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Intermediation Structures in Electronic Healthcare Portals

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ABSTRACT

Despite the fact that commercial intermediation accounts for over 15% of the US GDP (Spulber, 1996), it has commanded limited attention from the academic community. Moreover, popular discourse has heralded the Internet's ability to dis-intermediate supply chains and channels, directing attention away from intermediation. In contrast, this paper focuses upon a sector of the economy that has witnessed a surge in electronic intermediation, namely, the healthcare industry. Founded on a survey of leading healthcare portals, this paper documents and analyzes four predominant patterns of functional intermediation in this new form of IT-enabled commercial institution. Based upon an historical analysis of healthcare portals, functional, generalizable patterns of intermediation are posited.

1.0 INTRODUCTION

The vast majority of literature dealing with electronic commerce has exalted its ability to dis-intermediate traditional sales channels (e.g., Benjamin and Wigand, 1995; Armstrong and Hagel, 1996). Indeed, arguments have been perpetuated that the Internet will bring us a frictionless and intermediary-free economy. However, great differences still exist between popular rhetoric and reality. Despite the growth of eCommerce, it remains a marginal proportion of the economy (US Dept. of Commerce, 1999, 2000), and few new e-business models have proven their long-term economic viability. And although the disintermediation on a broad scale is certainly viable and worthy of interest, less attention has been addressed toward the rival hypothesis, that electronic commerce enables the development of new intermediaries (e.g., see Bakos, 1998), despite the fact that commercial intermediation accounts for over 15% of the US GDP (Spubler, 1996).

Accordingly, this research focuses upon a sector of the economy that has witnessed a surge in electronic intermediation, namely, the healthcare industry. Electronic healthcare portals have emerged within the last 36 months as a phenomenon with the potential to fundamentally shift the dynamics of the healthcare market in North America.

For example, McKesson and Healtheon/WebMD have positioned themselves to provide the market participants with the ability to connect to doctors, medical institutions, consumers, and payers with comprehensive products to manage information, communications and transactions - all via the Internet, contending that the medium is the "platform common to everyone" (Egger, 1999). Moreover, the information needed by the various participants, i.e., doctors, hospitals, insurers, pharmacies, and patients, can easily and efficiently be moved via the Internet (Egger, 1999; Cole-Gomolski, 1999), saving various market participants what has been speculated to be unnecessary inefficiencies and unproductive overhead costs (Downend, 1999).

Intermediaries are often assumed to play two roles (Brousseau, 1999): a purely informational role, whereby intermediaries are perceived as entities that gather, sort and arrange information about both parties' plans in order to match them, or an economic matching role, where the assumption is made that the intermediaries do not have the capability to perfectly match producers' and consumers' plans. While unanimous definitions of commercial intermediaries are difficult to identify, Brousseau (1999) delineates the following typology in which intermediaries ensure adjustments in terms of availability, volume and quality, as well as securing transactions and liquidity: (1) information management, (2) logistics management, (3) transaction securitization, (4) insurance, and (5) liquidity.

2.0 PATTERNS OF INTERMEDIATION

Despite the fact that commercial intermediation constitutes over 15% of the US GDP (Spulber, 1996), the subject has not commanded a great deal of attention for mainstream managerial and economic theorists. Most contributions in this area are predominantly from finance (Lewis, 1995). However, there are several publications dedicated to the intermediation of goods and services (Hackett, 1992; Bentacourt and Gautschi, 1993; Michael, 1994; Spulber, 1996; Brousseau, 1999).

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2. An economic matching role, where the assumption is made that the intermediaries do not have the capability to perfectly match producers' and consumers' plans.

In the first case, information matching is sufficient and the business model is often based upon the intermediary seizing a margin of the transaction amount. In the second case, the inability to perfectly match producers' and consumers' plans requires that the intermediary hold inventories and assume a risk-bearing partnership in the subsequent exchanges, thereby facilitating economic matching.

The popular press has assumed an extreme argument - that the provision of complete information will enable consumers and producers to match plans and deem intermediaries as superfluous third parties. Hence, the growth of the Internet has been viewed as determinant of, if not synonymous with, disintermediation. However, even if one assumes that the astronomical task of matching all transaction parties' optimization plans is tractable, additional coordination challenges may persist.

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- First, information asymmetries constitute more than just asymmetries in the knowledge of plans. Agents in a decentralized economy know different things, ranging from skill sets to the Hayekian "knowledge of the particular circumstances of time and place" (Hayek, 1945, p. 524.). These asymmetries in knowledge enable the realization of economic rents. In addition, a great deal of consumption is not simply a function of endogenous needs assessment and explicit plans, but is largely dictated by exogenous factors, such as the weather. Governments, for example, stockpile food reserves for many reasons, including the acknowledgement that circumstances outside the control of the farmer can result in a bad crop yield and consequent food shortages.
- Second, even in the instance that all plans could be made available to all parties, there is no reason to assume that they would match. Production plans are often dictated by economies of scale. Production and logistic cycles take time, and are often much longer than the typical needs assessment and fulfillment cycles of consumers. Business models based upon the creation and fulfillment of wants in the present moment in a specific geographic location, augmented by the instantaneous or compulsive behavior of consumers, would have little validity without the assistance of intermediaries to coordinate needs within local markets.
- Finally, asymmetries in skill, experience, and specific knowledge of time and place, cause difficulties in as asessing the amount of return obtainable in any given exchange. This leads to the classic problems of moral hazard and adverse selection (Milgrom and Roberts, 1992) that are very often mitigated to some degree by the participation of a credible third party intermediary.

While this argument is not exhaustive, it does serve to suggest that intermediaries do more than merely coordinate information. Moreover, it implies that changes in the cost and character of information that we have witnessed in the last decade are not only reducing the aggregate level of intermediation, but are spawning new forms of intermediaries that fulfill very traditional processes of commercial intermediation with unique methods or in novel combinations. Hence, a review of the classical roles of commercial intermediation may aid the understanding of the new class of intermediary currently witnessed in the healthcare sector.

3.1 CLASSIC INTERMEDIARY ROLES

While unanimous definitions of commercial intermediaries are difficult to identify, Brousseau (1999) delineates the following typology in which intermediaries ensure adjustments in terms of availability, volume and quality, as well as securing transactions and liquidity:

- Information Management: aggregator and filter of information
- Logistics Management: performing the basal tasks of sorting, packaging, storing, stocking and transporting goods
- Transaction Securitization: controlling and guaranteeing the products are delivered and assuring payment to producers
- Insurance: purchasing production before consumer demands are expressed
- Liquidity: buying products from the producer before demand is manifested

3.2 Data Collection and Assessment

This study is based on a survey of existing medical healthcare portals from the Fall of 1999 through the Spring of 2000. As this study is exploratory, our definition of intermediary was broadened to include any type of Internet presence that aggregated the products or services of multiple organizations within the healthcare sector. Thus, individual medical supply companies with Internet sites that exclusively represent their own products and/or services were not included. A many-to-many relationship between suppliers and consumers was required to fulfill the definition of an intermediary. By some estimates, there are over 17,000 web sites with some form of medical content (Fox, 2000). Consequently, a sample of 22 organizations cannot be considered comprehensive. However, a thorough scanning of the media was made to identify the most significant members of the sector to form a representative sample.

Our preferred form of data collection was personal interviews with senior and middle management (Creswell, 1997; Mason, 1996; Miles and Humerman, 1994). The interviews were semi-structured and guided by the assumption that there were two types of companies entering this venue - either new startups/ joint ventures that are seeking to build a completely new client base as a first mover, or existing companies in more traditional areas of pharmaceutical distribution or insurance claims processing that are seeking to expand into an Internet lead business by leveraging an existing client base. With the former organizations, we sought to illuminate the characteristics of the medical industry and the technological environment that motivated the move to a web-intermediated business model. Why did the management believe that such a proposition was feasible? What antecedents presented the opportunity of considerable gains in this sector (e.g., fragmentation, high search costs, etc.)?

With the latter group of organizations, we focused on the rationale behind their movement into an intermediary-based business model. How did they intend to leverage their existing business in this different media? Could they identify specific exogenous forces that motivated their expansion beyond their traditional venue?

Secondary data was employed including information collected from web sites, annual reports, newspaper articles, and third party analyses such as stock analysts and venture capital media. This historical data was used to supplement interviews as well as documenting the evolutionary path of the intermediary. In many instances, companies began their existence completing one form of intermediary function, and then proceeded through alliance or acquisition to fulfill other forms.

4.0 ANALYSIS

In an analysis of the types of services offered by the healthcare portals, a number of broad, generic functions were identified.

1. Consumer content aggregation
2. Professional content aggregation
3. Patient management
4. Records management
5. Practice management
6. Physician career management
7. Insurance claims processing
8. Supply chain management
9. Quasi-markets and vortals
10. Application service aggregation

For each company, we identified and catalogued their offering of services according to this typology. Secondly, we categorized each function against the classic intermediation roles described in preceding section. This analysis is presented in Table

1. Based upon this preliminary analysis of what services each company is offering and what type of intermediation role it constituted, the information was mapped on a two-dimensional grid according to intermediary role and historical entry path; that is, Internet pure-play or established industry function. The subsequent discussion elaborates this analysis, utilizing historical data concerning acquisitions and managerial decisions to identify four distinct paths of intermediation in the healthcare sector.

	Consumer Content	Professional Content	Patient Mgmt	Records Mgmt	Practice Mgmt	Physician Career Management	Insurance Claims Processing	Supply Chain	Quasi-markets and vortals	Application Service Provider
HBO & Co.	X	X	X	X	X			X		X
channelHealth	X	X	X		X		X			X
DrKoop.com Inc.	X	X	X		X					
WebMD Inc.	X	X		X	X		X	X		
Medscape Inc.& MedicaLogic	X	X		X	X					
Caredata.com	X	X				X				
Physicians On-Line	X	X				X				
Helios Health	X	X							X	
SeniorPlanet.com	X									
IDX Systems Corp.			X	X	X			X		X
Healthcare			X	X			X	X		
Abaton.com			X	X						
Mediconnect.com			X		X		X			
Health Claim			X		X		X			
Equarius			X		X					
dotcomments.com			X		X					
Digital Medical Systems			X							X
Kinetra					X		X	X		
Medical Resources Mgmt					X		X			X
Healtheon							X	X		X
McKesson								X		
Neoforma.com Inc.									X	

Table 1: Identification of healthcare portals and generic functions

	Consumer Content	Professional Content	Patient Mgmt	Records Mgmt	Practice Mgmt	Physician Career Management	Insurance Claims Processing	Supply Chain	Quasi-markets and vortals	Application Service Provider
Information Management	X	X	X	X	X	X				X
Logistics Management			X	X	X					
Transaction Securitization					X		X	X	X	
Insurance							X	X	X	X
Liquidity							X	X	X	

Table 2 Comparison of domain-specific functions with intermediation types

5.1 FOUR PATTERNS OF INTERMEDIATION

Pattern 1- Internet-based Infomediaries - content aggregators

The emergence of Amazon.com (Bailey, 1998) as a household expression in the mid-90's brought attention to a new paradigm of business - that of virtual companies and infomediation. The prospects of stores with no physical inventory or infrastructure to speak of, combined with a blossoming venture capital market, quickly popularized the possibility of building virtual institutions and supra-normal market valuations through a savvy for aggregating and redistributing information and content for a profit. The first predominant pattern of healthcare portals identified does exactly this. As pure-play Internet infomediaries, they attempt to acquire, re-bundle and market content based upon the assumption that the Internet enables them to build communities of consumers and professionals who have previously only been able to obtain information from fragmented sources (Armstrong, 1996), if at all. Companies like Helios, DrKoop, Medscape, or WebMD in its early form, fit this profile.

Pattern 2 - Established professional services – light information logistics

One group of companies has expanded upon its traditional services such as practice management, patient management, and records management, via alliances to offer a quasi- market solution addressing the light information logistic functions of healthcare management. These companies have leveraged their existing base of customers and skill sets via the Internet to offer a broader portfolio of services by aggregating their own products and services with those of others. These companies include Abton, Digital Medical Systems, Equarius, and Mediconnect.

Pattern 3 - Established professional services – physical & transactional logistics

There is a significant group of existing professional service companies that have sound, non-Internet-dependent businesses in insurance claims processing, medical supply logistics, practice and facilities management, and software development and consulting of standard applications to large clinics and hospitals. These companies have seen an opportunity in leveraging their existing infrastructure and competencies with an Internet mediated distribution channel. For example, IDX, a vendor of large standard software packages for the administration of clinics and hospitals, has spun off their own portal called ChannelHealth. This portal will aggregate a variety of services, primarily their own portfolio of insurance claims processing and patient records management, with consumer content sourced from WebMD as well as other vendors. Another example is McKesson HBOC, which aims at leveraging McKesson's well-established position in pharmaceuticals with other vendors in a quasi-market, offering full supply chain management for larger medical organizations. Like the companies in Pattern 2, the overriding logic of these companies is to use the Internet to spin off an additional channel for an established and tested business model. Other instances of this trend can be seen in Medical Resource Management and Healthcare.com, companies that are attempting to cultivate portal- based channels to their own offerings within software, insurance claims processing, and human resource management with complementary offerings from partner vendors.

Pattern 4 – Internet-based infomediaries - maturing to information, physical and transactional logistics

One very marked pattern identified was the recent merger-driven expansion by WebMD. This company began as a content aggregator, sourcing consumer and professional content from respected sources. However, the company was quick to realize that, despite a highly institutionalized name acquired through massive expenditures in first mover branding, the position of content aggregator is very difficult to defend, due to the low relative costs of information acquisition and distribution. WebMD thereafter merged with Healtheon, a company focused upon insurance claims management, records management and patient management. It has since then moved into other areas of commercial intermediation such as information logistics functions of laboratory and radiology record transactions through its acquisition of Kinetra, breaking stories for the medical profession through its acquisition of MedCast (expanded content aggregation), as well as alliances with Neoforma, a portal which matches buyers and sellers of medical assets.

5.2 Discussion

The last example, Pattern 4, would seem to suggest that there may be some overwhelming logic in expanding out of the infomediary role into one of information and physical logistics, as well as transaction securitization. And indeed, the example of WebMD in many ways parallels the well-known plight of Amazon, which was forced to develop an infrastructure of physical

inventories, despite original intentions to the contrary. Competition from established publishers such as Barnes and Nobel which could source products without distributor markups, forced Amazon to buy inventory in large quantities to realize volume discounts (Bailey, 1998; Brousseau, 1999), thus abandoning their highly praised model of infomediation with limited tangible ballast.

The decision to abandon a pure-play Internet strategy of subscription-based content aggregation with heavy branding may have proven to be wise, given the recent developments of DrKoop, one of WebMD's strongest competitors within content aggregation. DrKoop has made significant and costly attempts to institutionalize their brand through the use of the former Surgeon General's reputation for integrity and expensive marketing endeavors, including restrictive agreements with AOL and Walt Disney-Go.com that call for DrKoop to make huge payments in return for being the exclusive health content provider to the two companies' web properties (Yates, 2000). Yet, despite the arduous attempts at first mover branding and advantages, the position of infomediary in isolation has proven very difficult to maintain, such that the company is projected to run out of cash by August of 2000 (Yates 2000). This may be due to the fact that the market is too thin to support the current offering of medical content providers. But alternatively, it may be a function of the fact that it is very difficult to cultivate and defend the position of an economically prosperous infomediary.

These observations are consistent with Brousseau (1999) who argues that those intermediaries best-positioned to offer an information management function are those intermediaries currently facilitating logistics, transaction and liquidity management. While content aggregation can be viewed as provision of an asset in its own right, the general challenge faced by pure content providers is that the assets provided are often not requisite to the operations of the business. Thus, the most central platform to market supplementary content may in fact be the applications facilitating the revenue stream, such as the insurance claims processors. This pattern can be seen in Healtheon/WebMD and IDC/ChannelHealth, where functions of transaction securitization enable control of the "meat and potatoes" (Kanell, 2000) of their clients. Through management of the revenue stream, intermediaries can logically extend liquidity management through the purchasing of accounts receivables forward (Medical Resource Management). Moreover, logistics functions, central to the metabolism of the organization, also command a central role in the needs for intermediation. In this instance, companies like McKesson/HBOC, who control large networks of pharmaceutical and medical supply provision, also realize advantages in marketing complementary products of their own and associated companies.

5.3 Generalizations

The analysis presented above would suggest that the most viable path towards intermediation, be it electronic or otherwise, would be to facilitate transaction securitization (revenue stream management) and logistics management. Through command of these basic, yet vital, operations of a business, one could easily extend offerings into the arenas of market making, content provision and infomediation. The opposite strategy, however, may be very difficult to defend. While channel dis-intermediation does provide compelling logic of greater consumer welfare, a pure economic matching function of buyers and sellers is relatively inexpensive and, consequently, easy to emulate. In fact, returning to our analysis, we see that purely electronic intermediaries neglect the paramount functions of physical logistics, transaction securitization, liquidity, and inventory management, as buffers to uncertainty and bounded rationality. The ability of commercial intermediaries to hold inventories, re-bundle products, and subsidize portfolios of goods and services as dictated by the end user, enables a resolution of the problems generated by information asymmetries. Moreover, the requisite investments in relational assets by the transactional and logistics intermediary permits, in many instances, superior levels of information management due to the transactional knowledge which is a natural by-product of their given activity. Finally, the intermediaries inherent incentive to invest in a reputation for fairness and efficiency, as well as mutual trust among transacting partners, help mitigate problems of adverse selection and moral hazard.

Hence, those controlling the lifeblood of transactions and logistics will always reap the benefits of superior information of the transaction, as well as economies of scale nurtured through investments in infrastructure. As such, the very basic functionaries in the economy may be best-positioned to offer some form of infomediation in an e-business context. This advantage is derived from central placement in revenue and logistic management, as well as an ability to leverage transactional knowledge as a source of information-based rents.

6.0 CONCLUSION

This paper has described and documented the emergence of a new form of intermediary in the medical sector, the healthcare portal. From a representative sample, generic functions of healthcare portals were identified and typed according to theoretical views on commercial intermediation. Based upon an historical analysis of managerial decision and acquisitions, four evolutionary patterns of commercial intermediation are identified within healthcare portals: (1) Internet-based Infomediaries-content aggregators, (2) Established professional services–light information logistics, (3) Established professional services–physical & transactional logistics, and (4) Internet-based infomediaries-maturing to information, physical and transactional logistics. From a perspective of generic intermediary roles, the potential of generalizing these patterns beyond the healthcare industry is explored.

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