

# Multi-Sided Markets for Transforming Healthcare Service Delivery

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**Abstract.** Changes in healthcare delivery needs have necessitated the design of new models for connecting providers and consumers of services. While healthcare delivery has traditionally been a push market, multi-sided markets offer the potential for transitioning to a pull market for service delivery. However, there is a need to better understand the business model for multi-sided markets as a first step to using them in healthcare. This paper addressed that need and describes a multi-sided market evaluation framework. Our framework identifies patient, governance and service delivery as three levels of brokerage consideration for evaluating multi-sided markets in healthcare.

**Keywords.** Multi-sided market, healthcare transformation, services, brokerage

## Introduction

Our aging population and the increased prevalence of complex care delivery models such as chronic disease management models and collaborative care models have changed the landscape for how healthcare services need to be delivered. These new care delivery models have brought increased demand for healthcare services that often result in people unable to access necessary services [1, 2]. Healthcare systems worldwide face a common challenge in providing access to services. Patients frequently have long wait times for rehabilitation or clinical services.

Meeting increased demand for services requires new ways to connect available services with the people who need them. Healthcare service delivery has historically been a push driven market largely facilitated by hospitals and formal care delivery systems where patients would enter the formal system and get access to services based upon needs [3]. The challenge with a push system is that it fails to utilize all available services that a healthcare system can offer. To overcome that issue, healthcare transformation can learn from other industries, for example commercial commerce, which have developed eCommerce approaches to connect buyers and sellers to enable enhanced definition and exchange of goods and services. eCommerce enabled connectivity has created new markets for access to goods and services (e.g. E-Bay, Amazon, Airbnb, Uber) by using technology to actively connect buyers and sellers.

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We suggest that healthcare can similarly use eHealth to transform healthcare delivery by enabling better access to healthcare services. Mettler and Uhrland describe different eHealth models including multi-sided markets, freeware and crowdsourcing [4]. A multi-sided market is when two or more parties interact via a platform (e.g. information technology) and are dependent on each other to generate value from the interaction [4, 5]. Example of such markets include credit cards, Health Maintenance Organizations (e.g. patients and doctors); and communication networks, such as social media sites [5]. Vimarlund and Mettler describe a multi-sided markets as being defined by three main components [5]. One, service consumers use the services and define the tasks that need support. Two, service providers provide digital services that are used by consumers in a multi-sided platform. Three, service brokers promote the services, enable service delivery, and match consumer demand with the best available services.

The multi-sided market model could transform healthcare service delivery from a push to a pull market by using brokers to connect service providers and consumers [3]. However, we need to understand the business model for broker enabled multi-sided markets in healthcare to inform the design and evaluation of them [4]. This paper addresses the above need and describes the business model for a multi-sided market to support patient centered community based care delivery. We identify brokerage considerations at the patient, governance and service delivery levels and use them to develop an evaluation framework for multi-sided markets in healthcare.

## 1. Method

Mettler and Eurich describe the need for eHealth business models at the clinical, personal/community health, and trans-sector levels [4]. While there is a move towards the provision of patient centered care delivery outside traditional delivery venues (e.g. in patients homes), the business model for eHealth enabled patient centered care delivery has not been defined. In this paper we focus on defining the business model for a multi-sided market at the personal/community care level.

### 1.1. Data Sources

At Medinfo 2017 we held a workshop on multi-sided models in healthcare to obtain insight on how to design and evaluate multi-sided models. Twelve participants attended the workshop. Comments from the workshop were recorded and transcribed. We also draw upon literature on multi-sided markets in healthcare and other domains [2-3, 5-7].

### 1.2. Data Analysis and Conceptual Model

During our workshop a large amount of the discussion focused on the types of brokerage platforms that could connect service providers and consumers and the challenges of brokering services. Our data analysis integrated the two-sided brokerage model of Vimarlund and Mettler [5] described earlier with the findings from our Medinfo workshop and multi-sided market literature review. We then used the integrated analysis to develop an extended evaluation framework for multi-sided markets in healthcare.

## 2. Results

Our results are presented in two sections. First, we describe three types of brokerage considerations that emerged from our data analysis. Second, we integrate our brokerage considerations with the Vimarlund and Mettler model [5] to develop an extended evaluation model for multi-sided markets in healthcare.

### 2.1. Multi-sided market Brokerage Considerations

As we analyzed our data three levels of consideration emerged: patient, governance and service delivery levels.

#### 2.1.1. Patient level

A multi-sided market changes the landscape of healthcare delivery where patients become the procurers of the services they need. This could provide several advantages to patients. One advantage is that it can improve patient access to services. Patients are often unaware of services, or unable to access them. Access is particularly difficult in certain patient populations such as mental health and other vulnerable populations [7]. A second advantage is that when patients access services it also allows us to identify patients who require services. During our workshop a point was raised that having patients request services can essentially create a register of patients needing services, which could help to better define patient populations and get patients formally registered in the healthcare system. However, patient level challenges also exist. eHealth and health literacy are known issues and we need to ensure that new models of care delivery do not increase the gap between the have and have nots. Patients will also need to understand the implications and responsibilities associated with procuring their own services.

#### 2.1.2. Governance level

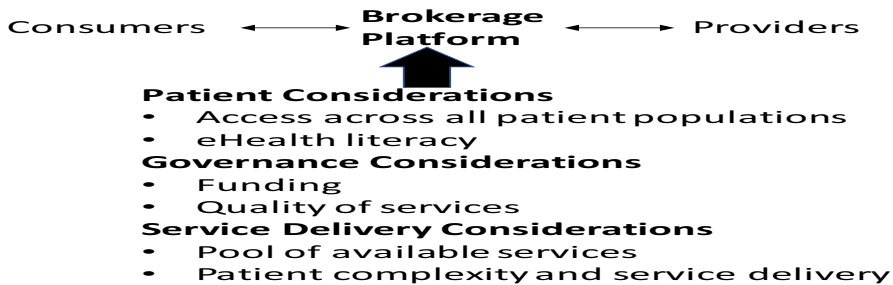
Governance considerations were a common discussion at our workshop. One such consideration was financial governance. Most government funded healthcare systems rely on a central delivery model where governments allocate funds for services and patients have services pushed to them based upon needs. In a multi sided market delivery system governments would have to allocate funds to patients to enable them to procure and purchase their own services. Such a delivery model will require discussion around what are essential services, what are optional services and what services are covered by government medical insurance in contrast to services that must be paid for by the patient. Governance around the quality of services is another issue. Some services (e.g. physio or other therapies) require delivery by licensed practitioners while other services (e.g. cooking or cleaning) do not require accreditation or licensing. Workshop participants also described the need for some type of rating scale for procured services. One possibility is a five-star rating scale where people could review services to identify quality variations between different service providers. This would enable communication about service quality to inspire competition between service providers as way of improving quality of future services.

### 2.1.3. Service Delivery Level

The first service delivery consideration is defining the pool of services that would be made available. Related to that task is understanding the range and complexity of services that are offered. People may be comfortable using a multi-sided market to access basic services such as cleaning or cooking but if a patient needs multiple services then they may still require a care coordinator to help manage the complexity. At the workshop an analogy was made with multi-sided travel websites such as Expedia where people may be comfortable booking simple travel (e.g. one-way trip and hotel) but may still want a face-to-face travel agent for more complex travel involving multiple destinations. Uber succeeded at turning products (underused auto capacity) into transportation services, but the transition from products to services is more complex in healthcare. In many cases we do not know what services are needed for patient management of chronic or complex illness and patient complexity can lead to variations in the types of services that are needed [8].

### 2.2. Multi-Sided Market Evaluation Framework

Fig.1 shows our multi-sided market evaluation framework. The top part of the framework is the service providers, consumers and brokers from the Vimarlund and Mettler model [5] while the bottom part has our three levels of brokerage considerations and sub-factors within each of the levels. The model provides insight for the three levels of brokerage considerations that can be used to evaluate multi-sided markets in healthcare.



**Figure 1.** Multi-sided market evaluation framework

## 3. Discussion

The business of healthcare is ultimately about the exchange of good and services to achieve value based patient outcomes. While eHealth can be key driver for facilitating efficient access and choice around the procurement of healthcare services, we need to define the business model for new approaches of eHealth enabled service delivery. Brokering and multi-sided markets provides an innovative way to support healthcare transformation. This paper identified the business model for a multi-sided market for healthcare service delivery to support community based care. We extend existing work by identifying patient, governance and service delivery as three considerations when evaluating multi-sided markets in healthcare. Governance considerations include

funding and tracking of quality of service delivery. Service delivery issues include the need to understand the range and complexity of services that are provided and how to convert products into services. Patient level conclude eHealth literacy and defining services and patient complexity.

Future work is needed to study brokerage models of healthcare transformation from multiple dimensions. From a medical perspective we need objective evaluations of how such models provide benefits such as quality of life and value based care delivery. We also need to understand how informatics solutions can provide better information to support decision making about relative priorities in brokerages. Finally, multi-sided markets in healthcare are still a very immature phenomena and implementing them will require a developmental trajectory over time. We will need to start with basic levels of service delivery (e.g. single services) and then scale up to more complex care delivery (e.g. multiple services).

#### 4. Conclusion

Multi-sided markets can support healthcare transformation from a push to pull market by connecting service providers and consumers. This paper identified brokerage considerations at the patient, governance and service delivery levels and then developed an evaluation framework for multi-sided markets in healthcare.

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