirics gathered, we have only been able to identify representational influences, which is why that is the only thing included in our model. With that

said, we do not contest that avoidance actions may influence exchange and normalizing practices through adjacent markets.

5.4. Conclusion of Analysis

In light of this study's findings, we have constructed a new theoretical framework to reflect the empirics. The model is illustrated in figure 7 below.

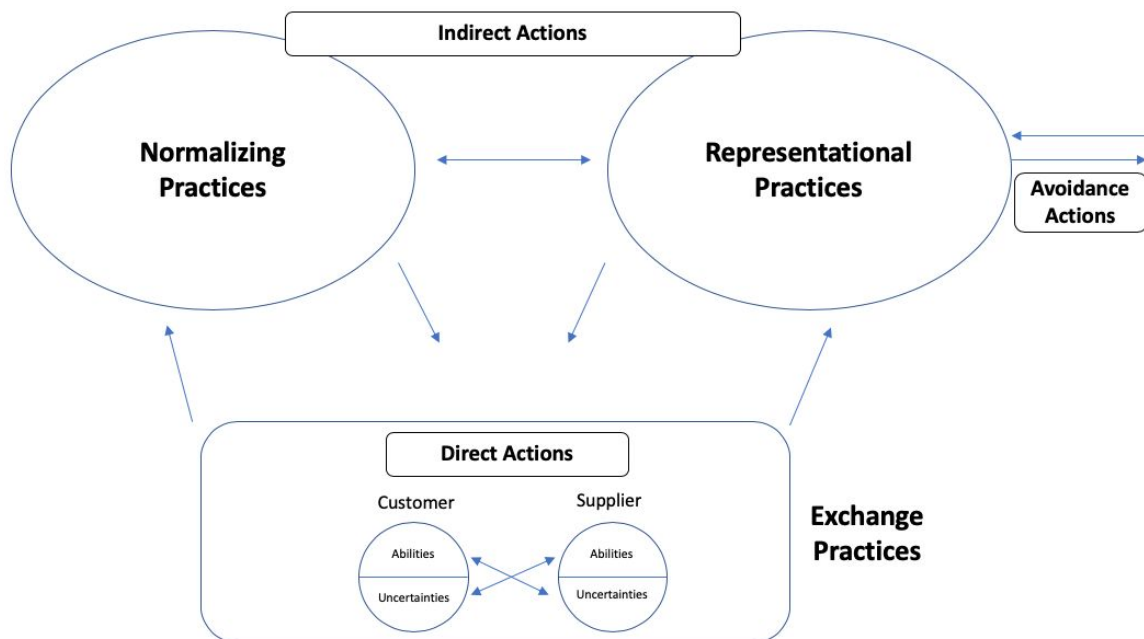


Figure 7: Enhanced Theoretical Framework

This model shows that suppliers engage in different kinds of actions in order to cope with uncertainties. *Direct actions* are used to cope with uncertainties head-on without addressing their root problems. *Indirect actions* are used to influence the structure of the market indirectly by

influencing how things are done and/or how the market is represented directly, i.e. addressing the root causes of the uncertainties. *Avoidance actions* are used to deal with uncertainties by avoiding them altogether.

In turn, all of these actions shape the market in different ways: through direct actions when engaged in repeatedly by groups of suppliers through *norm-creation* and by influencing *one customer at a time*; through indirect actions by *supporting the trade organization* and its work to legitimize and educate the market; and through avoidance actions by *attempting to avoid uncertainties* that in turn may open up the scope of the market.

The empirics also suggests that suppliers engage in different kinds of actions targeting different kinds of stakeholders. Several suppliers appear to attempt to shape the market one customer at a time (using a bottom-up approach where teachers and people on the lower spectrum of the hierarchy are targeted), as well as by supporting other market shaping activities by working with Swedish EdTech Industry and (consciously or not) partnering with larger actors. These market actors may then shape the market in their own ways.

Lastly, it is important to note that actions are not inherently of one kind (Kjellberg & Helgesson, 2007). Actions in different contexts may be of different kinds. For instance, some indirect actions are sometimes direct actions in the sense that it is important for suppliers to educate customers in the transaction at hand in order to gain adoption within a school or municipality.

6. Discussion

This section will discuss the conclusion of the analysis in terms of what abilities are required to shape the market; how the results relate to other previous market research; and how the results link to previous research about uncertainty theory.

6.1. Shaping Markets

In order to engage in indirect actions, suppliers need certain abilities. These abilities are not reflected in the supplier abilities that are used in order to reduce interaction uncertainties. We can infer that the abilities must be able to tackle some of the most challenging issues on the market, namely changing institutions and changing how the market is perceived. The literature suggests that this can be accomplished by converting as many players on the market to a desirable view of the market (e.g. Storbacka & Nenonen, 2011; Akrich et al., 2002; Read, Dew, Sarasvathy, Song, & Wiltbank, 2009) and that the market is shaped by both emerging and intentional actions by market actors (Nenonen et al., 2014).

Relating back to Storbacka and Nenonen (2011), they suggest that there are four ways suppliers can increase configurational fit. First, suppliers can establish means to measure value creation. From our empirics, we see that suppliers engage in this by, for example, building a reference base that appears pivotal for proving to customers that the solution works. Another way that

value has been measured is through the 1:1 initiative that some municipalities have used (perhaps misleadingly) to illustrate the value of a product, though this is solely related to hardware with – as far as we know – a missing corresponding standardized measurement for evaluating EdTech instructional solutions. In this sense, reference building and data collection are currently central aspects of measuring value created by solutions, but one standardized measurement is yet to evolve. Seeing that Swedish EdTech Industry is engaged in standardization work (Swedish EdTech Industry, 2019-b) it is likely that they will take an active role in creating a measurement like this, if ever it gets created.

Second, suppliers can engage in price formation. Again, we see that suppliers engage in this through Swedish EdTech Industry's work to improve the quality of public procurement and to generally influence decision-makers, but see few other supplier activities to influence price formation.

Third, suppliers can engage in value sensing. We have limited data that supports that suppliers do this, but can see that suppliers engage in different kinds of partnerships, mainly with incumbent firms. From industry reports (Carlberg et al., 2017), we see that the ecosystem is weak in EdTech, meaning that interaction between firms may be limited. Two interviewed suppliers also saw limited value in partnerships beyond those focused on sales, though different suppliers had different views on this issue. In this sense, suppliers are likely to engage in some kind of value sensing, but to what extent is not clear.

Fourth, suppliers can attempt to script the market (Storbacka & Nenonen, 2011). We have limited data to support these kinds of activities, though we note that suppliers likely promote their perception of the market in every customer interaction they engage in.

As the above shows, we have discovered few instances of suppliers within the scope of this thesis engaging in intentional market shaping activities. That could be because that was not our primary focus during the interviews. However, we suspect that suppliers do not engage in many such activities because of the characteristics of the EdTech sector. For instance, one supplier expressed frustration over having to educate the whole market and argued that this made disruptive innovation difficult and that being in an industry where buyers do not educate themselves is demanding. As such, we suspect that four factors demotivate suppliers from engaging in market shaping activities. First, the education sector has a rigid institutional structure, making changes slow and difficult to push through. Second, there is a lack of capital in the EdTech sector, making activities to shape the EdTech sector too costly. Third, there is a weak ecosystem in the EdTech sector (Carlberg et al., 2017), making value sensing comparatively difficult in shaping already rigid institutions. Lastly, the sector is populated by a selected few strong players such as publishing houses, large hardware providers, and freemium systems from giants such as Google or Microsoft.

The last point is peculiar and requires further note. We suspect that larger firms engage in market scripting (Andersson et al., 2008) to a larger extent than startups in the EdTech market. There seems to be a battle going on about what the future of EdTech should be. Google and Microsoft

appear to think that EdTech solutions should be complements to their freemium platforms. Some other suppliers appear to think that EdTech should be run through integrations and partnerships between different systems. A third group of EdTech suppliers appear to think that EdTech should consist of separate platforms. Here, small suppliers appear to be predominant. A fourth and last group appear to want to keep the status quo for as long as possible and prevent digitization from happening. Here we include incumbents with incentives to shape the market in different directions. These incumbents are then benefitted by gaining partnerships, because firms need legitimacy and networks in order to promote their own view of the market and influence actors to act according to it (Storbacka & Nenonen, 2011; Akrich et al., 2002; Read et al., 2009; Rinallo & Golfetto, 2006). We are reluctant to point out any type of company here because of lack of empirical data, but suspect that publishing houses could be grouped into this category. At the same time, interviewed suppliers use partnerships, often with incumbents, to deal with uncertainties. From this, we can draw the preliminary conclusion that small suppliers help incumbents shape the market by entering into partnerships with them.

As such, we conclude that most of the interviewed suppliers alone largely miss the abilities required to directly shape the market, but that suppliers can complement this by working together or working with incumbents. The incumbents in turn, are often part of other markets, supporting previous research on the effects adjacent markets have on the EdTech markets (Kjellberg & Olson, 2017).

Lastly, our results suggest that markets, indeed, have blurry boundaries (Nenonen et al., 2014) and that all kinds of practices, especially exchange practices, interrelatedly shape each other (Kjellberg & Helgesson, 2007).

6.2. Uncertainty Theory

The findings of this paper confirms existing views on uncertainties. For instance, the low trust for startups reflects the uncertainty Horton (2019) characterized that buyers have for supplier's capacity. The knowledge uncertainty and choice uncertainty of Urbany et al. (1989) are also reflected in the empirics, with customers having limited knowledge for EdTech products, as well as different alternatives of suppliers. Furthermore, the supplier uncertainties in this study to a large extent match with previous research. For instance, EdTech suppliers are facing an ambiguous buying process from the buyer side, as well as understanding the complex buyer structure, resembling the process uncertainty by Sharma (1998).

We also found that the customers suffer from their own uncertainty, as suggested by some previous research (e.g. Eriksson and Sharma, 2003). The lack of formal decision-making process makes the transaction difficult for buyers themselves, an uncertainty that does not originate from the supplier side. As such, suppliers have to encourage the bottom-up approach on the buyer side and have teachers influence decision makers.

Lastly, the findings in the study suggest that a heavy portion of the supplier actions are around the interaction with the customers. What suppliers do to understand the need of the customers fit in what Leuthesser and Kohli (1995) called initiating behavior and what Brennan and Turnbull (1999) characterized as adaptive behavior can also be reflected in the actions suppliers take, such as providing flexible trial periods. Interestingly, the extra role behavior Wuyts (2007) developed resembles what is characterized as “indirect actions” in this study, as the suppliers also take responsibilities that lie outside of their duty and influence the buyers through extra actions.

In conclusion, this study complements previous research by adding a new dimension showing that suppliers can deal with customer uncertainties and help customers develop abilities by shaping the market at large.

7. Conclusion

In this paper, we have shown that the Swedish EdTech market for instructional tools is full of customer and supplier uncertainties. These uncertainties, in turn, give rise to direct, indirect, and avoidance actions that contribute to suppliers shaping the market in five different ways. First, suppliers engage in *norm-creation* by influencing other actors behaviors based on successful direct actions. Second, suppliers engage in direct actions that shape the market, *one customer at a time*. For instance, suppliers engage closely with customers on the lower level of the pyramid that in turn shape customers and their way of working. Third, suppliers shape the market (consciously or not) by *working with partners* that are often incumbents that may have incentives

to performatively shape the market landscape. Fourth, suppliers shape the market through indirect actions by *supporting the trade organization*, Swedish EdTech Industry, that in turn educates and legitimizes the market. Lastly, suppliers shape the market by *attempting to avoid uncertainties*, which in turn may open up the scope of the market and may also give rise to new practices through adjacent market influences. All of these market shaping methods may reduce uncertainties in the market, but also have the potential of increasing them. We further theorize that the rigid institutions, lack of ecosystem, lack of capital, and dominance of large players heavily influence EdTech players ability to influence the market. For this reason, we suspect that the players that engage in most market shaping activities are incumbents and the trade organization on the market.

7.1. Limitations of the Study

Our methods had several limitations. Because of access issues and a pressing deadline, we conducted a mix of a purposive and practical sampling method, where we concentrated on a segment of the EdTech market but only interviewed people who responded to our messages and only interviewed founders and/or CEO:s, instead of also including other employees from the companies (e.g. sales people who are in daily contact with customers). Furthermore, we have more interviews with some organizations than others, because of access issues. As a consequence, some suppliers' voices are louder in this paper than others. Moreover, we have relied heavily on suppliers' perceptions of the market. The reason for this, too, was access problems resulting from the ongoing COVID-19 crisis. Furthermore, how customer abilities

address supplier uncertainties was not addressed in depth, but we largely assumed that it worked in accordance with the Ford et al. (2003) model, i.e. that the low customer abilities in the EdTech market leave little room for positively impacting supplier uncertainties. This assumption was not, however, confirmed as we only interviewed one municipality during our prestudy. Lastly, the COVID-19 crisis also places doubt on the future of the EdTech market. Seeing that many interviewed suppliers hoped that COVID-19 would change the market for the better, it is a possibility that EdTech's market dynamics are currently changing radically. This is not a limitation of the study per se, but indicates that some of the empirical findings may not reflect the dynamics in the EdTech market after the COVID-19 crisis.

7.2. Theoretical Contribution

This thesis links the uncertainty theory with a markets as practice perspective by investigating how uncertainties in a forming market and the resulting supplier actions taken to cope are involved in shaping an uncertainty-filled market. The results fills the research gap of how exchanges contribute to shaping a market (Mele et al., 2015) and preliminarily complements Storbacka and Nenonen's (2011) theory about how firms can achieve configurational fit, by illustrating how specific actions and their consequences can shape markets. This thesis also sheds light on the current situation of the Swedish EdTech market, where private-public interactions are central to the buying process, thereby making the findings potentially adaptable in other sectors characterized by private-public interaction.

7.3. Managerial Implications

The findings of this thesis are applicable to the EdTech market for instructional tools, but also to other markets with similar characteristics. For suppliers operating in environments full of uncertainties, it is important to know that the counterpart might not be able or willing to develop abilities to cope with their uncertainties, thus making it necessary for suppliers to form abilities first and utilize these to influence buyers and then help customers develop abilities. It is also essential to not only focus on the exchange practices and the very transactions involved, but also to think about actions that can shape the market in ways that benefit future exchanges. Another point is that direct supplier actions that directly cope with uncertainties and avoidance actions, that circumvent the uncertainties, might lead to new uncertainties in the future. Therefore, it is important for suppliers to evaluate what long-term consequences their actions may have and whether they should give more focus to shaping the market at large, rather than focusing on consummating individual exchanges.

7.4. Future Research

The empirics and results of this study give rise to five interesting future research areas. First, it would be interesting to shed light on how companies in different phases of their life cycles engage in market shaping activities. Second, it would be interesting to systematically research what abilities suppliers need in order to shape the rigid EdTech market. Third, it would be interesting to make a longitudinal study where interactions between a set of suppliers and

customers are followed, to see what kind of market shaping activities these interactions give rise to. A fourth interesting area of research would be to study what perceptions of EdTech key market actors have (e.g. teachers, municipalities, incumbents, other suppliers, etc.) and what performative effects these perceptions have on the EdTech market. Lastly, it would be interesting to replicate this study but expand it by bringing in perspectives from other market actors than suppliers.

8. References

- Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002). The Key to Success in Innovation Part I: The Art of Intersement. *International Journal of Innovation Management*, 06(02), 187-206. <https://doi.org/10.1142/S1363919602000550>
- Andersson, P., Aspenberg, K., & Kjellberg, H. (2008). The configuration of actors in market practice. *Marketing Theory*, 8(1), 67–90. <https://doi.org/10.1177/1470593107086485>
- Araujo, L. (2007). Markets, market-making and marketing. *Marketing Theory*, 7(3), 211-226. <https://doi.org/10.1177/1470593107080342>
- Araujo, L., Kjellberg, H., & Spencer, R. (2008). Market practices and forms: introduction to the special issue. *Marketing Theory*, 8(1), 5–14. <https://doi.org/10.1177/1470593107086481>
- Badhani, S., & Mut, J. (2017). *Business Model Innovation in Edtech: An exploratory study of business model innovation in a complex market environment* (Master's thesis, Stockholm School of Economics, Stockholm). Retrieved from https://hhs.primo.exlibrisgroup.com/permalink/46SSOE_INST/1r9ksa/alma991001014359706056
- Barney, J. B. (1996). The Resource-Based Theory of the Firm. *Organization Science*, 7(5), 469–469. <https://doi.org/10.1287/orsc.7.5.469>
- Brennan, R., & Turnbull, P. (1999). Adaptive Behavior in Buyer–Supplier Relationships. *Industrial Marketing Management*, 28(5), 481–495. [https://doi.org/10.1016/S0019-8501\(99\)00057-7](https://doi.org/10.1016/S0019-8501(99)00057-7)
- Bryman, A., & Bell, E. (2011). *Business research methods* (3. ed.). New York, NY: Oxford University Press.
- Callon, M. (1998). An essay on framing and overflowing: Economic externalities revisited by sociology. *The Sociological Review*, 46(1), 244-269. <https://doi.org/10.1111/j.1467-954X.1998.tb03477.x>
- Callon, M., Méadel, C., & Rabeharisoa, V. (2002). The economy of qualities. *Economy and Society*, 31(2), 194-217. <https://doi.org/10.1080/03085140220123126>

- Carlberg, N. (2017). *Svensk EdTech 2017: Tillväxtbransch ökar igen, unga bolag växer snabbast*. Retrieved from the website of Swedish EdTech Industry
http://media.swedishedtechindustry.se/2017/09/Edtechrapport_-Svensk-edtech-o%CC%88kar-tillva%CC%88xt.pdf
- Carlberg, N., Hylén, J., Jeppesen, J. (2017). *Svensk EdTech: möjligheter och utmaningar för en bransch i stark tillväxt*. Retrieved from the website of Swedish EdTech Industry
<http://www.edtechsweden.se/~media/files/edtech/for-besokare/svensk-edtech-final.pdf>
- Dimoka, A., Hong, Y., & Pavlou, P. (2012). On Product Uncertainty in Online Markets: Theory and Evidence. *MIS Quarterly*, 36(2), 395–426. <https://doi.org/10.2307/41703461>
- Dubois, A., & Gadde, L. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55(7), 553–560. [https://doi.org/10.1016/S0148-2963\(00\)00195-8](https://doi.org/10.1016/S0148-2963(00)00195-8)
- Edtech Southeast Sweden. (n.d.). Edtech Southeast Sweden | Digitalisering av utbildning och lärande. Retrieved 2020 May 11 from <https://edtechsoutheast.se/en/>
- EdTechXGlobal. (2016, March 25). Global report predicts EdTech spend to reach \$252bn by 2020. *Cision PR Newswire*. Retrieved from
<https://www.prnewswire.com/news-releases/global-report-predicts-edtech-spend-to-reach-252bn-by-2020-580765301.html>
- Eriksson, K., & Sharma, D. (2003). Modeling uncertainty in buyer–seller cooperation. *Journal of Business Research*, 56(12), 961–970. [https://doi.org/10.1016/S0148-2963\(01\)00331-9](https://doi.org/10.1016/S0148-2963(01)00331-9)
- Fligstein, N. (1996). Markets as Politics: A Political-Cultural Approach to Market Institutions. *American Sociological Review*, 61(4), 656–673. <https://doi.org/10.2307/2096398>
- Ford, D., Gadde, L., Håkansson, H., & Snehota, I. (2003). *Managing business relationships* (2. ed.). Chichester, United Kingdom: Wiley.
- Gao, T., Wang, Y., Sirgy, M. J., & Bird, M. M. (2002). An Integrative Model on the Antecedents of Buyer Decision-Making Uncertainty in Organizational Purchasing. In Ramizwick and Tu Ping (Eds.), *AP - Asia Pacific Advances in Consumer Research Volume 5* (p. 41-47). Valdosta, GA: Association for Consumer Research.
- Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91(3), 481–510. <https://doi.org/10.1086/228311>
- Granovetter, M., & McGuire, P. (1998). The Making of an Industry: Electricity in the United States. *The Sociological Review*, 46(1), 147-173. <https://doi.org/10.1111/j.1467-954X.1998.tb03473.x>
- Guest, G., Namey, E. E., & Mitchell, M. L. (2013). *Collecting Qualitative Data: A Field Manual for Applied Research*. London: SAGE Publications. <https://doi.org/10.4135/9781506374680>
- HolonIQ. (2019, January 24). *Global education technology market to reach \$341B by 2025* [Press release]. Retrieved from
<https://markets.businessinsider.com/news/stocks/global-education-technology-market-to-reach-341b-by-2025-1027892295>
- Horton, J. J. (2019). Buyer uncertainty about seller capacity: Causes, consequences, and a partial solution. *Management Science*, 65(8), 3470-3469. <https://doi.org/10.1287/mnsc.2018.3116>
- Jaworski, B., Kohli, A., & Sahay, A. (2000). Market-driven versus driving markets. *Journal of the Academy of Marketing Science*, 28(1), 45–54. <https://doi.org/10.1177/0092070300281005>

- Kjellberg, H., & Helgesson, C. (2006). Multiple versions of markets: Multiplicity and performativity in market practice. *Industrial Marketing Management*, 35(7), 839–855. <https://doi.org/10.1016/j.indmarman.2006.05.011>
- Kjellberg, H., & Helgesson, C. (2007). On the nature of markets and their practices. *Marketing Theory*, 7(2), 137–162. <https://doi.org/10.1177/1470593107076862>
- Kjellberg, H. (2008). Market practices and over-consumption. *Consumption Markets & Culture*, 11(2), 151–167. <https://doi.org/10.1080/10253860802033688>
- Kjellberg, H., Storbacka, K., Akaka, M., Chandler, J., Finch, J., Lindeman, S., Löbner, H., Mason, K., Mccoll-Kennedy, J., & Nenonen, S. (2012). Market futures/future markets: Research directions in the study of markets. *Marketing Theory*, 12(2), 219–223. <https://doi.org/10.1177/1470593112444382>
- Kjellberg, H., Azimont, F., & Reid, E. (2015). Market innovation processes: Balancing stability and change. *Industrial Marketing Management*, 44(C), 4–12. <https://doi.org/10.1016/j.indmarman.2014.10.002>
- Kjellberg, H., & Olson, D. (2017). Joint markets: How adjacent markets influence the formation of regulated markets. *Marketing Theory*, 17(1), 95–123. <https://doi.org/10.1177/1470593116658203>
- Konkurrensverket. (2020). Tröskelvärden. Retrieved 2020 May 11 from <http://www.konkurrensverket.se/upphandling/om-lagstiftningen/troskelvarden/>
- Langley, A. (1999). Strategies for theorizing from process data. *The Academy of Management Review*, 24(4), 691–710. <https://doi.org/10.2307/259349>
- Leuthesser, L. (1997). Supplier relational behavior: An empirical assessment. *Industrial Marketing Management*, 26(3), 245–254. [https://doi.org/10.1016/S0019-8501\(96\)00092-2](https://doi.org/10.1016/S0019-8501(96)00092-2)
- Leuthesser, L., & Kohli, A. (1995). Rational behavior in business markets: Implications for relationship management. *Journal of Business Research*, 34(3), 221–233. [https://doi.org/10.1016/0148-2963\(95\)00006-E](https://doi.org/10.1016/0148-2963(95)00006-E)
- Mele, C., Pels, J., & Storbacka, K. (2015). A holistic market conceptualization. *Journal of the Academy of Marketing Science*, 43(1), 100–114. <https://doi.org/10.1007/s11747-014-0383-8>
- Nenonen, S., Kjellberg, H., Pels, J., Cheung, L., Lindeman, S., Mele, C., Sajtos, L., Storbacka, K., Brodie, R., & Storbacka, K. (2014). A new perspective on market dynamics: Market plasticity and the stability–fluidity dialectics. *Marketing Theory*, 14(3), 269–289. <https://doi.org/10.1177/1470593114534342>
- North, D. (1991). Institutions. *The Journal of Economic Perspectives*, 5(1), 97–112. <https://doi.org/10.1257/jep.5.1.97>
- OECD. (2018). *OECD Reviews of Digital Transformation: Going Digital in Sweden*. Paris, France: OECD Publishing. <https://doi.org/10.1787/9789264302259-en>
- Oosterhuis, M., van Der Vaart, T., & Molleman, E. (2011). Perceptions of technology uncertainty and the consequences for performance in buyer-supplier relationships. *International Journal of Production Research*, 49(20), 6155–6173. <https://doi.org/10.1080/00207543.2010.527386>
- Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS quarterly* 31(1), 105–136. <https://doi.org/10.2307/25148783>
- Pfeffer, J., & Salancik, G. R. (2003). *The External Control of Organizations: A Resource Dependence Perspective*. California, CA: Stanford University Press.

- Read, S., Dew, N., Sarasvathy, S. D., Song, M., & Wiltbank, R. (2009). Marketing under uncertainty: The logic of an effectual approach. *Journal of Marketing*, 73(3), 1-18. <https://doi.org/10.1509/jmkg.73.3.001>
- Rinallo, D., & Golfetto, F. (2006). Representing markets: The shaping of fashion trends by French and Italian fabric companies. *Industrial Marketing Management*, 35(7), 856–869. <https://doi.org/10.1016/j.indmarman.2006.05.015>
- Rosa, J., Porac, J., Runser-Spanjol, J., & Saxon, M. (1999). Sociocognitive dynamics in a product market. *Journal of Marketing*, 63, 64–77. <https://doi.org/10.1177/00222429990634s108>
- Sharma, D. D. (1998). A model for governance in international strategic alliances. *Journal of Business & Industrial Marketing*, 13(6), 511–528. <https://doi.org/10.1108/08858629810246814>
- Slovik, P. (2010). Market uncertainty and market instability. In Bank for International Settlements (Ed.), *Initiatives to address data gaps revealed by the financial crisis* (p. 430-435). Basel: Bank for International Settlements.
- Storbacka, K., & Nenonen, S. (2011). Markets as configurations. *European Journal of Marketing*, 45(1/2), 241-258. <https://doi.org/10.1108/03090561111095685>
- Swedish EdTech Industry. (n.d.-a). Att köpa edtech, stöd vid inköp och upphandling. Retrieved 2020 May 10 from <https://swedishedtechindustry.se/edtechkartan/att-kopa-edtech-ett-stod-vid-inkop-och-upphandling/>
- Swedish Edtech Industry. (n.d.-b). Edtechkartan.se - Swedish EdTech Industry. Retrieved 2020 April 15 from <https://www.edtechkartan.se/>
- Swedish EdTech Industry. (n.d.-c). Om oss. Retrieved 2020 May 7 from <https://swedishedtechindustry.se/om-oss/>
- Swedish EdTech Industry. (2019-a). *Att köpa edtech - olika upphandlingsförfaranden, ord- och begreppslista*. Retrieved from <https://www.edtechkartan.se/cms/wp-content/uploads/2019/11/PDF-Ink%C3%B6psf%C3%B6rfarande-ur-Att-k%C3%B6pa-edtech-olika-upphandlingsf%C3%B6rfaranden-ord-och-begreppslista.pdf>
- Swedish EdTech Industry. (2019-b). Ny studie: Standarder för datadrivna processer i skolan. Retrieved 2020 May 9 from <https://swedishedtechindustry.se/uncategorized/ny-studie-standarder-for-datadrivna-processer-i-skolan/>
- Swedish Edtech Industry. (2020). Edtechtempen 20 april. Retrieved 2020 May 7 from <https://www.edtechkartan.se/cms/wp-content/uploads/2020/04/Edtechtempen-l%C3%A4gesrapport-20-april-2020.pdf>
- Swedish Edtest. (n.d.). Om. Retrieved 2020 April 26 from <https://edtest.se/om/>
- Urbany, J., Dickson, P., & Wilkie, W. (1989). Buyer Uncertainty And Information Search. *Journal of Consumer Research*, 16(2), 208–215. <https://doi.org/10.1086/209209>
- Utbildningsdepartementet. (2017). *Nationell digitaliseringsstrategi för skolväsendet*. Retrieved from <https://www.regeringen.se/4a9d9a/contentassets/00b3d9118b0144f6bb95302f3e08d11c/nationell-digitaliseringsstrategi-for-skolvasendet.pdf>
- Wallin, F. (2020, March 1). Ny statistik: Sverige satsar minst pengar i Norden på läromedel. *Skolvärlden*. Retrieved from <https://skolvarlden.se/artiklar/ny-statistik-sverige-satsar-minst-pengar-i-norden-pa-laromedel>
- Wuyts, S. (2007). Extra-role behavior in buyer–supplier relationships. *International Journal of Research in Marketing*, 24(4), 301–311. <https://doi.org/10.1016/j.ijresmar.2007.05.002>

9. Appendices

Appendix 1: Interviews Conducted

All interviews were conducted between January and April.

Interviewee	Duration (minutes)	Recorded
Prestudy Expert	60	Yes
Prestudy Municipality/Expert	60	No
Supplier 1 (Prestudy)	60	No
Supplier 1 (Main Study)	60	Yes
	60	Yes
	40	Yes
Supplier 2	60	Yes
	60	Yes
Supplier 3	60	Yes
	60	Yes
Supplier 4	60	Yes
Supplier 5	60	Yes
Supplier 6	60	Yes
Supplier 7	45	Yes
Supplier 8	60	No

Appendix 2: Interview Guide

Introduction

- Thank you for taking the time to talk to us.
- Give an introduction of the project and ourselves.
- Structure of interview
- Is it OK to record?

Context questions

- Tell us a bit about yourself.
- To founder
 - What was the original idea of the company?
 - Why did you start the company?
 - Has the company's products/services changed over the years?
 - When the company was founded, how did you know that there was a need for the product?
- What is your role in the company?
- How long have you been with the company?
- What is your payment model? What is your business model? How do you earn money?

Customers

- Who are your classic customers?
 - Do you work directly with teachers, principals, or even municipalities?
 - How do you interact with the different stakeholders on the buyer side?
 - Does who your customers are ever change? [direct procurement amount]
 - How do you work with public procurement?
- How do you usually get in touch with them? [**market uncertainty**]
 - How do you know that the customer needs your product in particular?
 - How do customers usually hear about you?
 - What are your most common reach out channels?
- How long have you been working with them?
- What products do you provide them? What is the value that you provide to them?

Customer uncertainties / Supplier abilities

- How do your customers communicate what they want? [**need uncertainty**]
 - Are your customers able to describe their problems clearly or are they aware of their problems at all?

- What is your role in helping customers express their needs?
- What do customers expect from your product?
- Has this changed over time?
- How well aware are customers of EdTech products? [**need uncertainty**]
- How do you know what the customer wants? [**problem-solving ability**]
 - Has this changed over time?
- How do you adjust your solution to changing customer needs? [**need uncertainty**]
 - Has this changed over time?
- How do you capture feedback from customers? [**need uncertainty**]
 - What kind of feedback do you usually receive from the customer?
 - Has this changed over time?
- How do your customers know that you deliver what you will promise? [**transaction uncertainty**]
 - Given that you are a new company in the startup phase.
 - How long do your customers need to commit to your product? Do they pay monthly, yearly, or how do they pay?
 - Has this changed over time?
- How long are usually your trial periods (before purchase)? [**transfer ability**]
- How do you maintain your relationship with the customer? [**transfer ability**]
 - Has this changed over time?
- How long does it take to install/implement your service at the customer? [**transfer ability**]
 - Is the implementation time communicated at the time of purchase?
 - How much effort does it take to make the teachers completely comfortable with the product?
 - Has this changed over time?
- How do you work with partners, if you do?
 - Integrations, helping in the selling process, etc.

Complementary questions

- [specific testing themes from other interviews and secondary sources]

Closure

- To end with an open question: What do you perceive are the largest uncertainties in the market?
- Do you have any questions for us?

Thank you very much for the interview!

Appendix 3: Initial Thematic Analysis

General Themes	Challenges Identified	Actions
Low customer competence	Low purchasing competence	Educating the buyers and users Supporting Swedish EdTech Industry Close and high-touch contact with the customers
	Low digital competence	
	Customer focus on solution rather than on the problem	
Complex customer structure	Long and complex buying process	Using multiple touchpoints to influence Give free or cheap trial periods for long periods Influence actors on the bottom to sell solutions to the top Educate the buyers and users Contact customers on a regular basis Being patient Gaining references & brand exposure
	Complex buyer structure	
	Teachers and ICT pedagogues need to sell solutions to municipalities	
	Lack of formal decision-making process	
	Buyer-user disconnect	
Demanding user conditions	Teachers have little time	Give free or cheap trial periods for long periods Close and high-touch contact with the customers Contact customers on a regular basis Educate users Gaining references & brand exposure
	Adoption within schools is difficult	
Traditional market culture	Slow-moving and traditional	Using multiple touchpoints to influence Educating the buyers and users Give free or cheap trial periods for long periods
	Resistance to change	
	Adapting old ways to procure for new types of products	
Ambiguous perceptions of what the market is	Perception of products as content instead of system	Combining systems with contents Educating the buyers and users
	Ambiguities about what the market is	
Low price sector	Low willingness to pay for educational products	Target municipalities to get spread of product Use resellers to circumvent costly procurement process Target other groups of customers, as corporations Go below the direct procurement threshold and target schools/teachers directly Internationalize business Long commitment periods to products
	Low budget of teachers	
	Public procurement process pushing prices down	
	Competition is broad and fierce	
Small market size	Swedish EdTech market is small	Internationalize business

	Low capital in EdTech market Limited private school market Content providers develop exclusive content for Sweden	Target other groups of customers, as corporations Keep a tight budget
Segregated market	Varying user knowledge about what they need Segregated and decentralized market	Educating the buyers and users Use resellers to circumvent costly procurement process Use broad target group
Adjacent markets with strong influence	Adjacent markets that affect Large and powerful actors	Form partnerships with powerful partners (e.g. use resellers to circumvent costly procurement process) Avoid direct competition by filling niches Educating the buyers and users
Tight regulations	Requirement to publicly procure products over the direct procurement threshold	Use gatekeepers to circumvent costly procurement process Go below the direct procurement threshold and target schools/teachers directly

Appendix 4: Development of EdTech

