

Case Study Triamun: Solving IT Integration Problems in the Health Care Sector with the Innovative Use of an ASP Software Solution

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ABSTRACT

This paper presents the lessons learned from a case study about the integration of information systems in the health care sector. The company Triamun developed an ASP software solution for the seamless integration of a variety of different partners. The discussion of the integration project comprises four perspectives: business, processes, application, and technology. The case study contains a description of the company, its e-business strategy, parties involved, e-business software solution, and lessons learned. The case shows how a dominant market player created and implemented an industry-wide software solution for an improved electronic data exchange in the healthcare sector. There are, however, limitations to an eventual industry-wide acceptance of the solution especially by players who are not part of the initiator's business network. The analysis shows that existing governance structures were the key to the acceptance of this software solution. The likeliness for other partner to join in remains an open question.

Keywords

E-Business, IT Integration, ERP System, Electronic Data Interchange, Health Care Sector

INTRODUCTION

Case studies have long been used as a research methodology, especially in the area of managerial sciences. They are commonly recognized as a valuable means of extracting or testing research hypotheses. The first chapter of this case study describes the background of the company, industry sector, product range, and target group. The next chapter deals with the e-business strategy, the scope of the integration solution and the development partners. The integration solution will be described from four different views: business, process, application, and technical view. The focus is on the distribution of tasks among the partners that operate the platform. The final chapter analyses the success factors and limitations of the integration solution, with a focus on the specialties of the system and the decisive changes. The analysis is concluded by a description of the lessons learned and the experiences gained by the people involved in the project.

THE TERM "E-BUSINESS INTEGRATION"

The question of the "ideal intensity of e-business integration" is a fundamental topic of e-business management. As Davydow points out in his following statement, e-business is per se geared at establishing seamless communication channels between business departments (intra-company) and businesses (inter-company) alike. "Fundamentally, e-business is, first and foremost, about breaking all kinds of „walls“ – internal corporate „walls“ that exist between functional departments, but more importantly, external „walls“ that limit companies' willingness and actual abilities to engage in new business relationships and accept new ideas." (Davydow 2001, 17)

Electronic data processing is only about 50 years old and the systems supporting electronic transactions have been growing historically over the last decades. The heterogeneity of information systems is a result of existing competition between vendors for hardware, databases, operating systems, and software applications and has led to complex enterprise information architectures. The broad acceptance of Internet technology finally enables applications, endowed with different hardware and incompatible operating systems to seamlessly communicate with each other.

Following Dettling (2002), the Fortune 500 companies were operating an average of 47 different business critical software applications in 1990. In the course of the last decades, a multitude of specialized systems for specific business tasks were being implemented. Even the functionality which, nowadays, is being offered by modern standard ERP systems is often distributed over multiple specialized applications in large companies.

With the increasing interconnectedness between commercial partners, the call for an IT-supported integration of the entire value creation process is getting louder. Employees jointly working on a business process ever more often need access to different internal (and external) information systems. This is exactly where e-business integration comes into play: in the connection of specialized application systems for the support of business processes from the point of view of an employee.

A growing number of IT experts believes, that heterogeneity of systems is not necessarily a bad thing (Liebhard 2002) and that systems should not be migrated for the reason of total integration only. Following Sneed (2003) there are only three reasons to dispose of an information system in favor of a new one: (1) There are no more employees that possess the necessary know-how for the maintenance of the system, (2) the hardware/software/database is not being maintained by the vendor any longer, or (3) the application does not meet the requirements of the users any more.

Definition of the Term “E-Business Integration”

As a compilation from our discussion, we define the term e-business integration as follows: “E-Business integration is the connection of business processes and information systems with the objective to produce a coherent product or service for the customer in a distributed value chain.”

Following this definition, we distinguish between *internal* and *external* integration. Internal integration is being discussed in literature using the term „Enterprise Application Integration (EAI)“ focusing on the integration of information systems within one single company. The challenge of the external integration, also known by the term „B2B Application Integration (BBAI)“, is the application of pre-defined formats and protocols in order to bridge enterprise boundaries. External integration is far less widespread in current practice (Schubert and Dettling 2004). As will be shown in the Triamun case study, integration can be implemented at different technical levels: (1) presentation, (2) application, and (3) data level.

Enterprise Application Integration: Company-wide, internal integration

EAI is the abbreviation for Enterprise Application Integration, the company-wide integration of software applications. There is a multitude of different definitions of EAI (e.g. Linthicum 2001; Davydov 2001; Buhl et al. 2001; Dettling 2002; Schelp and Winter 2002; Keller 2002; Kaib 2002; Voigtmann and Zeller 2002; Holten 2003). Some authors restrict the definition to the integration of application systems within *one* company; others include the creation of interfaces *between business partners* in their definition of EAI. The common denominator of all definitions is the *connection of applications* and the *exchange of business documents*.

Some experts believe that EAI is a prerequisite for an “easier start” into B2B Integration (Voigtmann and Zeller 2003). To them the state of EAI reflects the “e-readiness” of a company to set up electronic communication channels to business partners. They argue that once the requirements of business departments have already been taken into consideration companies have the basis for an easier integration of inter-company processes (Hagel 2002).

BBAI: Boundary-spanning, external integration

BBAI is the abbreviation for Business-to-Business Application Integration, which is the inter-company-spanning integration of applications. Linthicum (2001) defines BBAI as follows: “(B2B Application Integration) is, at its foundation, the mechanisms and approaches to allow partner organizations, such as suppliers and consumers, to share information in support of common business events. In short, B2B application integration is the controlled sharing of data and business processes among any connected applications and data sources, intra- or inter-company.” (Linthicum 2001, 10)

Views of Integration

Integration projects can be analyzed from different points of view. In order to facilitate an easy orientation for the reader, the description of the case study was segmented into (1) business view (Schopp and Dold 2002) (2) process view (Porter 1999), (3) application view (Kaib 2002; Voigtmann and Zeller 2002), and (4) technical view (Liebhart 2002). The business view describes the value creation of products and services i.e. the performance of the participating parties. The process view takes a look at the business processes whereas the application view links the processes to the actual information systems. The technical view includes the basic architecture and its components.

THE TRIAMUN CASE STUDY

Triamun AG (Triamun Ltd.) was founded in August 2000 as a joint venture between the Galenica Group and the business consultancy Ludwig & Partner. The Galenica Group operates an extensive network of pharmacies in Switzerland and was interested in an integrated software package. To develop the Triamun solution for the healthcare sector, Triamun entered into

a joint venture with the software development company Ramco. The Triamun software products are being offered as an ASP (Application Service Provider) software solution, for which the user merely requires a standard web browser. No special software is installed on the client's system. The software supports all operation sequences within pharmacies and medical practices. The system operated by Triamun is geared at a data and information exchange between the partners in the healthcare sector based on a central database. The program modules were developed in close cooperation with doctors, pharmacies and their teams of employees.

The Triamun case study evolved from interviews with various parties who were involved in the development of the system, namely employees of GaleniCare (network of pharmacies), from Triamun (software provider), from Ramco (software developer) and the pilot pharmacy named "zum wilde Maa", which provided information about its experiences during the system's launch. The pilot pharmacy is a relatively large pharmacy, which deals with around 200 prescriptions from customers per day.

Industry sector, product and target group

The business segment of the healthcare sector is facing increased cost pressure and at the same time demands for quality assurance with respect to medical and pharmaceutical services. Doctors and pharmacists are no longer isolated providers of products or services which compete with each other. Nowadays they have to optimally interlink various value chains and market offerings in order to be able to work cost-effectively (Wölfle 2003). Medical practices and pharmacies are companies with high costs in relation to the service rendered. There are over 1,600 pharmacies in Switzerland, of which at least 1,500 use IT solutions.

Importance of E-Business in medical practices and pharmacies

The use of IT tools has no strategic importance in medical practices and pharmacies. IT is only a means of handling processes efficiently and thus saving costs and guaranteeing quality. For the Galenica Group the area-wide use of Triamun software promises more transparency and therefore a better basis for managing the GaleniCare network of pharmacies.

E-Business fields of application: practice and pharmacy

triamun@practice for doctors: patient management

The Triamun software module for doctors supports all arising processes from appointment-making, including an agenda for results registration, and warehouse management through to billing of services to patients or the health insurance company. The following functions are included in the module: practice organization, patient management, customer relations, master data, results registration, medical documentation, prescription, service billing, materials management, statistics (crystal report), network capabilities, system support and security.

triamun@pharmacy for pharmacies: POS sales

The module for pharmacies supports point-of-sale transactions (POS) from cash sales (incl. online checking of credit cards) and invoice and prescription sales as well as full dossier and warehouse management, ordering, and billing to customers or health insurance companies. The special requirement of this application is the synchronized support of the sales process between pharmacist and customer: functions and data must be available without a time delay. The sales database is mainly based on the master article list of GalDat (more on this in the section about e-procurement). In addition, new articles can also be recorded. The following functions are included in the module: master data, sales, patient management, customer relations, medical/pharmaceutical documentation, POS, accounting and dunning, materials management, statistics, system support, security and access rights, integration of master data concerning outside suppliers and availabilities (for the wholesalers Galexis, AmedisUE, Voigt and Unione).

Partners for developing the Triamun system

To search for a development partner, Triamun issued a call for tenders, in which well-known ERP providers participated, such as, e.g., SAP, Baan and Peoplesoft. The tender criteria were above all the anticipated development costs, subsequent operative costs and scaling possibilities. Ramco Systems submitted the best bid – mainly because of the technology used.

Ramco Systems

Ramco Systems, with more than 1,000 installations in 30 countries and 70,000 users, is one of the world's leading manufacturers of component-based corporate software. The company was founded in 1989, is listed on the stock market and has 1,700 employees worldwide in 19 branches. Around 80 employees work at the European headquarters in Basle.

INTEGRATION SOLUTION

The Triamun platform represents a new generation in industry software, which has so far not been widely applied from a technological point of view. The ASP approach (no local software apart from the Windows operating system) has been rigorously applied in the case of this solution. This changes the basic requirements of the IT. The local client is only used as an access window. The constantly available, high-performance Internet connection is assigned an important role. In the event that the connection is broken, users have no functionalities at their disposal, although, on the other hand, decentralized users are released from software maintenance and updates.

The following integration takes place via the Triamun solution (Figure 1):

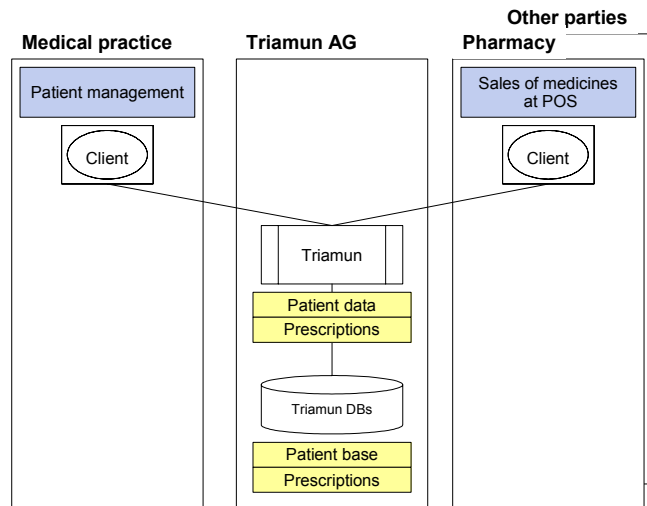


Figure 1: Integration in the Triamun solution

Business view

The Triamun system is an industry solution for the healthcare sector and was developed to facilitate electronic data exchange between all connected parties in its last phase of implementation. The main modules, which are examined in this case study, are the "triamun@practice" module for medical practices and the "triamun@pharmacy" module for pharmacies. In July 2003, 15 customers were actively using the system (13 doctors and 2 pharmacies). 20 contracts had already been concluded in total. A big increase in user numbers was planned for the coming years.

Most parties in the healthcare sector are amalgamated in association-type structures. The Ofac (www.ofac.ch) is the professional association of Swiss pharmacists, which bills the health insurance companies for services rendered. The Ofac has approximately 1,200 member pharmacies in the whole of Switzerland, which accounts for two-thirds of the total number of pharmacies in existence. In 2000, it issued close to 8 million invoices with a total sum of 1.5 billion Swiss Francs (1.15 billion US\$). In the case of doctors, the Doctors' Collection Office bills the health insurance companies for their services. The santésuisse is the industrial federation of Swiss health insurers. Due to the association-type organization, not all parties have to be connected individually to Triamun. Ofac and the Doctors' Collection Office act as a clearing office between their members and the health insurance companies as bodies that bill services.

Process view

From the point of view of business processes, the three key processes are the clearing of invoices, the purchase of medicines (E-Procurement) and the electronic forwarding of prescription data (cf. Figure 2).

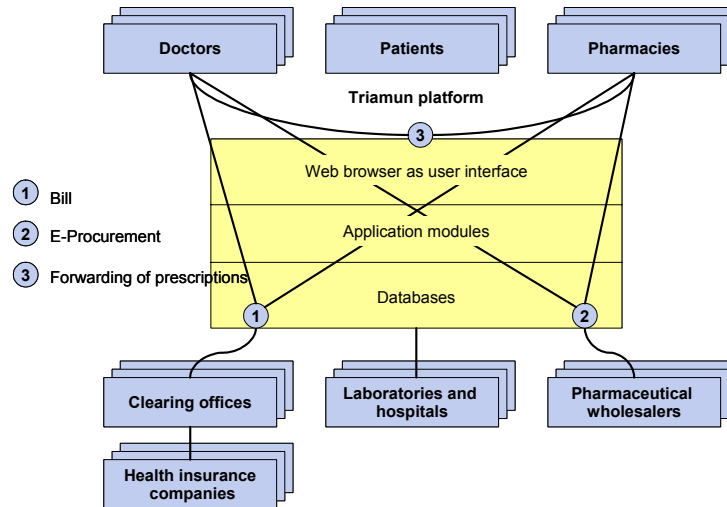


Figure 2: Processes which are integrated via the Triamun platform

Clearing

Doctors' bills (above all for examinations; in the case of self-dispensing doctors also medicines) and pharmacies bills (medicines) are transferred to the clearing offices electronically via the platform. The clearing offices carry out the task of sending the bills to the appropriate health insurance company or to the patient. Clearing offices are e.g. Ofac or IFAK for pharmacies and the Doctors' Collection Office or MediData for doctors. Even if pharmacies' bills are sent to the health insurance company electronically via Ofac, a paper version of the prescription still has to be sent to the health insurance company by post. The doctors' bills are sent to the patient as a paper version or electronically to the Doctors' Collection Office, which checks the contents.

E-Procurement

The orders from doctors and pharmacies for medicines are sent to the pharmaceutical wholesalers, e.g. to Galexis (www.e-galexis.com) or to AmedisUE (www.amedis.ch). The Triamun system allows access to personal customer conditions (special prices) and an online availability check, so that the person ordering knows after completing the order when and at what price he/she will receive the goods. In order to obtain better conditions, there are pharmacies that join forces and submit collective orders. An important basis is the standard medicines database "GalData", which is stored in the system. In this database each article for Switzerland is identified with a unique pharma code. The GalData database is maintained and operated by e-mediat (www.e-mediat.ch). All companies which require pharmaceutical data receive this master data on a CD. As soon as a new medicine comes onto the market in Switzerland, it is entered in GalDat and is then available to all Triamun users. The connection of wholesalers is effected via an XML interface.

Application view

Owing to the ASP architecture, the Triamun application represents none of the traditional approaches of internal or external integration. Through the joint use of the same platform and the same master data, users are seamlessly connected with each other without adjustments having to be made to decentralized information systems. The most important data that are used jointly are the GalDat database (pharmaceutical articles) and the TarMed table (tariff system for billing (tax points)). The system also allows the joint use of data for the self-recorded patient base.

GalDat has caught on throughout Switzerland as the standard format for POS systems, commodity control and electronic billing. In addition to the generally valid information, GalDat also contains wholesaler-specific data, such as, for example, the availability of products or campaigns. GalDat contains approximately 95,000 articles. The database contains EAN codes, pharma codes and all other standard codes. It is the reference file for orders (VSSG, EDIFACT) and bills (clearing offices and health insurers).

The main advantages of the ASP architecture are the local access of all authorized people, data hierarchy through clear access privileges, data security due to the underlying security concept, topicality and accuracy of information, integrity of data, i.e.

the guarantee that data is only filed once and no twin tracking. The system is programmed in English and has full multilingual capability.

Technology view

The Triamun software is based on 3-tier architecture (cf. Figure 3): the client of the user accesses the web server in the Hosting Center. Access is carried out either using an SSL encrypted connection via the public Internet or via a VPN connection (Virtual Private Network). The program logic is located on the application server. Master data and user data are stored on a special database server. The user is identified via the device's MAC address on which the Triamun software is started. The MAC address is a clear, worldwide identification number for network cards and is deposited in the system for each authorized computer.

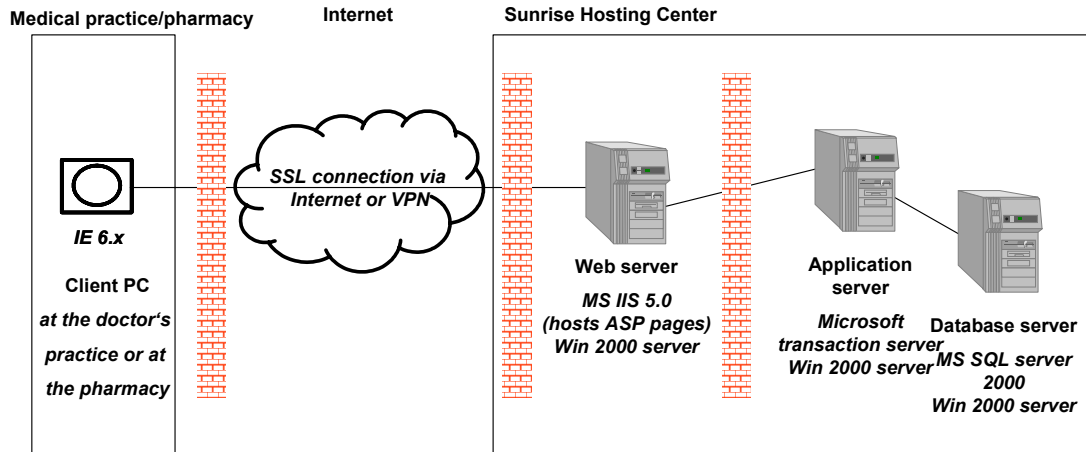


Figure 3: Access from the browser of the client PC to the Triamun ASP solution

The system has been designed for a high number of end users and transactions. It is scalable up to 30,000 users and 10,000 orders per month. A key factor is high system availability, as the applications are used for sales support at the POS. All software modules are implemented in a modular way. The access privileges are implemented via a role concept. Restrictions for certain users can be allocated both on the level of patient data and with respect to certain content types. Special technical challenges were the integration of different locally processed tasks, since the called application logic is located on the server. Thus, the control of barcode readers, printing functions for local printers and the integration of the online checking of credit cards in the case of 3-C systems (for payment in the pharmacy) were difficult hurdles. Data exchange is carried out using different formats, such as, e.g., normal ASCII files, EDI (clearing offices), XML (wholesalers) or HL7 (laboratories). Figure 4 shows excerpts from files in the two formats EDI and XML.

<pre> 173=8305.00 110=316 174=8 175=17-HYDROXYPROGESTERON 178=0 179=0006000 180=001000 183=0 [PRE59] 169=1 170=07072003 171=001 172=8354.00 173=8354.00 110=316 </pre> <p>Excerpt from EDI file</p>	<pre> <?xml version="1.0"?> <ITEMSLIST xmlns:dt="urn:schemas-microsoft-com:datatypes"> <ITEM> <ITEMCODE>1234243</ITEMCODE> <DESCRIPTION>VARISMA wadenstrumpf haut KII a-d Gr 2</DESCRIPTION> <QUANTITY>0</QUANTITY> </ITEM> <ITEM> <ITEMCODE>0020209</ITEMCODE> <DESCRIPTION>ERYTHROCIN I.V. Trockensub F1 1 g</DESCRIPTION> <QUANTITY>0</QUANTITY> </ITEM> </pre> <p>Excerpt from XML file</p>
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Figure 4: Examples for different exchange formats with clearing offices and wholesalers

IMPLEMENTATION

The people in charge of the project chose the pharmacy named “zum wilde Maa” in Basle as a pilot candidate for the initial launch of the Triamun system.

Software solution/programming

The processes were designed with the help of future users (mainly doctors and pharmacists) over a period of eighteen months and recorded as a specification. In the intensive phase of programming up to 35 employees from Ramco were involved in the programming work.

Profitability of the solution for the software provider

The Galenica Group opted for the cooperation with respect to development of the Triamun platform for the purposes of a nationwide use in their pharmacies. In addition, the solution is also available on the free market. In the long term an increase in benefit is expected due to the deployment of the solution in all pharmacies in the GaleniCare group, especially in the area of controlling (sales/purchasing figures).

Triamun generates its income with the aforementioned license fees and with services (data migration and training). The decision to invest in the Triamun platform was made based on a business case. The company's investment appraisal predicted a break-even after three years.

Ramco is connected as a partner via the joint venture. Ramco has thereby participated in the development costs on a share basis. The costs for the whole system development roughly correspond to the original share capital of Triamun, which was estimated at 10.5 million CHF (0.77 million US\$).

SUCCESS FACTORS

Specialties of the solution

The ASP approach has been consistently applied in the Triamun solution. The constantly available high-performance Internet connection takes on a central importance. The Thin Client Approach has the advantage that program changes are available to all users immediately. Decentralized program updates are no longer necessary.

The people in charge of the project see the ASP model as the future for SME industrial software, although the pilot phase of the pharmacy in Basle in particular makes it very clear that real benefit effects only arise if a lot of parties are connected to the system (network effects). The increased time expenditure is still significantly outweighing the benefits. Many problems which occurred during the launch were attributable to necessary adjustments to the screens and function processes rather than the ASP operation. The special requirement of the pharmacy solution is the synchronized support of the sales process between pharmacist and customer: functions and data must be available without a time delay. The fact that the business-related data is now located on a central server does not worry the employees interviewed. Confidence in the hosting solution is high in this respect.

Changes

The launch of a system that is completely different to its predecessor operation-wise is difficult. The employees had to learn how to use the Windows functionalities (the old system was DOS-based) and the Triamun functionalities simultaneously. The old DOS application was a lot simpler in terms of the number of functions and therefore easier to use. The system had still not proved its worth in practice at the time of the launch, which is, however, also not expected of a pilot project. In addition to learning new functions, faults and improvement suggestions also had to be repeatedly reported to the software developer. One example is the process for marking new products (packets of medicines) with price labels. The labels are issued by the system on a special printer per received order. The produced labels did not appear on the printer in alphabetical order to start with, and were all mixed up, which caused more work with regard to sticking labels on packaging.

Changes have also been caused by the change to an ASP solution. The pharmacies now only have to ensure an operational Windows computer with a constant Internet connection. Software is not stored locally. Difficulties arise with regard to connection problems, where it is unclear what has caused them (e.g. errors in the network card cause breaks in the connection). In this case, it is difficult to define responsibilities.

Lessons learned

Political interests have a crucial influence on the success of an industry-wide software solution. The Triamun platform has prospects for success in this case, as many of the potential users come from the Galenica Group itself. This statement is supported by the difficulties which have arisen concerning the integration of external partners. While the pharmaceutical wholesalers were “simply” connected (Galaxis belongs to the Galenica Group, for example), integration of the clearing center turned out to be relatively difficult. The launch of the system in the pilot pharmacy took place following pressure from the GaleniCare. There was no actual need for the launch of a new system at the pilot pharmacy.

In hindsight, it is clear that a longer test phase with only one pilot customer should be carried out. The employees of the pharmacy should have been involved in the development phase at an earlier stage. In the day-to-day business things happen which cannot be anticipated by the developers. The person-machine interface is a big challenge at the end of the day. There are existing systems which have been in use for years to which employees have become accustomed. The Triamun system is a different story. In the old systems an order could be simply deleted. This is no longer possible in Triamun, as the bookkeeping processes function in an integrated way and a deletion has an effect on other function modules. A booking now has to be carefully cancelled. The first users will still have a considerable influence over the months and years to come on improving operation of the system on an ongoing basis.

Besides many advantages that such a system might bring along there are also limitations. The implementation of the ASP solution at a point of sales (the pharmacy) was not without problems. After several months of operation, the increased time expenditure was still significantly outweighing the benefits.

OUTLOOK AND APPRAISAL

The long-term expectation of the launch of an industry-wide software system is the cost reduction in the national healthcare sector. The main beneficiaries of the integration via the platform and of the standardized, electronic data exchange will be the health insurance companies. It is to be hoped that this will have a positive effect on the insurance premiums. Thus, it is conceivable, for example, that patients will receive premium reductions in future if they allow their health insurance access to their Triamun data.

The pilot phase of the pharmacy in Basle in particular made it very clear that real benefit effects only arise if many parties are connected to the system (network effects). The likeliness that partners outside the “reach” (governance structure) of the Galenica Group will accept and implement the software solution is an open question. We will need to wait for another 3 to 5 years before we can definitely answer this question. It is anticipated that within short time independent pharmacies will no longer exist. The cost pressure in the healthcare sector is such that pharmacies will have to amalgamate into groups in order to benefit from more favorable purchasing conditions. The use of Triamun also offers advantages for such alliances.

It is possible that the many limitations interspersed in the description of this case study shed light on a fundamental flaw in the whole effort, and might be the foreboding of a potential failure. The emphasis of the discussion of the case is on the positive effects such an industry-wide solution might have. Even in the event that the Triamun software initiative will finally fail to be implemented by companies outside of the Galenica Group, we should learn from the intent, the approach, and the limitations of this case. There are only very few real Internet success stories thus far, and it is important to report on the companies who are at least trying, even if they do not turn out to be a big success.

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