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The Development And Deployment Of Electronic Personal Health Records:
A Strategic Positioning Perspective

By: **Mark Lewis**, Ryan Baxter, and **Richard Pouter**

Abstract
The purpose of this study is to examine the impact of strategic position on the ability of an entrepreneurial firm to successfully develop and deploy electronic personal health records technology within the US healthcare industry. The study contributes by juxtaposing a longitudinal view of how the focal firm proposed and acted on different strategic positions in an attempt to achieve development and deployment success. In doing so, the study also elaborates on Porter's recognition that firms need to make trade-offs when choosing a strategic position, as the purposeful limitation of service offerings can protect against the degradation of existing value creating activities. While the fragmented nature of the healthcare industry provides opportunities for entrepreneurial firms, such complexity within the ecosystem should not be underestimated as a reason for concern for small firms. Total economic burden due to chronic diseases and other healthcare-related expenses is massive for the USA. Consequently, prevention and early detection of future disease states has become a core component of the current healthcare reform debate. EPHRs are considered one core component of a broader healthcare strategy to improve health outcomes and lower costs. By deepening our understanding of how best to develop and deploy such interventions, society will surely benefit. The longitudinal nature of the authors' study provides a unique opportunity to understand the dynamic interrelationships between context, position, and performance within the US healthcare industry.

The development and deployment of electronic personal health records
A strategic positioning perspective

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Abstract

Purpose – The purpose of this study is to examine the impact of strategic position on the ability of an entrepreneurial firm to successfully develop and deploy electronic personal health records technology within the US healthcare industry.

Design/methodology/approach – This study uses an in-depth longitudinal case study methodology.

Findings – The study contributes by juxtaposing a longitudinal view of how the focal firm proposed and acted on different strategic positions in an attempt to achieve development and deployment success. In doing so, the study also elaborates on Porter's recognition that firms need to make trade-offs when choosing a strategic position, as the purposeful limitation of service offerings can protect against the degradation of existing value creating activities.

Research limitations/implications – The authors' study highlights the enormous challenge of facilitating the adoption and diffusion of technology enabled interventions in the US healthcare ecosystem. Future research that combines both interdisciplinary and multi-level investigation and analysis is sorely needed to develop a more sophisticated understanding of the phenomenon and to encourage the development and deployment of useful technology enabled interventions within the US healthcare industry.

Practical implications – While the fragmented nature of the healthcare industry provides opportunities for entrepreneurial firms, such complexity within the ecosystem should not be underestimated as a reason for concern for small firms.

Social implications – Total economic burden due to chronic diseases and other healthcare-related expenses is massive for the USA. Consequently, prevention and early detection of future disease states has become a core component of the current healthcare reform debate. EPHRs are considered one core component of a broader healthcare strategy to improve health outcomes and lower costs. By deepening our understanding of how best to develop and deploy such interventions, society will surely benefit.

Originality/value – The longitudinal nature of the authors' study provides a unique opportunity to understand the dynamic interrelationships between context, position, and performance within the US healthcare industry.

Keywords Electronic personal health records, Innovation, Healthcare ecosystem, Strategic positioning, Case studies, Personal health, Health services, United States of America

Paper type Research paper

Introduction: flattening the cost curve with ePHRs

Exploding healthcare costs in the USA are projected to double in the next decade, reaching nearly $4.4 trillion by 2018 (Centers for Medicare and Medicaid Services, 2009). Study after study confirms that an overwhelming percentage of total healthcare costs are actually preventable, as they are often attributed to the treatment of preventable chronic conditions, such as obesity, heart disease, and diabetes that can result from lifestyle choices (Miller *et al.*, 2009). In a continuous search for interventions that may encourage preventive behaviors and thereby flatten ballooning cost curves, most people who are trying to fix the healthcare crisis look towards health information technology, in general (Lemire, 2010; Chaudhry *et al.*, 2006), and electronic personal health records (ePHRs), more specifically, as a means for supporting prevention and early detection programs (Loeppke, 2008; Miller *et al.*, 2009). ePHRs build on the ideas of electronic health records (EHR), which are designed to track patients' interactions within the healthcare ecosystem, containing physicians, hospitals, clinics, insurance companies, etc. (Miller *et al.*, 2009). In the most elementary sense, ePHRs are tools that allow individual patients to manage their health information (Detmer and Steen, 2006). Thus, ePHRs foster individuals' active role in managing their health (Tang *et al.*, 2006) so that they "become partners in maintaining their health and treating their own illnesses". However, to achieve such outcomes a key dependency for a successful ePHR is that it aggregates patient data across a fragmented landscape of doctors, laboratories, clinics, and hospitals that inhabit the healthcare ecosystem (see the Appendix). Unfortunately, it seems that fragmentation in the USA is at an even higher level than other developed countries, as the private sector and market forces play more significant roles than other countries (Detmer and Steen, 2006). As a result, the USA lags significantly behind many of the developed countries in the adoption of health information technology (Detmer and Steen, 2006). Expectedly, the development and deployment of an ePHR within such a context is no easy task. The purpose of this study is to understand more fully some of the challenges and opportunities that exist in doing so.

A likely user of ePHR technology would be organizations that adopt self-funded health-insurance strategies. More than 50 percent of US firms pursue such strategies, providing health insurance for more than half of US workers (Kaiser, 2009). Understandably, self-insured firms have significant direct incentives to lower the healthcare costs of their employees[1]. However, self-insured employers are also not likely to have the in-house resources to develop ePHRs, leaving an opportunity for existing industry players or entrepreneurs to fill this need. Since a critical success factor for an ePHR is to aggregate data from many disparate sources, a key challenge for the development and deployment of ePHRs is the highly fragmented nature of the healthcare industry, which can disrupt information flows across the many constituents that make up the patient-delivery-care process (Cebul *et al.*, 2008; Shekelle *et al.*, 2006; Wilcox *et al.*, 2006). For instance, when a patient has a check-up with a primary care physician, then visits a specialized practice for blood testing, and finally stops by the drug store to fill medications, there are three distinct sources of data related to that one patient. For a central entity (such as an insurance company) to capture those distinct events, they need to digitally integrate with potentially three different systems. As a result of this integration complexity, no consistent or agreed-upon standard for how ePHRs will be offered to self-funded employers has emerged.

While healthcare fragmentation provides opportunities for entrepreneurial firms, research calls for new ways for firms to compete in such information-intensive ecosystems. Van de Ven (2005) suggests that since a single firm rarely possesses all of the resources necessary to develop and commercialize knowledge-intensive technologies, they should take a broader view of their competitive landscape and shift their focus to the network level, whereby firms work together in "packs" rather than as single entities within their industry. In doing so, Van de Ven (2005) points to the necessity of a firm's political savvy to operate within a pack. However, in addition to the importance of political savvy and since firms can often alter the structure of their pack through their strategic positions, they must pay close attention to the ways in which their positioning choices impact their ability to develop and deploy an ePHR. For instance, are they going to position themselves so that they provide services directly to employer groups and thereby own the customer relationships, or are they going to focus on providing services to another entity within the ecosystem, thereby giving up direct access to the employers? Furthermore, what are the benefits and detriments that result from each positioning decision? The importance of strategic position in the context of ePHRs leads to our primary research question from the perspective of an entrepreneurial firm: how does strategic position affect the development and deployment of an ePHR?

This paper is structured as follows. In the next section, we introduce a theoretical framework to guide our study that combines an industry infrastructure and positioning based perspective. We then review the methodology and introduce the intensive longitudinal case study, which follows the development and deployment of an ePHR over a two-year period. Finally, we analyze and discuss the results and of our case study before concluding with a discussion that highlights our contributions.

Theoretical lens: industry infrastructure and strategic positioning

Van de Ven (2005) proposes that firms be aware of a broad framework of key resource dependencies and activities and develop political savvy, since firms rarely possess all of the resources and capabilities that are required to develop and deploy technical innovations. Van de Ven (2005) describes critical aspects of the development and commercialization of such innovations in four subsystems:

(1) *Institutional arrangements* – The governmental agencies, professional trade associations, and scientific/technical communities that legitimate, regulate, and standardize a technology.

(2) *Resource endowments* – These include advancements in basic scientific and technological knowledge, financing and insurance arrangements, and training of competent professionals.

(3) *Consumer demand* – For new-to-the-world technologies, informed, competent, and responsible consumers do not preexist; the market must be created.

(4) *Proprietary activities* – These transform the available supply of public resources (scientific knowledge and work force competence) into proprietary products and services to meet customer demand.

This framework is useful and applicable to the context of ePHRs, as their success undoubtedly rests upon the cooperation of many individual firms, each with a unique

contribution. Cho and Mathiassen (2007) utilize this framework as a diagnostic lens to understand the failure of a telemedicine initiative. They confirmed the need for firms running in packs to be "political savvy to understand and mobilize the interests of other players with stakes in an emerging industry" (Van de Ven, 2005, p. 374), the entrepreneurial firm still failed to propel the innovation further. Though Van de Ven's (2005) framework provides a useful lens to focus ones attention on a broad mix of resources and the relative dependencies that firms should be aware of when developing and deploying IT-based innovations. There are inherent limitations, too, as it pays scant attention to the dynamic interrelationships between the four subsystems mentioned above. Furthermore, the basic notion that firms should cooperate with other firms in such contexts is not sufficient for helping firms navigate an ecosystem as complex as the US healthcare industry. For instance, where firms position themselves within this ecosystem, relative to the customer and other providers, likely have important tradeoffs that need to be better understood. Therefore, to extend the industry infrastructure view, we borrow from the positioning view of strategy within the strategic management literature, once the basic building block of the strategic management discipline (Porter, 1980, 1996), to explore these important issues.

Strategic positioning

Embedded within the positioning view of strategy is a strong underlying foundation in systems thinking. In essence, the firm is conceptualized as a system of interconnected activities and technologies that combine to transform inputs into consumable outputs. Of course, investing in technology and performing activities incurs costs that are in addition to those sustained through the procurement of raw materials. The transformation process will result in products and services that create a level of utility that consumers are willing to pay a monetary price for, generating revenues for the firm that will hopefully outweigh the costs incurred during the transformation process (Porter, 1996). From this general perspective, two firms could share similar sources of inputs and perform very similar activities, but firm A may perform such activities more efficiently than firm B, leading to increased levels of operational effectiveness for firm A. From a different perspective, firm A and firm B might decide to not only source raw materials from different suppliers or in different ways, but fundamentally alter the design of their internal activity systems to generate a completely different set of outputs that are targeted at a unique set of customers. In the second case, firm A and firm B are considered to have variations in strategic positioning (Porter, 1996). From this perspective, the positioning view of strategy makes a clear and important distinction between operational effectiveness and strategic positioning. It is from this framework that the design of activities becomes the building blocks of competitive advantage.

Because competitive strategy is about being different, strategy rests on strategic positioning, or the design of unique activities systems that deliver goods and services that are unlike those provided by competitive firms (Porter, 1996). For instance, as Porter illustrates, Southwest Airlines has designed a unique set of activity systems that offer short-haul, low-cost, point-to-point services between midsize cities while using secondary airports. This is in contrast to other firms in the industry that use large airports, fly great distances, and utilize the hub-and-spoke system to reach a larger number of destinations. Both firms have obvious differences in terms of the services they provide, but it is most important to realize that these differences result

from designing distinct activities. Essentially, distinctive goods and services result from distinctive activities, and, together, represent distinct strategic positions.

Porter mentions three diverse sources that shape three types of strategic positions. First, variety based positioning is based on the unique attributes or characteristics of a good or a service, rather than focusing on a particular customer group. Regal Nails, the largest nail salon franchisor in the USA specializes in manicures and pedicures, and does not offer other services often expected in a full-scale beauty salon. Rather than going to a full-scale salon that offers nail service as one of many offerings, customers who want quick, convenient service can go to a Regal Nails store, where all their attention is on nails. Focusing their attention to this extent allows Regal Nails to design a set of value-creating activities that allow them to offer manicures and pedicures cheaper and faster. As Porter mentions, a variety-based position can serve a broad customer base, but will likely only meet a portion of their overall needs. Second, needs-based positioning is more closely related to traditional customer segmentation, where activities are designed to meet the needs of a unique group of customers. Marriott Corporation, a global hotel management company, manages a suite of brands all aligned to customer groups with specialized needs. For those seeking a luxurious stay, the Ritz-Carlton and J.W. Marriott hotels and resorts offer the utmost in service and amenities. For the business traveler seeking long-term residence, the Residence Inn and TownePlace Suites offer comfortable accommodation at reasonable rates. Thus, as Porter suggests, Marriott follows a variant of needs-based positioning in providing services to the same customer who might have different needs at different times. However, as Porter suggests, simply positioning a firm relative to differences in customer groups is not adequate for achieving superior performance. Instead, internal activities must also be sufficiently different to translate into a meaningful distinction in competitive position. Finally, access-based positioning results from segmenting customers based on where or how you would reach them. As Porter suggests, access can result from either scale or geography, or anything that requires a unique set of activities to reach customers most effectively. Cracker Barrel Old Country Store, Inc. is an American restaurant and gift chain with a Southern theme. Traditionally, Cracker Barrel stores were located near highway exits along the Interstate Highway System to accommodate the discerning needs of travelers seeking a home-cooked meal. Since then access has grown to include larger suburban residential areas, likely requiring adjustments to the design of marketing, logistics, and other such internal activity systems.

Trade-offs of positioning
According to Porter, a strategic position is not sustainable unless trade-offs are made between other positioning possibilities. The old adage, "You can't be everything to everyone" holds here, in that as firms decide on their positions, they must also decide on what their positions are not. Trade-offs are most recognizable when attention is again focused on activities themselves. A firm that chooses a needs-based position that focuses on providing products that meet the needs of low-income families will have to design activity systems and adopt technologies that are free of waste and unneeded frills. Therefore, in making this decision they are trading off the possibility of providing higher-end products and increased customer service (to upper-income market segments), with the same activity systems that were designed to meet lower-income needs. This does not mean firms are unable to provide goods and

services to multiple, unique, market segments. What it does mean is that there is an inevitable tradeoff with doing so, and firms should be intricately aware of the associated costs. As mentioned earlier, Marriott Corporation is able to meet the needs of various market segments through individual brands, but this likely does not come without high coordination costs associated with orchestrating multiple internal activity systems.

Methodology: longitudinal case study

As Greenhalgh *et al.* (2009) mention in their meta-analysis of existing ePHR research, a systematic study of how ePHRs are co-created in practice is sorely needed. This research project was designed to fill such a gap, by deeply immersing ourselves in the context to understand how an ePHR is developed in a real life context. The study took place over a multi-year period and continues as part of a broad initiative to deepen our understanding of how IT can be developed and deployed to reduce costs and improve the quality of healthcare in the USA. We leveraged our inside access with key stakeholders of the focal firm, XYZ Health (based in the Southeastern USA), to follow the development and deployment of Insight, an ePHR system. XYZ was a small entrepreneurial firm that consisted of a core nucleus of nine employees, a monthly operating budget of approximately $40,000, and monthly revenues that averaged around $20,000.

Case study design

Case studies are particularly applicable when:
- "how" and "why" questions are being explored;
- researchers have little control over behavioral events; and
- phenomena are being studied in their real-life contexts (Yin, 2003).

As such, our objective was to gain an in-depth understanding of how a start-up firm negotiates their position within the complex healthcare ecosystem, and how their strategies and actions affect the efficacy of their ePHR development and deployment efforts. For this reason, we adopted the engaged scholarship research approach (Van de Ven, 2007) to conduct our case study. Engaged scholarship is guided by the need to study the phenomenon in its natural context and committed to bridging the gap between theory and practice. Furthermore, because this study explores how a start-up firm alters their strategic position, the method employed fits well with delving deeply into the focal firm rather than broadly across the other firms within the pack. We adopted a process, rather than a variance, perspective to guide our study (Mohr, 1982, Van de Ven, 2007). As a result, we were more interested in accurately exploring, describing, and explaining the temporal sequence of events involved in change (Van de Ven and Huber, 1990) for this single firm, which clearly limits our ability to generalize more broadly. Due to the revelatory nature of our relationship with XYZ and the lack of extant work in this area, we chose an exploratory single-case design. According to Yin (2003), the revelatory case exists when a researcher has a unique opportunity to observe and analyze a phenomenon that is characteristically inaccessible by a particular research community.

Data collection

To understand the phenomenon more fully and to ensure adequate validity of the research findings, we leveraged multiple collection techniques and data from different

sources (Miles and Huberman, 1994; Yin, 2003). Most of our data stemmed from weekly and bi-weekly semi-structured interviews over a two-year period with the person responsible for leading the technology development team. The core development team consisted of the team lead and application architect, a database architect and programmer, a business analyst, a quality control and testing expert, a physician, and a healthcare policy expert who was extensively involved in the national healthcare debate in the USA. This core development team then interfaced with the executive team consisting of the CEO, COO, and CMO, and with representatives from customer firms, third party administrators, and potential resellers. Thus, given the small nature of this entrepreneurial firm, the development team was the central node in the entire development and deployment process. Though the preponderance of our interview data stemmed from our ongoing meetings with the development team lead, we were able to develop a more far-reaching and robust understanding of the entire group's beliefs in diverse ways. For instance, the healthcare policy expert is widely considered to be the foremost expert in healthcare prevention in the USA. Consequently, he is often interviewed on national (and international) news stations like CNN, and Fox. As a result, we were able to download, transcribe, and analyze his interviews and public speeches to gain deeper insight into his positions. Additionally, the unique access that enabled us to analyze documentation and archival records, including confidential emails, PowerPoint presentations, and white papers provided great means of triangulation. Ongoing interviews with the team lead and validation with other members of XYZ were also used to solidify our findings as they were generated. In total, over 100 semi-structured interviews took place with a key member of the technical leadership team, 175 e-mails were analyzed, and more than ten media interviews were collected and analyzed.

Data analysis

We leveraged a hybrid analytical technique to analyze the data, incorporating both inductive and deductive coding and thematic development procedures (Chiasson *et al.*, 2009, Fereday and Muir-Cochrane, 2006). This dual approach can be extremely rich, as it allows creative insight to be generated from the data without the need to reinvent valuable concepts that already exist in the literature (Denis *et al.*, 2001; Fox-Wolfgramm *et al.*, 1998). The hybrid approach is particularly useful in novel settings for which extant work is limited; it allowed us to begin the analytical process by working from the data and enabled us to move from specific detail to more general conclusions (Schwandt, 1994). Furthermore, by complementing the inductive analysis with a deductive examination of the data, we were able to utilize the industry infrastructure and strategic positioning frameworks to develop deeper insight from our data. Specifically, we followed a four-step process to analyze the data (Lewis *et al.*, 2011).

Inductive analysis. The initial step in our analysis process was to inductively analyze the data. In doing so, we thoroughly listened to recordings of interviews, read notes from interviews, coded data to generate major themes that were emerging, and discussed the data in an iterative fashion between members of the research team and the team lead within the organization (Eisenhardt, 1989). To allow us to iterate through the data in this fashion, we took detailed notes during each interview and judicially reviewed and validated emerging themes in recap sessions. The interview notes

attempted to capture the heart of each conversation, and focused on key issues that the focal firm was facing at that point in time relative to our research question. Interview notes and recordings were listened to multiple times using a literal reading strategy (Mason, 2002), and notes were added through each iteration to capture missing details or emerging themes. To determine key themes, saliency (Blatt *et al.*, 2006) and contextual interpretation (Stake, 1995) of the significance of events, actions, or viewpoints were used as explanatory factors rather than frequency.

Narrative construction. The second step, narrative construction, allowed us to draw up our data and the emerging themes to construct a composite narrative of XZY's evolving strategy and the corresponding changes to the structure of their pack (Dunford and Jones, 2000; Currie and Brown, 2003). In doing so, we first created a timeline to identify the major changes that had occurred. Then, in an effort to build a more robust narrative we placed the key themes that emerged from our inductive analysis within the temporal context in which they were observed (Dutton and Dukerich, 1991). Through numerous iterations while working collaboratively among the research team we constructed a narrative explanation of what we had observed over the multi-year period. To continuously validate our findings, we ensured that the narrative that was emerging was supported by our data and critically interpreted by members of XYZ.

Deductive analysis. In the next step we leveraged our two analytical lenses as top down interpretive devices. Doing so enabled us to develop deeper insight into the findings that emerged from the first two steps. Initially we just used the industry infrastructure view as a method of inquiry to focus our attention on four subsystems outlined in Van de Ven's (2005) framework. Using the industry infrastructure view in this way allowed us to experience and observe the interrelationships that seemed to exist between the resources, activities, channels, trade-offs and opportunities that dynamically adjusted to XYZ's changing strategy. However, it was also at this point that we started to sense a need for another analytical lens to provide greater insight into what we had observed, and to develop a more sophisticated understanding of the dynamic interrelationships that existed between the four subsystems. As a result, we leveraged Porter's positioning view of strategy to augment the industry infrastructure view. Doing so allowed us to begin to see the interrelationship between XYZ's position in their pack and the corresponding changes to resources, activities, channels, trade-offs and opportunities that we had observed.

Synthesis. Finally, the fourth step of our analysis was to synthesize our findings by highlighting and sharpening our contributions to existing research and practice. In doing so, we paid attention to the theoretical and practical implications that emerged throughout our analysis while maintaining focus on prior research to further identify and contribute to existing gaps. As we traversed through this step we used it as a final opportunity to triangulate and validate our findings by relying extensively on our comprehensive repository of data.

Findings: three strategic positions
Strategic position 1: Targeting self-insured employers
XYZ Health was founded in 2003 by a former orthopedic surgeon, Dr Jim Low[2], with the goal of helping small to medium-sized self-insured employers drive down total healthcare costs by tying incentives and disincentives to specific behaviors that impact

an individual's health. For example, if an individual meets criteria for compliance (e.g. a yearly check-up), she may receive reduced deductible rates and lower premiums. In contrast, if she failed to meet such criteria she could face an increase in her deductible and/or a change in overall coverage. It was not long into the relationship with the Southern Clinic that Dr Low realized that information technology was going to play an important role in monitoring such a program and in XYZ's strategy moving forward. According to the CTO:

> XYZ wanted to offer a technology based tool to help organizations manage costs. Instead of having it [health benefits programs and insurance] act as unmanaged entitlement programs, we wanted to develop the technology tools to help companies manage this huge expenditure-healthcare costs.

As a complement to the technology platform, XYZ's early focus was to help self-insured organizations design, implement, and manage innovative healthcare plans to help drive down total costs for an organization by shaping new and healthier behaviors. Thus, their initial strategic position was both needs based (self-funded organizations needing an ePHR) and access based (small to midsize companies in the Southeast USA), and was designed to provide a comprehensive solution to their customers. In achieving this position, their goal was to not only provide the innovative insurance plan design, but also to provide the electronic platform that monitored and managed the program. This platform would track all health-related activities per employee, manage and monitor all control mechanisms (incentives and disincentives) that would be established to shape healthy behaviors, educate users based on personal health issues identified through a personal health assessment, and address all of the backend transaction processing that is part of the claims administration process.

Though they did not have the internal resources to provide claims administration services themselves, XYZ's initial strategy was to contract with a TPA to provide that service for them. However, this did not last long, as they quickly realized that there were significant costs associated with managing the relationship with the TPA and getting involved with the claims adjudication process simply required too many resources. Therefore, they rapidly adjusted their initial position to focus their offering on providing the plan design and the electronic platform to monitor it, with the intent that they would then work with a customer's existing TPA to get access to the necessary data. While following this strategy, XYZ's position essentially placed them between the employer and the TPA (see Figure 1), because their needs based position focused on providing services to self-funded employers, thereby effectively owning the relationship with the end customer (the employer), which was perhaps the biggest benefit of this positioning strategy.

Trade-offs of Position 1 (data accessibility). Since a critical success factor for Insight was the ability to pull data from many disparate sources, getting access to such data was obviously important. To integrate electronically with the TPAs, Woody and Luke, the core members of the development team, began by designing the underlying data model that described how data would be represented and accessed. After the initial data model was developed, Woody and Luke designed data extracts that identified data points that needed to be retrieved from TPA applications to populate the underlying database that supported the Insight application. Once the extracts were complete, they made them available to the TPA that was providing claims administration. To their surprise, an early TPA that they were working with
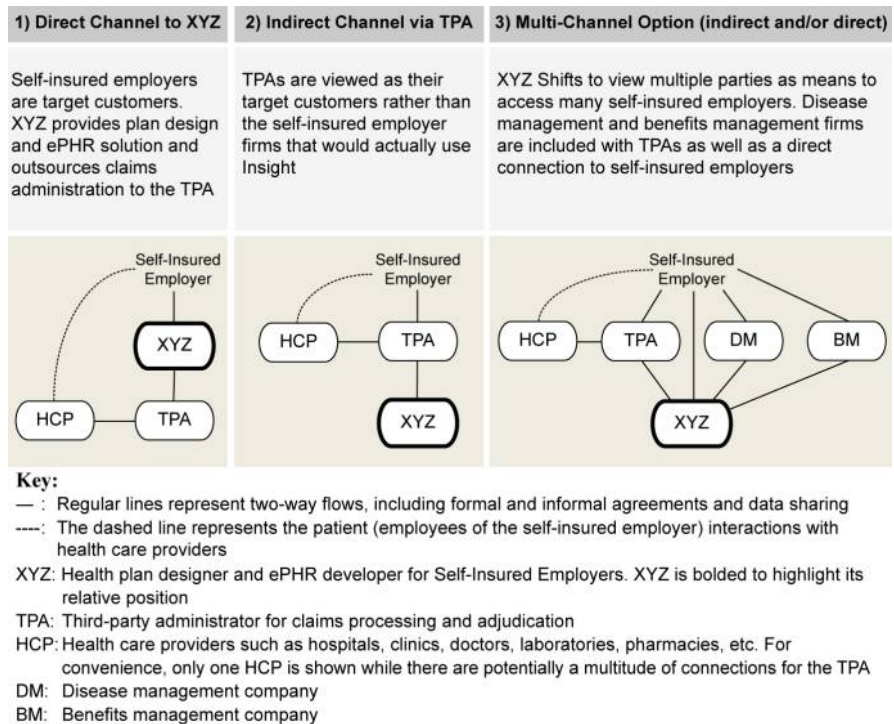
1) Direct Channel to XYZ	2) Indirect Channel via TPA	3) Multi-Channel Option (indirect and/or direct)
Self-insured employers are target customers. XYZ provides plan design and ePHR solution and outsources claims administration to the TPA	TPAs are viewed as their target customers rather than the self-insured employer firms that would actually use Insight	XYZ Shifts to view multiple parties as means to access many self-insured employers. Disease management and benefits management firms are included with TPAs as well as a direct connection to self-insured employers

Key:
— : Regular lines represent two-way flows, including formal and informal agreements and data sharing
---- : The dashed line represents the patient (employees of the self-insured employer) interactions with health care providers
XYZ: Health plan designer and ePHR developer for Self-Insured Employers. XYZ is bolded to highlight its relative position
TPA: Third-party administrator for claims processing and adjudication
HCP: Health care providers such as hospitals, clinics, doctors, laboratories, pharmacies, etc. For convenience, only one HCP is shown while there are potentially a multitude of connections for the TPA
DM: Disease management company
BM: Benefits management company

Figure 1.
Comparison of different strategic positions occupied by XYZ

responded to their request by saying it would cost $10,000 to write these specialized abstracts. Woody commented:

Most TPAs don't have sophisticated technology people around to create extracts. For the most part, to make this happen they need to hire someone to do it. We learned early on that extracts were going to be extremely difficult to get.

Though they appreciated the abstracts that they finally did get from the TPA, Woody was left to sift through volumes of data since the TPA was unwilling to write specialized routines and instead gave them one large data dump. According to Woody, "A huge part of my time was spent sifting through the volumes of data, and then writing the custom load routines to parse out what was needed". He continued, "The TPA helped a little, but it was not much". It was this experience that got Woody wondering about the viability of their current position. He commented: "Moving forward, if we do not partner with a TPA to create a packaged offering, we are going to have to go through this data exercise with each customer". Woody continued: "Data is king and those who have it are in position to compete in this space". Despite their collaborative efforts to build alliances with many TPAs, XYZ continued to struggle as they simply did not control the data source and their focus was still on providing services to self-insured firms, not TPAs themselves. According to Woody:

If we are going to compete in this space, we have to own the data. Otherwise we are going to be developing customized integration engines for each relationship and spending all of our

time jockeying for data. That model just is not sustainable. We need to either acquire a TPA or develop the technical sophistication to become one.

It became increasingly evident that there were clear trade-offs related to their initial position. On the positive side they owned the relationship with the end customer and could therefore manage the relationship to encourage innovation. Furthermore, when XYZ owned the customer relationship and contracted with TPAs to provide the claims processing, they at least had some influence over the TPAs since they were paying their bill. However, the negative side of their initial position resulted when they decided to remove the claims administration services from their offering and thereby pushed that back onto the existing TPAs, they lost the little control they had, and were therefore at the mercy of whichever TPA that they happened to be working with. As Woody reiterated, "Something had to change".

Strategic position 2: Targeting TPAs

As Version 1.0 of Insight was coming to market, the XYZ team began to question their initial strategic position. Their original approach was based primarily on a needs-based positioning strategy, where they focused on targeting the needs of self-insured employers that faced rising healthcare costs. This needs-based approach, in turn, shaped their variety-based positioning decisions, which led them to focus on plan design and the complementary technology platform to monitor it (Insight), thereby keeping the claims administration function in the hands of the third party TPA that was already servicing the client account. Despite the value that can come from owning the customer relationship and providing a one-stop-shop offering to self-insured employers, XYZ decided after a couple of years to alter their strategic position. Instead of delivering value to employers, XYZ was going to focus their attention on redesigning Insight and their own internal activities to begin delivering value to TPAs. Thus, XYZ's new strategy was to adjust their needs based position and begin to see the TPAs as their target customers, not the employers. Now, in effect, the TPA would sit between the customers and XYZ, allowing the TPA to own the customer relationships while hoping to take advantage of the many relationships TPAs already had (see Figure 1). According to Woody:

> It just made sense, if we could get the TPAs to see the value of Insight they could be a reseller for us. Instead of us trying to establish many one-to-one relationships, we could leverage the power of the one-to-many relationships that TPAs had […] to facilitate deployment of insight to a much broader audience.

With their new strategic position, XYZ relinquished the need to have the internal activities that were necessary to manage many individual customer relationships as well as an intensive outsourcing relationship with one or more TPAs. Instead, they could reallocate those resources to building a few strong relationships with a handful of TPAs. However, despite the inherent upside, they began to realize that by altering their position relative to the customer, they found that there were unintended trade-offs.

Trade-offs of Position 2 (innovation capacity and customer accessibility). As with all strategic positions, trade-offs do exist. Position two was no different for XYZ. On the positive side of Position 2, XYZ developed revenue sharing agreements with TPAs and began selling and marketing Insight to these organizations, hoping that the TPAs

would then become a value-added reseller of the application. As a result of these relationships they had access to a whole new customer base, as many TPAs already had accounts with hundreds of potential customers. Furthermore, by integrating tightly with one TPA it would limit the number of customized integration routines that would need to be developed. However, on the downside, their attempt to shift their position to focus on the needs of TPAs came with a cost. Realizing the TPAs were locked in a commodity market and an ongoing struggle to differentiate their services, XYZ thought that the Insight platform would be a natural extension to their existing service offering, helping them to differentiate their services from other TPAs. However, after many presentations and meetings, the adoption rate by TPAs was slow. In their ongoing interaction with the TPAs, Dr Low and Woody became increasingly frustrated. The excitement for Insight and XYZ's offering seemed evident and this notion was reinforced by the ongoing callbacks and meetings they would have with specific TPAs. However, it seemed as though the TPAs were just unable to move past the excitement phase when considering how they would deploy these solutions to their existing customers. The industry seemed to have almost a collective identity that focused purely on transactional efficiency in a commodity market. As expected in such a market, excess capacity within the TPA industry seemed to create a situation where price was the only means of competition, and the notion of innovation or differentiated services within this industry was simply not well understood and outside the scope of the social norm. According to Woody:

> The TPAs are antiquated, not innovative in their thinking at all [. . .] they're in a standard commodity based industry and seem content with the status quo; it just seems like a very difficult type of industry to penetrate as they seem to lack interest in new ideas and new products.

XYZ learned that while the TPA had existing relationships with many customers and were the central point for data collection, the social fabric that connected them with their customers was simply not conducive to encouraging novel thought or innovation outside the scope of continuously improved operational efficiencies. The TPA's job was to carry out the health plan instructions faithfully and continuously search for ways to lower the costs of processing claims. The apparent inertia seemed to simply inhibit them from moving past the status quo. Moreover, since XYZ's new strategic position revolved around providing services to TPAs, they subsequently lost the ability to access employers directly. Therefore, in addition to issues with innovation capacity within the channel, they lost customer accessibility with their new positioning approach. In a continuous search for a means to deploy their technology enabled services into this existing ecosystem, they began developing relationships with other types of healthcare consulting groups that they thought they could provide services to or in conjunction with. This included a benefits-management company, Benefito, and a disease-management company, CareCo.

Strategic position 3: Targeting benefits and disease management companies
XYZ health developed a relationship with Benefito, a benefits company that was a wholly owned subsidiary of a large bankers trust association in the Southern USA. Under the bankers trust umbrella sat many distinct business units, and each unit managed many individual banks. In an effort to gain greater visibility into healthcare spending across the entire organization, Benefito managers sought an application that

could help them aggregate, compare, and analyze data across business units. Though earlier versions of Insight initially seemed like a fit, it did not allow multiple groups to be analyzed and compared against each other within the same organization. In an effort to earn the Benefito business, Woody and Luke set out to build a hierarchical reporting functionality into a new version of Insight. This represented yet a third strategic position for XYZ, where they were now beginning to develop offerings for both benefits and disease management companies. According to Woody, "This required us to completely redo the underlying data model that we developed for 1.0". Fortunately, by developing this new functionality, they earned the Benefito business, signing a contract with them in March of 2009. Despite the new business provided by the growing Benefito relationship, Dr Low and the executive team continued to search for new ways to deploy Insight. In doing so, they established a relationship with a large disease management organization that provided potential access to nearly 100,000 lives. In an effort to capture this business, Woody and Luke built a robust disease management portal that was also part of the 2.0 release of Insight. This functionality allowed disease managers to have access to an activity dashboard that helped track patients who were under their care. As a part of this functionality, disease managers had access to input screens in which they could enter key information (such as blood pressure, weight change, etc.) into the ePHR database. They could then access and track this information throughout their relationship with a given individual.

Trade-offs of Position 3 (technical and relational scalability). XYZ's most recent decision – to maintain their existing position that focused on TPAs while also straddling new channels – obviously provided additional opportunities to deploy their technology enabled service offering. Yet, by expanding their needs-based positioning strategy to so many customer groups, they were required to continually develop new functionality and services to meet the diverse needs of their broadening customer base. This broad market approach differs from a more niche or single condition approach that has been taken by some rather successful ePHRs around the world, such as the Renal PatientView, a program developed through the NHS in the UK. The problem with the broad market approach for XYZ was that the new functionality and services resulted from activities that were not necessarily compatible across all channels, and therefore as they invested time and resources in one channel they were essentially taking them away from another, a clear trade-off. In other words, they were unable to develop either technical or relational scalability as their focus expanded across all of three unique channels. Technical scalability results from leveraging technology investments across multiple customer accounts, thereby lowering the marginal costs required to service such accounts. Relational scalability works the same way. By leveraging relational investments (such as with a TPA) across multiple customers' accounts, they could spread those costs out thereby lowering their marginal costs required to obtain and service new accounts.

Summary. A summary of key trade-offs identified from XYZ's shifting strategic positions is shown in Table I.

Discussion
We have presented findings from an in-depth case study that explores how a start-up firm adjusts its strategic position within its pack to facilitate the development and

Construct	Definition	Case illustration
Data accessibility	The relative ease of obtaining and accessing data outside of the firm	When XYZ contracts with a TPA to provide backend claims processing their influence leads to an increase in data accessibility. When they consider TPAs as their customers, they lose that influence and data accessibility decreases
Innovation capacity	The capacity to identify and allocate resources that link and facilitate the movement of the innovation from the point of production to the point of consumption	When XYZ adopted the strategy of working exclusively through TPAs, they become removed from the end customer. The TPA channel seemed to lack the organizational cognition necessary to reconfigure or acquire resources to strategically target innovation initiatives
Customer accessibility (end customers)	The relative ease of getting access to the end customer in order to establish market conditions and establish buying behavior	When XYZ owns the customer relationship, they are able to influence directly the customer buying behavior. Alternatively, if the TPA or another entity controls the customer relationship, XYZ must work through that channel to shape behavior
Technical scalability	The ability adapt the technical platform to accept increased volume from new and potentially diverse customer accounts without significant system customization	XYZ struggled to scale their technical platform with their multi-channel strategy given the diversity of these potential customers
Relational scalability	The ability to adapt the relational antecedents that enable seamless integration with new customer accounts without significant relationships specific investments	XYZ's best strategy to scale relationally was to leverage existing relationships with TPAs. However, the multi-channel strategy would create a strain on trying to adapt efficiently to the variety and dynamics of managing multiple relationships

Table I.
Summary of key
trade-offs identified from
XYZ's shifting strategic
positions

deployment of Insight, an ePHR. XYZ has successfully developed the innovation through multiple versions and deployed it across a range of customer types. However, despite some early success, they continue to struggle with the most effective strategic position for deploying the innovation. Each strategic position they have chosen (i.e. direct, indirect, and multi-channel) has come with unanticipated trade-offs that challenge the viability of their business model. To further understand why, we coupled the industry infrastructure framework (Van de Ven, 2005) with core concepts from the strategic positioning school to interpret how XYZ's proprietary activities impact the structure of their pack, and, in turn, impact their ability to develop and deploy Insight in this complex context. In light of these findings, our study makes important contributions to theory and practice.

Proprietary activities shape strategic position
Running in packs is an essential strategy for firms looking to develop and deploy ePHR technologies. In doing so, firms must broadly consider how their proprietary activities transform the resources and institutional arrangements in a way that enables them to compete for customers that demand ePHR solutions or to create that demand. Van de Ven's (2005) industry infrastructure framework broadly depicts these infrastructure components and encourages firms to "run in packs" by focusing on their technical competence, outsourcing non-core aspects of the business, and being politically savvy. We noticed that running in packs is a negotiated process that takes place over time, and that how the players in a pack collaborate and adjust their positions has trade-offs in terms of how the technological innovation is developed and deployed. We observed changing pack structures by looking at how XYZ's strategic position changed relative to other firms in the pack and to the ePHR end users[3]. We also looked at XYZ's strategies in attempting to broaden its access to more customers by working through indirect and multi-channel relationships. These provided a view of distinctive pack structures in terms of how XYZ intended to interface with customers and collaborate with other pack members. Our findings indicate that when the structure of the pack changes, there are important implications related to the ability of a firm to access key resources, adjust institutional arrangements to shape standards, and align channels to facilitate deployment. Furthermore, we also noticed that there seemed to be an inherent lack of awareness as to how changes in strategic position corresponded to changes in the structure of the pack. Thus, the members of XYZ were reacting to strategic challenges that they faced when they adopted a new strategic position, but did not anticipate these prior to making their next move. These findings highlight the inherent challenge of broadening one's perspective to the network view when we are embedded in a particular context and focused on day-to-day activities. It begs the question, "Could XYZ have known about the obstacles that they would encounter prior to making adjustments to their strategic positions?". Our hope is that through studies such as this one we will further emphasize the importance of a network (or pack) based view for individuals working in firms both large and small.

Strategic position impacts power and access to key resource endowments
As in all pack formations, some players have control over resources that others need. In this case, the TPA is the nexus of the data required to populate Insight. This notion is recognized by Miller *et al.* (2009) when they note that claims and billing players have the best source of complete data to populate an ePHR. From a broader network perspective, the TPAs central position and many connections would indicate a high degree of power and influence over other firms within the pack (Wasserman and Faust, 1994). However, our findings indicate that XYZ's relative position to the end consumer and the TPA, the services they offer, and how they deliver these services has important implications on their ability to counteract the power that TPAs have, and thereby the accessibility of key resources. Because of their early proprietary activities and resulting strategic position, XYZ owned the customer relationship and provided a full range of services, including claims administration, which was enabled through an outsourcing deal that they negotiated with a TPA. Thus, XYZ effectively positioned themselves between the customer and the TPA, acting as a broker between the two firms. Through their brokerage role, XYZ gained influence over the TPA through

contractual control and direct access to the end customer. Therefore, their strategic position had clear implications on the level of power they had over other firms in a pack. Such influence was needed to get the electronic data feeds that were required to populate Insight. When XYZ adjusted their strategic position to stop providing claims administration services and instead targeted TPAs as their customers, too, they traded their brokerage role for access to a broader customer base. In doing so, their strategic position changed and the power distribution was again altered in favor of the TPAs. Accordingly, in the context of ePHRs, our findings indicate that a firm's position within a pack clearly impacts their ability to access the crucial data that is needed to populate an ePHR. In addition to issues of data accessibility, XYZ became acutely aware of other tradeoffs they faced as a result of their changing position within their pack. Our findings support the sizeable precedent in the network literature that views a firm's position within a pack as a resource from which it can draw on to support its proprietary activities (Gulati *et al.*, 2000; McEvily and Zaheer, 1999). XYZ began to realize that opting out of owning the customer relationship, in turn, made them dependent upon the TPA for access to potential customers.

Strategic position impacts power and institutional arrangements

Institutional arrangements impact the formulation of standards that shape behaviors within and across firms (Van de Ven, 2005). A key value of Insight was the low marginal costs for adding new users to the system, an important factor that would impact XYZ's profitability over time. Yet, this was dependent on XYZ's ability to develop an ePHR application that could be standardized and therefore efficiently replicated across new implementations. As discovered, many core aspects of Insight could be replicated across customer organizations with little need for customization. Yet, creating the integration mechanisms to enable data to flow from a given TPA to Insight proved timely and costly. As XYZ moved away from playing the brokerage role and contracting with a small number of TPAs to provide a full breadth of services to end consumers, they now had to respond to the requests of a given TPA that was looking to resell Insight. In a sense, they went from having the power that comes from being a broker and a consumer with many alternatives (there are many TPAs they could contract with) to being at the mercy of any TPA that was considering using Insight in one of their existing customer relationships. This illuminates issues related to the technical scalability of Insight, and helps to broaden Van de Ven's notion of technical competence which is critical when organizations decide to run in packs. Our findings suggest that technical competence is not simply a "choose it and compete proposition" that Van de Ven may be suggesting. Rather, it is capability that is entangled with a firm's proprietary activities and strategic position, and is dependent on where a firm sits relative to other firms within a given pack, and therefore it has clear costs and benefits associated with it. Thus, the power a firm has within a pack has clear implications on their ability to influence other firms to adopt standards that facilitate data integration. This in turn significantly affects a firm's ability to develop technical scalability in the context of ePHR development and deployment.

Strategic position impacts channel and market consumption

XYZ's strategy to relinquish control of the customer relationships and broaden their strategic position changed how the entire pack deployed the ePHR innovation by

altering the final tie that connected the pack with the end consumer. In other words, it altered the final channel that is responsible for deploying the ePHR innovation from the pack that developed it to the end user who will use it. Our findings suggest a nuanced approach to understanding why these distinct customer channels have differing capacities to effectively deploy an ePHR innovation because some are more or less conducive to facilitating the adoption of technical innovations. Furthermore, they illuminate that the pack's channel alignment relative to the end customer affects the overall innovation capacity of the entire pack. As Van de Ven points out, the essence of the political savvy needed for firms to run in packs is that firms must "recognize the interests of key actors and enroll them to one's viewpoint" (Van de Ven, 2005, p. 371). The importance of persuasion within and across groups to mobilize collective action is seen across many theoretical frameworks, including actor network theory (Callon, 1986), and is therefore not specific to Van de Ven's focus on the importance of political savvy. As Callon (1986) identified, in the second stage of network formation (interessement) other actors become interested in the solution proposed and begin to shift their affiliations. Over time, XYZ began to recognize that the TPAs interests were not well aligned with their interests in expanding and constructing a market for ePHRs and value-based health plans, and therefore the TPA-customer channel seemed less suitable for delivering the innovation. Thus, from an ANT perspective, they were never able to get through the interessement stage. Despite what seemed like an obvious opportunity, TPAs resources and capabilities were aligned with a lean strategy of serving as many customer claims as efficiently as possible. They were locked into a commodity-based market where they faced intense competitive rivalry over price. Furthermore, there seemed to be clear norms surrounding the relationships between TPAs and their customers, norms that kept people keenly focused on price while seemingly less willing to explore opportunities for innovation. Thus, the final channel that connects the pack with the end consumer leads to differing norms that can be more or less conducive to the effective deployment of ePHRs.

This research shows that the development and deployment of employer sponsored ePHRs is a complicated process that requires the effective negotiation of many differing players with often competing objectives. It shows that running in packs is a useful meta-lens for investigating how firms in knowledge intensive industries can cooperate to introduce new technologies into the marketplace. Yet, in applying the lens to the context of IT development and deployment, firms must move beyond thinking about being politically savvy, and pay close attention to how differing strategic positions (and corresponding changes to pack structures) can lead to important trade-offs between market opportunities and resource accessibility, scalability, and channel suitability. In doing so, they will become more aware of the dynamic interrelationships between the four subsystems identified by Van de Ven (2005). In short, we propose that this awareness will lead to a higher likelihood that the industry infrastructure sub-systems and a firm's proprietary activities will support knowledge-intensive innovation. As firms understand the relationship between their proprietary activities and how these shape pack structure and infrastructure sub-systems we expect a higher likelihood of ePHR deployment success.

Limitations
Clearly, the biggest trade-off of this study is the ability to generalize outside of its current context so that we could focus more specifically on ePHR development and

deployment for self-insured employers. However, we believe the inductive and engaged approach applied here could be used in future research to determine the types of temporal patterns associated with small firms in other domains that are attempting to simultaneously develop and deploy knowledge-intense technologies. Another fruitful area for future research involves gathering the insights from other pack players directly (e.g. TPA, human resource managers of employers, etc.) and looking more broadly at the development of ePHRs outside of the self-insured employer market. In this study, our approach explicitly focused on how a start-up firm, XYZ, interpreted their strategy and activities relative to other pack players, and how this interacted with their changing development and deployment activities. Given that running in packs assumes that firms will simultaneously cooperate and compete with other pack members, our exploration reveals how a single firm can interpret and act according to how they make sense of their environment and actions (Weick, 1995). This perspective is important when coupled with the dynamic nature of juxtaposing the rapid nature of start-up firms with the changing landscape of healthcare and IT.

Conclusion

Generally, there are three ways that ePHRs develop in the marketplace to achieve the aggregation of clinical data and healthcare knowledge. First, consumer-driven applications like Google Health[4] and Microsoft HealthVault provide digital platforms for storing personal healthcare information. These services depend upon individuals to take responsibility for the aggregation of their own healthcare data. Second, self-contained eco-systems such as managed care organizations (Kaiser Permanente) or government-sponsored programs (Veterans' administration) develop proprietary systems for their own use. Third, in what is largely driven by entrepreneurial ventures, employer-driven applications take data aggregation out of the hands of the individual, acting as electronic data aggregators by pulling healthcare data from many disparate sources and using it to populate ePHRs for each employee. From this latter perspective, our findings illustrate the benefits of a small, nimble firm seeking to quickly adapt to meet perceived market needs as well as the drawbacks that exist within a complex network of multiple interdependencies. Approaching these networks from a systems orientation should enable entrepreneurs to consider a wider variety of potential patterns and feedback that may stem from strategic positioning choices. These findings also underscore the importance of taking time to reflect and learn from the trade-offs that exist between distinct strategic positions. Often, healthcare entrepreneurs come from a healthcare background and are able to clearly identify where inefficiencies and improvement opportunities exist. However, they may have not stopped to consider the complex ecosystem of companies that exists within the healthcare industry and the interdependencies that exist between constituents. As our study shows, doing so is crucial. Table I of this study is an excellent starting point for anticipating and assessing the relational consequences of operating within a network such as the one illustrated in the case. We would anticipate that for various start-up activities some of the categories noted may be inconsequential while others may need to be added. For those conducting additional research in these topics we suggest that exploring this issue may lend itself to the development of more robust mid-range theoretical views that are sensitive to issues pertaining to entrepreneurship in the healthcare domain. Clearly, due to regulatory and political reasons the complexity of each healthcare ecosystem will vary as well. Research would benefit by isolating the

commonalities as well as differences across different countries and their systems, and as we have indicated already, the differences are abundant. In addition to illuminating the contextual factors that impact the development and deployment of ePHRs, our study provides three core contributions.

First, we approached this study from an inductive, explorative stance which led to important insights for the development and deployment of employee sponsored ePHRs. Drawing on the industry infrastructure (Van de Ven, 2005) and strategic positioning views (Porter, 1980, 1996) we explored issues related to resource dependencies that surround development and deployment initiatives. This perspective led us to juxtapose a temporal view of how XYZ proposed and acted on different strategic positions, and the trade-offs that impacted their ability to gain access to key resources or influence the pack in a way that supports ePHR deployment success. Second, this study elaborates on Van de Ven's recognition that firms need to be politically savvy to successfully run in a pack. We believe that if firms (like XYZ) better understand the consequential relations between their proprietary activities, strategic positions, and the impact to ePHR critical success factors (issues of resource accessibility, scalability, and channel suitability), they will be more likely to develop strategies that support the successful deployment of knowledge-intensive innovations in the healthcare context. Lastly, we applied the industry infrastructure lens in a novel way by incorporating temporal and structural (Porter, 1980, 1996) aspects to how a firm's proprietary activities and strategic position draw upon and are shaped by institutional arrangements, resource endowments, and market consumption. While the prior view of an industry infrastructure implies a dynamic nature, this study provides further theoretical development in that direction by applying it to a distinct case of innovation in a real life context. Moreover, in exploring these dynamic relationships, our longitudinal, process oriented, and deeply engaged approach heeds the call from recent scholars suggesting the need for research that explores the underlying generative mechanisms that help explain performance outcomes in organizational settings (Poole *et al.*, 2000).

Notes

1. "Self-funded plan: An insurance arrangement in which the employer assumes direct financial responsibility for the costs of enrollees' medical claims. Employers sponsoring self-funded plans typically contract with a third party administrator or insurer to provide administrative services for the self-funded plan. In some cases, the employer may buy stop-loss coverage from an insurer to protect the employer against very large claims" (Kaiser, 2009, p. 184).

2. All names have been disguised to protect confidentiality.

3. Defining which firms to include in a pack can be challenging because clear boundaries often do not exist. In this study we follow the advice of Laumann *et al.* (1983) and adopt a position-based approach to boundary specification. We focus on firms that hold formally defined positions within the pack and exclude all others.

4. As of January 1, 2012, Google Health has ceased operations. Users were offered options to export their data to other services such as Microsoft HealthVault.

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Appendix. Understanding the industry infrastructure for ePHRs

The self-funded employer-based model of insurance is one in which employers bear the risk of paying for healthcare rather than an insurance plan. Figure A1 shows a simplified version of this model where the employer provides a health plan to the employee and is then responsible for all costs beyond the deductible. The employee then contracts with doctors, clinics, hospitals, and health-related providers for services.

Two challenges not identified in Figure A1 are that:

(1) doctors, hospitals, labs, pharmacies, etc., likely have different electronic health record systems; and

(2) not all systems are electronically based.

As a result, there are potentially numerous connections between the employer and employees as indicated in Figure A2.

Challenges in the information flow and collection of health-related information exist because of the difficulty in obtaining clinical care data, which includes data from physician-patient interactions, labs, procedures, tests, hospitals and clinics. Because self-funded employers would have to dedicate many resources to establishing and maintaining interfaces with these healthcare providers, many draw upon a third-party administrator (TPA) to provide billing, establish eligibility, manage the payment process, and adjudicate claims. Such administrators effectively aggregate the connections between the employer and providers. Figure A3 illustrates the role that the TPA plays in aggregating data flow to and from healthcare providers.

The inclusion of a TPA does help to aggregate and centralize the clinical data necessary for billing. However, it also means that the TPA, as an established industry player, has access to many employers with potential ePHR users. In this position, TPAs are in a stronger position to leverage potentially the creation of a market for ePHRs, as they own the relationships with the employers.
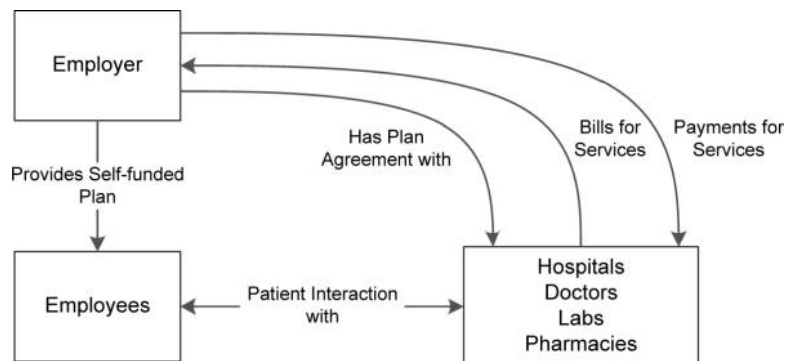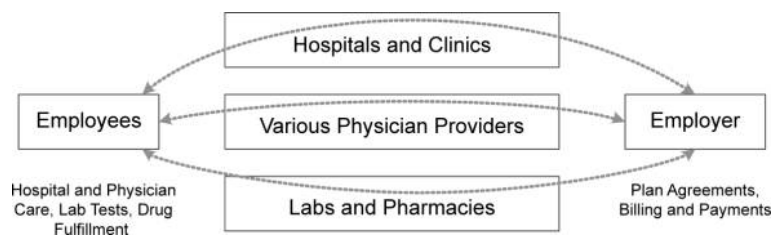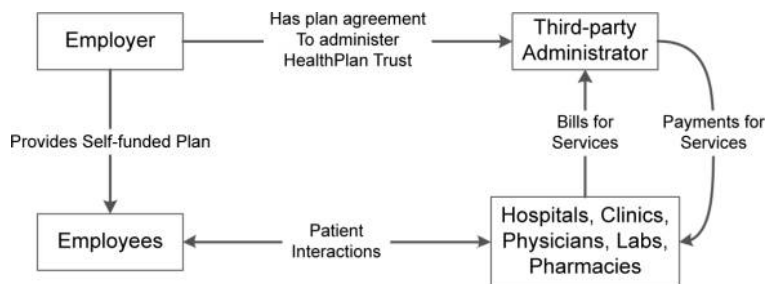
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