

Intermediation in the healthcare system: The example of Switzerland

Konrad Walser, Thomas Myrach

Universität Bern, Institut für Wirtschaftsinformatik, Abteilung Information Management
Engehaldenstr. 8, CH-3012 Bern
konrad.walser@iwi.unibe.ch
thomas.myrach@iwi.unibe.ch

Abstract: The paper analyzes the situation of intermediaries and their business models in the Swiss health system. Various intermediary roles are positioned within the value-added chain of the healthcare system. Particular attention is paid to cost-benefit relationships of intermediation for partners of the intermediary and for the intermediary itself. With regard to the connection between healthcare providers and health insurers, three intermediaries – namely the Trust Centers, Medidata, and H-Net – are featured in greater detail and studied in terms of differences of their business and revenue model.

1 Introduction

Intermediation is defined as a brokering service between market partners. In many business transactions, the handling of service exchanges between market participants is supported by intermediaries. These intermediaries may perform a variety of functions. In e-business, brokers between market partners on the electronic level are also known as cybermediaries [SBS95]. Cybermediaries exercise their brokering function via electronic platforms and media. Electronic intermediaries are encountered in various industries and business areas. They are sometimes complementary to established offline intermediaries, for example online traders operating as distributors. New forms of intermediation that do not exist as such in the offline environment are also being implemented. An example of this is provided by classic Value Added Networks (VANs), via which electronic data exchange (EDI) between business partners is facilitated. In the Internet age, a great deal of attention is paid to electronic marketplaces, which are defined as platforms for exchanging products and services [HaNe05: 736].

Intermediaries are also playing an important role in transforming the healthcare system. National and transnational intermediation networks are built, e.g. in Europe [eBW03a] [eBW03b] and US [Det03] [AHRQ06]. An overview of the situation in Switzerland is given by [WE05]. The insurers, the physicians and their political representatives negotiated a scheme for the standardized settlement of medical services. This scheme is known as TarMed (“Tarif Médical”). In the TarMed scheme, all medical services are assigned a value in TarMed points, which in turn are assigned a value in CHF. In addition, the tariff agreement between healthcare providers and health insurers requires

that, as from 01-01-2006, billing should be carried out by electronic means only. This makes it necessary for the information systems of the corresponding participants in the healthcare system to be integrated between the organizations. This paper begins by explaining the basic conditions for integration in the Swiss healthcare system. It then examines the value-added chain of the healthcare system, and the possible positioning of various cybermediaries acting predominantly via electronic media. General cost-benefit considerations for intermediation are then presented, both from the perspective of the intermediaries and from the perspective of the parties using the brokering services. The situation in the Swiss healthcare system is illustrated on the basis of three examples of intermediation between healthcare providers and health insurers.

2 Integration in the Swiss healthcare service

The healthcare system in Switzerland (and in other countries) is characterized by complex service interrelationships. These result not least from national regulations, which are intended to ensure that the population has access to adequate basic medical provision. Increasing demands on the range of medical services, an aging population and even the imposition of governmental controls and market mechanisms have resulted in a disproportionate increase in healthcare costs in recent years in all industrialized countries. Healthcare costs in Switzerland are currently running at over 50 billion CHF per year [FBoS03]. Various measures by the Swiss government and other players are aimed at curtailing this increase in costs.

One possible way of achieving savings in the healthcare system is to integrate the exchange of information between those involved as far as possible, not only in order to integrate the processing of (medical) transactions, but also to ensure that they are handled and accounted for in a transparent and patient-oriented manner. In this way, it is possible to differentiate between medical and administrative processes (internal and interorganizational) and the corresponding transaction costs in the healthcare system. Interorganizational integration between health insurers and healthcare providers (with or without intermediaries) in the healthcare system, therefore, is essentially only worthwhile if it results in a cost reduction with regard to administrative or (redundant) medical processes and to data exchange. The above-mentioned TarMed system ensures that “the same medical services by outpatient physicians” and general medical practitioners are charged “at the same rate” throughout Switzerland [Ae04]. For the time being, cantonal rates are used for settlement of hospital inpatient services between hospitals and health insurers. These are to be replaced in about 2009 by a standard rate of charges for hospital inpatient services (known as DRG: diagnosis-related settlement of services) [Fi04], which is to be agreed between the partners involved.

Of central importance for the exchange of data between healthcare providers and health insurers are the different accounting types *Tiers Garant* and *Tiers Payant*, which are used throughout Switzerland, as described in [DGL01] and [Ja01]. *Tiers Garant* is the system normally used for outpatient and general practice treatment. It is based on the principle of cost reimbursement. The patient is liable for the fees. He or she pays the bill, but is then reimbursed the costs from his or her health insurance scheme. The *Tiers*

Payant system is based on the principle of non-cash benefits or benefits in kind. The insurance company is liable for the fees. It pays the bills directly to the physician/hospital. This is what normally happens in the case of hospital inpatient treatments (e.g. in hospital) and for accident insurance and invalidity insurance claims.

3 Intermediaries in the Swiss healthcare system

Depending on the category of intermediary, the market for intermediaries in the Swiss healthcare system is relatively new, has a lot of momentum with regard to pricing and competitive situation, and is sometimes restrictive with regard to price and service information (price intransparency). It is determined by the interplay of free market, statutory regulations, and the political interests of the different parties involved. Furthermore, the market for intermediaries is heterogeneous because of the different services as well as corresponding combinations and reimbursements. A number of business models exist for intermediation as discussed in the following.

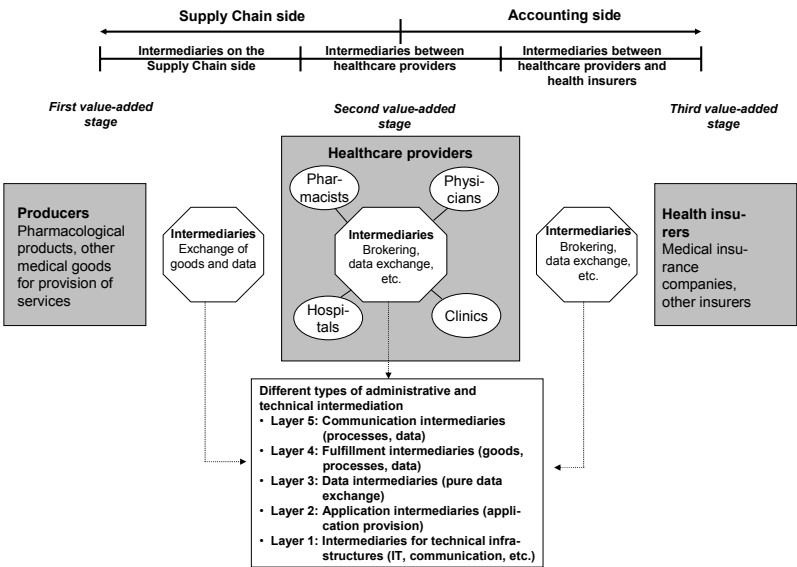


Figure 1: Assignment of intermediaries in the healthcare value-added chain (WE05).

Intermediaries may be located at different positions on the value-added chain in the healthcare system. We differentiate broadly between three levels of value creation. An initial value-added stage includes producers and service providers in the areas of pharmacological products, medical supplies, apparatus, equipment and other goods and services. This stage provides preliminary value-added for the second stage. In a second value-added stage, the healthcare providers are located within the healthcare system. These include physicians, hospitals, clinics, pharmacies, laboratories, etc. They are the actual producers of medical services. A third value-added stage includes the health insurers in the healthcare system. These include accident insurance companies as well as medical insurers, etc. These organizations represent collective safeguarding systems

which, essentially, directly or indirectly handle the financial settlement of services used by patients. Various areas of intermediation and different types of intermediary may be distinguished on the basis of the value-added stages: intermediaries on the supply-chain side, intermediaries between the healthcare providers and intermediaries between healthcare providers and health insurers. This is illustrated by Figure 1.

To characterize intermediaries further, it is necessary to determine which intermediation types or tasks arise in the healthcare system. In order to systematize these, a number of economic and technical layers – which may sometimes be mutually dependent or incremental – are distinguished for intermediation services (c.f. bottom of Figure 1): intermediaries may carry out, in individual areas or a combination of areas, technical platform services (Layer 1), application services in the sense of the Application Service Providers (ASP; Layer 2), data maintenance services (Layer 3), intermediation services for medical processes (Layer 4) and administrative processes, but – depending on their positioning in the healthcare service – also services for customer relationship management (e.g. platforms for medical advices by call centers; marketplaces; Layer 5). It is only through this differentiation that a classification of the intermediaries and their services or processes can be defined, as was done for the healthcare service by [WE05].

4 Cost-benefit aspects of intermediation

4.1 Basic considerations

In order to establish interorganizational integration, such as is necessary – for example – for the electronic exchange of accounting data, it is sometimes necessary to make considerable investments in the technical infrastructure. One cost driver in this is the number of integration relationships. Basically, it may be expected that specific investment costs will be incurred for each relationship to be established. Two main levers may be considered in order to reduce the costs incurred due to the technical and organizational implementation of interorganizational integration. One of these is to standardize the data exchange and the technical interfaces in the systems. This reduces the initial costs of establishing the technical infrastructure, but especially the costs of setting up links to various partners. Alternatively, by engaging an intermediary as an electronic hub, the number of relationships to be set up can sometimes be greatly reduced. Assuming that the establishment and maintenance of relationships is subject to associated costs, the cost-saving potential achieved through intermediation is immediately apparent.

These potential savings are dependent upon the size of the network. This is illustrated by Figure 2: whilst the number of relationships without intermediation increases geometrically with the number of partners, this growth occurs merely arithmetically with intermediation. In any intermediation, each connected partner must essentially set up just one unique relationship, i.e. the one with the intermediary, irrespective of the size of the network. This can sometimes result in large savings in implementation costs. These costs are correspondingly higher for the intermediary, since the latter must set up a

relationship with each connected partner and this relationship can generate technical integration requirements and costs. Because of the relatively high number of connections to be set up and the essentially similar set of problems, the intermediary may be expected to realize economies of scale.

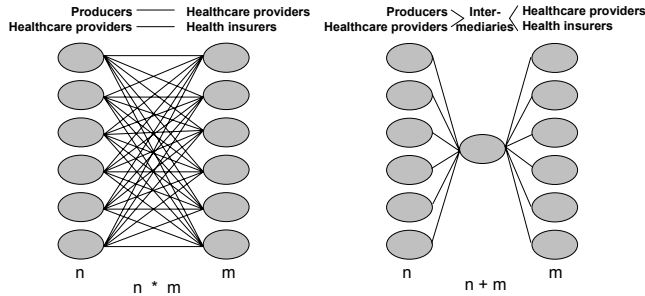


Figure 2: Network of relationships without (left) and with intermediation (right).

The analysis of a relationship network for interorganizational integration, based on relatively simple assumed models, shows that, on the basis of *Metcalf's Law*, the usefulness of intermediation increases with the number of partners participating in the network [SV98: 184]. A general cost-benefit view, relating to the entire network, is considered for this purpose. This viewpoint must be modified so that the participants in the network are typically independent entities pursuing opportunistic interests. This essentially also applies for an appointed intermediary, which has its value-added paid by the connected partners. Which partner is charged, and how, depends on the revenue model. At least part of the economic saving, therefore, is taken back from the partners as a result of intermediation, when the latter pay for the services. The business model of an intermediary is based on this. A particular problem may arise when a relationship network including an intermediary is set up, due to the dependencies that are created within it which may be opportunistically exploited to the disadvantage of the partners or to the disadvantage of the intermediary. Merely the fear of such behavior may prevent successful intermediation. For this reason trust, trust-building measures and safeguards against misuse can play an important role in the establishment of an intermediary. The operator model or ownership of the intermediary may also be significant in this context.

4.2 Current situation in the healthcare system

The health sector is characterized by a very large number of different healthcare providers (approx. 700 hospitals and similar institutions, approx. 19,000 physicians, approx. 1,900 pharmacies, approx. 300 laboratories) and health insurers (approx. 100 insurance companies). This makes for an extremely complex network of relationships in terms of interorganizational integration, compounded by the fact that the healthcare providers (hospitals) and the health insurers each have available a range of suppliers of ERP-type solutions. What is more, the number of software solutions used for outpatient and general medical practices is scarcely manageable. Alongside the number of healthcare providers and health insurers, this not makes integration more complex but also increases the potential benefits of intermediation. Among the aforementioned number of healthcare providers and health insurers there is a very large quantity of

transaction relationships, which – *without* intermediaries – would have to be initialized, maintained and administered by the participants themselves. The main economic consequences of this are as follows:

- In terms of communication cost, negotiating with a great many different partners (insurers, providers, pharmacies) results in high transaction costs.
- Integration costs, which are incurred separately for (data and process) integration with the different partners, have a significant impact from the cost perspective. These partners use different types of data and processes in different information systems. However, there are also varying levels of accounting data integration. Of the one hundred or so health insurers, only a few are currently capable of electronic processing of invoices without media interruptions.
- Cpts are incurred for specific hardware and software that enable various partners in the healthcare system to perform relatively simple adaptations and integrations.
- Software and hardware replacements by the partners generate additional costs/investments for interfaces and for software and hardware adaptations. This may even affect other internal information systems and their integration.

Initial moves have been made to standardize interfaces and data exchange in the Swiss healthcare system, though with very little likelihood of success. The Data Exchange Forum (www.forum-datenaustausch.ch), as the main contact in Switzerland, is attempting to produce *templates* for different transaction types on the basis of the XML standard. This would reduce the costs of facilitating interaction on the electronic level, because a corresponding standard would eliminate the task of individually adapting data formats for the integrated reading-in of data, or would make such action unnecessary. However, it is difficult to enforce these standards, which all participants would have to comply with, throughout the healthcare system because this would call for sometimes massive adaptations to the information systems in the organizations, and would make it necessary to have a type of comprehensive *template* for exchanging information in the healthcare system. That this appears rather unlikely at present is also due to the politically sensitive conditions and conflicts of interest. The transaction costs without intermediary would therefore remain very high. The *involvement of an intermediary* results in a positive cost-benefit potential for the partners involved in the healthcare system. Compared to the variant without intermediary, the resulting changes are as follows:

- Greater financial successes may be expected, since the interorganizational transaction costs between the various partners turn out to be lower.
- Savings are produced on all administrative and technical transaction levels, as outlined at the bottom of Figure 2.
- Savings also result due to fewer large IT investment and adaptation costs.

- Savings can sometimes also result because the number of interorganizational transactions is reduced.
- However, additional training costs may be incurred for the amended system environment or process and communication structure resulting from intermediation.

Overall, the potential savings are expected to result in an improvement in the cost-revenue relationship. The following circumstances also produce further cost-benefit potential: number and variety of partners connected via the intermediary, heterogeneity of partners with regard to business processes and the use and integration of information technology, variety of services offered by the intermediary, type and quality of roaming agreements and the breadth of services in the value-added chain. In this connection, roaming means that users of the intermediary services are also given access by the intermediary, through contractual arrangements, to other networks and intermediaries, e.g. to financial intermediaries for the electronic settlement of invoices.

The cost considerations from the intermediary's perspective are as follows:

- Large investments and high costs can be expected for the generation of technical or administrative intermediation platforms or infrastructures.
- Other costs are incurred as a result of adapting infrastructures and platforms to the conditions in the market, among partners and among roaming partners if necessary.
- The intermediary may also sometimes be called upon to provide advice (legal, administrative or technical), which has a significant effect on costs.
- It is necessary to budget for the cost of customer relationship management in the process areas of marketing, sales, and after-sales service [Scu05]. Costs are also incurred for the development of new services, for customer, platform, or infrastructural administration (e.g. billing).
- Additional costs are also incurred for the setting up, agreement, and processing of roaming contracts for extending the service and customer portfolio.

These costs for the intermediary must be covered by a suitable revenue model, which may contain the following components:

- Firstly, billing income is possible in various forms, for example as originator-oriented transaction charges; furthermore, one-off or recurring connection income may be billed.
- Fees may also be necessary, however, for advice and implementation of adapters or technical adaptations of information systems.
- Revenues may also result from first, second and even third-level support and other types of after-sales service.

- A clever roaming system enables multiple revenues to be generated by the continued integration of transaction partners or by the expectation of transaction quantities.

The success and appeal of the intermediary is all the greater, the more partners it connects. The intermediary can increase its appeal and success even further by widening the group of partners through roaming agreements for additional services. However, corresponding costs and investments for the roaming facilities must be in reasonable proportion to the increased income resulting from them. On the basis of the many different types of intermediation possible in the healthcare service, it is not surprising that, with the great complexity of possible participants in the market, the argument rests on the issue of which benefits arise, for which participants, and at what cost. In addition, costs and revenues may be balanced against one another along the lines of the layer model as shown in Figure 1 below. For the partners of the intermediary, this would permit the differentiated management of primary administrative and secondary technical transaction costs. Thus only one differentiated cost-benefit analysis is possible on the part of the intermediary and its partners.

5 Intermediaries between healthcare providers and health insurers

Three intermediaries operating in the Swiss healthcare market that operate wholly or partially at the level between the second and third value-added stage (figure 2) will be described in the following. These are Trust Centers, H-Net, and Medidata. The intermediaries to be compared have different characteristics with regard to sponsorship and business models. The features of the three intermediaries are summarized in Figure 3. From the current perspective, the total volume of 50 million invoices between healthcare providers and health insurers is divided between the three intermediaries as follows: Trust Center approx. 50%, Medidata approx. 40% and H-Net approx. 10%. On the basis of the three financing types and differentiation criteria mentioned in Figure 3, it is possible to distinguish various cost-benefit calculations or revenue models for the intermediaries ([Sch05] [Sc06]). *Trust Centers*: the cost units which retrieve the invoices from the Trust Centers representing the physician (administrative processing of the settlement) pay a transaction charge of CHF 1.00 on the *Tiers Garant* basis (refunding of costs). The Trust Centers officially request CHF 1.40 for the invoices retrieved by means of a *token*. In addition to these costs, a further 2 to 3 centimes are charged for transmission via the technical platform from HIN (Health Info Net; technical data transmission) and a monthly charge of CHF 50 is payable to HIN. This latter charge is incurred for each Trust Center partner from which invoices are obtained. For example, if invoices are obtained from all 11 Trust Centers currently in existence, this results in a monthly charge of 550 CHF. In addition, flat-rate amounts of between CHF 160 and 400 annually are paid to the Trust Centers by the healthcare providers or physicians. Non-members of medical associations incur further costs of up to CHF 300. Non-electronic data deliveries must also be paid for in addition.

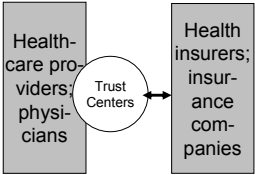
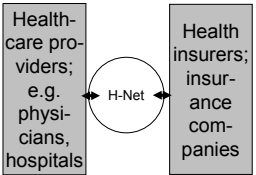
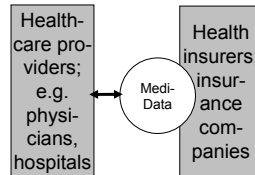
	Trust Centers	H-Net	Medidata
			
Owner-ship	Medical profession, cantonal sponsorships (healthcare providers).	Private, no shareholdings by health-care providers or health insurers.	Majority shareholding > 70% by five major health insurers.
Ser-vices	Mediport platform; data transport and maintenance for one or more cantons with aggregation option for all of Switzerland; accounting data may be called up by health insurers via code (token).	H-Net eFaktura and H-Net Business Connector products; used for communicating messages and data exchange in a wide variety of formats; sending invoices and connections to Electronic Bill Presentment & Payment (EBPP) and logistics suppliers.	Data exchange and maintenance for accounting data.
Asso-ciated part-ners	Physicians and medical companies, some suppliers for physicians. <i>Main focus:</i> physicians; storing invoices for aggregation and forwarding.	Physicians, hospitals, laboratories, Post (Logistics), Paynet (Payment), PostFinance (Payment), Global Health Care Exchange (GHX) (Logistics), health insurers, etc. <i>Main focus:</i> forwarding of data, no separate data storage; aim: to reach as many different customers as possible in the most diverse areas of the healthcare system (by network roaming).	Insurers, hospitals, laboratories, physicians, medical insurance associations. <i>Main focus:</i> insurers; fetching and storing invoices. Additionally, offering catalogs in a great variety of areas for health insurers.
Ope-rating com-pany	Various companies operating Trust Centers in the cantons, e.g., Argomed in the canton Aargau.	H-Net.	Mediport.
Plat-form ope-rator/ de-veloper	Technical: HIN for the whole of Switzerland; administrative/technical: Trust Centers, at canton level.	Integic.	Medidata.

Figure 3: Comparison of three intermediaries (intermediary types).

H-Net: Different payment models apply for two different services. For H-Net Business Connector, which includes the largest range of services – even when viewed across all three intermediaries – [Bo05], costs running well into five figures in CHF would have to be incurred annually. For a transaction using eFaktura, a subsidiary service of Business Connector, originator-oriented transmission costs of CHF 0.50 are incurred. For example, if a completed invoice is transmitted by the sender, the sender pays CHF 0.50. If the invoice is rejected by the health insurer an additional CHF 0.50 is incurred. Some 140 hospitals, various laboratories and small as well as large health insurers are connected to H-Net, as may well also be the case for physicians in the future. *Medidata*: the entering of invoices is free of charge for healthcare providers. The health insurers pay varying prices. The five major health insurers SUVA, Winterthur, Zürich and CSS, as well as Helsana, which own the majority shareholding in Medidata, are charged flat-rate prices in the region of six or seven figures in CHF annually. However, these include all payments for services – even catalog data accesses – provided by Medidata [WE05].

Health insurers that do not belong to the “big five” pay Medidata CHF 0.30 for each invoice received in the *Tiers Payant* (cost reimbursement) system. This applies in particular where pharmacy invoices are bundled (concentrators), e.g. in the case of OFAC. OFAC is a service provider and intermediary for pharmacists. One of its tasks is to arrange the settlement of charges between pharmacists and health insurers. For health insurers that do not belong to the “big five”, each invoice received costs 0.90 in the *Tiers Garant* (non-cash benefits) system. The officially communicated price in the *Tiers Payant* system, however, is CHF 1.40.

[Sc06] indicates potential savings of at least CHF 3.50 for comparison of electronically processed invoicing as opposed to conventional paper billing. The lower savings potential is produced for healthcare providers which are able to reduce the costs of printing and sending paper invoices. This varies depending on whether the payment process used is *Tiers Payant* or *Tiers Garant*. The greater savings potential is enjoyed by health insurers which, provided the statements of account are read in electronically, may expect lower process costs for the reading-in and processing of invoices. The total savings potential for electronic billing between healthcare providers and health insurers is approx. CHF 200 million to CHF 300 million [SCH05] for health insurers and healthcare providers. On the basis of the above statements in [Sch05] and [Sc06], and because several intermediaries exist between healthcare providers and health insurers in Switzerland, the following characterizations of healthcare providers and health insurers may be summarized: with several intermediaries cooperating, with one intermediary cooperating, with no intermediaries cooperating. The latter is an interesting alternative for concentrators, e.g. OFAC. For OFAC a billed intermediation via Medidata or H-Net is therefore of no interest because the bundling of large invoice payments via intermediaries would be highly ineffective in terms of cost. A roaming system operates between H-Net and Mediport, but not between Trust Centers/HIN and Mediport. This last-mentioned roaming connection could even be implemented immediately in technical terms, but has been shelved for political reasons.

6 Summary and outlook

In this paper, the results of an exploratory study of the Swiss healthcare system are presented, which show that intermediation in this area is at an early and dynamic stage. A market has only existed in this area for about two to three years. It is therefore in the next few years that changes and consolidations are to be expected. This paper focused on the cost-benefit aspects of intermediation. Concrete figures were produced with reference to the revenue models of three intermediaries. It was shown in [WE05] that different characterizations of intermediaries in the healthcare system are possible in Switzerland. The corresponding intermediaries offer various mutually incremental or dependent ranges of administrative and technical services within and between different value-added stages of the healthcare system. It became apparent, between the healthcare providers and the health insurers, that there is still no clear way in which, for intermediation, costs and benefits as well as interests may be balanced in a way that is acceptable for the intermediaries and their users. In particular, political interests sometimes play an important role in the intermediary market for the legal and natural

persons involved. However, there are initial signs that the sometimes rigid conflicts of interest are beginning to soften. This is also necessary, because electronic invoicing between healthcare providers and health insurers was agreed with effect from 01-01-2006 according to TarMed. Compliance is not complete, for the reasons mentioned above. It remains to be seen how long it will be until the contracting partners have completed their integration tasks, and the full and seamless transmission of accounting data, including the necessary internal integration work, becomes reality on the part of the health insurers.

The circumstances presented with regard to intermediation in the healthcare system give rise to further research requirements as follows. An expansion of the study to include the possibilities and limitations of customer relationship management via intermediaries, as recently discussed – for marketplaces, for example – by [Scu05], is of interest. On the basis of the addressed multilayer models of intermediation in the healthcare value-added chain, a differentiation in transaction costs should also be carried out. This may even help to refine the decision for or against intermediation and, for intermediaries, result in a clearer idea of the business model. [SBS95] deal with the issue of transaction costs incurred in intermediation mathematically, with a sometimes low generalization value for this sector. These aspects are to be investigated further in future and differentiated for the healthcare system. Studying the cost-benefit relationships of intermediation (in the healthcare system) more closely may also result in general findings on the subject of intermediation, disintermediation, and reintermediation in cyberspace. At the same time, from the question “Intermediation – yes or no?” possible further investigations on the issue of intermediation/disintermediation over time and thus beyond the limits of the company, on the basis of [La92], [LR93] and [La05], are of interest. Last but not least, the question as to whether different healthcare systems produce different characteristics and combinations of intermediation services, is of interest.

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