Discursive legitimation

The influences of organisational and product aspects on the discursive legitimation practices of mHealth vendors

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Abstract

Discursive legitimation literature has insufficiently explored what influences the discursive legitimation practices of organisations trying to build legitimacy towards a new technology. This research will study two organisational and two product variables which are expected to influence this. These variables will be studies in the case of the legitimation of mHealth applications in the Netherlands. Through a discourse analysis, the online discursive practices of 12 mHealth vendors, legitimating in total 16 mHealth applications are studied. The analyses shows that both the organisational variables of incumbency and specialisation and that the product variable, product phase, influence the discursive legitimation practices of the mHealth vendors. This research also shows that the other product variable, product functionality, did not influence this. Future research should focus on corroborating the proposed relationships between the variables and the discursive practices in other organisations and industries.

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1. Introduction

Scholars claim that mHealth has great potential in transforming the healthcare system in developed as well as in developing countries (Dehzad, Hilhorst, De Bie, & Claassen, 2014; Mechael, 2009; Vishwanath, Vaidya, Nawal, Parthasarathy, & Verma, 2012; Weinstein et al., 2014). mHealth is the delivery of healthcare practices over a mobile or wireless network (Leslie, Sherrington, Dicks, Gray, & Chang, 2011). In the Netherlands there are many companies focusing on the development of mHealth applications (see smarthealth.nl). However the adoption and diffusion of mHealth applications into the wider society is lagging (Anscombe, Bacardit, & Hamid, 2012; Dehzad et al., 2014; Skulimowski, 2004; Wu, Li, & Fu, 2011). Traditional models of diffusion and adoption of innovations argue that attributes of the innovation and characteristics of the potential adopters are the primary influences of adoption (Denis, Hébert, Langley, Lozeau, & Trottier, 2002; Eveland, 1986; Meyer & Goes, 1988; Rogers, 1995). However, this research will look at the adoption and diffusion of mHealth technologies from an institutional perspective, arguing that these traditional models oversee the broader social and cultural dynamics which are significant to the adoption process (Green, 2004; Hargadon & Douglas, 2001; King & Kugler, 2000).

For innovations to attain social acceptance, organisations must engage action to convince actors in their social setting of the fitness of the innovation to existing norms, values, beliefs and definitions (Onsongo & Walgenbach, 2015). This generalised perception that an innovation is desirable and appropriate within a social constructed system of norms and values means that the technology has legitimacy (Suchman, 1995). The novelty and uniqueness of innovations often results in a lack of legitimacy (Aldrich & Fiol, 1994; Dougherty & Heller, 1994; Zimmerman & Zeitz, 2002). Actors are unfamiliar with the innovation and moreover the innovation might not conform to common understandings or approved standards (Jain & George, 2007). It is necessary for innovations to attain legitimacy in order for resources to be mobilized, for demand to form and for actors in the innovation system to acquire political strength (Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008; Jacobsson & Lauber, 2006). Previous research therefore argues that legitimacy is a prerequisite for the formation of new industries (Bergek, Jacobsson, Carlsson, et al., 2008). The process of building legitimacy is done by actors, called institutional entrepreneurs, who purposefully mobilize resources in order to legitimate organisational phenomena which they highly value (DiMaggio, 1988; Fligstein, 1997; Selznick, 1957).

Phillips, Lawrence, & Hardy (2004) have argued that discourse plays a central role in the legitimation process. Discourse can be used as a tool by actors to shape 'frames' for how people make sense of particular issues and give sense to them (Fairclough, 1992; Hardy, Palmer, & Phillips, 2000). From a discursive perspective, legitimation is defined as; a process whereby agents deploy resources at their disposal to create senses of legitimacy in relation to specific discourses (Vaara & Tienari, 2008). This research therefore holds the understanding that it is not necessarily the nature of an innovation that determines its adoption and diffusion in an industry, but the discursive activities by actors who work to influence the social context of an innovation (Munir & Phillips, 2005).

Previous organisation and management studies have increasingly focused attention on the discursive aspects of legitimation for multiple organisational phenomena and practices (Phillips & Oswick, 2012; Vaara & Tienari, 2008). For example Vaara and Monin (2010) studied the specific discursive dynamics for legitimating the merger between two pharmaceutical companies. Also Vaara, Kleymann, Seristö, and Seristo (2004) show how the strategy of forming airline alliances is legitimated discursively in the airline industry. In addition Garud, Schildt, and Lant (2014) analyse how storytelling is used as a means for entrepreneurs to establish new venture legitimacy. More specifically, on the subject of innovation,

previous research has also shown how discursive strategies are used by institutional entrepreneurs in order to legitimate innovations (Khan, Munir, & Willmott, 2007; Munir & Phillips, 2005; Suddaby & Greenwood, 2005).

While these studies and others have given an important insight into the wide variety of practices and strategies used to construct legitimacy, they generally only provide a descriptive analysis of a specific case or multiple cases (Erkama & Vaara, 2010). Researchers argue that it would be interesting to focus on the essential differences in discursive legitimation patterns between cases and explain these differences (Erkama & Vaara, 2010; Vaara & Monin, 2010). However, there is a relative paucity of knowledge on the underlying processes of discursive legitimation (Joutsenvirta & Vaara, 2015). In general there has been limited interest in the relation between discourse and (social) variables (Van Dijk, 2006). In the few studies that have been performed, the focus has been on providing a direct link between social structures such as gender, age or class with language variation or discourse properties (Van Dijk, 2008). For example Horvath (1987) found that working-class speakers primarily conversed about themselves while the middleclass told stories about distant characters such as public figures or strangers. However these variables are mostly personal and not organisational variables and furthermore they do not relate to the practice of discursive legitimation. Other researchers have related social variables to legitimation in general, but not to the discursive practice of legitimation. For example Dowling & Pfeffer (1975) argue that bigger organisations tend to engage more heavily in legitimation behaviour.

This research proposes that the discursive legitimation practices of an organisation differ along two organisational aspects namely incumbency and specialisation. It is expected that because incumbents and new entrants hold different positions, their discursive strategies differ. Similarly organisations specializing on one industry such as the healthcare sector have a distinct starting position than organisations specialising on multiple industries. Furthermore, this research proposes two product aspects which are also expected to influence the discursive legitimation practices of organisations, namely the product phase and the functionality type of the technology that they are legitimating.

Finally, previous studies have examined discursive legitimation in specific settings such as commission hearings (Suddaby & Greenwood, 2005), actual organisational negotiations (Erkama & Vaara, 2010), annual reports (Milne & Patten, 2002) and numerous media texts (Joutsenvirta & Vaara, 2009; Vaara, Tienari, & Laurila, 2006; Vaara & Tienari, 2002, 2008). However, according to Barros (2014) legitimation on online websites and social media is still an understudied phenomena that should require extra attention. The internet has become embedded in the daily lives of almost all social actors (Wellman et al., 2003). Especially with the upcoming of social media, contemporary discursive practices on the web are a key factor in constructing representations of reality (Mautner, 2005). Mautner (2005) therefore emphasises the analytical potential of web based data for discourse analysis. However, although Herring (2010) agrees with the potential of web based data she draws attention to the differences of web content with that of conventional content. Herring (2010) therefore argues for adopted research methods tailored to the analysis of digital content.

These two literature gaps lead to the formulation of the following research question:

How do organisations differ in their online discursive legitimation practices when discussing a new technology and how do organisational and product aspects influence these differences?

To investigate this research question, this study employs an organisational discourse analysis amongst multiple commercial mHealth vendors in the Netherlands. Discourse analysis provides a framework for analysis of how the mHealth companies discursively frame and build legitimacy towards mHealth technologies in their texts. Furthermore the multi-case analysis allows for the identification of varying

organisational variables and product variables and their relation to differing discursive legitimation practices.

This research will contribute to the discursive legitimation literature because it will provide an understanding of the underlying aspects of the varying choices of legitimation strategies performed by actors. Furthermore this research also contributes to the methodological aspects of the discursive legitimation literature as it will show how the use of data sources can be expanded with online data sources such as Facebook and Twitter.

This report will proceed as follows. The next chapter will describe the theoretical background on which this research lies, the current theory on discursive legitimation and the organisational and theoretical attributes which are expected to influence this. Chapter 3 provides a description of the research method. In chapter 4 the findings of the discourse analysis will be presented and illustrated with quotations from the online sources. Lastly, chapter 5 will contain the conclusions and discussion of this research.

2. <u>Theory</u>

This research takes place within the broader context of the health sector. It explores organisational discourse within the organisational field using the framework of institutional theory. The first section will therefore present a larger theoretical background related to underlying epistemological foundations of discursive legitimation, including institutional theory, institutional entrepreneurship and discourse theory. The second section introduces the discursive legitimation practices which are used as a focal framework in this study. The section thereafter proposes the organisational and product variables which are assumed to influence these legitimation practices. Finally, the last section will draw on the methodological implications of using online data sources.

2.1. Institutional theory

Initially institutional theory focused on explaining how organisations and individuals are influenced by their situational shared meanings (Greenwood, Oliver, Suddaby, & Sahlin, 2008; Greenwood & Suddaby, 2006). It was argued that actors are embedded in a set of socially constructed rules, norms, and ideologies; their institutional environment (Meyer & Rowan, 1977). Through the process of institutionalisation these rules, norms and ideologies are institutionalised into the organisational field i.e. they have taken on a rule-like status in social thought and action (Meyer & Rowan, 1977). The organisational field is the context in which institutions operate. It is defined as: "those organisations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organisations in the field" (DiMaggio & Powell, 1983, p. 14). The institutional environment is divided into regulative, normative and cognitive aspects (Scott, 1995). These institutional aspects are transmitted to newcomers, maintained over long periods of time and are resistant to change (Zucker, 1977). Actors within the organisational field are pressurized to conform to these institutional aspects in order to gain legitimacy and improve their survival prospects (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Legitimacy is a signal of social fitness and is defined as: "a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). Consequently the concern about legitimacy has a homogenizing effect; actors create similar structure and pursue similar behaviour which leads to structural similarities and isomorphism (Dacin, 1997).

2.2. Agency in institutional theory

Several studies observed however, that not all organisations are homogeneous and that organisations are able to interpret and respond differently to institutional pressures (Fligstein, 1997; Greenwood & Hinings, 1996). This suggested that the responses to external pressures can be more varied than initially suggested (DiMaggio, 1988). Furthermore, original institutional theory could not explain institutional change. This led to the development of a new understanding within institutional theory which incorporated an agentic approach. Organisations and individuals were no longer seen as conformers to institutional pressures, but as strategic actors adapting, enacting and working upon them (Greenwood et al., 2008). As a result DiMaggio (1988) proposed the concept of institutional entrepreneurship which is defined as work by actors on their institutional environment in order to realise interests that they value highly (Lawrence, 1999; Maguire, Hardy, & Lawrence, 2004). This new approach also led to another view of legitimacy. Organisations no longer only have to conform to norms, beliefs and rules to gain legitimacy but can take strategic choices to alter the type and the amount of legitimacy (Zimmerman & Zeitz, 2002). Aldrich & Fiol (1994) distinguish between two types of legitimacy, cognitive legitimacy, which refers to the spread of knowledge about an aspect, and social-political legitimacy, which is the generalised perception that something is appropriate and

desirable. The process in which managers extend, maintain, or defend legitimacy, is the process of legitimation (Ashforth & Gibbs, 1990; Dowling & Pfeffer, 1975; Suchman, 1995). The creation of legitimacy is a central element in institutional change, because legitimacy provides the social acceptance of and support for institutions (Bergek, Jacobsson, & Sandén, 2008; Driscoll, 2006).

2.3. A discursive perspective

Recently legitimacy is increasingly understood as a discursive construction. According to Vaara, Tienari, and Laurila (2006,p. 793) legitimacy is "a discursively created sense of acceptance in specific discourses or orders of discourse". In this study, a discourse is defined as "a particular way of talking about and understanding the world (or an aspect of the world)" (Jorgensen & Phillips, 2002, p. 1). A discourse is a "structured collection of texts along with associated practices of textual production, transmission and reception" (Phillips & Oswick, 2012, p. 436). Furthermore this study holds that a discourse is predominantly focused on a specific level (Berendse, 2013; Vaara & Tienari, 2008). The process of building legitimacy entails actors to engage in discursive practices such as creating and disseminating texts and thereby accessing different discourse and creating new ones (Creed, Scully, & Austin, 2002; Hardy et al., 2000; Phillips et al., 2004; Suddaby & Greenwood, 2005). Scholars propose different discursive practices which actors can undertake to build legitimacy such as reframing the meaning of practices (Munir & Phillips, 2005), importing and adapting discourses from other resources (Battilana, Leca, & Boxenbaum, 2009; Phillips et al., 2004) and linking of discursive elements (Laclau & Mouffe, 2001). However researchers argue that legitimation practices are: "specific, not always intentional or conscious, ways of employing different discourses or discursive resources to establish legitimacy" (Vaara et al., 2006, p. 794). It should therefore be noted that the use of such legitimation practices is not always conscious, but often unintentionally (Livio & Tenenboim Weinblatt, 2007).

2.4. Discursive legitimation practices

What follows is a description of three specific discursive practices that can be used to legitimate a new technology. Each of these discursive practices builds towards the legitimacy of a technology at a different discursive level: intertextuality at the context level; discursive framing at the textual level and; legitimation arguments at the micro-text level (see figure 1).
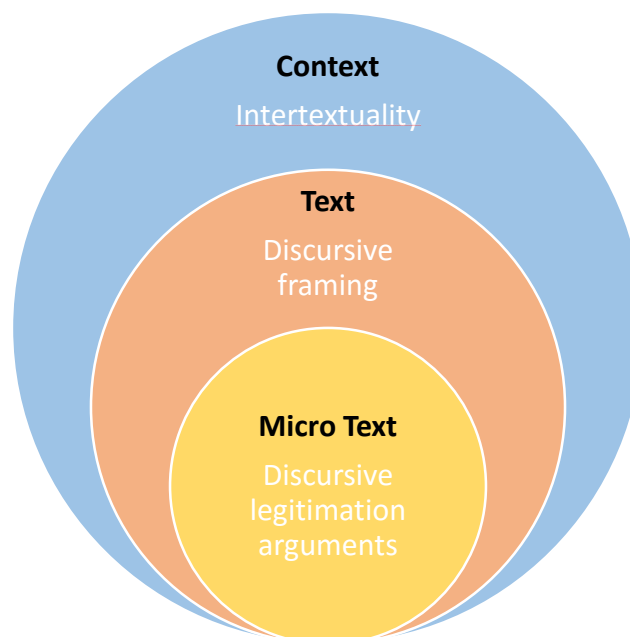

Figure 1 Discursive legitimation practices per level

2.4.1. Intertextuality

Intertextuality, which is drawing on other text and discourses can be an important strategy to bring about change (Hardy et al., 2000). Intertextuality holds the notion that texts are always shaped by previous texts (Bakhtin, 1986). Intertextuality is the practice of connecting texts by incorporating prior text into new contexts (Almhoud, 2015). Intertextuality can help to produce a more broadly grounded understanding and meaning by bringing other voices into a text (Fairclough, 2003). According to Norrick (1989) intertextuality occurs when one text suggests reference to some other identifiable text. Previously intertextuality focused on the direct co-presence between two or more texts, in the form of references or direct quotation. Web based texts have brought a whole new dimension to intertextuality, namely that of hyperlinking. This is wat was studied in this research (Herring, 2010).

2.4.2. Discursive framing

This discursive practice focuses on the specific use of frames in the discursive legitimation process. As mentioned above discourses are specific ways of speaking and constructing social reality. "These discourses provide very different kinds of means for framing specific issues and for establishing legitimacy" (Vaara et al., 2006, p. 797). Therefore by drawing on these different discourses, actors are able to provide different evaluations for a phenomena such as a technology (Vaara & Tienari, 2002). The difference between frames and discourses is that, discourses are a shared and general way of thinking about a technology while frames are more specific as they focus on the meaning and interpretation of specific issues (Geels & Verhees, 2011). It is therefore possible that within a specific discourse, multiple different (competing) frames can be constructed for a specific aspects of a technology (Geels & Verhees, 2011). Frames are thought organisers, highlighting various bits of information about an issue over others, thereby suggesting what is relevant about an issue and what should be ignored (Entman, 1993; Nisbet & Huge, 2006). When framing, some aspects of a perceived reality are selected and made more salient in such a way that it promotes a particular causal interpretation for an item (Entman, 1993). Furthermore frames usually hold a particular problem, and "bring into focus a set of solutions associated with that type of problem" (Bartel & Garud, 2009, p. 112). Framing is therefore used as a tool for the legitimation of new institutions, products and regimes (Bork, Schoormans, Silvester, & Joore, 2015; Geels & Verhees, 2011; Lounsbury & Glynn, 2001).

2.4.3. Discursive legitimation arguments

Furthermore Vaara and Monin (2010) provide a specific framework which explicitly focuses on discourse and the concept of legitimation. The framework is based on Van Leeuwen and Wodak's (1999) framework for analysing the language of legitimation. It elaborates on the different ways through which discourse constructs legitimacy for social practices. Over the years, the original framework by Van Leeuwen and Wodak (1999) has been researched and extended to fit other empirical settings (Vaara et al., 2006). The framework distinguishes between 5 main types of discursive legitimation arguments through which legitimacy is established (Vaara & Monin, 2010);

1) Naturalisation: rendering something natural by a specific discursive means,
2) Rationalisation: providing specific rational arguments to establish legitimacy,
3) Exemplification: using specific examples to establish legitimacy,
4) Authorisation: establishing legitimacy by references to authorities
5) Moralisation: using moral arguments to establish legitimacy

Van Leeuwen (2008) has also assigned several subcategories to some of these legitimation arguments. For example, within the category of authorisation he distinguishes between several subcategories, dependent on in whom or what the authority is vested. These are: personal authority, expert authority,

role model authority, impersonal authority, the authority of tradition and the authority of conformity. The legitimation arguments are used individually in individual texts, however the recurring use throughout the intertextual totality establishes to a total sense of legitimacy (Vaara et al., 2006).

2.5. Product and organisational variables

However, the discursive legitimation practices as juxtaposed above are not infinitely pliable. Actors cannot simply produce discourses to suit their needs (Hardy et al., 2000). They are restrained to the context in which the actor lies (Van Dijk, 2006). This study therefore proposes product and organisational variables which are expected to influence the discursive legitimation practices mentioned above. The two proposed organisational variables influencing the discursive practices of an organisation are incumbency and specialisation and the two product variables are product phase and product functionality type.

2.5.1. Organisational variables

Incumbency

This research proposes that being incumbent or a new entrant may influence the discursive legitimation practices of organisation. The incumbent/new entrant dichotomy has been proposed frequently in the literature such as the debate on market entry (Porter, 1979), innovation (Schumpeter, 1934) and in particular radical innovation (Christensen & Rosenbloom, 1995). Previous literature has proposed that incumbents and new entrants have different characteristics. Due to the liability of newness, new entrants often lack specific resources and capabilities (Teece, 1986). These characteristics give incumbents and new entrants different positions (Smink, Koch, Niesten, Negro, & Hekkert, 2015). For example incumbents often have greater knowledge about customers in the market and a stronger connection with the political system (Chandy & Tellis, 2000; Smink et al., 2015). Also, Smink et al. (2015) observed that new entrants and incumbents adopt distinctly different approaches to communicating when framing technologies to the wider audience. Therefore hypothesis 1 is formulated as follows:

H1: it is expected that the discursive practices produced by incumbent organisations differ from the discursive practices produced by new entrant organisations.

Specialisation

The second variable is that of specialised versus diversified organisations. Specialised organisations are focused on a narrow area of knowledge, skill or activity while diversified organisation have their knowledge, skills and activities in different industries or market sectors (Folinas & Altharwa, 2012). From an institutional perspective diversified organisations can be seen as having heterogeneity; "the presence of different institutional constituents within an organisation, with discrete sets of established interests, norms and beliefs, based on different tasks, background or contacts" (Van Dijk, Berends, Jelinek, Romme, & Weggeman, 2011, p. 1497). Heterogeneity therefore allows an organisation to frame innovations from different perspectives (Battilana & D'Aunno, 2009). This leads to the formulation of the following hypothesis:

H2: it is expected that the discursive practises produced by specialised organisations differ from the discursive practices produced by diversified organisations.

Conceptual Matrix

In figure 2, the two organisational variables are plotted against each other. This matrix proposes that the organisational field is divided into 4 categories: Focused Experts which are incumbent organisations who are specialised in a single sector; Experienced All-rounders which are incumbent organisations that have diversified into multiple sectors; Specialised Novices which are new entrant

organisations that have specialised in a single sector and; Diversified Adventurers which are new entrant organisations that have diversified into multiple sectors.
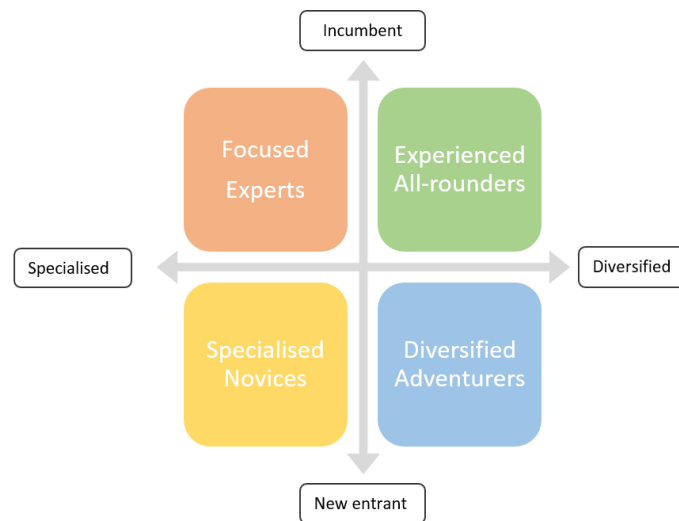

Figure 2 Conceptual matrix for organisational variables

2.5.2. Product variables

Product phase

Bruhn and Ahlers (2011) argue that the communication of an innovation varies along the innovation process. Kotler & Armstrong (2012) distinguish 5 phases that an innovation goes through; product development, introduction, growth, maturity and decline. As this research focuses on a new field it will focus on the first three stages from here on defined as; product development phase, market introduction phase and commercialisation phase. During each phase of the innovation process, different information about the technology is communicated with different goals, to different target groups and through different communication instruments (Bruhn & Ahlers, 2011; Dörner, Gurtner, & Schefczyk, 2009). For example in the development phase, the primary focus is on informing the innovation community about the main developments and sustaining their commitment, while during the market introduction phase a company needs to expose the innovation to its potential customers and convince them to use the new product (Ram, 1989; Bruhn and Ahlers, 2011). Furthermore in the market introduction phase examples of how an innovation contributes and improves a process may be missing while in the commercialisation phase these examples could be actively used for communication (Mast, Huck, & Zerfass, 2005). Based on the above, this research hypothesises that:

H3: It is expected that the discursive practices produced by mHealth vendors differ along the product phase of the mHealth application that they are discoursing.

Product functionality type

Finally, this research proposes that the functionality of the product itself can also influence the discourse that is produced by the mHealth vendors. Previous, marketing literature has provided an insight into the linkage between product functionalities and a firms marketing strategy (Varadarajan & Yadav, 2002). It highlights the differences between goods and services (Shostack, 1977), tangible and intangible products (Levitt, 1981) and search and experience attributes of products (Darby & Karni, 1973). Furthermore specific literature on the marketing of healthcare products proposes that whether a product is for prevention or protection, influences how the product is framed (Demangeot & Broderick, 2010). McArthur and Griffin (1997), therefore argue that different product-market situations demand different communication tools and techniques. This research will therefore argue that mHealth vendors discourse differently according to the functionality of the mHealth application

that they are discoursing. There are many different mHealth products, each with specific functionalities, these can be categorized into specific functionality types as will be shown in the next chapter. This leads to the following hypothesis:

H4: It is expected that the discursive practices produced by mHealth vendors differ according to the product functionality type of the mHealth application that they are discoursing.

2.5.3. Conceptual model

Figure 3 below is a visualisation of the conceptual model. It shows that it is expected that the four independent variables influence the discursive practices of the mHealth vendors. The discursive practices of the mHealth vendors is therefore the dependent variable.
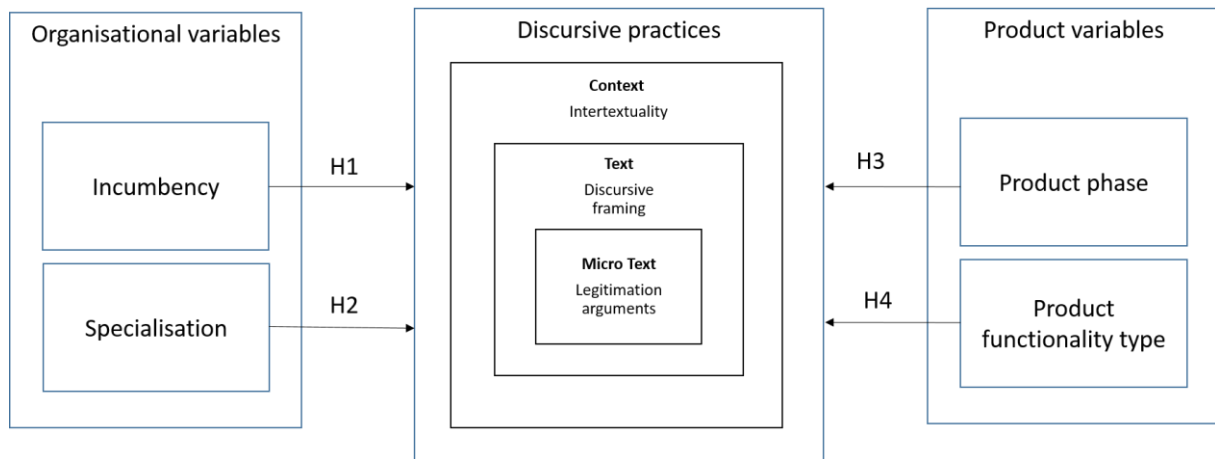
Figure 3 Conceptual model

2.6. Using the web for discursive legitimation

With the term online data this research refers to any digital media that is interactively produced and digitally distributed via the internet or the World Wide Web (Herring, 2004). Online data can be significantly different from traditional data. Online data contains, links, graphics, sound, animations and video and it can incorporate user-interface, user-content and user-interactive features. In conjunction with traditional sources it produces hybrid genres such as online news sites, blogs, wikis, photo and video sharing sites and social network sites (Herring, 2004). A characteristic feature of online web sources is the abundancy of hyperlinks (Herring, 2010). For example previous analysis has revealed that 75% of all tweets include a hyperlink. Also on news websites, blogs, Facebook walls and other online sources hyperlinking is a well-known practice (Herring, 2010; Vaughan, Gao, & Kipp, 2006). The virtual element of hyperlinks allows individual texts to be instantaneously linked to a multiplicity of other texts (Barros, 2014). Barros (2014, p. 13) defines hyper-intertextuality as: "the construction of more immediate, intense and transparent links between texts".

Another concern, involved in online data is the abundance of information (Mautner, 2005). She argues that in order to determine which data should be incorporate in a study, specialised criteria should be developed and applied (Mautner, 2005). Davidson & Reardon (2005) developed such criteria for their study concerning discourse surrounding Electronic Health Records (EHR). They proposed that only data which concerns one of the four aspects should be incorporated into the study. These aspects were; statements about healthcare problems, experiences and problems relating to the technology, core technologies and goals relative to the technology (Davidson & Reardon, 2005).

3. Research Methodology

This research has started out with a general interest in the strategies used to build legitimacy towards mHealth technologies in the Dutch healthcare sector. More specifically, this research is interested in how mHealth vendors purposefully create and manage this legitimacy and if and how this differs amongst the different vendors. This study will therefore perform a discourse analysis as it seeks to understand the textual processes through which practices are made sense of and how they come to be accepted as legitimate and taken for granted (Berendse, 2013).

The discourse analysis methodology is strongly embedded in a social constructionist epistemology which holds that reality does not just exist but is dynamically constructed through meaningful social action (Berendse, 2013; Berger & Luckmann, 1966). A key notion in the study of discourse is that the production and dissemination of texts of various kinds plays an important role in this process of social construction (Phillips & Hardy, 2002; Phillips et al., 2004; Phillips & Oswick, 2012). Discourse analysis is deemed appropriate for research with either a qualitative or quantitative research design (Phillips et al., 2004). This research had a qualitative research design as according to Verschuren, Doorewaard and Mellion (2010) a qualitative research strategy is regularly used for explanatory research as it allows for the examination of a phenomena of which little is known. A study has an exploratory nature when it is used in those situations in which the intervention that is being evaluated has no clear single set of outcomes, as was the case here (Yin, 2009).

The remainder of this section will elaborate on the empirical setting of this research, on how the data was collected and the way in which discourse analysis was used in order to understand the discursive dynamics of legitimation, the central subject of study here.

3.1.   Empirical setting

mHealth is a broad field with many different technologies. Two randomly picked technologies can be very alike but they can also be very different. The technologies are for different end users (patients, doctor, nurse, consumers), in different stages (prevention, treatment, diagnosis) and for different diseases (diabetes, cardiovascular, asthma). While the debate on whether a specialised field of mHealth exists and how to define it is still ongoing, most people agree that the use of mobile communication and devices for providing healthcare services or achieving health outcomes has great potential in transforming the healthcare system in developed as well as in developing countries (Dehzad et al., 2014; Mechael, 2009; Vishwanath et al., 2012; Weinstein et al., 2014). The increase in mobile (smart)phone usage (Heggestuen, 2013; West, 2014) and rollout of 3G & 4G networks (Vishwanath et al., 2012) promise great business opportunities, not only for traditional healthcare players but also for garage-type companies (Research2Guidance, 2014). However, while there are high expectations for mHealth innovations to transform the healthcare industry, it has not reached its scale many had hoped for (Anscombe et al., 2012; Dehzad et al., 2014; Skulimowski, 2004; Wu et al., 2011). An industry report by GSMA (2013) indicates that although initial estimates of mHealth benefits provided by ongoing mHealth pilots and expert opinions have been promising, there is a strong possibility that these potential benefits will be limited if the adoption of mHealth is not encouraged.

3.2.   Case selection

This research will have a case study research design. A case study research design is preferred over other designs such as historical analysis and experiments when the events under study are contemporary events and when behaviours cannot be manipulated (Yin, 2009). Furthermore a case study is typically performed when the context is believed to be important and when it is not clear where the boundaries between the context and the phenomena lie (Yin, 2009). However a common

concern about case studies is that due to the focus on a single case, they do not allow for scientific generalisation (Yin, 2009). In order to address this issue, this research will have a comparative design using a multiple case study approach. A comparative research design embodies the logic of comparison, arguing that we can understand a social phenomenon better when it is compared in relation to two or more other meaningful situations (Bryman, 2012). A comparative research design allows for the identification of concepts and relationships that are relevant to an emerging theory. It therefore makes it possible to establish a better understanding of the circumstances in which the generated theory will or will not hold (Bryman, 2012; Eisenhardt, 1989; Yin, 2009).

The cases selection relied on the concept of theoretical selection, selecting cases according to the organisational and product variables proposed in the theory section (Eisenhardt & Graebner, 2007). Firstly, a longlist was compiled of all the mHealth applications which were found on two reputable news websites concerning mHealth; *www.MobileDoctors.nl* and *www.SmartHealth.com*. Mobile doctors is an initiative of the VvAA (Vereniging voor Verzekering van Artsen Automobilisten) which has the purpose of informing and connecting forward thinking healthcare professionals. Smarthealth.com is the publishing partner of TrendITon, a collaborative program focused on digital health. On both websites the search terms "mHealth", "mobile", "mobiele", "app" were used. Furthermore SmartHealth.com had a publication series called "ehealth op de werkvloer", in which health care professionals who work with eHealth and mHealth applications are interviewed. This yielded a set of articles on mHealth which were read in order to identify any references to specific mHealth applications or organisations developing mHealth applications. In addition mHealth applications were found on the website *www.zorginnovatie.nl*. This website contains a national database of innovations in the healthcare sector. Applications under the typology of mHealth/apps were extracted, and in aggregation with the applications derived from the news websites were compiled in a long list (see appendix 1). It should be stressed that this is not an exhaustive list of all the mHealth applications available. However by compiling a list from two different sources such as news websites reporting on the latest mHealth technologies and a database in which organisations could upload their own mHealth application, this study hoped to catch most of the applications available.

From this long list a short list has been created which includes applications who qualified according to the following criteria. The first criterion is that the mHealth application under development must be designated for at least partial use by healthcare professionals, such as general practitioners, specialists, nurses or homecare workers. This study only focused on mHealth technologies which have a clinical or collaborative use, excluding consumer-centred applications. Consumer-centred applications were excluded for two reasons. Firstly, out of theoretical considerations, consumers have different opinions about mHealth and are therefore addressed differently by vendors (West, 2014). Secondly for more practical reasons due to that fact that there is a fuzzy border when trying to distinguish if a consumer app is a health app or not. An example would be a running app or diet app. A second qualifying criterion is that the applications were being developed by commercial vendors, excluding devices developed by public and semi/public organisations such as healthcare organisations or the ministry of health. This was done because it is assumed that commercial vendors communicate differently and through different sources than public and governmental organisations (Kulkarni, 2014). The last criterion is that the applications should have an active functionality thereby eliminating apps which merely have a static informative functionality. Finally, out of practical considerations the geographical scope of this study was restricted to the Netherlands.

The above mentioned criteria lead to a shortlist of 28 mHealth applications. Each of these applications has been developed by a commercial mHealth vendor. Some vendors have developed multiple applications within the shortlist. The list of applications was therefore transformed to a revised list

covering all the different mHealth vendors. This resulted in a final list of 23 mHealth vendors (see appendix 2) which was used for case selection.

In multiple-case research the selection of cases should follow replication logic rather than sampling logic (Yin, 2009). The replication logic is analogue to that used in multiple experiments; each case must be carefully selected in that it predicts either similar results or contrasting results but for an anticipated reason (Yin, 2009). Organisational cases were therefore selected according to the two variables incumbency and specialisation. Organisations were regarded as incumbent when they "dominated the field by being big, defining the product and reproducing their moves vis-à-vis smaller, challenger firms" (Fligstein, 2002, p. 68). Furthermore, organisations developing products for multiple industries were regarded as diversified whereas those who were only developing products for the healthcare sector were regarded as specialised. The organisations were then placed in the variable matrix as is seen in figure 4.
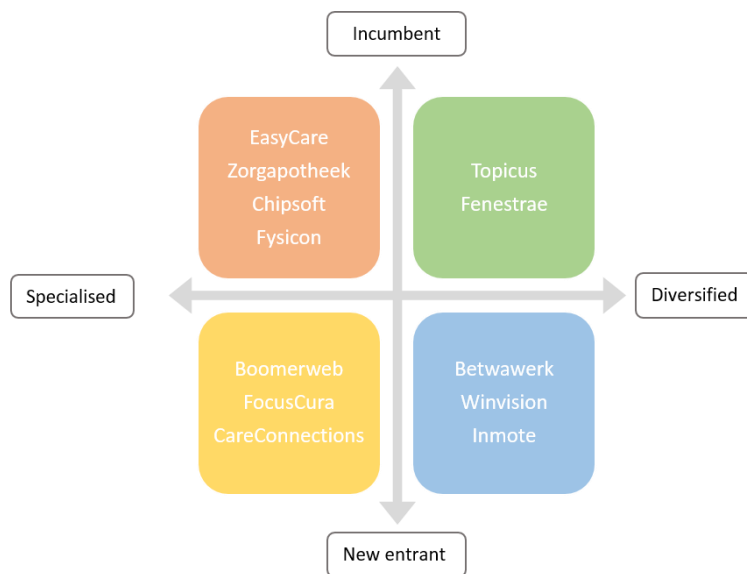
Figure 4 Matrix of the mHealth vendors grouped according to the dimensions of both of the organisational variables

In addition to organisational variables, this study also looked at product variables. Therefore the mHealth applications of the selected cases were grouped according to their functionality and product phase. In total six functionality groups were formed; 1) EHR applications, 2) information exchange applications, 3) medication check applications, 4) wound care applications, 5) video care applications and 6) sensor applications (see figure 5). The classification of these technologies was not predetermined, but emerged from the shortlist of mHealth applications defined above.
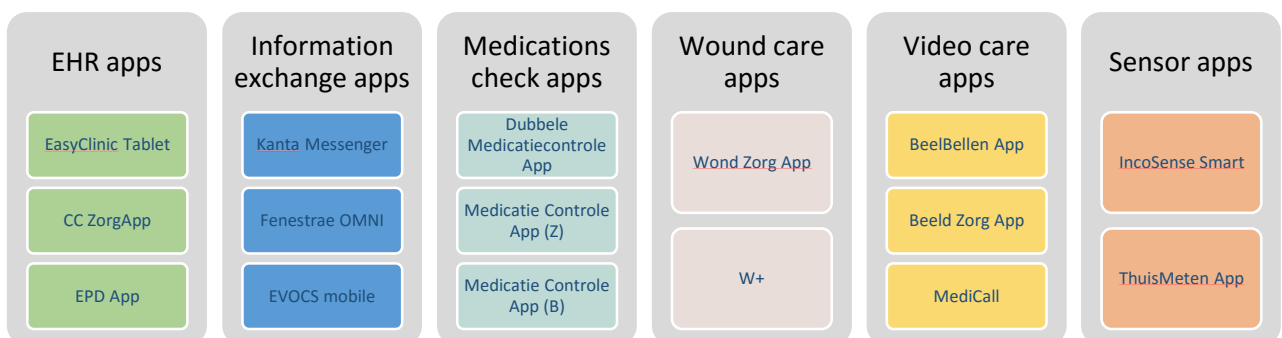
Figure 5 mHealth applications grouped according to the dimensions of the product functionality variable

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Furthermore the mHealth applications from the cases were grouped according to their product phase. The product phase was determined by the introduction date of the mHealth applications. All mHealth applications which were introduced to the market in the year 2015 were determined as in the market introduction phase. Those already on the market in the year 2015 as in the commercialisation phase and all applications not yet available on the market in 2015 as in the product development phase.

Product development phase	Market introduction phase	Commercialisation phase
• EasyClinic Tablet • IncoSense Smart • Dubbele Medicatiecontrole App • EPD App	• CC ZorgApp • Kanta Messenger • Wond Zorg App • Fenestrae OMNI • Medicatie Controle App (Z) • W+ • Medicall	• BeeldBellen App • ThuisMeten App • Medicatie Controle App (B) • Beeld Zorg App • EVOCS Mobile
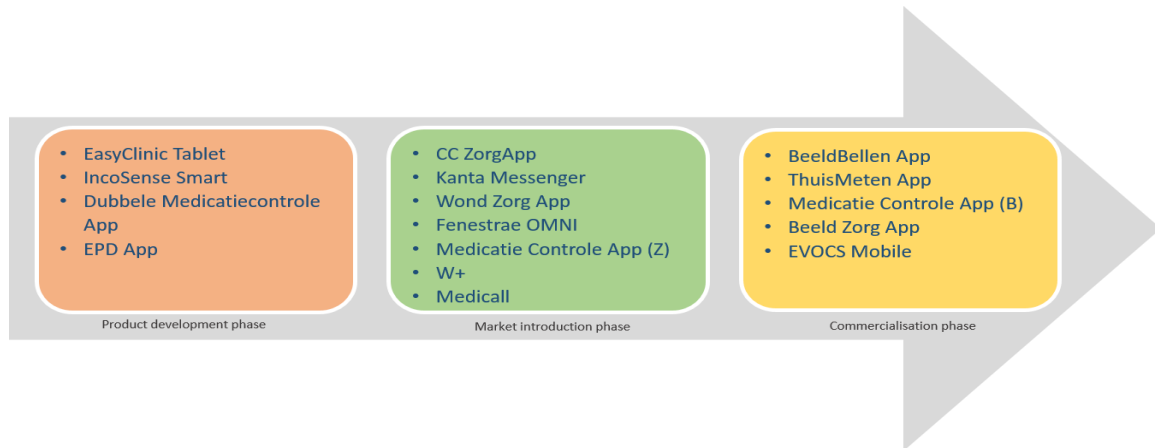
Figure 6 mHealth technologies grouped according to the dimensions of the product phase variable

Although looking at the product variable, the unit of analysis remained the mHealth organisations, as this research is interested in the discourses produced by the organisations themselves, and on how organisational and product variables may influence this. The selection of specific cases was developed in the course of the study, based on analytical grounds. Additional organisational cases were added for analysis based on grounds of the organisational as well as the product variables. A flowchart of the data collection process can be found in appendix 3.

3.3.   Data collection

This research focused on data available on the internet. For this research multiple different data sources were consulted; the company's website, its Facebook wall, Twitter feed and LinkedIn page. A primary reason for choosing these data sources is that they contain texts produced directly by the company itself in contrary to data on news websites which can be altered by journalists. Furthermore, according to Geisler et al. (2001) social media makes up a new and quite influential textual space.

If available for each case, the data was collected from all the four different data sources. Not all companies had a Twitter and Facebook account, so if lacking they could not be used in this study. The data collected for each company is shown in table 1.

Data was extracted from the web via the 'NCapture' tool of NVIVO. NCapture is a web browser extension that can be used to capture online content such as web pages, PDF's and social media data (Bazeley & Jackson, 2013). Webpages, online PDF's and LinkedIn pages were captured as PDF sources while Facebook posts and Twitter contents were captured as dataset sources. Sources on the website were divided into general webpages and news archives/blogs. Relevant webpages and content on these webpages such as marketing and sales brochures, whitepapers and videos were identified using Davidson and Reardon's (2005) criteria. These criteria ensured that only data containing; statements about healthcare problems, experiences and problems relating to mHealth, core mHealth technologies and goals relative to mHealth were incorporated in this study. Relevant news archives and blogs were, if available, found through the search tool using the search terms, mHealth, app, mobile and the app name and were also subjected to Davidson and Reardon's (2005) criteria. Some Facebook and Twitter pages generated more than five years' worth of data. In order to reduce this data to that relevant for

this study, a temporal boundary was set to only include posts posted in the year 2015. All posts before 1-1-2015 and after 31-12-2015 were omitted from the analysis. Each post within the set timeframe was individually evaluated according to Davidson and Reardon's (2005) criteria. An overview of the data source selection process can be found in the flowchart in appendix 4. Furthermore an overview of the amount of data sources for each case for each category is given in appendix 5.

	Website	Twitter	Facebook	LinkedIn
Betawerk	x	-	x	x
Boomerweb	x	x	-	x
CareConnections	x	-	-	X
Chipsoft	x	x	-	x
EasyCare	x	x	-	x
Fenestrae	x	x	-	x
FocusCura	x	x	x	x
Fysicon	x	x	x	x
Inmote	x	x	-	x
Topicus	x	x	-	x
Winvision	x	x	x	x
Zorgapotheek	x	x	-	x

Table 1 Use of online data sources per case

3.4. Data analysis

The analysis focused on the three discursive practices as mentioned in the theory section; an intertextual analysis to analyse the intertextual practices; a frame analysis to identify the discourses that were drawn on and the frames that were produced by the mHealth vendors and finally a discursive legitimation arguments analysis to identify the legitimation arguments that were used by the mHealth vendors. Each of these analyses will be explained below.

3.4.1. Context level

Intertextual analysis

This analysis focused on a distinctive method of intertextuality also referred to by Barros (2014) as hyper-intertextuality. In this analysis three dimensions were explored in order to understand how companies drew on outside sources. These were 1) the number of hyperlinks 2) the source type, i.e. identifying what type of sources the hyperlinks led to and 3) source content type, exploring the content of the sources the hyperlinks led to.

For the first dimension, all hyperlinks prevalent in the selected texts were individually analysed. However two types of hyperlinks were excluded from the analysis; website self-links, which are links between webpages within a single website and self-social-media-links, which are links to one's own social medial front page hence not links to specific tweets or posts. According to (Thelwall, Vann, & Fairclough, 2006) these links have a low value relationship content and should therefore be excluded. For the organisational variable, all the hyperlinks provided by a mHealth organisation, which met the inclusion criteria mentioned above, were included in the analysis. However, because some mHealth vendors had multiple mHealth applications, for the product variable, it was a lot harder to determine if a link belonged to a specific mHealth application or not. Therefore, for the product variable only links accompanied by a description that directly or indirectly mentioned the mHealth application or hyperlinks which linked to content on a specifically mentioned mHealth application were included.

The second dimension looked at the sources which the link led to. A distinction was made between self-sources and outside-sources. Self-sources were links to texts produced by the mHealth vendors themselves such as links to their own websites and outside-sources were links to texts produced by others. Multiple differing sources were linked to, such as media websites, governmental websites and healthcare websites etcetera. Each link was coded either as self-source or as an outside-source and in the event of an outside source, the link was also coded for the type of source. When the sources type was media also the type of media was assigned.

The third dimension, source content type, looked at the content of the text to which the hyperlinks linked. For the content type, if available, the tags of the media websites were used to code the content of the outside source. With non-media links and links to media with no tags, the content was coded by the researcher herself. For a complete overview of these dimensions and the coding categories associated with them see appendix 6 and appendix 7.

3.4.2. Textual level

Frame analysis

A frame analysis was performed to identify on which discourses the mHealth vendors drew and how they legitimated their mHealth applications through framing. This was done in two stages. The first stage of this analysis identified the main discourses that the texts of the mHealth vendors drew on. Based on Berendse (2013) and Vaara & Tienari (2002) who argued that discourses can be focused at a specific levels, different discourses were distinguished from the texts of the mHealth vendors. This resulted in the identification of three discourse types: rationalist discourse, operationalist discourse and humanist discourse. Each of these discourses was characterised by a focus on a different level: the rationalist discourse on the healthcare organisation level, the operationalist discourse on the healthcare professional level and the humanist discourse on a patient level. Because authors drew on multiple discourses within a single text, either whole texts, paragraphs or sentences were coded according to the discourses that they drew on. Thereafter for each mHealth vendor and for each mHealth application, the discourse(s) that they predominantly drew on were identified. Because of a variation in the length of texts and due to the fact that either whole texts, paragraphs or sentences were coded, it was meaningless to rely on the number of hyperlinks. A large text could for example have one discourse and therefore have only one code, while another much smaller text could have two alternating discourses which would yield multiple codes for both of the discourses. Therefore the predominant discourse(s) that the mHealth vendors drew on was determined based on the amount of codes in combination with the coverage percentage given by NVivo. The coverage is the percentage of the total source that is coded to a specific node. However because it was only possible to determine the coverage percentage per data source and not per vendor, the main discourse(s) the mHealth vendors drew on were determined approximately by the researcher herself.

The second stage of this analysis was the identification of the different frames. Identification of the different frames was done inductively from the data by performing of a content analysis. For the organisational variables the content analysis was used to identify statements (codes) addressed to two main questions: (1) what are the problems/changes in the healthcare sector? (2) how does mHealth address these problems/changes? For the product variables, the content analysis focused more on the framing of the specific mHealth applications. The three main questions guided this coding analysis were; (1) what are the existing practices used? (2) what are the problems/changes hereof? (3) how does the specific mHealth application address these problems/changes? An overview of the coding scheme can be found in appendix 8. By combining the identified discourse as mentioned above and the codes that were identified in the content analysis, different patterns could be observed. These patterns represented the different frames used by the mHealth vendors.

Discursive legitimation arguments analysis

This analysis aims to identify the explicit or implicit discursive arguments which organisations use for the legitimation of mHealth technologies (Vaara & Monin, 2010). Contrary to the other two analyses, this analysis took a more deductive approach. In practice Vaara and Monin's (2010) framework of authorisation, rationalisation, naturalisation, exemplification and moralisation, as mentioned in the theory section was used as a basis for this analysis. These categories and their sub-categories formed the basis for the coding scheme. The empirical data was then coded in order to identify such legitimations arguments in the texts produced by the mHealth vendors. During the analysis the coding scheme was developed and redefined in order to fit the empirical data, for example three additional types of authorisation were identified; user authorisation, user-involvement authorisation and alliances authorisation. A complete overview of the redefined coding scheme can be found in appendix 9.

Although described here as a sequential process, in reality the three analyses mentioned above were performed simultaneously and alternatively while going through the empirical data. As is often the case in discourse analysis, this study has an abductive nature, meaning that theoretical ideas were developed alongside an increasingly targeted empirical analysis (Glaser & Strauss, 1967). Data was labelled, categorised and constantly compared, in order to identify emerging categories and patterns showing how the mHealth vendors with diverse organisational and product variables differ. An overview of the analyses and the level they focused on are shown in figure 7 below.
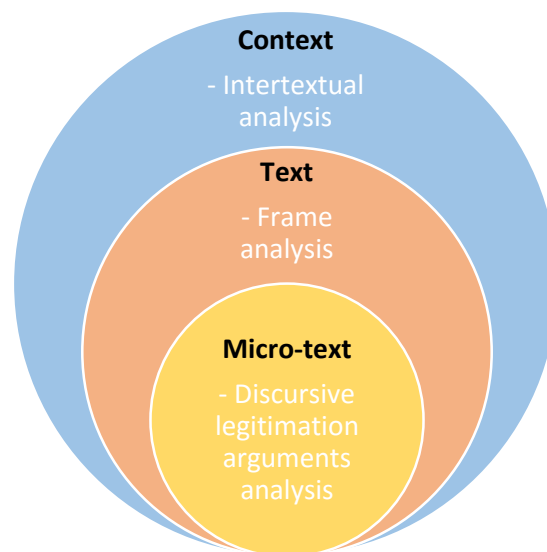
Figure 7 Data analysis framework, with proposed discourse analysis per level.

3.5. Quality of the data

Reliability and validity are important criteria for assessing the quality of research in general. Bryman (2012) has proposed a set of criteria for qualitative research. The following section will describe how these criteria were addressed in this research.

Internal reliability/credibility

Internal reliability refers to the fact that there is more than one observer. In other words, the phenomenon is analysed by various researchers and discussed, thoroughly which will lead to inter-observer consistency (Bryman, 2012). This research was only performed by a single person so in order to address this issue, inductive and deductive reasoning steps were substantiated by providing coding

schemes and using quotations from the texts of the mHealth vendors in the findings section (see appendix 6 to 10).

External reliability

External reliability is the degree to which this study can be replicated (Bryman, 2012). To assure replication, a detailed description is given of the selection of cases, by accompanying the selection criteria. The collection and analysis of the data was also described in detail so that the research in principle can be replicated. However the sample for this study is relatively small so other cases could potentially provide different insights.

Internal validity

Internal validity concerns whether there is a good match between researcher observations and the theoretical ideas that are developed. In other words the congruence between concepts and observations (Bryman, 2012). This issue was addressed by constantly comparing the data and the theory under development according to the constant comparative method. Furthermore this was addressed by observing multiple cases (Bryman, 2008).

External validity

External validity is the degree to which the research can be generalised across other social settings (Bryman, 2012). External validity is often problematic for qualitative research as it usually relies on a small sample (LeCompte & Goetz, 1982). This research also encountered this problem as only 12 mHealth vendors were analysed. However, by using the replication logic i.e., selecting cases which predicted similar and contrasting results, some generalisation can be accomplished (Yin, 2009). Furthermore the types of organisations and their technologies differ greatly. The sample included various types of organisations with technologies for different end users (specialists, nurses and homecare workers) which had different purposes (communication, monitoring, and treatment). This will allow for some generalisability across the field of mHealth.

4. Findings

This section will present the findings of the analyses. It will first present the findings of the organisational variables and thereafter the findings of the product variables. For both variables, the three discursive practices as mentioned in the theory section will be discussed individually, thereby highlighting remarkable differences and similarities. Thereafter these findings will be linked back to the hypotheses as proposed in the theory section. As seen the findings are supported by quotes from the online sources. These quotes have been translated from Dutch to English. The original quotes and their translations can be found in appendix 10.

4.1. Organisational variables

4.1.1. Intertextuality

Hyperlink count

When looking at the number of hyperlinks, it can be seen from table 2 that the Focused Experts provided very few hyperlinks in relation to the mHealth vendors in the other categories. The Specialised Novices provided the highest number of hyperlinks, although within the Specialised Novices group some variation was also seen. CareConnections for example provided hardly any hyperlinks at all while FocusCura exceeded all the other mHealth vendors with their number of hyperlinks. This was probably due to the fact that CareConnections did not have a Twitter or Facebook account while FocusCura, in contrast to most other mHealth vendors who were active on either one or the other, was active on both Twitter and Facebook. These were the two online mediums through which the mHealth vendors provided the most hyperlinks.

	Self-sources	Outside-sources	Total
Focused Experts			
Fysicon	4	1	5
Chipsoft	3	2	5
EasyCare	2	2	4
Zorgapotheek	3	2	5
Experienced All-rounders			
Topicus	9	16	25
Fenestrae	12	16	28
Specialised Novices			
Boomerweb	21	12	33
CareConnections	0	2	2
FocusCura	35	31	66
Diversified Adventurers			
Betawerk	2	1	3
Inmote	2	16	18
Winvision	8	9	17

Table 2 Amount of links to self-source and outside-sources per mHealth vendor

Table 2 above thus indicates that the number of hyperlinks the mHealth vendors provided, was not individually dependent on the organisational variables of incumbency or specialisation. This can be concluded because the organisations in the Specialised Novices category and in the Experienced All-rounders category both provided a significant number of hyperlinks while they were in opposite corners of the conceptual matrix as provided in figure 2. They have therefore contrasting

organisational variables, the Experienced All-rounders were incumbent and diversified while the Specialised Novices were new entrants and specialised.

It is worthy to note that the combination of both organisational variables, did seem to influence the number of hyperlinks a mHealth vendor provided. The organisations that were incumbent as well as specialised provided very few hyperlinks. Exactly why this combination caused for a lower hyperlinking practice was not clear. A possible explanation may be that because these organisations have been active in the healthcare sector for such a long time, they may have built up a database of contacts. Therefore, instead of communicating and providing hyperlinks via social media they could have been directly communicating with actors via for example email updates thus providing fewer hyperlinks via their social media.

Hyperlinks to self-source versus hyperlinks to outside-sources

Secondly, from table 2 it can also be seen that the specialised organisations hyperlinked more frequently to self-sources than to outside-sources, while the diversified organisations hyperlinked more frequently to outside-sources than to self-sources. The hyperlinks to self-sources led to mHealth vendors' own websites, often to the product pages of their mHealth applications or to blogs in which they talked about various topics related to their own mHealth applications. See for example the following tweet from FocusCura: *"@FocusCura: Blog @DaanDohmen about loneliness and how technology can open an extra window to the outside world: http://bit.ly/1M8ptit"* (1)*.* The link provided in this quote redirected to a blog on the website of FocusCura written by the CEO. By linking to this self-source, FocusCura brought in their own voice with their own institutional logic, the healthcare logic, through which legitimacy was added to their mHealth application. On the contrary when linking to an outside-sources, mHealth vendors could also rely on other voices with other institutional logics to add legitimacy to their mHealth application. This is for example seen in the following quote of Fenestrae linking to an article on the enactment of a new privacy law in the Netherlands: *"New privacy law also affects healthcare sector. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH"* (2)*.* In the following quote from that specific article Fenestrae linked to, it can be seen that the article held a different logic from the healthcare logic, it rather held a much broader security/safety logic: *"With the new law, companies in key sectors such as transport, energy, healthcare and finance are required to report serious cyber attacks with the authorities. Even Internet companies such as Google, Amazon and eBay are required to report computer systems break-ins to the national authorities. Social media like Twitter and Facebook are not mentioned in the law."* (Skipr, 2015). Thus by linking to outside-sources such as this article, Fenestrae brought in other voices and other institutional logics to legitimate their mHealth application. It can be argued from the ratio of self-sources versus outside-sources (table 2) that the specialised mHealth vendors and especially the specialised and incumbent mHealth vendors predominantly relied on their own voice and institutional logic to build legitimacy, while the diversified organisations relied on other voices and multiple institutional logics. As mentioned in the theory section, diversified organisations are distinguished from specialised organisations in that diversified organisations hold multiple institutional logics while specialised organisations only hold a single institutional logic. It seemed that having multiple institutional logics within an organisation meant that the diversified organisations linked more frequently to outside-sources than to self-sources. Moreover, the prevalence of only a single institutional logic within the specialised organisations meant that they linked more frequently to self-sources than to outside-sources.

On the other hand, from table 2 it can also be seen that although the Specialised Novices organisations linked more often to self-sources than to outside-sources, there was also a high prevalence of links to outside-sources. This may not be due to the fact that they had multiple institutional logics thus

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explaining the hyperlinking practice as a result of the diversified organisational variable. Instead this results from the fact that Specialised Novices are new entrant organisations, explaining the high prevalence of links to outside-sources as a result of the incumbency organisational variable. In the analysis it was seen that organisations in both the new entrant categories linked to outside-sources with other reasons than was the case with the Established All-rounders. The new entrant organisations, having low legitimacy, linked to outside sources to strengthen their claims about mHealth through the legitimacy of established institutions. This is seen in the following quote of a tweet by FocusCura: *"Great report @Nictiz opportunities for video care and implementation! We from @focuscura have also shared our experiences https://t.co/lg8nsspVvJ https://t.co/HDczaNymGx"* *(3).* When claiming by themselves that there are great opportunities for their own mHealth application, many actors would not have believed them because they were not (yet) familiar with the organisation or did not (yet) trust them due to their liability of newness. However, by linking to the website of Nictiz and their report, FocusCura drew on the expert status of Nictiz. Nictiz, is an expertise centre for the standardisation of eHealth and as an organisation had a high legitimacy, both cognitive legitimacy in the sense that they are well known in the field, and social-political legitimacy in the sense that what they do, is perceived as appropriate. Through hyperlinking, FocusCura tried to lean on the legitimacy status of Nictiz, in order to provide additional legitimacy for their own mHealth applications. In contrast, rather than drawing on the legitimacy of other well established institutions, the Experienced All-rounders linked to outside-sources to address the importance of a specific aspect of mHealth applications, that of data security. An example is the following quote of a tweet by Topicus: *"87% of the Android devices are unsafe due to lax manufacturers https://t.co/9Du4wUMZPf"* *(4).* The reason for Topicus to hyperlink to this news article was to create awareness on the issue of data safety and show that it is an issue that they valued highly. More details on how the Experienced All-rounders drew on this issue of safety will be explained further on in this section.

Source type

As seen in table 3 organisations from the different categories also linked to different outside-sources. From the table it can be seen that the incumbent organisations and specifically the Focused Experts, predominantly linked to articles on media websites, while the new entrants also linked directly to the websites of other organisations such as healthcare organisations and expertise centres. This may also be explained by their search for legitimacy through established institutions as mentioned above.

Another difference between the sources to which the organisations linked, was that the specialised incumbents predominantly linked to health related media sources such as Zorgvisie.nl whereas the diversified incumbents also linked to other types of media sources such as technology and safety related media sources for example Computable.nl and Security.nl. This was in line with what is mentioned above and was expected in the theory section concerning specialised organisations. These had a single institutional logic and were therefore focused on a narrow area of knowledge while the diversified organisations held multiple institutional logics and were therefore focused on a much wider area of knowledge.

Furthermore, it was seen that organisations from all of the four categories linked to public media sources such as Het Financieel Dagblad and De Telegraaf. By linking to articles in the public media, the mHealth vendors brought in the voices and concerns of the general public. The following example is a quote from Topicus where they addressed the fact that the issue of data safety was mentioned in the national paper. *"Article about using WhatsApp even made it to the printed newspaper! #breeduitgemeten http://t.co/z1inLuoN3W"* *(5).* By mentioning and hyperlinking to articles in the public media, Topicus showed that data safety was not only a concern for the actors in the healthcare sector, but also for the general public. By bringing in the voice of the general public, Topicus built extra

weight to their argument that information exchange was an important issue and should be made safer. Furthermore, as their mHealth application addressed this issue, Topicus indirectly implicated that their own mHealth application was in line with the norms and values of the general public. This added to the perceived appropriateness and value of the application, which built towards the legitimacy of the mHealth application.

	Health care organisation	Expertise centre	Industry association	Standard setting Organisation	Government	Appstore	Scientific journal	Media sources	Health media	Technology media	Public media
Focused Experts											
Fysicon									1		
Chipsoft									2		
EasyCare	1								1		
Zorgapotheek	1										1
Experienced All-rounders											
Topicus					1	2	1		6	4	2
Fenestrae		1		6	2				4	2	1
Specialised Novices											
Boomerweb	2	1	2		1	3			2		1
CareConnections						2					
FocusCura	2	1	1		1	1			14	3	8
Diversified Adventurers											
Betawerk					1						
Inmote		1							5	4	6
Winvision	2	2	1						3	1	

Table 3 Amount of links per type of outside-sources that the mHealth vendors linked to

Source content type

Table 4 below shows the content categories of the sources to which the mHealth vendors linked. The numbers correspond to the number of times the content of the sources that the mHealth vendors linked to was coded with that specific content category. Due to the fact that sources could be coded according to multiple content categories the number of codes presented in table two and the number of links presented in the table 2 and 3 do not necessarily correspond with each other.

A frequently occurring practice employed by the mHealth vendors in all of the categories was linkage to news articles or websites featuring their own mHealth applications. This is seen is for example in the following quote: "*RT @Zorgvisie: ChipSoft expands EHR with native apps http://t.co/ci0HfOUPMf*" (6)*.* By linking to articles featuring their own applications, the mHealth vendors provided their readers with extra information about the application, thereby building towards the cognitive legitimacy of their mHealth applications. Furthermore it served as a kind of authorisation strategy. When linking to an article of a highly regarded (health) magazine that featured a mHealth vendor's own applications, the mHealth vendors indicated that the product was valued by the magazine as appropriate and good. This also influenced the perception by the readers, specifically healthcare professionals and management because these rely on the opinion of the magazine. When health vendors linked to content featuring their own product, they therefore built towards the socio-political legitimacy of the mHealth applications.

	Own Application	Safety/ security	Policy	Competition	Healthcare organisation	Trends	Use of mHealth	Future of healthcare	Innovation
Focused Experts									
Fysicon	1								
Chipsoft	2								
EasyCare	1			1	1		2		
Zorgapotheek	2		2						
Experienced All-rounders									
Topicus	6	22		3			2	3	1
Fenestrae		13	5	1		3			
Specialised Novices									
Boomerweb	6		3		21	2	4		
CareConnections	4								
FocusCura	23				4	2	19		7
Diversified Adventurers									
Betawerk	2			1					
Inmote	6	3	3	2				4	4
Winvision			3			2		3	9

Table 4 Amount of codes per source content category per mHealth vendor

Secondly, it was notable that the Experienced All-rounders, linked to news articles with a reoccurring theme. The topics of the articles they linked to were all safety/security related, not specifically in relation to healthcare, but safety and security of digital technologies in general. This was for example about data security of new products, changes in regulations concerning data, or issues when security was not safeguarded. Of the latter the following quote is an example: *"Unjustified processing of personal data obliges #Nikerunningapp to be adjusted. #whosnext? https://t.co/P3ijUMERSv @CBPweb" (7).* Their linking practice with a reoccurring theme may also be due to their diversification strategy. Diversified organisations have heterogeneity; within the organisations multiple institutional logics may exist. As mentioned above it seemed that besides a healthcare logic, these organisations also held another logic, that of data safety and security. This logic may have come from their business in other sectors for instance the financial sector, were data security is especially important. This logic may have led them to link to content about safety and security, thereby creating awareness amongst their readers about the importance of these aspects for technology. By linking to these articles the mHealth vendors indicated that data security was a significant issue and that their mHealth applications took this into account. They were thereby building towards the legitimacy of their own applications.

Finally, while the Experienced All-rounders predominantly linked to content about data security and the Focused Experts to content concerning their own mHealth applications, the new entrant mHealth vendors linked to sources with a much wider variety of content categories, but which were predominantly situated within the healthcare sector. The reason for why these new entrant mHealth vendors located their mHealth applications in the wider healthcare context, may also be a result of their low legitimacy as mentioned above. By linking to a wide variety of content categories, the mHealth vendors showed that they had knowledge of the healthcare sector. This indicated that they were accustomed to the norms, beliefs and values that were held by the actors within the healthcare

sector and by doing this they built towards the legitimacy of themselves as well as their mHealth applications. Furthermore, through this hyperlinking practice they provided arguments throughout the whole healthcare system on why mHealth should be adopted. Specifically they drew attention to these aspects to indirectly influence the perception of the actors towards their own mHealth application. This was illustrated by a link to an article about the eHealth targets set by the Dutch government as seen in the following quote of a Tweet provided by Winvision: *"Interesting article! https://t.co/5OesnbA1yp" (8).* By linking to this report, Winvision referred to aspects such as policy and the future of the healthcare sector and brought in the voice of the government to build legitimacy towards their own mHealth application. Although the government did not directly legitimate the mHealth application of Winvision, they did indicate the importance of eHealth and mHealth technologies such as the one Winvision had developed. Another example is that of Inmote. They linked to an article on Medscape.com which reported on how remote monitoring programs reduced the readmission rate of hospitals. *"Always good to be a front-runner… Remote Monitoring Cuts Hospital Readmissions* http://t.co/c7KTWi7QV7*" (9).* Inmote, being a new entrant, did not have the resources to perform such a study. However, by drawing on the positive results of this study about another mHealth application, Inmote tried to convince actors of the value of mHealth in general. Thereby also adding towards to social-political legitimacy of their own mHealth applications.

4.1.2. Discursive framing

Discourses

As seen in table 5, also the discourses that the mHealth vendors drew on differed within and between the different categories. A resemblance however is that all the mHealth vendors at some point drew on an operationalist discourse. The operationalist discourse focused on the actual usage of the mHealth application at the healthcare professional level. The mHealth vendors usually employed an operationalist discourse when they started explaining how the mHealth application should be used. The usage of the operationalist discourse is exemplified by the following text produced by Fysicon: *"EVOCS® Mobile is an extension of the existing EVOCS® platform. Wherever a Wi-Fi or 3G / 4G connection is present, users can consult lab results. As in EVOCS® webclient the user has access to the patient list of his institution for consulting images. A user can perform a search or filter and sort lab results. From the reporting console a user can give feedback on the results. The extensive viewer can display both images and movies. The user may, if the images are suitable for that purpose, perform angular or distance calculations." (10, emphasize added).* As seen, Fysicon kept referring to the mHealth application in relation to the healthcare professional. They did so by starting every sentence with the words; 'users', 'a user' or 'the users'. From such an operationalist discourse the mHealth vendors also indicated how the mHealth applications could be used in the daily work activities of the healthcare professionals, thereby positioning the mHealth applications in the cognitive framework of healthcare professionals. See for example the following quote from the website of EasyCare: *"Temperature, blood pressure, pulse, respiration, saturation, pain score, consciousness etc.: the complete daily nursing process can be handled efficiently with the app."* (11). As this study only included mHealth applications that were (at least partly) used by healthcare professionals it is then not surprising that an operationalist discourse was employed by all of the mHealth vendors, as through the operationalist discourse the mHealth vendors legitimated the mHealth application according to the norms, values and beliefs of the healthcare professional.

	Rationalist	Operationalist	Humanist
Focused Experts	x	x	
Fysicon		x	
Chipsoft		x	
EasyCare		x	
Zorgapotheek	x	x	
Experienced All-rounders		x	x
Topicus		x	x
Fenestrae		x	x
Specialised Novices	x	x	x
Boomerweb	x	x	
CareConnections	x	x	
FocusCura		x	x
Diversified Adventurers	x	x	
Betawerk	x	x	
Inmote	x	x	
Winvision	x	x	

Table 5 Main discourses that mHealth vendors drew on

What is seen from the analysis is that most mHealth vendors drew on multiple discourses to frame their mHealth applications (see table 5). So, besides an operationalist discourse, mHealth vendors also drew on a rationalist or a humanist discourse. This was for example done by Topics. As seen in the following quote, through an operationalist discourse Topicus addressed the norms and values of the healthcare professional indicating aspects that the mHealth vendors expected to be important for them: *"The application does not use your personal contact information. This makes it very suitable, for example, to maintain contact with colleagues or patients. If you want to add a new contact, you have to scan a QR code. Herefor, there should always be a physical encounter. This allows for the privacy of you and your patient to be fully guaranteed" (12).* On the other hand, when speaking from a humanist discourse they addressed aspects in line with the norms and values of patients as seen in the following quote: *"Linda Burger sees a different need under young people with, for example with infusion therapy. They want to retain easy contact with transfer nurses in the hospital. Once at home, young people often have relatively simple questions. Therefore they call the transfer desk whereafter the transfer nurse tries to give the right advice by phone. "But what if the youth can send questions and photographs to transfer nurses? Answering their questions would be a lot easier," is what Linda Burger thought. Kanta Messenger offers a solution." (13).* Thus, what was seen from the analysis is that the mHealth vendors employed different discourses in order to legitimate their mHealth applications in the eyes of the different actors within the healthcare sector.

In addition to the operationalist discourse, mHealth vendors also drew from a humanist discourse. Within the humanist discourse the healthcare recipient was not merely regarded as the object, but as the subject of the text, thereby focusing on the feelings, experiences and wellbeing of these subjects in relation to mHealth. This was seen in the following quote of a Facebook post by FocusCura: *"How can technology literally be a 'window into the world" for the elderly or people with chronic disease http://bit.ly/1M8ptit" (14).* Also the combination of images and texts was used to positon the mHealth application in the cognitive framework of the patient This can be seen in the following snapshot from Fenestrae's website:

The use of a humanist discourse however does not seem to correspond with the two organisational variables proposed in the theory section. This can be argued because the humanist discourse was employed by just one organisation from the Specialised Novices category and both the organisations in the Experienced All-rounders category. Instead, the two organisations in the Experienced All-rounders category, had a similar type of mHealth application, so rather than an organisational variable it may be a product variable that influences the employment of a humanist discourse. This will be discussed later on in this research.

Table 5 shows a notable difference between the incumbent organisations and the new entrant organisations. It is seen that, with exception of FocusCura, in addition to an operationalist discourse all of the new entrants also drew on a rationalist discourse. The rationalist discourse placed the use of mHealth in an institutional framework of rational decision making predominantly at the healthcare organisation level. CareConnections did this by frequently talking about the healthcare organisations in relation to their mHealth application: *"The ZorgApp is suitable for all healthcare institutions and municipalities that want to work more client-oriented and efficiently." (15)*. Furthermore by talking 'business' about what the mHealth application would cost and what it would yield they were directly speaking to the healthcare organisations: *"Flexible contracts where the fixed costs move with the growth or shrinkage of the healthcare organisation, are increasingly becoming a requirement. The deployment of the Care Connections ZorgApp leads directly to cost savings due to the low investment and the spread payments per month. The business case is easily made."(16)*. Through the rationalist discourse the mHealth vendors tried to convince the management of healthcare organisations of the value that the mHealth applications could bring to the healthcare organisations, thereby legitimating the mHealth application at the healthcare organisation level. It is not to be expected that because incumbent organisations did not employ a rationalist discourse that they did not try to legitimate the mHealth application at the health care organisational level. This is still required in order to convince healthcare management of the value of the mHealth applications. These findings propose that incumbent organisations employ different, not discursive legitimations strategies to do that, for example through standard setting as seen with Fenestrae, or by visiting trade fairs as seen with Chipsoft. However, the employment of these strategies requires specific resources such as funding and employees. New entrants did not generally have these resources, and therefore entrusted to less resources absorbing legitimation strategies such as discursive practices.

Problems/changes
As seen in table 6 the problems/changes that the frames provided by the mHealth vendors centred around were different. While the Focused Experts did not frame their mHealth applications in light of a problem/change the vendors from the three other categories framed their mHealth applications in light of distinct problems/changes.

When framing their mHealth applications, it was seen that the Experienced All-rounders which were organisations with a diversified strategy, had a wide knowledge of other industries. Drawing on their experience in other industries and their expertise in digital information technology, they addressed the fact that digitalisation was an important trend that had already changed many industries and hence was also doing so in the healthcare industry. This is seen in the following quote by Fenestrae: *"RT*

@zorgvisie_ict "Digitisation in healthcare three years behind banking": The healthcare sector is only a few years behind the banking sector http://bit.ly/1V1C36O*" (17).* What Experienced All-rounders then problematized in their frames, was that there were not yet many standards or rules for digital technologies in the healthcare sector. In their frames they made salient that this could be problematic in the healthcare field with issues such as privacy. Such is seen in the following quote of a sentence on the website of Topicus: *"It is a secret that health care professionals such as medical specialists and community nurses regularly use unprotected systems to share confidential medical information or peer consultations." (18).*

Secondly, the Specialised Novices and the Diversified Adventurers (both new entrant organisations) framed their mHealth applications in light of different kind of problems. This research categorised these problems into two distinct types of problems/changes; push forces and pull forces. The push forces were changes in the healthcare sector which forced healthcare organisations to change. These were for example demographic, structural and policy changes. An example is the following quote from Boomerweb's website: *"With the increasing demand for healthcare and the changing reimbursement programs from the government and health insurers, the demand for brief external health care increases" (19).* The pull forces were related to competiveness. They were not particularly forces from outside the healthcare organisations but more from within the organisations, endeavouring the healthcare organisations to change so that they could compete more effectively with other healthcare organisations. An example is the following quote from CareConnection's website: *"More efficient care with less time available. To achieve this, the organisation of healthcare has to change fundamentally."* (20). According to the Specialised Novices and the Diversified Adventures these forces changed, or even disrupted the whole healthcare system. In the frames of the Specialised Novices and Diversified Adventurers, these push and pull forces were salient features which the mHealth vendors frequently repeated.

The Focused Experts did not frame their mHealth technologies in light of a problem or change (with exception of the Zorgapotheek). What was seen was that their mHealth applications were additions to their existing products and services. For example, Chipsoft and EasyCare were both providers of Electronic Health Record (EHR) software and they both developed a mHealth application which brought the software to a mobile device. So rather than framing their mHealth applications in light of a problem, they framed their mHealth applications in relation to the main products/services that their organisations provided. The mHealth applications were then framed as extensions, which additionally benefitted the healthcare professional in the use of the main product. For example as seen in the quote below, the EHR app of EasyCare ensures that healthcare professionals can now access patient information from the EHR system and enter new patient information into the EHR system anywhere and anytime they like: *"EasyCare has partnered with computer manufacturer Dell and the EHR team of Meander to develop a unique app specifically for nurses that allows them to register their daily observations and measurements directly into the EHR. In addition, the nurses can access real-time patient data from the EHR, no matter where they are recorded."* (21). These mHealth vendors may not have framed their solutions in light of a specific problem because they did not have to. A possible explanation could be that the specialised and incumbent organisations have been supplying products to the healthcare sector over a long time. This allowed them to build strong relationships with their customers. Because of these relationships they had pre-informed knowledge on their customers' desires and needs. As any organisation with informed knowledge would do, they developed products which addressed these needs. They therefore did not have to provide a background and tell actors why their mHealth applications could be beneficial. They merely had to inform them that this is actually the case.

Finally, FocusCura was different to all the other mHealth organisations. The analysis showed that they did not frame their mHealth application in view of a problem, rather addressing mHealth in light of a goal to improve the quality of life of the elderly and sick. The difference is for example seen when talking about elderly who are living longer at home. The organisations focusing on the push and pull forces framed this as a consequence of the budget cuts and policy changes, which the healthcare system. This can be seen in the following quote: "*Kanta Messenger responds to the extramuralisation: much more care will take place outside of healthcare organisations in the future. Many systems have traditionally been arranged centrally while healthcare is decentralising rapidly*" (22). FocusCura rather saw living at home longer as an aim. They wanted to ensure that with their mHealth applications, elderly can stay longer in their own comfortable homes. This is seen in the following quote from one of their tweets: "*Beautiful example of how with support of volunteers via Beeldbellen App @focuscura Mrs. Goertz could stay at home @dezorggroep! http://t.co/621vFjAzE4*" (23). Being the only organisations that framed their mHealth application in light of a goals it is not really expected that any of the organisational variables proposed in the theory section influence this.

Frames

So through the different discourses and with the different problem settings as discussed above, the mHealth vendors provide different frames. These frames are shown in table 6. Notable was that in light of one specific problem or change, mHealth vendors provided different frames, depending on the discourse that they were drawing from. This also led to the fact that the mHealth vendors provided multiple frames.

In the theory section it was expected that because the diversified organisations were present in multiple in industries, they could frame their mHealth applications from multiple institutional perspectives. Surprisingly, in the analysis it was seen that mostly the diversified organisations did not discourse about their expertise in other industries and how this could benefit the mHealth application. This was only noticed once, on the website of Inmote: "*Inmote is also working on secure communication solutions for the department of defence. In MediCall a similar technology is used to achieve the highest level of security.*"(24). Instead of framing from multiple institutional logics, it was seen that the diversified incumbent mHealth vendors held an additional but distinct institutional logic, from which they framed their mHealth application, a so called information and communications logic. From this logic they framed their mHealth applications as a safe way to go along with this trend of digitalisation, keeping in mind the safety and quality issues that are important for the different actors in the healthcare system. This is exemplified by the following quote from Topicus' website: "*Due to digital developments, privacy and protection of patient data are key issues in healthcare. You want to share safe and fast medical data with supply chain partners and patients. With Kanta from Topicus you can send confidential text messages or images via a secure connection.*" (25). From the two different discourses the Experienced All-rounder drew, they provided two distinct frames. From an operationalist discourse they framed their mHealth applications as a method for healthcare professionals to safely respond to the digitalisation trend. They thereby framed the mHealth in line with the norms and values of the healthcare professionals, addressing aspects that the mHealth vendors expected to be important for the healthcare professionals. When drawing from a humanist discourse they framed mHealth in light of the same changing aspect (digitalisation) but then made salient different concerns and aspects that were in line with the norms and values of the patients. With the Diversified Adventurers the existence of additional logics from which they framed their mHealth applications was much less clear, they rather stayed with the healthcare logic.

	Problem/change	Rationalist discourse	Operationalist discourse	Humanist discourse
Focused Experts				
Fysicon	Not in light of a problem		mHealth applications are an addition to the main product/services and therefore enhances the use thereof for the healthcare professional	
Chipsoft	Not in light of a problem			
EasyCare	Not in light of a problem			
Zorgapotheek	Push & Pull forces	mHealth is a method for healthcare organisations to respond to the changes in the healthcare sector	Responding to changes in the healthcare setting, through mHealth applications will also benefit the healthcare professional	
Experienced All-rounders				
Topicus	Digitalisation		Through mHealth applications, healthcare professionals are able to digitalise in a safe and secure way	Through mHealth applications, the data of patients is safe and secure.
Fenestrae	Digitalisation			
Specialised Novices				
Boomerweb	Push & Pull forces	mHealth is a method for healthcare organisations to respond to the changes in the healthcare sector	Responding to changes in the healthcare setting, through mHealth applications will also benefit the healthcare professional	
CareConnections	Push & Pull forces			
FocusCura	Not in light of a problem but in light of a goal		By using mHealth, health care professionals are able to improve the quality of life of their patients in an easier and faster way	mHealth is a method to improve the quality of life of patients and elderly
Diversified Adventurers				
Betawerk	Push & Pull forces	mHealth is a method for healthcare organisations to respond to the changes in the healthcare sector	Responding to changes in the healthcare setting, through mHealth applications will also benefit the healthcare professional	
Inmote	Push & Pull forces			
Winvision	Push & Pull forces			

Table 6 Problem/changes of the mHealth vendor referred to and the frames provide by the mHealth organisations (same colours indicate same frame)

Also seen in table 6 is that organisations from both the new entrant categories (with exception of FocusCura) provided similar frames. They framed mHealth as a method to respond to the changes in the healthcare sector which would as a result benefit the different actors in the healthcare sector. Drawing on the different discourses, they provided two distinct frame, one making salient the benefits for the healthcare organisations (26) and the other making salient the benefits for the healthcare professionals (27). The difference can be seen in the following quotes: *"Healthcare apps make it possible that healthcare records and other vital patient information is always available. This is necessary given the changing demands on healthcare: to work more efficient in less available time."* (26) and *"The Zorgapp is suitable for all healthcare institutions and municipalities that want to work more client-oriented and efficiently."* (27). Besides the organisations in the new entrant category, Zorgapotheek also provided these frames. However, as the Zorgapotheek is an incumbent organisation and all the others providing these frames were new entrants, this rather seems to be an exception.

FocusCura, framing their mHealth applications in light of a goal instead of a problem/change, provided two distinct frames. Both frames focused on how mHealth could improve the quality of life of patients and elderly. But drawing from different discourses the frames made salient different aspects. The frame from the operationalist discourse was in line with the norms and values of the healthcare professionals. It addressed how through the use of mHealth, the healthcare professionals could improve the quality of life of their patients. For an example see the following quote: *"With ThuisMeten you can literally remotely monitor your patients and guide them. With attached or manual measuring equipment, a patient can do his own measurements at home and sends them safely to a care provider or care centre."(28).* From the humanist discourse, FocusCura framed their mHealth applications according to the norms and values of the patients, addressing how the use of mHealth applications would improve their quality of life. This is seen in the following quote: *"Beautiful example of how with support of volunteers via BeeldBellen App @focuscura Mrs. Goertz could stay at home @dezorggroep! http://t.co/621vFjAzE4" (29).* FocusCura was the only organisation in this research who provided these frames. It is therefore not expected that any of the organisational variables proposed in this research influences this.

4.1.3. Discursive legitimation arguments

Table 7 provides an overview of the legitimation arguments that were employed by the mHealth vendors. The table shows that all the mHealth vendors provided rationalisation arguments. Note not to confuse the rationalisation argument with the rationalist discourse. While the rationalist discourse is a particular way of talking about and understanding mHealth applications, a rationalisation argument is a specific rational argument through which a sense of legitimacy is created. A rationalisation argument, in the form of an objectification or factualisation of the benefits can therefore also be used in an operationalist or humanist discourse. What was during the analysis was that the rationalisation arguments put forth and disused by the mHealth vendors varied greatly according to the different discourses and frames they used. For example, when speaking from a rationalist discourse and framing the mHealth application as a solution to changing forces, the rationalisation arguments emphasised benefits for the healthcare organisations such as cost reduction and more efficiency, leading to more competeveness for the healthcare organisations. See for example the quote from Boomerweb's website: *"With the image Beeld Zorg App it is possible to realise considerable savings in travel costs. In addition, practice shows that contact moments remain manageable and thereby are executed in less time / more efficient." (30)* While speaking within the same frame but from an operationalist discourse, the rationalisation arguments that were used proposed benefits for the healthcare professional as seen in the following quote: *"As a specialist you have the ultimate responsibility for your patients. However, you have very limited control. You can not see your patients to often because your time is precious. That is why we want to help you by providing organisations in the wound care chain (among*

others, home care workers and doctors) with real-time wound information and consistent pictures. This makes it also possible for our software to (automatically) measure the increase or decrease of the wound surface, so that it eases your diagnosis." (31). Moreover a rationalisation argument from an operationalist discourse but within a different frame, for example that of mHealth as a safe way for digitalisation emphasized yet other benefits of mHealth as is seen by the following quote: *"Kanta does not use your email address, phone number or contact list to contact other users of Kanta.... In this way your privacy is best protected"* (32). Furthermore, rationalisation arguments in the humanist discourse, were almost always related to a person's wellbeing and were therefore identified as moralisation arguments. In light of this, it is also not surprising that moralisation arguments such as provided in the following quote, were mostly used by the organisations employing a humanist discourse: *"Better #care by secure data exchange. It is possible with #fenestraeOMNI. #IHE #privacy Https://t.co/e0LegOxgU3 https://t.co/2xMV0YvNyO"* (33)

	Adjudicated authorisation	Impersonal authorisation	User authorisation	User-involvement authorisation	Alliance authorisation	Exemplification	Moralisation	Rationalisation	Naturalisation
Focused Experts		x	x					x	
Fysicon								x	
Chipsoft								x	
EasyCare			x		x			x	
Zorgapotheek		x				x		x	
Experienced All-rounders	x	x		x	x	x	x	x	x
Topicus	x	x		x	x	x	x	x	x
Fenestrae		x					x	x	x
Specialised Novices	x	x	x		x	x	x	x	
Boomerweb		x			x	x		x	x
CareConnections	x				x			x	x
FocusCura		x	x		x	x	x	x	
Diversified Adventurers	x	x	x	x	x	x		x	x
Betawerk	x			x	x			x	
Inmote	x				x			x	x
Winvision		x	x	x	x	x		x	

Table 7 Legitimation arguments employed by the mHealth vendors

From table 7 it is also seen that almost none of the incumbent organisations provided alliance authorisation arguments while all of the new entrants did provided them. It can therefore be said that the use of alliance authorisation arguments is probably related to the incumbency variable. With alliance authorisation arguments, the mHealth vendors built legitimacy towards a mHealth applications by referring to the fact that they were partnering for the development, pilot study or something else with other organisations. The mHealth vendors referred to healthcare organisation as well as to other technology suppliers with whom they formed alliances. By referring to an alliance partner the mHealth vendors showed that other organisations valued the mHealth application as appropriate because they were prepared to form alliances. Moreover, by referring to alliance organisations, the mHealth applications could rely on the legitimacy from those alliance organisation. Therefor alliance authorisation arguments built towards the legitimacy of mHealth applications. An example of such an alliance authorisation argument is seen in the following quote from a tweet by

Boomerweb: *"RT @UQARE: Cooperation @UQARE and @Boomerweb is a fact! #appsindezorg http://t.co/XglPwijQuH"* (34). Alliance authorisation was a kind of legitimation argument that was not identified in previous research but emerged from the data when performing the analysis. This research will therefore define alliance authorisation as; legitimation by reference to an alliances partners in whom institutional authority of some kind is vested. As it was mentioned before, new entrant organisations have few resources due to their liability of newness. In order to obtain resources they have to collaborate with other organisations. Because incumbent organisation do not have this problem, the new entrants probably collaborate with other organisations more often than the incumbents do and therefore also talk about it more. This could explaining the high prevalence of alliance authorisation arguments provided by the new entrant organisations. Moreover, it could have also been a specific strategy of the new entrant organisations to talk about alliances. When mentioning a partner with high legitimacy the mHealth vendors could partly rely on the legitimacy of the alliance organisation, overcoming their own low legitimacy. Besides a distinctive pattern in the use of rationalisation and alliances authorisation arguments, no other patterns could be detected from table 7.

4.1.4. Preliminary conclusions

Incumbents versus new entrants

From the results discussed above it is possible to distinguish two broad aspects in which incumbents differed from new entrants. First of all it has become clear from the analysis that new entrants leaned more on established institutions to build legitimacy towards their mHealth applications than incumbent organisations did. This is firstly seen by the fact that new entrants provided alliance authorisation arguments while incumbent organisations hardly did that. A second practice in which the entrants relied on the legitimacy of other institutions was through their hyperlinking strategy. While incumbents provide links to themselves and media sources, new entrants also frequently provide direct links to other organisations who are well accepted in the institutional field.

A second aspect that was distinguished in this analysis was that the new entrants framed their mHealth applications similar to each other but distinct from the incumbent organisation. They framed their mHealth applications from a rationalist discourse making salient competiveness related aspects that were important for the healthcare organisations. Moreover, they proposed a lot of rationalisation legitimation arguments focusing on efficiency factors such as time and cost reduction. The framing from such a rationalistic point of view by the new entrant organisations may be explained by the privatisation of the Dutch healthcare sector in 2006. This entailed that from then on healthcare organisations had to compete with each other over the price and the quality of care (Wilgen, 2006). These market forces caused that there was a higher demand for innovation. The new entrant organisations were all established around that time or after, probably responding to this higher demand for innovation. This may explain the difference in the legitimations practices used by the new entrants and the incumbent organisations.

It can thus be concluded that the discursive legitimation practices of new entrants differ from that of incumbent organisations in the way that they draw on the legitimacy of established intuitions. And that new entrants' discursive practices are more rationally orientated than the discursive legitimation practices of the incumbents. These findings therefore supports hypothesis *1*; *it is expected that the discursive practices produced by incumbent organisations differ from the discursive practices produced by new entrant organisations.*

A remarkable difference between the diversified and the specialised organisations was that the discourses of the diversified organisations focused much more on digital technology and the safety and security issues accompanied with that. This applied for both their hyperlinking practices as well as their framing. It can be argued that besides a health care logic, these organisations also held other logics from which they could draw. It was for example seen that the diversified organisations linked more frequently to technology related media than the specialised organisations did. Furthermore, drawing from an information and communication logic, the diversified organisations frequently addressed aspects such as information security and safety and put a higher emphasis on these aspects than the specialised organisations did when legitimating their mHealth application. These findings therefore support hypothesis 2; *it is expected that the discursive practises produced by specialised organisations differ from the discursive practices produced by diversified organisations.*

4.2.   Product variables

4.2.1. *Intertextuality*

Amount of links and the self-sources/outside sources ratio

Tables 8 and 9 below show the amount of links that the mHealth vendors provided for the mHealth applications per product phase and per product functionality type. As seen in table 8, the total number of links the mHealth vendor provided for mHealth applications in the development phase are rather few. When the mHealth vendors with applications in this category did provide hyperlinks, they were mostly directed to self-source. mHealth vendors with products in the other two phases provided much more hyperlinks, both to self-sources and to outside-sources. A trend can be seen, as the mHealth application matured, the mHealth vendors provided more hyperlinks. This is actually not surprising as when the mHealth technologies were in the development phase there was probably not so much to talk about. Furthermore mHealth vendors may have wanted to keep quiet about the applications because, they did not want the competition to know what they were working on.

From table 8 it can be seen that organisations provided links to self-sources for mHealth application in all three of the product phases. Due to text limitations on social media such as twitter it was not possible to give detailed information on the mHealth applications on social media. Instead Facebook post and tweets providing hyperlinks were rather used as "bait" to direct interested actors to sources such as the mHealth vendors' websites, where actors could read more about the mHealth applications. In additions to linking to their own websites it was also seen that the mHealth vendors linked to their own videos in which they featured their own mHealth applications. They then used a short text to attract attention and thereafter provide a link to their own sources where more information could be found. See for example a tweet from Fenestrae: *"Direct access to relevant patient information. Discover #Fenestrae #Omni through: https://t.co/Nkz8MHc3Vm#zorg #HIE https://t.co/hKUbydaabo"* (35).

There was also some variation between the linking practices of mHealth vendors with mHealth applications within the same product phases. From table 8 it can be seen that for example the mHealth vendors who have developed EVOCS mobile and MediCall were outliers. They did not directly provide any hyperlinks in relation to their mHealth applications. The reason here for is not clear.

	Self-sources	Outside-sources	Total
Product development phase			
EasyClinic Tablet	1	1	2
EPD App	1	2	3
Dubbele Medicatiecontrole App	4	0	4
IncoSense Smart	2	0	2
Market introduction phase			
CC ZorgApp	0	3	3
Medicatie Controle App (Z)	3	1	4
Kanta Messenger	4	8	12
Fenestrae OMNI	12	0	12
W+	0	5	5
Wond Zorg App	0	4	4
MediCall	0	0	0
Commercialisation phase			
Medicatie Controle App (B)	2	4	6
Beeld Zorg App	8	4	12
BeeldBellen App	10	5	15
ThuisMeten App	6	12	18
EVOCS Mobile	0	0	0

Table 8 Amount of links per mHealth application per product phase

	Self-sources	Outside-sources	Total
EHR applications			
EasyClinic Tablet	1	1	2
EPD App	1	2	3
CC ZorgApp	0	3	3
Medication check applications			
Dubbele Medicatiecontrole App	4	0	4
Medicatie Controle App (Z)	3	1	4
Medicatie Controle App (B)	2	4	6
Sensor applications			
IncoSense Smart	2	0	2
ThuisMeten App	6	12	18
Information exchange applications			
Kanta Messenger	4	8	12
Fenestrae OMNI	12	0	12
EVOCS Mobile	0	0	0
Wound care applications			
W+	0	5	5
Wond Zorg App	0	4	4
Video care applications			
MediCall	0	0	0
Beeld Zorg App	8	4	12
BeeldBellen App	10	5	15

Table 9 Amount of links per mHealth application per functionality type

When looking at the hyperlinking practices of the mHealth vendors for the different product functionality types (table 9), no clear patterns can be detected between the different product functionality categories. It can be seen that also within a specific product functionality type, the hyperlinking practice of the mHealth vendors vary greatly.

Sources type

In table 10 it can be seen that the type of sources that the mHealth vendors linked to also differed along the product phase of the mHealth applications. Firstly, it can be seen that the mHealth vendors with a mHealth application in the commercialisation phase linked to the websites of healthcare organisations, while the organisations with products in other phases hardly did this. The mHealth vendors usually linked to these organisations when they talked about a healthcare organisation using, or going to use the mHealth application. This is seen in the following quote of a tweet by Boomerweb:

"The Beeld Zorg App of Boomerweb in practice at Axion Continu https://t.co/eK6vwFE7ch" (36). Therefore it is not surprising that the organisations with mHealth applications in the two other phases hardly linked to healthcare organisations because some of those mHealth applications were not yet in use. More about this linking practice to healthcare organisations, will be discussed in the next section when this research looks at the content of the sources that that the mHealth vendors linked to.

	HC organisation	Branch organisation	Health media	Public media	Appstore
Product development phase					
EasyClinic Tablet	1				
EPD App			2		
Dubbele Medicatiecontrole App					
IncoSense Smart					
Market introduction phase					
CC ZorgApp					3
Medicatie Controle App (Z)			1		
Kanta Messenger			5	1	2
Fenestrae OMNI					
W+			3	2	
Wond Zorg App		1		1	2
MediCall					
Commercialisation Phase					
Medicatie Controle App (B)		1	1	2	
Beeld Zorg App	1	2		1	1
BeeldBellen App	2		2	1	
ThuisMeten App			7	5	
EVOCS Mobile					

Table 10 Type of sources that the mHealth vendors linked to per product phase

	HC organisation	Branch organisation	Health media	General media	Appstore
EHR applications					
EasyClinic Tablet	1				
EPD App			2		
CC ZorgApp					3
Medication check applications					
Dubbele Medicatiecontrole App					
Medicatie Controle App (Z)			1		
Medicatie Controle App (B)		1	1	2	
Sensor applications					
IncoSense Smart					
ThuisMeten App			7	5	
Information exchange applications					
Kanta Messenger			5	1	2
Fenestrae OMNI					
EVOCS Mobile					
Wound care applications					
W+			3	2	
Wond Zorg App		1		1	2
Video care applications					
MediCall					
Beeld Zorg App	1	2		1	1
BeeldBellen App	2		2	1	

Table 11 Type of outside-sources that the mHealth vendors linked to per functionality type

Between the two phases with many hyperlinks there was also a noticeable difference. From table 10 it can be seen that ratio of number of links to health related media sources in relations to the number of links to general media sources differed between the mHealth vendors with mHealth applications in the market introduction and mHealth vendors with mHealth applications in the commercialisation

phase. mHealth vendors with mHealth applications in the market introduction phase linked more to health related media while the mHealth vendors with mHealth applications in the commercialisation phase linked almost equally to health related media sources as well as to much wider public media sources. Thus as the technologies matured more links where provided to public media sources. This probably was a result of the fact that the mHealth technologies in the commercialisation phase were on the market longer, causing that they were talked about more in the public media. As a result the mHealth vendors could link to them more frequently. However, it could have also been a deliberate strategy of the mHealth vendors with mHealht applications in the commercialisation phase to link to general media sources. By linking to general media sources the mHealth vendors showed that the mHealth application is talked about and valued as positive in the wider social setting, thereby showing that the mHealth application should therefore be valued as legitimate. An example of such a hyperlinking practice is seen in the following quote: "*Nice article in local paper of Brabant about ThuisMeten @ZuidZorg and @Anna_Ziekenhuis see http://t.co/hEgpHeaUTI http://t.co/SIjwBb6Uqx*" (37)

Finally, it is notable from table 10 that the mHealth vendors with a mHealth application in the market introduction phase linked more to appstores, than mHealth vendors with mHealth applications in the other phases. The hyperlinks to the appstores led to pages which provided information about the mHealth application and where the mHealth applications could be downloaded. The mHealth vendors usually provided a hyperlink to an appstore when they announced that a mHealth application was available on the market. An example hereof is the following quote: "*Today Boomerweb's Wond Zorg App has officially gone into the Google Play Store! https://t.co/pXuO14POjl*" (38). When hyperlinking to these appstores the mHealth vendors informed actors about the mHealth application being available on the market and therefore built towards the cognitive legitimacy of the mHealth application.

When looking at table 11 no distinct hyperlinking patterns can be detected between the hyperlinking practices of mHealth vendors with mHealth applications from the different functionality types. There are major difference and no similarities between and within the different functionality types.

Source content type

Table 12 and 13 show the contents of the sources that the mHealth vendors linked to. When looking at the contents of the sources that the mHealth vendors linked to, it is notable that a majority of the sources which the mHealth vendors linked to, contained content about the mHealth applications of the mHealth vendors themselves. In comparison to the source content table identified for the organisational variable (see table 4) it is seen that the ratio of content on own application in relation to other content is much higher for these tables below. This was because for the product variable, only hyperlinks that were directly or indirectly related to a specific mHealth applications were coded. So mHealth organisations did address a wide variety issues but did not always relate them to a specific mHealth application. This is for example seen in the following quote provided by Fenestrae: "'New privacy law also affects healthcare sector'. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH" (39). The link provided information amount the new privacy act, but fenestrae did not specifically relate it to their mHealth application. As a result this hyperlink was not included in this analysis. This therefore explains why the number of links to content about the mHealth vendors' own applications in relation to links to other content was much higher for the product variables than for the organisational variables.

Table 12

	Own Application	Safety/ security	Policy	Competition	Healthcare	Trends	Use of mHealth	Future of healthcare	Development
Product-development phase									
EasyClinic Tablet	1				1				1
EPD App	2								
Dubbele Medicatiecontrole App									
IncoSense Smart									
Market introduction phase									
CC ZorgApp	3								
Medicatie Controle App (Z)	1								
Kanta Messenger	5	3		1			1		1
Fenestrae OMNI									
W+	3	1						1	
Wond Zorg App	2					1	1		
MediCall									
Commercialisation phase									
Medicatie Controle App (B)	1		1		1	1	1		
Beeld Zorg App					1	1			
BeeldBellen App	12				2		10		
ThuisMeten App	11				6		7		
EVOCS Mobile									

Table 12 Source content categories of the outside sources the mHealth vendors linked to per product phase

Table 13

	Own Application	Safety/ security	Policy	Competition	Healthcare	Trends	Use of mHealth	Future of healthcare	Development
EHR applications									
EasyClinic Tablet	1				1				1
EPD App	2								
CC ZorgApp	3								
Medication check applications									
Dubbele Medicatiecontrole App									
Medicatie Controle App (Z)	1								
Medicatie Controle App (B)	1		1		1	1	1		
Sensor applications									
IncoSense Smart									
ThuisMeten App	11				6		7		
Information exchange applications									
Kanta Messenger	5	3		1					
Fenestrae OMNI									
EVOCS Mobile									
Wound care applications									
W+	3	1					1	1	
Wond Zorg App	2				1		1		
Video care applications									
MediCall									
Beeld Zorg App					1	1			
BeeldBellen App	12				2		10		

Table 13 Source content categories of the outside-sources the mHealth vendors linked to per functionality type

Coming back to the fact that the content of the sources that mHealth vendors linked to, contained a lot of information on the mHealth vendors' own mHealth applications, there was still a notable differences between the different phase as seen in table 12. The sources linked to for mHealth applications in the product development and market introduction phase mainly provided information on the mHealth application in general. For example the link provided in the following tweet by Inmote: *"Our product at @MobileDoctorsNL W + wound monitor http://t.co/8tAzpdeFoE through @MobiledoctorsNL"* (40). This hyperlink, linked to the MobileDoctors website featuring an articles on the W+. This article informed on the application itself, the potential market for it and the benefits of using it. However the contents of the sources linked to for mHealth applications in the commercialisation phase did not merely provide information on the mHealth applications themselves but rather exemplified the use of the mHealth applications. This is seen in table 12 by the high prevalence of codes to the content categories of 'healthcare organisation' and 'use of mHealth'. The content of the hyperlinks for mHealth applications in the commercialisations phase, provided information on the actual usage of the mHealth applications in healthcare organisations. For example the hyperlink provided in this quote provided by FocusCura, linked to an article on the use of the ThuisMeten App by healthcare organisation SHO: *"FocusCura ThuisMeten is not just for the elderly. We also help pregnant women who are under additional monitoring during their pregnancy, such as women with diabetes or hypertension. After the summer, the first women will start with the app. SHO: It saves a lot of hassle for women, and if necessary, there is direct contact with the midwife. At home, in the office or via video call! Very safe! Read more at: http://bit.ly/1FDvH7E"* (41). Additionally, organisations with products in the commercialisation phase also linked to articles on the experience of users with their mHealth applications. As seen in the following quote where FocusCura links to an article on Skipr about a user study with the ThuisMeten App: *"Our recent user survey ThuisMeten App showed unique results: 28% reduction in readmissions, 26% less ... http://t.co/fgXIfJ5g2"* (42). It was thus seen that mHealth organisations with products in the different development phases provided hyperlinks with different intentions. mHealth vendors with mHealth applications in the product development and market introduction phase provided hyperlinks to other sources to inform people about the mHealth application itself, thereby building towards the cognitive legitimacy of the application. While the mHealth organisations with mHealth applications in the commercialisation phase linked to other sources to show how their mHealth application were actually used and evaluated in practice Thereby they built towards the social-political legitimacy of the mHealth applications.

Furthermore it was seen that the mHealth vendors with mHealth applications in the commercialisation phase did not merely provided hyperlinks to frame the mHealth application in order to convince healthcare organisations and professionals to adopt the mHealth application. They also provide hyperlinks in order to frame additional value for the mHealth application, once the mHealth application was adopted. For example the following hyperlink provided by Boomerweb: *"Financial matters for the Beeld Zorg App. Recently there has been much debate about the funding of remote care in 2016. Actiz put in a lot of effort to ensure that the funding remains the same for 2016. In a subsequent debate in September, the funding for 2017 will be discussed. Read more here http://www.actiz...."* (43). In this quote Boomerweb provided a link to an article about the changes concerning the funding of mHealth. These changes would have influenced the healthcare organisations who had already adopted their mHealth applications. Therefor by doing this they were building additional legitimacy to the mHealth applications and sustaining a relationship with the adopters.

Once again, when looking at the content of the sources the mHealth vendors with the different functionalities linked to, as seen in table 13, no notable pattern within or between the different functionality types can be detected.

4.2.2. Discursive framing

Discourses

Table 14 and 15 below show the discourses that the mHealth vendors drew on for the different mHealth applications. When looking at the discourses that the mHealth vendors drew on when talking about their mHealth applications it can be seen that in all three product phases mHealth vendors drew on the three different discourse types. Just as seen in organisational variable analysis also here the mHealth vendors drew for all their mHealth applications (at least partly) on an operationalist discourse. Furthermore it is seen in table 14 that in the product development phase the mHealth vendors drew relatively little on the humanist discourse. More attention is put into framing the mHealth application from a rationalist discourse. This may be because in this phase, the health vendors are not yet very concerned with the opinions of the patients, because they are not (directly) the ones deciding if a mHealth application will be used or not. It may thus be therefore that that the mHealth vendors with mHealth applications in the product development phase are not yet trying to legitimate the mHealth technologies in the eyes of the patient.

	Rationalist	Operationalist	Humanist
Product development phase			
EasyClinic Tablet		x	
EPD App		x	
Dubbele Medicatiecontrole App	x	x	x
IncoSense Smart	x	x	
Market introduction phase			
CC ZorgApp	x	x	
Medicatie Controle App (Z)	x	x	x
Kanta Messenger		x	x
Fenestrae OMNI		x	x
W+	x	x	x
Wond Zorg App	x	x	
MediCall	x	x	x
Commercialisation phase			
Medicatie Controle App (B)	x	x	x
Beeld Zorg App	x	x	
BeeldBellen App		x	x
ThuisMeten App		x	x
EVOCS Mobile		x	

Table 14 Discourse drawn on per mHealth vendor per product phase

	Rationalist	Operationalist	Humanist
EHR applications			
EasyClinic Tablet		x	
EPD App (c)		x	
CC ZorgApp	x	x	
Medication check applications			
Dubbele Medicatiecontrole App	x	x	x
Medicatie Controle App (Z)	x	x	x
Medicatie Controle App (B)	x	x	x
Sensor applications			
IncoSense Smart	x	x	
ThuisMeten App		x	x
Information exchange applications			
Kanta Messenger		x	x
Fenestrae OMNI		x	x
EVOCS Mobile		x	
Wound care applications			
W+	x	x	x
Wond Zorg App	x	x	
Video care applications			
MediCall	x	x	
Beeld Zorg App	x	x	
BeeldBellen App		x	x

Table 15 Discourses drawn on per mHealth vendor per mHealth functionality type

For the product functionality variable, also no clear pattern can be detected. Although, it can be seen that the mHealth vendors of the medication check applications, the wound care applications and the video care applications all framed from both a rationalist as well as an operationalist discourse. However in this research no possible explanation here for was found.

Existing practice/technology
What is seen is that a mHealth application were usually framed in regard of an existing practice that was used to perform a specific operation. An overview of the existing practices that the mHealth technologies were framed to is given in table 16. Notable is, that besides indicating existing practices, the mHealth vendors also drew attention to existing malpractices. Indicating that there where unjustified practice performed be health care professionals which were not the standard way of operating according to the rules and regulations. The mHealth vendors indicated two kinds of malpractices, the use of consumer communication apps such as WhatsApp and Skype and the malpractice of not complying with the dual medications administration check as required by the health inspection. This had implications for the framing of the mHealth application which will be discussed in the next section.

When looking at table 16 it can be seen that the mHealth applications with the same functionality type were usually framed in relation to the same existing practice. However there were two exceptions. First of all in the sensor applications category. The two applications in this category have distinct uses, the ThuisMeten App for monitoring patients at home and the IncoSense Smart for monitoring incontinence. It is thus not surprising that the existing practices that the mHealth vendors framed these applications to were different. The other functionality group where there was a difference was the video care applications group. Within the video care application functionality group, two of the mHealth applications were framed only in relation to traditional physical health care visits as seen in the following quote of Boomerweb's website: *"To get this in balance, the use of the Beeld Zorg App is the proper form of substitution (= replacing physical care by remote care)"* (44). On the other hand MediCall was also framed in relation to the malpractice of using consumer video call apps such as skype and facetime as seen in the following quote from Inmote's website: *"Why? Current available video calling systems like Skype and FaceTime are unsafe."* (45).

Frames
The mHealth vendors then framed their mHealth technologies in relation to these existing practices as mentioned above. An overview of the distinctive frames is given in table 16 above. As seen the mHealth applications were framed differently when drawing on different discourses. What is seen from table 16 is that sometimes the same frames were provide by the mHealth vendors for mHealth technologies with different functionality types. For example from a rationalist discourse, most mHealth applications were framed similar. They were framed as a method to ensure efficiency and cost savings. However, sometimes a particular frame was only provided for a specific functionality type. For example for the medication check applications. From rationalist discourse these applications were framed as a method for the healthcare organisation to comply with regulations set by the healthcare inspection: *"The Healthcare Inspection has also announced that in 2015 they will inspect extra on the issue of medication safety. During unannounced visits by Inspectorate has shown that 87% of the visited healthcare facilities does not (yet) meet the requirements. ... Zorgapotheek offers a IGZ-proof solution that meets NEN 7510 en ISO 27001 certifications: De Medicatie Controle App"* (46). From table 16 it can be seen that this frame was only provided for the mHealth applications which had a medication check functionality.

	Existing practice	Rationalist	Operationalist	Humanist
EHR applications				
EasyClinic Tablet	Look up of patient records before visits and entry of new information after visits		1) Informed decision making 2) Efficiency	
EPD App				
CC ZorgApp		1) Efficiency 2) Cost savings		
Medication check applications				
Dubbele Medicatiecontrole App	1) Double check by second person physically present 2) Malpractice -> No double check at all	Compliance to regulations	Efficiency	Wellbeing of the patient
Medicatie Controle App (Z)				
Medicatie Controle App (B)				
Sensor applications				
IncoSense Smart	Unstructured incontinence care	1) Efficiency 2) Cost savings	Efficiency	
ThuisMeten App	Frequent hospital visits.		Informed decision making	Wellbeing of the patient
Information exchange app				
Kanta Messenger	1) Information sharing through PACS 2) Malpractice -> information sharing through WhatsApp		1) Efficiency 2) Privacy of HC professional	Privacy of the patient
Fenestrae OMNI				
EVOCS Mobile				
Wound care applications				
W+	Manual measurement of wound characteristics	1) Efficiency 2) Cost savings	1) Efficiency 2) Informed decision making	Better care for the patient
Wond Zorg App				
Video care applications				
MediCall	1) Traditional physical care 2) Malpractice -> Remote care through Consumer video call apps	1) Efficiency 2) Cost savings	Privacy of healthcare professional	1) Wellbeing of the patient 2) Privacy of patient
Beeld Zorg App	Traditional physical care		1) Efficiency 2) Informed decision making	
BeeldBellen App			Efficiency	Wellbeing of the patient

Table 16 Existing practice/technology that a mHealth applications was framed to and the frames provided per discourse type

The same held for the framing from an operationalist discourse, some frames were used for mHealth applications in multiple functionality types while others were used only for a specific functionality type. There were overall three frames provided by the mHealth vendors which drew on an operationalist discourse. First, multiple mHealth applications in different functionality categories were framed as a method to improve efficiency for the healthcare professional so that they could spend more time with the patients. This frame is exemplified by the following quote from CareConnections' website: *"The role of the healthcare professional changes because of these new techniques. Work can be done quickly and efficiently. The result is that ultimately more time remains for the human side of care."* (47). Second, a frequently used frame applied by mHealth vendors with mHealth applications in different functionality groups, was that the mHealth applications allowed the healthcare professional to have up to date information so that they could make better informed decisions. For example as seen in table 1 and the quotes below both the W+ and the EHR application of Chipsoft had a different product functionality types but were framed the same. They were both framed as a mHealth application that provided more up to date information to the healthcare professional, allowing them to make more informed decisions. This is a quote of Chipsoft's website showing how they framed their mHealth application: *"From personal data, diagnoses, medication, allergies, and lab results to radiological, nuclear, bacteriological and pathological information: everything is real-time available through the dashboard. Does the patient has a treatment restriction or allergy? Then this is notified directly on the screen. This allows medical specialists to make rapid and fully informed decisions"* (48). And the following quote is from Inmote's website, showing how they frame a different mHealth application but address the same issue of informed decision making: *"The quality of care is improved, because with W + all those involved in the healthcare chain always have instant access to the latest information about the recovery of their patients"* (49). Finally, a frame only provided by mHealth vendors for mHealth applications in the information exchange functionality type group was that the mHealth applications made sure that the privacy of the healthcare professional was better protected, this is exemplified in the following quote: *"Kanta does not use your email address, phone number or contact list to contact other users of Kanta.... In this way your privacy is best protected"* (50).

From a humanist discourse, also three frames were provided. The first frame focused specifically on the care that was provided to the patient. It framed the mHealth applications as a better way to perform healthcare. The second frame, did not focus on healthcare specifically but on a patient's well-being in general. For example through the BeeldBellen App loneliness was addressed: *"Blog @DaanDohmen about loneliness and how technology extra window to offer the world: https://t.co/DlwACMIXBl https://t.co/Z6yeAJEjp4"* (51). This frame of improving the wellbeing of patients and elderly was also used across multiple functionality categories. The third frame focused on the privacy of the patient, framing the mHealth applications as technologies through which the privacy of the patient was better protected. This frame was only provided for mHealth applications in the video care group and the information exchange functionality group. It is noticeable that these were the only two functionality groups of which the previous practices were a consumer technology, therefore this may have influenced the framing of the applications in these functionality groups.

Concluding, it was seen that the mHealth vendors provided similar frames for mHealth applications from different functionality types while it was also seen that other specific frames were only used for specific functionality types. It can therefore be said that the frames that were provide by the mHealth vendors were sometimes but not always dependent on the functionality type of the mHealth applications. What exactly influences this is unknown.

Furthermore, what was seen was, that instead of only legitimating their own mHealth application, the mHealth vendors dealing with malpractice also performed delegitimation practices by framing the malpractice as, inappropriate and inconsistent with current norms and values. For the mHealth vendors with a product in the information exchange category it was seen that in their frames they questioned the safety of WhatsApp Messenger and then proposed that their own applications were a much better alternative. This is seen in the following quote: *"You don't want to send medical patient information via a public network such as WhatsApp. Taking a picture of a wound and sending it via WhatsApp to hear the opinion of a fellow doctor. In the medical world WhatsApp is indispensable. Doctors are very enthusiastic. But some doctors have a less pleasant feeling. Because how safe is this method to share medical data? WhatsApp is owned by Facebook, which is often criticized because of privacy violation ... Read more and watch the video in the article:* medische/info/delen/via/whatsapp*"* (52). As mentioned above Inmote also used a delegitimation strategy. They also framed the use of consumer video apps such as Skype and Facetime for the use in the healthcare setting as unsafe. This is seen in the following quote: *"Current available for video calling systems like Skype and FaceTime are unsafe."* (53). It was thus seen that Inmote provided a similar frame for the delegitimation of the video care app as the mHealth vendors did for the delegitimation of their information exchange technologies.

Also the malpractice of not dual checking medication administrations was framed as inappropriate from both a rationalist and a humanist discourse. From a humanist discourse this was framed as immoral for the patients such as seen in the following quote: *High-risk medications such as opioids should, insulins and parenterals, before they can be administered to the patient, to be controlled by two competent caregivers on: right drug, right dose, right time and right client. Double Check this procedure is important because a wrong dosage or administration may lead to serious incidents, such as hospitalisation or even ultimately to the death of the client."* (54). And from a rationalist discourse this was framed as inappropriate as the healthcare organisation then did not meet de safety requirements set by the health inspection. *"Also, there are already several healthcare organisations under increased supervision of Inspectorate, partly because the process was not conducted properly and was not sufficiently secured."* (55). Note that here also two different legitimation arguments are provided, a moralisation and an impersonal authority authorisation, more hereon in the next section.

When converting table 16 in order to evaluate the product phase variable, table 17 is produced. When looking at this table, it is seen that a specific frame, that of the mHealth application ensuring the privacy patient, is only provided for mHealth applications in the market introduction phase. However no logical explanations here for were found in the analysis. Furthermore no other clear patterns can be detected from table 17. The different frames provided by the mHealth vendors, are provided for mHealth applications spread over all of the product phases. Therefore the framing of the mHealth applications by the mHealth vendors does not seem to be related to the product phase that the mHealth applications are in.

	Rationalist	Operationalist	Humanist
Product development phase			
EasyClinic Tablet		1) Informed decision making 2) Efficiency	
EPD App		1) Informed decision making 2) Efficiency	
Dubbele Medicatiecontrole App	Compliance to regulations	Efficiency	Better care for patient
IncoSense Smart	1) Efficiency 2) Cost savings	Efficiency	
Market introduction phase			
CC ZorgApp	1) Efficiency 2) Cost savings	1) Informed decision making 2) Efficiency	
Medicatie Controle App (Z)	Compliance to regulations	Efficiency	Better care for patient
Kanta Messenger		1) Efficiency 2) Privacy of healthcare professional	Privacy of the patient
Fenestrae OMNI		1) Efficiency 2) Privacy of healthcare professional	Privacy of the patient
W+	1) Efficiency 2) Cost savings	1) Efficiency Informed decision making	Better care for the patient
Wond Zorg App	1) Efficiency 2) Cost savings	1) Efficiency Informed decision making	
MediCall	1) Efficiency 2) Cost savings	Privacy of healthcare professional	Privacy of patient
Commercialisation phase			
Medicatie Controle App (B)	Compliance to regulations	Efficiency	Better care for patient
Beeld Zorg App	1) Efficiency 2) Cost savings	1) Efficiency 2) Informed decision making	
BeeldBellen App		Efficiency	Wellbeing of the patient
ThuisMeten App		Informed decision making	Wellbeing of the patient
EVOCS Mobile		1) Efficiency 2) Privacy of healthcare professional	

Table 17 Existing practice/technology that a mHealth applications was framed to and the frames provided per product phase

Tables 18 and 19 below give an overview of the legitimation arguments provided by the mHealth organisations for the different mHealth applications.

Firstly, it is seen that in all the phases the mHealth vendors provided rational legitimation arguments. However the reason why they use the rationalisation arguments may differ in the different phases. In the development phase the mHealth vendors, use rational legitimation arguments when talking about their mHealth technologies still under development. Thereby promising that the mHealth applications that they are developing will benefit the healthcare organisation and the healthcare professional. With these promises they build expectations for the mHealth application. By building expectations, people read about the application and get a positive perception of it therefore this practice of building expectations causes for a gain in legitimacy.

	Adjudicated authorisation	Impersonal authorisation	User authorisation	User-involvement authorisation	Alliance authorisation	Exemplification	Moralisation	Rationalisation	Naturalisation
Product development phase									
EasyClinic Tablet			x	x				x	
EPD App								x	
Dubbele Medicatiecontrole App			x	x	x	x	x	x	
IncoSense Smart				x				x	
Market introduction phase									
CC ZorgApp	x			x	x			x	x
Medicatie Controle App (Z)		x				x	x	x	
Kanta Messenger	x	x		x		x	x	x	x
Fenestrae OMNI		x					x	x	x
W+				x				x	
Wond Zorg App						x		x	
MediCall				x				x	
Commercialisation phase									
Medicatie Controle App (B)			x		x	x	x	x	
Beeld Zorg App			x		x	x		x	
BeeldBellen App			x		x	x	x	x	
ThuisMeten App			x		x	x	x	x	
EVOCS Mobile								x	

Table 18 Legitimation arguments per mHealth application per product phase

mHealth vendors with mHealth technologies in the commercialisation phase provided a special kind of rationalisation argument. They provided rationalisation arguments which were based on the experienced truth and not on something that was expected. This is seen the following quote: *"Our*

recent user survey of the ThuisMeten App showed unique results: 28% reduction in readmissions, 26% less ... http://t.co/fgXIfJ5q2L" (56). Through user studies the claims made by the organisations about the mHealth technologies such as more efficiency, cost reduction or happier patients could now be validated. They were thereby adding extra weight to their legitimation claims because it was now founded on some kind of truth that they could refer to.

Furthermore it is seen that the organisations in the product development phase and the market introduction phase provide user-involvement authorisation arguments to legitimate their mHealth applications. This is seen in the following quote: *"Meander Nurses have been at the forefront of the development. They have indicate what the design should look like and development team of Dell and EasyCare have translated this into a user-friendly app."* (57). This is a type of authorisation in the sense that they argue that users have conceived the product, have given input throughout the development of the product or that it was tested by actual users. This was also an additional type of authorisation, not previously defined but identified in the analysis. When referring to the fact that users were involved in the development of the mHealth application, the mHealth vendors showed that the mHealth applications were in line with norms and values of the users. Therefore user-involvement authorisation arguments build towards the legitimacy of mHealth applications. These user involvement arguments were used a lot in the product development phase because in that phase talked about the development of the mHealth applications when announcing a new mHealth application. Furthermore these arguments were also provided in the market introduction phase to influences the perception of the potential users. It provided no guarantee but the fact that users were involved in the innovation process signalled that the needs and wishes of the users were taken into consideration. An example of such a legitimation argument is seen in the following quote: *"MediCall was developed in consultation with the industry. So no useless features, but only what users really need"* (58). Noticeable was that the mHealth vendors for their mHealth technologies in the commercialisation phase did not provide user-involvement authorisation argument. This may be because in this phase the technologies were already widely used.

The mHealth vendors with mHealth applications in the commercialisation phase rather used exemplification and user authorisation arguments to show that their mHealth applications fulfilled the needs and expectations of the actors. Exemplification arguments, indicated that other organisations were using the mHealth application. The use of exemplification arguments brought in something that for many healthcare organisations was imaginary, in this case the use of mHealth, to real and factual manifestations. It showed that other healthcare organisations were actually working with mHealth, and that it was no longer just talked and speculated about. It therefore added to the cognitive legitimacy of the mHealth applications. Furthermore exemplification arguments added to social-political legitimacy of mHealth application by drawing on the legitimacy of healthcare organisations already using the mHealth applications. When showing that highly regarded healthcare organisations are using a mHealth application, other actors will value the mHealth application as legitimate. Exemplification by Boomerweb took the form of referring to companies who were already customer of Boomerweb and were using their mHealth products. These explicit references to health care institutions were done on Boomerweb's website, in their email updates and in tweets, an example of which is seen in the following quote: *"Today Archipel Zorggroep is the first healthcare organisations who has officially started with this!"* (59).

From table 18 it can be seen that for mHealth applications in the commercialisation phase the mHealth vendors also used user authorisation arguments. User authorisation was also an additional type of authorisation identified in this research. User authorisation differs from exemplification in that exemplification merely refers to an example while user authorisation also refers to the opinion of the example. Of course, mHealth vendors can claim that their mHealth application are beneficial and user

friendly but actor know that their primarily concern is to sell their products. So referring to users who have actually experiences with using the mHealth product and have an opinion about it, can give extra weight to their claims. An example of the use of such an user authorisation argument is seen in the following quote: *"Janneke Wittekoek cardiologist Heartlife Klinieken" With the deployment of ThuisMeten I can keep in regular contact with my patients in a very pleasant way, and only see them in my clinic if it is really necessary! Using ThuisMeten, we can make care more tailored and save costs.'"* (60). Because this study primarily focused on technologies used by healthcare professionals or healthcare professionals in collaboration with patients, user authorisation arguments included references to both patients as well as healthcare professionals, as seen in the following quote: "*Nice video: client and nurse talk about deployment of video care through @focuscura BeeldBellen App at @MeanderGroep! http://t.co/GTijhZau8K*" (61).

	Adjudicated authorisation	Impersonal authorisation	User authorisation	User-involvement	Alliance authorisation	Exemplification	Moralisation	Rationalisation	Naturalisation
EHR applications									
EasyClinic Tablet			x	x				x	
EPD App								x	
CC ZorgApp	x			x	x			x	x
Medication check app									
Dubbele Medicatiecontrole App			x	x	x	x	x	x	
Medicatie Controle App (Z)		x				x	x	x	
Medicatie Controle App (B)			x		x	x	x	x	
Sensor applications									
IncoSense Smart				x				x	
ThuisMeten App			x		x	x	x	x	
Information exchange app									
Kanta Messenger	x	x		x		x	x	x	x
Fenestrae OMNI		x					x	x	x
EVOCS Mobile								x	
Wound care applications									
W+				x				x	
Wond Zorg App							x	x	
Video care applications									
MediCall				x				x	
Beeld Zorg App			x		x	x		x	
BeeldBellen App			x		x	x	x	x	

Table 19 Legitimation arguments per mHealth applications per functionality type

Table 19 shows the legitimation arguments used per mHealth functionality type. Notable is, that for all the mHealth applications in the medication check app category, the mHealth vendors provided a moralisation argument such as seen in the following quote: "*Before they can be administered to the patient, high-risk medications such as opioids, insulins and parenterals, should be checked, to by two*

competent caregivers on criteria such as: right drug, right dose, right time and right client. This Dual Check procedure is important because a wrong dosage or administration may lead to serious incidents, such as hospitalisation or even ultimately to the death of a patient" (62). These arguments were usually provided to introduce why dual medications check was necessary in the first place. However, other discursive legitimation arguments like rationalisation argument were then provided to argue why specifically a mHealth application should be used therefore. When looking at the table below no other obvious patterns for the use of legitimation argument by mHealth vendors for mHealth applications in the different functionality categories can be detected. The legitimation argument provided by the mHealth vendors differed greatly within and between the different functionality types. Therefor it is expected that the use of legitimation arguments in not related to the product functionality variable.

4.2.4. Preliminary conclusions

Product phase

The findings presented above showed that the discursive practices of organisations differed along the product phase of the mHealth applications. It was seen that in the product development phase, organisations tried to raise awareness and expectations amongst both healthcare professionals and healthcare organisations by talking about the development of a new mHealth application. Therefor they used both user innovation authorisation as well as rationalisation arguments proposing the benefits that the mHealth technologies were expected to have. In the market introduction phase, the focus was more on providing information about the mHealth applications and were they could be bought. This was seen by linking practices to appstores and health related media featuring the product of the mHealth vendors himself. When in the market introduction phase the mHealth vendors were legitimating their mHealth applications by showing how they were already applied by healthcare organisations. This was especially done by providing links to articles and websites which talked about the use of the mHealth application in healthcare organisations and through the use of exemplification and user authorisation arguments. Furthermore in the commercialisations phase the mHealth vendors were also more interested in legitimating their applications in the wider public which was seen by their hyperlinking practice to public media sources and on how they framed their mHealth applications in a humanist discourse.

Concluding, the discursive intertextual legitimation practices, the framing practices as well as the discursive legitimation argument practices, of the mHealth vendors differed according to the product phases of the mHealth application they were legitimating. Therefore these findings support hypothesis 3*; it is expected that the discursive practices produced by mHealth vendors differ along the product phase of the mHealth application that they are discoursing.*

Product type

The findings above show that for both the discursive intertextual legitimation practice as well as the discursive legitimation argument practice, no differences could be detected between the different functionality groups. Furthermore also for the discursive framing analysis it was seen that when legitimating a mHealth application relative to the previous practice, the mHealth vendors mostly used the same frames for the mHealth applications in the different functionality type categories. When the mHealth applications were framed in sight of a malpractice such as the use of consumer communication apps, as was seen for the information exchange and one video care application, a distinctive frame was used. A frame that delegitimated the use of consumer communications apps by making salient how unsafe they were. However as these were also from two distinctive functionality categories, it can be concluded that the finding of this research do not support hypothesis 4; *It is expected that the discursive practices produced by mHealth vendors differ according to the product functionality type of the mHealth application that they are discoursing.*

5. Conclusion and discussion

This study was set out to investigate if and why organisations discourse differently when constructing legitimacy towards a new technology. It proposed a set of organisational and product variables identified from the innovation literature which were expected to influence this. This study then performed a discourse analysis on the empirical setting of the legitimation of mHealth technologies by commercial mHealth vendors. Throughout the analysis it was seen that both the organisational variables, incumbency and diversity, as well as the product variable, product phase, influenced the discursive legitimation practices of mHealth vendors, but that the other product variable, product functionality, did not.

5.1. Theoretical implications

Findings of this study have important theoretical implications for research on discursive legitimation. Firstly, the literature on discursive legitimation has been extended by providing insight into potential influences on the discursive legitimation practices of an organisation. While previous studies have focused on providing descriptive insights on how organisations build legitimacy, there is a relative paucity of knowledge on the underlying processes of discursive legitimation (Joutsenvirta & Vaara, 2009). This research therefore adds to the legitimation literature by showing how organisational and product factors influences the discursive legitimation practices of an organisation.

This research showed that due to the low legitimacy and lack of resources the discursive legitimation practices of new entrants differed from that of incumbents in the way that they drew on the legitimacy of established institutions. This is in line with insights from previous research on non-discursive legitimation practices. In their study on new industry formation Aldrich & Fiol (1994) have identified that new organisations develop perceptions of reliability by generating and sustaining relationships with established institutions and that this is key for overcoming low legitimacy. Moreover new entrants also differed from the incumbent companies in that they employed a rationalist discourse while incumbent organisations did not. This analysis also demonstrated that diversified organisations have distinct institutional logics from which they frame and legitimate a new technology. It was seen that due to the background of the diversified organisations in communication and information systems their discursive practices such as framing and intertextuality focused more on safety and security issues. Finally, it was also seen that the product phase of the mHealth application that an organisation is trying to legitimate influenced the discursive practices the mHealth organisation executed. When the mHealth applications matured, the construction of legitimacy was less focused on convincing actors of the value of the mHealth applications by proposing its benefits, but more on convincing actors that it was appropriate to adopt the mHealth applications as this conformed with the actions of other organisations. This is in line with the institutional theory arguing that pressures for conformity exerted by institutionalised practices influence an organisation's behaviour (Pache & Santos, 2010).

Secondly, through the analysis in the field of mHealth legitimation, this study has also extended Van Leeuwen's (2008) pioneering framework. In this research the framework was tested in a new empirical setting of the health care industry, adding to the generalisability of the framework. Furthermore, the framework was previously used in research on the legitimation of organisational actions such as mergers and acquisitions (Vaara & Monin, 2010) and alliance formation (Vaara et al., 2004). By applying this framework in the setting of the legitimation a new technology, three additional authorisation arguments were identified and added to the framework; alliance authorisation, user authorisations and user-involvement authorisation.

5.2.   Methodological implications

This research specifically and intentionally focused on the usage of online sources for the discourse analysis. Thereby this research aimed to broaden the limited methodological understanding hereof. Several implications and limitations were encountered during this study. Firstly it was noted that some mHealth vendors performed different discursive practices on different media platforms. For example FocusCura predominantly drew from an operationalist discourse on their website while via their Facebook and Twitter account they engaged more in a humanist discourse. Moreover, it was seen that the mHealth vendors did not use the online platform as distinct discursive mediums, rather using them in combination with each other, especially exemplified by the frequent hyperlinking practices on social media to the vendors own sources. This research therefore argues that when performing an online discourse analysis, it should not be focused on a single online sources but on the whole online discursive practice of an organisations.

This research also identified a lack of uniformity regarding the online platforms on which the mHealth vendors discoursed. For example CareConnections did not have a Twitter or Facebook account and therefore only their website and LinkedIn page were used for the analysis. On the other hand, FocusCura discoursed on both Twitter and Facebook. This influenced the basis for comparison. This was for example seen in the intertextual analysis, which showed that CareConnections only provided a few hyperlinks while FocusCura provided many hyperlinks. Another implication of using multiple online sources is that it was seen that mHealth vendors sometimes discoursed repetitiously on the different platforms, e.g. providing exactly the same text and hyperlinks on both Facebook and Twitter. This was also seen frequently on the LinkedIn pages of the mHealth vendors, where links were provided to own news sections and blogs. Future research should put extra attention on deciding how to deal with this; are these repetitions regarded as distinct legitimation practices or not.

5.3.   Limitations

A few limitations of this research need to be addressed. Firstly, a frequent mentioned criticism on discourse analysis is that it is often seen as an interpretation analysis rather than a factual analysis due to its identification of arguments and discourses which rest on the interpretations of the researchers (Machin & Mayr, 2012). However, the purpose of this analysis was to develop new theoretical understandings about the influence of variables on the discursive legitimation practices and not to make accurate claims regarding the frequency and use of the different practices used by the mHealth vendors. Secondly, as also mentioned in the theory section, not all discursive practices of actors are intentional, hence the use of the term "discursive practices" and not "discursive strategies" throughout this research. Actors seldom intentionally choose from a predefined set of practices in order to legitimate a new technology and this should also be taken into account when evaluating the findings (Livio & Tenenboim Weinblatt, 2007). Thirdly, the use of only 12 cases in a specific industry poses restrictions to the generalisability of the results. This relatively small sample allowed for the identification of a possible relationship between the proposed variables, however, more research is needed to corroborate the findings for other organisations in other industries.

5.4.   Future research

As mentioned above, future research should focus on verifying the proposed relationships between the organisational and product variables on the discursive practices of organisations in other empirical settings. Moreover, this research has focused on three types of discursive legitimation practices, intertextuality, framing and discursive legitimation arguments. Further research could corroborate if these proposed variables also influence other discursive practices performed by organisations such as rhetorical strategies. Furthermore, for the product phase variable this study compared different

mHealth technologies, from varying mHealth producers in different phases. It can therefore not be ruled out that the difference in discursive practices of mHealth vendors with technologies in the different phases is attributable to other variables than the product phase. For a better comparison of how the discursive practices of organisations changes throughout the product phase, further research should perform a temporal study, mapping the discursive practices of organisation for distinct technologies over time.

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Appendices

Appendix 1: Longlist of mHealth applications

|		
24Care	Figure 1-app	Odiononline
3D Human Anatomy Atlas	Fysiovoorjou.nl	Omreken ap
ABCTV	Goedenacht	Oncologie viewer app
Abel	GOMA	Ons
Activiteitenweger-app	HealthSuite	Orfeus mobiel
Acute patient app	Hellofysioapp	OWise borstkanker
Alarmering messange app	Heyewey	Partogram
ASVZTV	ICPC app	Patient+
Beagleboxx	ICU delierapp	PebbleMED (nu "Emma")
BeeldbelApp	IJso4all	Physitrack
Beeld Zorg App	Incosense Smart	Portal healthcare apps
Beeldschermzorg	Inforium	Quli
Behandelingbegrepen app	IntelliCare	Receptprijs-app
Behandelpad app	IntelliSpace	Richtlijnen apps
Casemix Viewer App	IP Plaslijst	Qaltro app
CC zorgapp	Iqaurant	Spaulding webECG
Chipsoft - EPD App Hix	JBZ Zorgapp	Swipesens
Crisis App	Kanta messenger	Switch Tables
Codex medicus app	Karify	TabletAPP
COMMUNICATE APP	Klinische anastesiologie	TELEDERMATOLOGY APP
Constamed	Livv Mobile Health	ThuismeetApp
CSC mobile	Medapp	Touch surgery
De zorgpatch/ de vital connect pleister	Medcom	Trace
DeleerICU	MedEye	TraumaNet AMC
Diagnosishelp	Medialis	Uptodate
Dubbele Medicatiecontrole App	MediCall	Urologie viewer App
EarlySense	Medicatie Contole App (winvision)	ViaSana app
Easyclinic Tablet	Medicatie Controle App (zorgapotheek)	VISIQ/lumify (ultrasound)
e-cardiocare	Medimapp	Vitalink
eCareCompanion	Minddistrict	VoICe
EHBO App	Mobilea	W+
Eigenzorg app	MoMe Monitor me	WinCare
Epic Eva (EPD VU-AMC)	MOUNT	Wond Zorg App
EVOCS Mobile	MPACSView	Zio Patch
Exsudo zorplatform	Nfc skin patches	Zorgdossier app
Farmacotherapeutisch Kompas	NHG standaarden app	Zorgonline
Fenestrae Omni	Nurseapp	ZwApp

Appendix 2: Shortlist of mHealth vendors with their mHealth technologies

mHealth vendor	mHealth application
Betawerk	Incosense Smart
Boomerweb	Beeld Zorg App, Medicatie Controle App, Wondzorgapp
Brevidius	ABCTV
CareConnections	CC ZorgApp
Chipsoft	EPD APP Hix
Easycare	EasyClinic tablet
Eigenzorg	Eigenzorg app
Fenestrea	Fenestrae OMNI
FocusCura	BeeldbelApp, ThuismeetApp
Fysicon	EVOCS Mobile
ICT	mPACSView
Moet ik naar de doktor?	Mag ik meekijken app
Mountsoftware	MOUNT
Nedap	Zorgdossier app, medicatie controle app
Orfeus	Orfeus mobiel
Phillips	VISIQ/lumify -> healthsuite
Physitrack	Physitrack
PinkRoccade	Iqaurant
Saltro	Saltro app
Tijdstroom	Medcom
Topicus zorg	Kanta-messenger
Winvision	WinCare, Medicatie Controle App
Zorgappotheek	Zorgapotheek Medicatie Controle App

Appendix 3: Flowchart of the case selection process
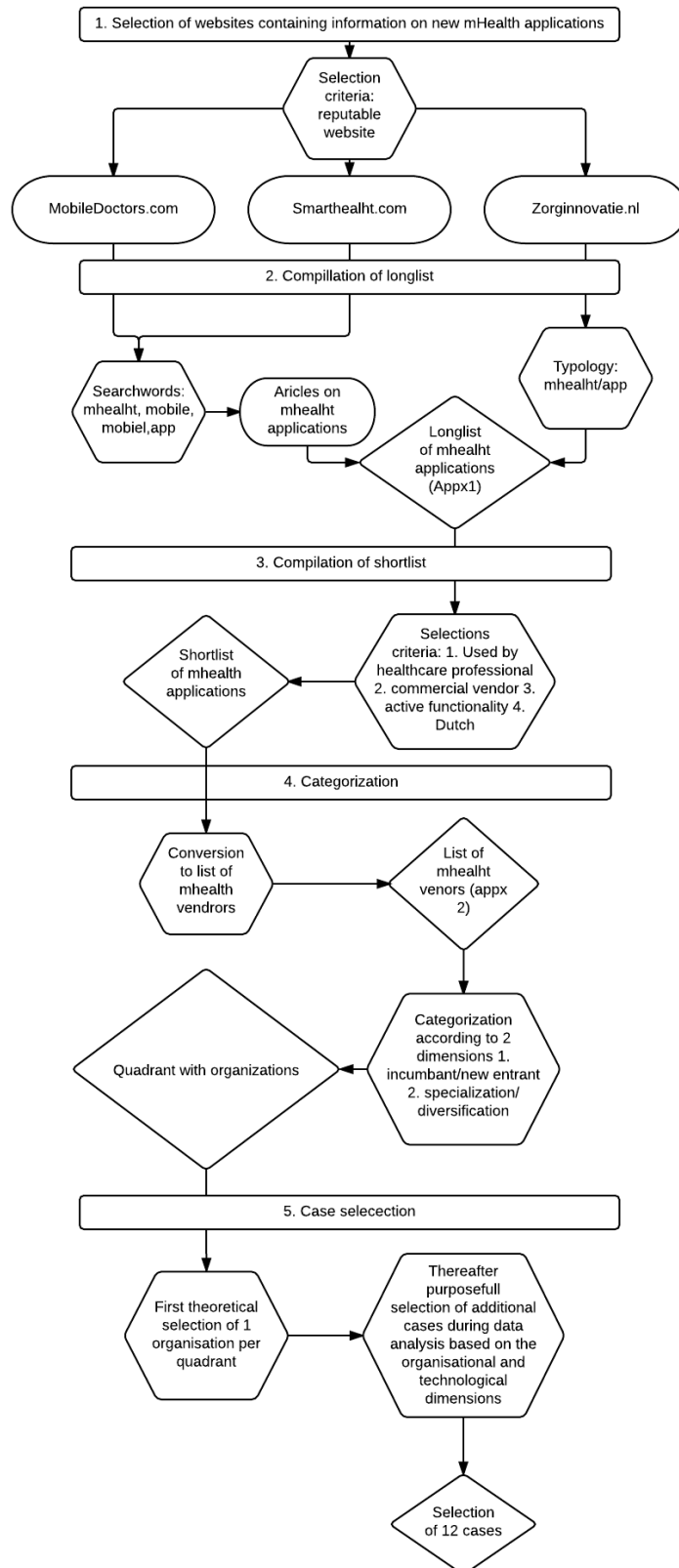
Appendix 4: Flowchart of data source selection process
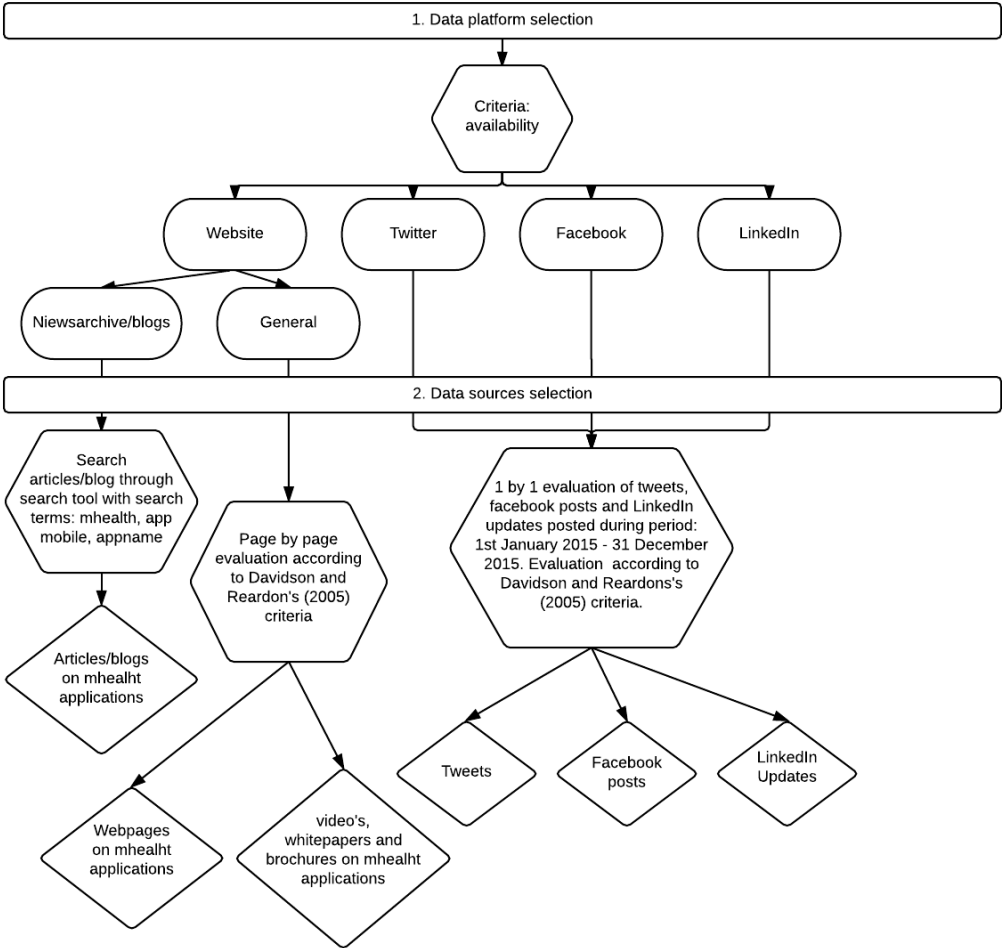
Appendix 5: Overview of the number of data sources per case per source platform

	# Web pages	# Tweets	# Facebook Posts	# LinkedIn Updates	Video	# Other
Betawerk	0	n.a.	7	0	1	3
Boomerweb	6	29	n.a.	18	3	8
CareConnections	6	7	n.a.	1	1	2
Chipsoft	2	10	n.a.	2	0	
Easycare	2	4	n.a.	1	1	0
Fenestrae	1	28	n.a.	9	1	2
FocusCura	5	147	60	11	6	2
Fysicon	3	3	3	1	0	1
Inmote	8	18	n.a.		1	2
Topicus	15	46	n.a.	4	1	0
Winvision	4	34	3	8	0	2
Zorgapotheek	3	5	n.a.	4	0	0

Appendix 6. Coding scheme intertextual analysis: source type

Super code	Code	Sub code	Sub code
Own website			
Other website	App store		
	Branch organisation		
	Events		
	Expertise centre		
	Government website		
	Healthcare organisation website		
	Health Tech vendor website		
	Network		
	Patient organisation		
	Scientific journal		
	Standard setting organisation		
	Health insurer		
	Other		
	Media website	Traditional media	
		Themed media	Technology related
			Health related
			Safety related

Appendix 7. Coding scheme intertextual analysis: source content type

Super code	Code	Sub code
Information on application/organisation	In a news article	
	On the Appstore	
Safety/security	Privacy/safety regulations	
	Safety standards	
	Unsafe applications	WhatsApp, email, Nike running app, android phone
	Safe information exchange	
Policy	Funding of ehHealth/mHealth	
	New regulations	
	Government stimulation	
	mHealth target	
Competition	Accelerator program	
	Award	
Healthcare organisation	Healthcare organisation	
Trends	Living at home longer	
	Compulsory shutdown of healthcare organisations	
	Patient participation	
	Digitalisation	
Use of mHealth	Implementation of mHealth	
	EHealth monitor	
	In use at a healthcare organisations	Collaboration, pilot study
	Experience with use of mHealth	User experience, cost savings,
	Actual use of mHealth	
	Proof of market	
	Effects	Efficiency, cost reduction
Future of healthcare	Chances for mHealth	
	Future of care	
Innovation	With users	
	Innovations in the healthcare sector	

Appendix 8: Coding scheme for frame analysis

Category	Super code	Code	Findings
Problem/changes/trends	Push forces	Structural changes	Extramuralisation, livig at home longer, 2de lijns naar 1te lijns zorg,
		Demographic changes	Aging, loneliness
		Policy changes	Reimbursement policy, privacy acts,
	Pull forces	Finacial forces	Rising cost of healthcare, budget cuts
		Competivenes	efficiency
		Governmental forces	Stmulation of innovation
	Safety concerns	Privacy	Unsafe data exchange,
		Drug administration	Wrong drug adminstrations, shut down of healthcare organisations,
	Digital and technological changes	digitalisation	Smartphones, BYOD, digitalisation
		Patient empowerment	Health apps,insights in own data.
Goal	Improve quality of life	Improve quality of life	Quality of life
Previous practice/technology	Practices	Traditional healthcare	Unstructured incontinence care, manual measurement of wounds, physical home visits,
	Malpractice	Medication check	No dual medication, check, wrong administration of drugs
		Data exchange	Unsafe data exchange, cumbersome data exchange,
	Technology	Messaging technology	Whatsapp
		Video call technology	Skype, Facetime
Benefits of mHealth	HC organisational level	Cost savings	Saving of labour costs, saving of material costs, saving of traveling expenses, paper costs savings
		Legal compliance	IGZ-inspectie voor medicatie veiligheid
	HC professional level	Privacy	Privacy of details hc professional
		Efficiency	Less administrative work, less travel time,
		Provide better care	Up to date information to make decisions, everywhere access to data, easyer

		HC professional satisfaction	Positive experience
	Patient	Safety	Safer drug administration,
		Better care	More time for patient, less complications
		Privacy	Privacy of patient data
		Beter quality of life	Less hospital visits, less loneliness, more independence
		Patient satisfaction	Positive experience

Appendix 9: Redefined coding scheme of discursive legitimation arguments

Arguments	Description	Example
Authorisation	References to authorities	
- **Personal authorisation**	Referencing to others who have a high status within an institution	*"The idea for the app came from the workfloor, Bart van den Bogaard explains, father of Kanta Messenger and product manager at Topicus Care, an IT specialist who links the parties in the healthcare sector."* *("Het idee voor de app is afkomstig van de werkvloer, vertelt Bart van den Bogaard, geestelijk vader van Kanta Messenger en productmanager bij Topicus Zorg, een ICT-specialist die partijen in de zorgwereld verbindt.") – Kanta Messenger*
- **Impersonal authorisation**	Establishing legitimacy by conforming to impersonal authority such as laws, rules and regulations	*"The Apotheek Receptcontrole App meets the Inspectorate requirements for final inspection of drug delivery, including the box with shipping label"* *("De Apotheek Receptcontrole App voldoet aan de IGZ-eisen voor eindcontrole van aflevering van een geneesmiddel inclusief het doosje met afleveretiket") - Zorgapotheek*
- **User authorisation**	Establishing legitimacy from the opinion of users	*"Mrs. Luiten-Quist, user of Thuismeten" With Thuismeten I have to make fewer trips to the hospital and I feel safe. '"* *("Mevrouw Luiten-Quist gebruiker van ThuisMeten 'Met ThuisMeten hoef ik minder vaak naar het ziekenhuis en heb ik een veilig gevoel.'") - FocusCura*
- **User-involvement authorisation**	Establishing legitimacy by referring to the involvement of user in the development process	*"Nurses of Meander have been at the forefront of development. They have shown how the design should come out the development of Dell and EasyCare translated into a user-friendly app "* *("Verpleegkundigen van Meander hebben aan de wieg gestaan van de ontwikkeling. Zij hebben aangegeven hoe het ontwerp er uit moet komen te zien en het ontwikkelteam van Dell en EasyCare hebben dit vertaald naar een gebruiksvriendelijke app") - EasyCare*
- **Alliance authorisation**	Establishing legitimacy by referring to partners	*"St. Anna Hospital and care organisation ZuidZorg work with FocusCura innovation in healthcare. So ... https://t.co/O20Z3QymBm"* *("St. Anna Ziekenhuis en zorgorganisatie ZuidZorg werken samen met FocusCura aan innovatie in de zorg. Zodat... https://t.co/O20Z3QymBm")*

Exemplification	using specific examples to establish legitimacy	*"St. Anna Hospital, Geldrop and care organisation ZuidZorg work with FocusCura on innovation in healthcare. So that the elderly and people with chronic disease can maintain their own control over their care and health as long as possible. In this video nurse and COPD patient tell how to healthcare has become even better thanks to ThuisMeten and BeeldZorg. "* *("Sint Anna Ziekenhuis, Geldrop en zorgorganisatie ZuidZorg werken samen met FocusCura aan innovatie in de zorg. Zodat ouderen en mensen met een chronische ziekte zo lang mogelijk de eigen regie over hun zorg en gezondheid houden. In deze video vertellen verpleegkundige en COPD-patient hoe de zorg nog beter geworden is dankzij ThuisMeten en BeeldZorg." - FocusCura*
Moralisation	establishing legitimacy by moral arguments	*"Increase quality of life for client by deployment of remote healthcare."* *("Stijging kwaliteit van leven cliënt bij inzet zorg op afstand.") - FocusCura*
Rationalisation	providing specific rational arguments to establish legitimacy	*"With the deployment of apps their can easily be booked more profits on three areas: efficiency, time and cost."* *("Met de inzet van apps kan heel eenvoudig winst op een drietal terreinen worden geboekt: efficiëntie, tijd en kosten.")- FocusCura*
Naturalisation	Legitimation by rendering something natural	*"Within healthcare more employees are faced with digitisation. On this field, healthcare in the Netherlands has already changed over the past few years but will face many more changes in the near future.* *("Binnen de zorg krijgen steeds meer medewerkers te maken met digitalisering. De zorg is in Nederland op dat vlak de afgelopen "jaren al veranderd, maar gaat de komende tijd met nog veel meer veranderingen te maken krijgen.) - CareConnections*

Appendix 10: Translation of qoutes

Quote number	Original Quote	English translation of the quote	Source
1	"@FocusCura: Blog @DaanDohmen over Eenzaamheid en hoe technologie extra venster op de wereld te bieden: http://bit.ly/1M8ptit"	"@FocusCura: Blog @DaanDohmen about loneliness and how technology can open an extra window to the outside world: http://bit.ly/1M8ptit"	Twitter FocusCura
2	"'Nieuwe privacywet raakt ook zorgsector'. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH"	"New privacy law also affects healthcare sector. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH"	Twitter Fenestrae
3	"Top rapport @Nictiz kansen Beeldzorg en implementatie! Ook als @focuscura ervaring gedeeld: https://t.co/lg8nsspVvJ https://t.co/HDczaNymGx"	"Great report @Nictiz opportunities for video care and implementation! We from @focuscura have also shared our experiences https://t.co/lg8nsspVvJ https://t.co/HDczaNymGx"	Twitter FocusCura
4	"87% Android-apparaten onveilig door lakse fabrikanten https://t.co/9Du4wUMZPf"	"87% of the Android devices are unsafe due to lax manufacturers https://t.co/9Du4wUMZPf"	Twitter Topicus
5	"Artikel over gebruik van WhatsApp heeft zelfs de papieren krant gehaald! #breeduitgemeten http://t.co/z1inLuoN3W")	"Article about using WhatsApp even made it to the printed newspaper! #breeduitgemeten http://t.co/z1inLuoN3W"	Twitter Topicus
6	"RT @Zorgvisie: ChipSoft breidt EPD uit met native apps http://t.co/ci0HfOUPMf"	"RT @Zorgvisie: ChipSoft expands EHR with native apps http://t.co/ci0HfOUPMf"	Twitter Chipsoft
7	"Onterecht verwerken van persoonsgegevens leidt er toe dat #Nikerunningapp moet worden aangepast. #whosnext? https://t.co/P3ijUMERSv @CBPweb")	"Unjustified processing of personal data obliges #Nikerunningapp to be adjusted. #whosnext? https://t.co/P3ijUMERSv @CBPweb"	Twitter Topicus
8	"Interessant artikel! https://t.co/5OesnbA1yp"	"Interesting article! https://t.co/5OesnbA1yp"	Twitter Winvision
9	"Always good to be a front-runner… Remote Monitoring Cuts Hospital Readmissions http://t.co/c7KTWi7QV7"	n.a.	Twitter Inmote
10	"EVOCS® Mobile is een uitbreiding van het bestaande EVOCS® platform. Gebruikers kunnen overal, waar een Wi-Fi of 3G/4G verbinding aanwezig is, onderzoeken raadplegen. Zoals in de EVOCS® webclient heeft de gebruiker toegang tot de patiënten lijst van zijn instelling voor het raadplegen van beelden.	"EVOCS® Mobile is an extension of the existing EVOCS® platform. Wherever a Wi-Fi or 3G / 4G connection is present, users can consult lab results. As in EVOCS® webclient the user has access to the patient list of his institution for consulting images. A user can perform a search or filter and sort lab results. From the reporting	Website Fysicon

	Een gebruiker kan een zoekopdracht uitvoeren of onderzoeken filteren en sorteren. Vanuit de reporting console kan de gebruiker feedback geven op de studie. De uitgebreide viewer kan zowel beelden als films weergeven. De gebruiker kan, indien de beelden daarvoor geschikt zijn, hoek of afstand berekeningen uitvoeren."	*console a user can give feedback on the results. The extensive viewer can display both images and movies. The user may, if the images are suitable for that purpose, perform angular or distance calculations."*	
11	*"Temperatuur, bloeddruk, pols, ademhaling, saturatie, pijnscore, bewustzijn etc.: het complete dagelijkse verpleegkundige proces kan met de app efficiënt afgehandeld worden."*	*"Temperature, blood pressure, pulse, respiration, saturation, pain score, consciousness etc.: the complete daily nursing process can be handled efficiently with the app."*	Website EasyCare
12	*"De applicatie maakt geen gebruik van jouw persoonlijke contactgegevens. Daardoor is het zeer geschikt om contact te onderhouden met bijvoorbeeld collega's of patiënten. Wanneer je een nieuw contactpersoon wilt toevoegen, moet je eerst een QR-code scannen. Hiervoor moet altijd eerst een fysieke ontmoeting plaatsvinden. Zo blijft de privacy van jou en jouw patiënt optimaal gewaarborgd."*	*"The application does not use your personal contact information. This makes it very suitable, for example, to maintain contact with colleagues or patients. If you want to add a new contact, you have to scan a QR code. Herefor, there should always be a physical encounter. This allows for the privacy of you and your patient to be fully guaranteed"*	Website Topicus
13	*"Linda Burger ziet echter een andere behoefte bij jongeren met bijvoorbeeld infuustherapie. Zij willen graag op een laagdrempelig wijze contact onderhouden met transferverpleegkundigen in het ziekenhuis. Eenmaal thuis hebben jongeren vaak relatief simpele vragen. Daarvoor bellen ze nu het transferbureau, waar de transferverpleegkundige probeert om aan de hand van mondelinge toelichting het juiste advies te geven. 'Maar wat nu als jongeren vragen en foto's zouden kunnen versturen naar transferverpleegkundigen? Dan zou de beantwoording een stuk makkelijker verlopen', dacht Linda*	*"Linda Burger sees a different need under young people with, for example with infusion therapy. They want to retain easy contact with transfer nurses in the hospital. Once at home, young people often have relatively simple questions. Therefore they call the transfer desk where after the transfer nurse tries to give the right advice by phone. "But what if the youth can send questions and photographs to transfer nurses? Answering their questions would be a lot easier," is what Linda Burger thought. Kanta Messenger offers a solution."*	Website Topicus

	Burger. Kanta Messenger biedt hierbij uitkomst."	
14	*"Hoe kan technologie letterlijk een 'venster op de wereld' zijn voor ouderen of mensen met een chronische ziekte http://bit.ly/1M8ptit"*	"How can technology literally be a 'window into the world" for the elderly or people with chronic disease http://bit.ly/1M8ptit"	Facebook FocusCura
15	*"De Zorgapp is geschikt voor alle zorginstellingen en gemeenten die cliëntgerichter en efficiënter willen werken."*	"The ZorgApp is suitable for all healthcare institutions and municipalities that want to work more client-oriented and efficiently."	Website CareConnectio ns
16	*"Flexibele contracten waarin de vaste kosten mee-bewegen met de groei of krimp van de zorgorganisatie, zijn steeds meer een eis. De inzet van de CareConnections Zorgapp leidt direct tot kostenbesparingen door de lage investering en de gespreide betaling per maand. De business case is snel gemaakt."*	"Flexible contracts where the fixed costs move with the growth or shrinkage of the healthcare organisation, are increasingly becoming a requirement. The deployment of the Care Connections ZorgApp leads directly to cost savings due to the low investment and the spread payments per month. The business case is easily made."	Website CareConnectio ns
17	*"RT @zorgvisie_ict: 'Digitalisering zorg drie jaar achter op banken': De zorg loopt slechts enkele jaren achter op de bancaire sector http://bit.ly/1V1C36O"*	"RT @zorgvisie_ict "Digitisation in healthcare three years behind banking': The healthcare sector is only a few years behind the banking sector http://bit.ly/1V1C36O"	Twitter Fenestrae
18	*"Het is een publiek geheim dat ook zorgprofessionals zoals medisch specialisten en wijkverpleegkundigen geregeld gebruik maken van onbeveiligde systemen om vertrouwelijke medische informatie te delen of voor intercollegiaal overleg."*	"It is a secret that health care professionals such as medical specialists and community nurses regularly use unprotected systems to share confidential medical information or peer consultations."	Website Topicus
19	*"Door de toenemende zorgvraag en de veranderingen van de vergoedingen vanuit de overheid en zorgverzekeraars nemen het aantal korte extramurale zorgmomenten toe."*	"With the increasing demand for healthcare and the changing reimbursement programs from the government and health insurers, the demand for brief external health care increases"	Website Boomerweb
20	"Er moet efficiënter worden gewerkt met minder beschikbare tijd. Om dat te kunnen bereiken dient de organisatie van de zorg fundamenteel te veranderen."	"More efficient care with less time available. To achieve this, the organisation of healthcare has to change fundamentally."	Website care connections
21	*"EasyCare heeft samen met Computerfabrikant Dell en het EPD-team van Meander speciaal*	*"EasyCare has partnered with computer manufacturer Dell and the EHR team of Meander to*	Website EasyCare

	voor verpleegkundigen een unieke app ontwikkeld waarmee verpleegkundigen eenvoudig al hun dagelijkse waarnemingen en metingen bij de patiënt direct registreren in het EPD. Bovendien heeft de verpleegkundige alle actuele gegevens van de patiënt uit het EPD letterlijk bij de hand, ongeacht waar deze gegevens zijn vastgelegd."	*develop a unique app specifically for nurses that allows them to register their daily observations and measurements directly into the EHR. In addition, the nurses can acces real-time patiënt data from the EHR, no matter where they are recorded."*	
22	*"Kanta Messenger speelt in op de extramuralisering: in de toekomst zal veel meer zorg buiten instellingen plaats vinden. "Veel systemen zijn van oudsher centraal ingericht terwijl de zorg in rap tempo decentraaliseert""*	*"Kanta Messenger responds to the extramuralisation: much more care will take place outside of healthcare organisations in the future. "Many systems have traditionally been arranged centrally while healthcare is decentralising rapidly""*	Website Topicus
23	*"Mooi voorbeeld hoe mbv mantelzorg-ondersteunig via BeeldbelApp @focuscura mevr Goertz thuis kon blijven @dezorggroep! http://t.co/621vFjAzE4"*	*"Beautiful example of how with support of volunteers via BeeldbelApp @focuscura Mrs. Goertz could stay at home @dezorggroep! http://t.co/621vFjAzE4"*	Twitter FocusCura
24	*"Inmote werkt tevens aan beveiligde communicatie oplossingen voor defensie. In MediCall is soortgelijke technologie toegepast om tot het hoogst mogelijke beveiligingsniveau te komen."*	*Inmote is also working on secure communication solutions for the department of defence. In Medicall a similar technology is used to achieve the highest level of security."*	Website Inmote
25	*"Door de digitale ontwikkelingen zijn privacy en bescherming van patiëntengegevens belangrijke onderwerpen in de gezondheidszorg. Je wilt graag veilig en snel medische gegevens delen met ketenpartners en patiënten. Met Kanta van Topicus kun je via een beveiligde verbinding vertrouwelijke tekstberichten of afbeeldingen versturen."*	*"Due to digital developments, privacy and protection of patient data are key issues in healthcare. You want to share safe and fast medical data with supply chain partners and patients. With Kanta from Topicus you can send confidential text messages or images via a secure connection."*	Website Topicus
26	*"Zorgapps maken het mogelijk dat zorgregistraties en overige essentiële cliëntinformatie te allen tijde voorhanden is. En dat is noodzakelijk gezien de veranderende eisen aan de zorg:*	*Healthcare apps make it possible that healthcare records and other vital patient information is always available. This is necessary given the changing demands on healthcare: to work more efficient in less available time."*	Website CareConnectio ns

	efficiënter werken in minder beschikbare tijd"		
27	*"De Zorgapp is geschikt voor alle zorginstellingen en gemeenten die cliëntgerichter en efficiënter willen werken."*	*"The Zorgapp is suitable for all healthcare institutions and municipalities that want to work more client-oriented and efficiently."*	Website CareConnectio ns
28	*"Met ThuisMeten kunt u letterlijk op afstand uw patiënten volgen en begeleiden.* *Met meetapparatuur, gekoppeld of handmatig, doet een patiënt thuis zelf metingen en verstuurt deze veilig naar een zorgverlener of zorgcentrale."*	*"With Thuismeten you can literally remotely monitor your patients and guide them. With attached or manual measuring equipment, a patient does his own measurments at home and sends them safely to a care provider or care center."*	Website FocusCura
29	*"Mooi voorbeeld hoe mbv mantelzorg-ondersteunig via BeeldbelApp @focuscura mevr Goertz thuis kon blijven @dezorggroep!* http://t.co/621vFjAzE4*"*	*"Beautiful example of how with support of volunteers via BeeldBellen App @focuscura Mrs. Goertz could stay at home @dezorggroep!* http://t.co/621vFjAzE4*"*	Twitter FocusCura
30	*"Met de Beeld Zorg App is een aanzienlijke besparing te realiseren van t.a.v. reiskosten. Daarnaast blijkt uit de praktijk dat de contactmomenten beheersbaar blijven en daardoor korter/efficiënter worden uitgevoerd."*	*"With the image Beeld Zorg App it is possible to realise considerable savings in travel costs. In addition, practice shows that contact moments remain manageable and thereby are executed in less time / more efficient."*	Website Boomerweb
31	*"Als specialist heeft u de uiteindelijke verantwoordelijkheid voor uw patiënten. Echter, u heeft zeer beperkte controle. U kunt uw patiënten niet te vaak zien, omdat uw tijd kostbaar is. Daarom willen wij u helpen door organisaties in de wond zorg keten (o.a. thuiszorgmedewerkers en huisartsen) de middelen te bieden om u van real-time wondinformatie en consistente foto's te voorzien. Dit maakt het binnenkort dan ook mogelijk voor onze software om (automatisch) de toename of afname van de wondoppervlakte te meten, zodat uw diagnose vergemakkelijkt wordt."*	*"As a specialist you have the ultimate responsibility for your patients. However, you have very limited control. You can not see your patients to often because your time is precious. That is why we want to help you by providing organisations in the wound care chain (among others, home care workers and doctors) with real-time wound information and consistent pictures. This makes it also possible for our software to (automatically) measure the increase or decrease of the wound surface, so that it eases your diagnosis."*	Website Inmote
32	*"Kanta maakt geen gebruik van uw emailadres, telefoonnummer of contactlijst om contact te*	*"Kanta does not use your email address, phone number or contact list to contact other users*	Website Topicus

	leggen met andere kanta gebruikers…. Op deze manier blijft uw privacy optimaal gewaarborg"	*of kanta…. In this way your privacy is best protected"*	
33	*"Betere #zorg door veilige gegevens uitwisseling. Het kan met #fenestraeOMNI. #IHE #privacy https://t.co/e0LegOxgU3 https://t.co/2xMV0YvNyO"*	*Better #care by secure data exchange. It is possible with #fenestraeOMNI. #IHE #privacy Https://t.co/e0LegOxgU3 https://t.co/2xMV0YvNyO"*	Twitter Fenestrae
34	*"RT @UQARE: Samenwerking @UQARE en @Boomerweb is een feit! #appsindezorg http://t.co/XglPwijQuH"*	*"RT @UQARE: Cooperation @UQARE and @Boomerweb is a fact! #appsindezorg http://t.co/XglPwijQuH"*	Twitter Boomerweb
35	*"'Direct toegang tot relevante patiënt informatie'. Ontdek #Fenestrae #Omni via: https://t.co/Nkz8MHc3Vm #zorg #HIE https://t.co/hKUbydaabo "*	*"Direct access to relevant patient information. Discover #Fenestrae #Omni through: https://t.co/Nkz8MHc3Vm #zorg #HIE https://t.co/hKUbydaabo "*	Twitter Fenestrae
36	*"De Beeld Zorg App van Boomerweb in de praktijk bij Axion Continu https://t.co/eK6vwFE7ch"*	*"The Beeld Zorg App of Boomerweb in practice at Axion Continu https://t.co/eK6vwFE7ch"*	Twitter Boomerweb
37	*"Leuk artikel regionale krant Brabant over start ThuisMeten @ZuidZorg en @Anna_Ziekenhuis zie http://t.co/hEgpHeaUTI http://t.co/SIjwBb6Uqx"*	*"Nice article in local paper of Brabant about ThuisMeten @ZuidZorg and @Anna_Ziekenhuis see http://t.co/hEgpHeaUTI http://t.co/SIjwBb6Uqx"*	Twitter FocusCura
38	*"Vandaag is de Wond Zorg App van Boomerweb officieel de Google Playstore in gegaan! https://t.co/pXuO14POjl"*	*"Today Boomerweb's Wond Zorg App has officially gone into the Google Play Store! https://t.co/pXuO14POjl "*	Twitter Boomerweb
39	*"'Nieuwe privacywet raakt ook zorgsector'. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH"*	*"'New privacy law also affects healthcare sector'. #digitalisering #ICT #zorg #healthcare #privacy https://t.co/QUOal5Z5lH"*	Twitter Fenestrae
40	*"Ons product bij @MobileDoctorsNL W+ wondmonitor http://t.co/8tAzpdeFoE via @MobiledoctorsNL"*	*"Our product at @MobileDoctorsNL W + wound monitor http://t.co/8tAzpdeFoE through @MobiledoctorsNL"*	Twitter Inmote
41	*"FocusCura ThuisMeten is er niet alleen voor ouderen. Zo helpen wij ook vrouwen die tijdens hun zwangerschap onder extra controle staan, bv voor Zwangerschapsdiabetes of -hypertensie. Na de zomer starten de eerste vrouwen samen met de app. SHO:Scheelt voor vrouwen een hoop gedoe en als het nodig is,*	*"FocusCura ThuisMeten is not just for the elderly. We also help pregnant women who are under additional monitoring during their pregnancy, such as women with diabetes or hypertension. After the summer, the first women will start with the app. SHO: It saves a lot of hassle for women, and if necessary, there is direct contact*	Facebook FocusCura

	is er direct contact met de verloskundige. Aan huis, in de praktijk of via een videoverbinding! Wel zo veilig! Lees meer op: http://bit.ly/1FDvH7E"	*with the midwife. At home, in the office or via video call! Very safe! Read more at: http://bit.ly/1FDvH7E"*	
42	*"Ons recente gebruikersonderzoek ThuisMeten App liet unieke resultaten zien: 28% minder heropnames, 26% minder... http://t.co/fqXIfJ5g2"*	*"Our recent user survey ThuisMeten App showed unique results: 28% reduction in readmissions, 26% less ... http://t.co/fqXIfJ5g2"*	Twitter FocusCura
43	*"Beeld Zorg App financieel De afgelopen periode is er veel te doen geweest over de financiering van Zorg op Afstand in 2016. Actiz heeft hier veel aandacht aan besteed om ervoor te zorgen dat deze ook voor 2016 gelijk blijft. In een vervolgdebat in september wordt over de bekostiging vanaf 2017 gesproken. Lees hier verder http://www.actiz...."*	*"Financial matters for the Beeld Zorg App. Recently there has been much debate about the funding of remote care in 2016. Actiz put in a lot of effort to ensure that the funding remains the same for 2016. In a subsequent debate in September, the funding for 2017 will be discussed. Read more here http://www.actiz...."*	LinkedIn Boomerweb
44	*"Om dit in balans te krijgen is de inzet van de Beeld Zorg App de juiste vorm van substitutie (=fysieke zorg vervangen door zorg over een afstand)"*	*"To get this in balance, the use of the Beeld Zorg App is the proper form of substitution (= replacing physical care by remote care)"*	Website Boomerweb
45	*"Waarom? Huidige beschikbare systemen voor videobellen zoals Skype en FaceTime zijn onveilig."*	*"Why? Current available video calling systems like Skype and FaceTime are unsafe."*	Website Inmote
46	*"De Inspectie Gezondheidszorg heeft aangegeven ook voor 2015 extra toe te gaan zien op medicatieveiligheid. Tijdens onaangekondigde bezoeken door IGZ is immers gebleken dat 87% van de bezochte zorginstellingen (nog) niet voldoet aan de eisen op dit thema. ... Zorgapotheek biedt een IGZ-proof oplossing die voldoet aan NEN 7510 en ISO 27001 certificering: de Zorgapotheek Medicatie Controle App"*	*"The Healthcare Inspection has also announced that in 2015 they will inspect extra on the issue of medication safety. During unannounced visits by Inspectorate has shown that 87% of the visited healthcare facilities does not (yet) meet the requirements. ... Zorgapotheek offers a IGZ-proof solution that meets NEN 7510 en ISO 27001 certifications: De Medicatie Controle App"*	
47	*"The role of the healthcare professional changes because of these new techniques. Work can be done quickly and efficiently. The result is that ultimately more time remains for the human side of care."*	*"De rol van de zorgverlener verandert door deze nieuwe technieken. Er kan sneller en efficiënter worden gewerkt. Het resultaat is dat er uiteindelijk meer tijd overblijft voor de menselijke kant in de zorg."*	Website CareConnections

48	"Van NAW-gegevens, diagnoses, medicatie, allergieën en labresultaten tot de radiologische, nucleaire, bacteriologische en pathologische informatie: alles is via het dashboard realtime inzichtelijk. Heeft de patiënt een behandelbeperking of allergie? Dan licht het direct op in het scherm. Zo kunnen medisch specialisten snel en optimaal geïnformeerd beslissingen nemen – website Chipsoft	"From personal data, diagnoses, medication, allergies, and lab results to radiological, nuclear, bacteriological and pathological information: everything is real-time available through the dashboard. Does the patient has a treatment restriction or allergy? Then this is notified directly on the screen. This allows medical specialists to make rapid and fully informed decisions"	Website Chipsoft
49	"De kwaliteit van de zorg gaat tevens omhoog, omdat met W+ alle betrokkenen in de zorgketen altijd en direct toegang hebben tot de laatste informatie omtrent het herstel van hun patiënten"	"The quality of care is improved, because with W + all those involved in the healthcare chain always have instant access to the latest information about the recovery of their patients"	Website Inmote
50	"Kanta maakt geen gebruik van uw emailadres, telefoonnummer of contactlijst om contact te leggen met andere kanta gebruikers.… Op deze manier blijft uw privacy optimaal gewaarborg"	"Kanta does not use your email address, phone number or contact list to contact other users of kanta.... In this way your privacy is best protected"	Website Topicus
51	"Blog @DaanDohmen over Eenzaamheid en hoe technologie extra venster op de wereld te bieden: https://t.co/DlwACMIXBl https://t.co/Z6yeAJEjp4"	"Blog @DaanDohmen about loneliness and how technology extra window to offer the world: https://t.co/DlwACMIXBl https://t.co/Z6yeAJEjp4"	Twitter FocusCura
52	"Medische patiëntinformatie wilt u niet versturen via een openbaar berichtennetwerk zoals WhatsApp. Even een foto van een wond maken en appen naar een collega-arts om zijn advies te horen. In de medische wereld is WhatsApp niet meer weg te denken. Artsen zijn laaiend enthousiast. Maar een enkele arts bekruipt ook een minder prettig gevoel. Want hoe veilig is deze methode om medische gegevens te delen? WhatsApp is in bezit van Facebook, dat vaak vanwege privacy schending onder vuur ligt... Lees meer en bekijk de video in het artikel:	"You don't want to send medical patient information via a public network such as WhatsApp. Taking a picture of a wound and sending it via WhatsApp to hear the opinion of a fellow doctor. In the medical world WhatsApp is indispensable. Doctors are very enthusiastic. But some doctors have a less pleasant feeling. Because how safe is this method to share medical data? WhatsApp is owned by Facebook, which is often criticized because of privacy violation ... Read more and watch the video in the article: medische/info/delen/via/whatsapp"	Website Fysicon

	medische/info/delen/via/whatsapp"		
53	"Huidige beschikbare systemen voor videobellen zoals Skype en FaceTime zijn onveilig."	"Current available for video calling systems like Skype and FaceTime are unsafe."	Website Inmote
54	"Risicovolle medicatie zoals bijvoorbeeld opiaten, insulines en parenteralia dienen, alvorens ze aan de cliënt toegediend mogen worden, door twee bevoegde verzorgenden gecontroleerd te worden op: juiste medicament, juiste dosering, juiste tijdstip en juiste cliënt. Deze Double Check procedure is belangrijk aangezien een verkeerde dosering of toediening kan leiden tot ernstige incidenten, zoals bijvoorbeeld een ziekenhuisopname of uiteindelijk zelfs tot het overlijden van de cliënt."	"High-risk medications such as opioids should, insulins and parenterals, before they can be administered to the patient, to be controlled by two competent caregivers on: right drug, right dose, right time and right client. Double Check this procedure is important because a wrong dosage or administration may lead to serious incidents, such as hospitalisation or even ultimately to the death of the client."	Website Zorgapotheek
55	"Ook zijn er al diverse zorgorganisaties onder verscherpt toezicht van IGZ komen te staan, mede omdat dit proces niet goed uitgevoerd werd en onvoldoende geborgd was."	"Also, there are already several healthcare organisations under increased supervision of Inspectorate, partly because the process was not conducted properly and was not sufficiently secured."	Website Zorgapotheek
56	"Ons recente gebruikersonderzoek Thuismeten App liet unieke resultaten zien: 28% minder heropnames, 26% minder... http://t.co/fgXlfJ5g2L"	"Our recent user survey of the Thuismeten App showed unique results: 28% reduction in readmissions, 26% less ... http://t.co/fgXlfJ5g2L"	Twitter FocusCura
57	"Verpleegkundigen van Meander hebben aan de wieg gestaan van de ontwikkeling. Zij hebben aangegeven hoe het ontwerp er uit moet komen te zien en het ontwikkelteam van Dell en EasyCare hebben dit vertaald naar een gebruiksvriendelijke app"	"Meander Nurses have been at the forefront of the development. They have indicate what the design should look like and development team of Dell and EasyCare have translated this into a user-friendly app."	Website EasyCare
58	"MediCall is in overleg met het werkveld ontwikkeld. Dus geen nutteloze features, maar alleen dat waar echt behoefte aan "	MediCall was developed in consultation with the industry. So no useless features, but only what users really need"	Website Inmote
59	"Vandaag is Archipel Zorggroep als eerste zorginstelling hier officieel mee gestart!"	"Today Archipel Zorggroep is the first healthcare organisations who has officially started with this!"	Twitter Boomerweb
60	"Janneke Wittekoek cardioloog Heartlife Klinieken 'Met het	"Janneke Wittekoek cardiologist Heartlife Klinieken" With the	Website FocusCura

	inzetten van ThuisMeten houd ik op een heel prettige manier goed en regelmatig contact met mijn patiënten en zie ik ze in mijn kliniek als het echt nodig is! Met behulp van ThuisMeten kunnen we de zorg meer op maat maken en toch kosten besparen.'"	*deployment of ThuisMeten I can keep in regular contact with my patients in a very pleasant way, and only see them in my clinic if it is really neccesary! Using ThuisMeten, we can make care more tailored and save costs.'*	
61	*'Leuke video: client en verpleegkundige vertellen over inzet Beeldzorg via @focuscura Beeldbellen App bij @MeanderGroep! http://t.co/GTijhZau8K"*	*Nice video: client and nurse talk about deployment of video care through @focuscura BeeldBellen App at @MeanderGroep! http://t.co/GTijhZau8K"*	Twitter FocusCura
62	*"Before they can be administered to the patient, high-risk medications such as opioids, insulins and parenterals, should be checked, to by two competent caregivers on criteria such as: right drug, right dose, right time and right client. This Dual Check procedure is important because a wrong dosage or administration may lead to serious incidents, such as hospitalisation or even ultimately to the death of a patient"*	*"Risicovolle medicatie zoals bijvoorbeeld opiaten, insulines en parenteralia dienen, alvorens ze aan de cliënt toegediend mogen worden, door twee bevoegde verzorgenden gecontroleerd te worden op: juiste medicament, juiste dosering, juiste tijdstip en juiste cliënt. Deze Double Check procedure is belangrijk aangezien een verkeerde dosering of toediening kan leiden tot ernstige incidenten, zoals bijvoorbeeld een ziekenhuisopname of uiteindelijk zelfs tot het overlijden van de cliënt."*	Website Zorgapotheek