HOW DO BUSINESS MODELS INFLUENCE THE SUSTAINABILITY OF ENTREPRENEURIAL FIRMS? -THE CASE OF HEALTH INFORMATION EXCHANGES

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Abstract

Although business models have been widely implicated as key influences on the performance of firms, empirical studies investigating the relationship between business models and performance are limited. In this study, we theorize and propose to empirically examine the influence of two elements of a business model: organizational form and revenue model on the sustainability of new ventures. We contextualize our study to health information exchanges (HIEs) that are new business ventures in healthcare engaged in providing information exchange services across healthcare stakeholders. We propose to use a unique archival data set constructed from surveys of HIEs in the US from 2008 to 2010 for the empirical analysis to explore the influence of for-profit organizational form, and transaction and subscription based revenue models on financial sustainability and operational maturity of the HIEs. We discuss the possible research and managerial implications of this study.

Keywords: entrepreneurial firms, health information exchange, organizational form, business model, sustainability, operational maturity.
1 INTRODUCTION

Entrepreneurial firms are constantly challenged to achieve sustainability. They evolve through various stages of growth, confronting differing problems and resulting in the need for distinctive management skills, priorities, and structural configurations (Hanks et al. 1993; Quinn and Cameron 1983). Post-formation, an entrepreneurial firm might progress to becoming operational by relying on resources made available through early venture funding. However, reliance on venture capital is not a strategy for long-term viability, a firm becomes sustainable only when it achieves financial breakeven, and is able to support operations through its own stream of revenues and profits. Prior studies estimate that somewhere between 30 to 50% of new business ventures reach operational status, and a smaller percent of firms eventually become sustainable (Parker and Belghitar 2006; Reynolds 2007).

To address the sustainability challenge it has been suggested that designing appropriate business models for the entrepreneurial firm should lead to value creation through efficient deployment of resources (Amit and Zott 2001). Indeed, during the venture formation process, the growth and success of new organizations is often credited to the development of appropriate business models (George and Bock 2011; Hedman and Kalling 2003). By designing avenues through which the firm can generate revenue to become sustainable, business models provide connections and roadmaps that leverage the firm’s technical potential for the realization of economic value (Chesbrough and Rosenbloom 2002; Teece 2010).

Although business models are argued to have an influence on the entrepreneurial firm’s performance, systematic research on the influence of business model design on venture performance is sparse in the literature. Few studies in existing management literature have investigated how different elements of a business model influence the success of an entrepreneurial firm to drive towards sustainability (Zott and Amit 2007; 2008).

In this study, we propose to explore the research question of how the elements of a business model influence the sustainability of entrepreneurial firms. We build on prior research and identify two commonly discussed elements of a business model for a new venture that are important for the entrepreneurial firm: the organizational form, reflected in its choice of for-profit or non-for-profit structure, and the revenue model. Drawing on efficiency arguments, we hypothesize that for-profit organizational form, subscription fee and transaction fee based revenue models influence the financial sustainability of entrepreneurial firms. We further predict that, along with the financial sustainability, organizational form and revenue models influence the operational maturity of an entrepreneurial firm. Finally, we hypothesize that the two business model elements’ effect on financial sustainability is mediated through operational maturity.

We propose to test the hypotheses in the context of health information exchanges (HIE). HIEs are emerging forms of organization in the healthcare sector, and function as collaborative inter-organizational information exchange platforms. HIEs are devised to facilitate the electronic mobilization and sharing of healthcare information across organizations within a region, community or hospital system (Vest and Gamm 2010; Walker et al. 2005). Although several HIEs have been initiated in the last few years in the US, not all efforts have reached sustainability. Highly visible and publicized failures of some HIEs have raised public concern and scepticism regarding their anticipated role in improving deficiencies in US healthcare.

Our empirical analysis will use a unique archival data set on HIEs from surveys conducted by the eHealth Initiative (198 HIEs in 2010, and 153 HIEs in 2009, and 130 HIEs in 2008). Currently, we are conducting the analysis of the data, and the findings will be reported during the doctoral consortium.

This study is intended to contribute to the existing literature on business models and sustainability of entrepreneurial firms in the context of a new form of IT-enabled services. Given the dearth of rigorous study on the subject, we believe that documenting the influence of different elements of business model provides useful insights for entrepreneurs planning new ventures. Further, this study will also contribute to the healthcare management literature by isolating factors that influence the sustainability of HIEs.
2 PRIOR LITERATURE

2.1 Value Creation with Business Models

Although definitions of the concept of a business model abound in the literature, they share a common theme that principally relates to the idea of value creation for firms (e.g., Mahadevan 2000; Timmers 1998; Weill and Vitale 2001). For example, Amit and Zott (2001) frame business model as the design of the transactions of a firm such that they generate economic payoffs.

Recent literature on business models suggests that they can be efficacious in defining new organizational structures, customer-centric value propositions, and gaining a path towards competitive advantage. Value creation for customers has been variously alluded to as a ‘value proposition’, ‘creating value network’ or ‘value configuration’ frameworks (Johnson et al. 2008; Osterwalder et al. 2005). Researchers argue that business models play a more significant role for entrepreneurial firms in identifying and establishing organizational design, resource structures, value structures, and transitive structures; and creating opportunities for their value creation mechanisms (George and Bock 2011; Teece 2010).

Although several studies in the recent literature converge on the idea of using the concept of business model as a focal construct in the set of antecedents that drive firm performance and success (Zott and Amit 2007), rigorous work in this domain is limited. A few scholars offer guidance on how to refine the construct and relate its elements to firms’ strategy (e.g., Osterwalder et al. 2005; Tikkanen et al. 2005). Further, prior research has conceptualized, classified and categorized several components of business models that can be operationalized as constructs in studies related to business models (Morris et al. 2005; Shafer et al. 2006). However, to our knowledge no prior study has operationalized and empirically examined the elements of business models on the performance of incumbents, or the sustainability of entrepreneurial firms.

Scholars broadly agree that two focal elements need to be emphasized while designing a business model. First, the revenue model is a central element in most prior work, albeit referred to with different labels such as revenue logic, capture value, profit formula or return for stakeholders (Chesbrough 2007; Johnson et al. 2008; Magretta 2002). Second, studies also converge on the notion that the structure of the firm, that influences strategic decisions, choices and principles, is a core element of the business model design, implementation, and execution process (George and Bock 2011; Shafer et al. 2006; Tikkanen et al. 2005). Third, studies argue that to the degree that the business model is a reflection of the firm’s core value propositions for customers, if configured appropriately, it can help the firm to achieve continued sustainability and satisfy the objectives of multiple stakeholders (Amit and Zott 2001; Voelpel et al. 2005). Building on this work, we theorize and empirically investigate the influence of organizational form and revenue model on sustainability of entrepreneurial firms.

2.2 HIEs as Entrepreneurial Firms in Healthcare

Health information exchanges are similar to information exchange and integration platforms in finance, banking and airlines sectors that have provided immense benefits to firms and customers in sectors as diverse (Mukhopadhyay et al. 1995; Rai et al. 2006). HIEs offer the interoperability that can facilitate access to vital information for care providers about their patients (e.g., prior history, admissions, prescriptions, allergies) at the time and point of care delivery, they improve the speed of access to test results, reduce staff time in handling lab and radiology results, and reduce clerical administration and filing functions. Collectively, it is envisioned that these capabilities should enable care providers to minimize errors, save cost and become more efficient (Rishel et al. 2007; Walker et al. 2005).

In the US healthcare sector, HIEs can be positioned as entrepreneurial firms, as they are seeking to establish their identities, define the structures with respect to their institutional environment, and trying to achieve sustainability along with tackling the challenges of managing resources and operational constraints (Lounsbury and Glynn 2001; Stevenson and Jarillo 1990). Although a
number of HIEs have been funded through government grants, or grants from other stakeholders during their incubation phases, they face similar challenges as entrepreneurial firms in structuring the organization. Moreover, as researchers note, grant funding is not very helpful for the HIEs to become sustainable (Adler-Milstein et al. 2009; Khuntia et al. 2010). Prior studies and existing reports suggest that only 73 HIEs were operational in 2010 out of more than 200 HIE initiatives. As reported, 41 percent of operating HIEs are covering operating costs with revenue from participating entities, and only 28 percent of the remaining 59 percent expect to eventually cover their operating costs (Adler-Milstein et al. 2009). Therefore, sustainability of HIEs is a challenge. This study seeks to explore the influence of business models on HIE maturity and sustainability using a large sample across several years.

3 THEORETICAL FRAMEWORK AND HYPOTHESES

We draw on efficiency based arguments and prior literature on business models to develop a theoretical model for the influence of organizational form and revenue model on the operational maturity and financial sustainability of HIEs (see Figure 1).

Figure 1. Conceptual model

A business model can be conceptualized as a strategic tool for increasing efficiency of the entrepreneurial firm. Prior studies suggest that business model is a central tenet to shape the firm’s structure, top management configuration, decision making process, and principles of organizing (Shafer et al. 2006; Tikkanen et al. 2005). The appropriate design of the business model leads the firm to identify elements of the value chain such as the products and services it will provide and the market segments it will serve (George and Bock 2011; Teece 2010).

We suggest that an efficiency based business model is appropriate to the HIE context as they principally exist to enable transaction efficiency for better information flow among stakeholders and reduce information asymmetries among healthcare providers (Zott and Amit 2007; 2008). In so far as efficiency-centered business models are appropriate for the transactional context of HIEs, we address the question of how HIEs can structure their organizational forms and revenue models to achieve higher transaction efficiency.

3.1 Organizational Form

Organizational form defines the roles and functions for the top management, and determines organizational structure and operational strategy to achieve the objectives (Grossman et al. 2008; McGowan et al. 2007). Organizational form influences the structure of the board, quality of top managers, and strategies of the organization. We explore the influence of for-profit and non-profit organizational forms on the sustainability of HIEs. Structuring the HIE as a for-profit venture is expected to influence sustainability and maturity for a variety of reasons. First, the legal constraint on nonprofits against distributing profits restricts the profit motive. For-profit firms strive for higher...
revenue as the managers can earn higher incentives aligned with the profit of the firm (Hansmann 1987). Second, non-profit organizations are less focused on efficiency and cost minimization; and they will expend resources to serve segments of the stakeholders that would otherwise be seen as too costly or unprofitable to serve (Holtmann 1983). While important for garnering stakeholder support, such actions jeopardize the financial stability of a venture. Finally, for-profit HIEs can take decisions to structure their service offerings more flexibly than nonprofits. We therefore hypothesize:

\( H1a: \) For-profit organizational form is positively associated with operational maturity of HIEs.
\( H1b: \) For-profit organizational form is positively associated with financial sustainability of HIEs.

### 3.2 Revenue Model

A revenue model is the plan through which a firm generates its revenues, and may extend to include its operational priorities. Having a robust pre-defined revenue structure helps to balance resource supply and demand, to turn abstract goals into concrete operational steps, and reduces the likelihood of venture failures (Delmar and Shane 2003; Kirsch et al. 2009). In the case of HIEs, once the HIE has been initiated, its continued sustainability is a function of the revenue that can be generated from its customers. Since HIEs operate on the stakeholder-exchange mode in their operations, their business models primarily depend on subscription fees and transaction fees to accrue revenue from transactions.

Transaction fees are charged based on the count of the data or information involved in the transaction, such as a fee per claim exchanged, or per lab result delivered. While fixed subscription fees might help the provider gain a specific revenue stream continuously through subscriptions, transaction fees generate marginally increasing revenue based on the volume of transactions (Kahn and Varian 2000; Shapiro and Varian 1999). For example, an HIE can impose a tiered structure and charge higher fees beyond a certain volume of data transactions, leading to higher revenue. At the same time, it may be costly to develop and maintain a system for counting and monitoring transactions, thereby incurring higher administrative overheads. Further, unless a HIE becomes operational, monitoring and charging fees on transactions is not feasible. Not surprisingly, only a few HIEs have become reported as becoming sustainable by adopting the transaction based revenue models; such as the Delaware health information network, Universata Inc. in Maryland and HealthLINC in Indiana.

Subscription and transaction fee-based business models are likely to have an impact on the sustainability of HIEs for at least three reasons. First, subscriptions or transactions provide the momentum and motivation that is needed in an organization to continuously improve performance because managers fear that failure to do so may lead to cancelled subscriptions and a reduction in transaction volume. Second, transaction or subscription based services provide avenues for bundling of services, and offer greater value for stakeholders by mitigating risk. For examples, HIEs can charge a certain subscription fee for minimal core functionalities, and higher for additional features. Third, in the subscription or transaction based revenue models, failure to meet the customer demands is likely to result in customers discontinuing the services of the HIEs. Based on these arguments, we hypothesize:

\( H2a: \) Transaction fee based revenue model is positively associated with operational maturity of HIEs.
\( H2b: \) Transaction fee based revenue model is positively associated with financial sustainability of HIEs.
\( H3a: \) Subscription fee based revenue model is positively associated with operational maturity of HIEs.
\( H3b: \) Subscription fee based revenue model is positively associated with financial sustainability of HIEs.
3.3 Mediation by Operational Maturity

Initial venture funding and grants help the entrepreneurial firms to develop capabilities, skills and expertise in managing technology operations, addressing issues related to implementation and moving towards the commercial aspects of operations. As the entrepreneurial firms progress on the path of operational maturity, the management techniques applied to establish processes and activities lead the firm to achieve a higher level efficiency. Achieving a higher operational stage helps the firm to establish essential tools, guidelines, and procedures for process improvement within the organization (Harter et al. 2000; Krishnan et al. 2000). Managers then use these tools, guidelines and procedures to integrate the business models to achieve higher efficiency and revenue. As firms mature, they begin to expand their portfolio of product and service offerings.

We suggest that when the HIE transmits and exchanges patient data with its stakeholders, and strives to acquire more customers, it progresses along the maturity continuum that can propel it towards financial sustainability. We suggest that the capabilities and expertise developments through the process of achieving operational maturity help the entrepreneurial firm to translate the organizational goal of earning revenue from customers easily and faster. The expansion in services that occurs because of greater maturity should generate greater demand, and resultant revenue for the HIE. Thus, we predict:

\[ H4: \quad \text{The effect of organizational form and revenue model on financial sustainability is mediated through the operational maturity of HIEs.} \]

4 PROPOSED METHODOLOGY

We propose to use an archival data used in this study from the annual surveys conducted by the eHealth Initiative. The surveys elicit information regarding the progress of health information exchanges in US, and track their progress every year since 2004. The empirical analysis will use the survey data collected from 198 HIEs in 2010, and 153 HIEs in 2009, and 130 HIEs in 2008.

As noted earlier, we conceptualize firm’s sustainability as achieving financial breakeven through revenue and profits. Accordingly, we use financial breakeven as the dependent variable for sustainability, which indicates whether the HIE has achieved financial breakeven as a result of operational revenue. We use operational maturity as the second dependent variable indicating the maturity of the HIEs from a 7-stage maturity model developed by the eHealth Initiative. We will include for-profit organizational form, subscription fee based business model, transaction fee based business model as independent variables in our models.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Financial breakeven</th>
<th>Whether the HIE has achieved financial breakeven as a result of operational revenue.</th>
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<tbody>
<tr>
<td>Operational maturity</td>
<td>Operational maturity</td>
<td>The stage of operational maturity of the HIE</td>
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<tr>
<th>Independent variables</th>
<th>For-profit organizational form</th>
<th>Whether the HIE is structured as a for-profit corporation model or limited liability company model</th>
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<tr>
<td>Subscription fee based revenue model</td>
<td>To support the ongoing operations, whether the HIE charges subscription fees to data users and providers.</td>
<td></td>
</tr>
<tr>
<td>Transaction fee based revenue model</td>
<td>To support the ongoing operations, whether the HIE charges transaction fees to data users and providers.</td>
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Table 1. Description of Key Variables

We control for several factors that might influence the maturity and sustainability of HIEs, beyond those proposed in theoretical model guiding this study. The empirical analysis will use appropriate
econometric techniques and estimation methods based on the study design and operationlization of variables.

Table 1 provides a description of key variables used in the empirical analysis.

We have collected the archival data, and currently are in the process of data analysis. Preliminary findings will be reported during the doctoral consortium.

5 DISCUSSION

This study is expected to make contributions to the literature on new ventures and entrepreneurial initiatives by identifying a business model linked sustainability strategy for entrepreneurial firms (Goldfarb et al. 2005; Singh et al. 1986). Second, this study will contribute to the growing streams of literature exploring the relationship between business model and value creation in the market place (Nenonen and Storbacka 2010; Osterwalder et al. 2005). Third, this study also contributes to the literature around health information exchanges by exploring the influence of organizational forms and revenue models on the sustainability of HIEs.

We expect our results to yield managerial insight for designing appropriate organizational forms and revenue models for new ventures. Further, the findings will identify salient factors that should receive requisite attention from policymakers and HIE managers to make progress toward sustainability and success of HIEs.

In conclusion, this study proposes to empirically explore how two elements of a business model - organizational form and revenue model influence the sustainability of a highly consequential entrepreneurial organizational form: HIEs in US healthcare. Health information exchanges are a key element of transforming the healthcare system so that it is safer, less expensive, and more effective, and it is important for managers and policy makers to gain an understanding of the drivers of their viability.
References


