Pharmacy information systems: the experience and user satisfaction within a chain of Dutch pharmacies

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Abstract: This paper proposes two models for evaluating Pharmacy Information Systems (PIS) on their user satisfaction, thereby exploring one of the major requirements in designing PIS for pharmacy networks. The first model is developed to measure pharmacies’ satisfaction with their PIS and the second model is developed to specify the determinants of PIS satisfaction. Both models were validated by data from 142 members of a Dutch pharmacy chain. Based on the user satisfaction model, the explanatory model showed that Information Technology (IT) experience and knowledge are the most important drivers for pharmacies’ PIS satisfaction. The implications for the evolution of PIS in pharmacy chains are discussed.

Keywords: pharmacy; Information Systems; IS; e-healthcare; user satisfaction; chain computerisation.


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1 Introduction

In many countries, pharmacies move from small, professional organisations to market-oriented firms, using the growing opportunities from strategic cooperation and networking (Brown and Mesak, 1992; Grouls et al., 2004). The creation and fast growth of pharmacy chains are typical examples of a strategic reaction to the restructuring of
the pharmaceutical industry. Until the mid-1990s, most pharmacies were independent companies with a strong local and occupational orientation (cf. Cancrinus-Matthijssse, 1995). During the last decade, however, their strong and stable market position has dramatically changed. The market for pharmaceutical products has become liberalised, globalised and open to new initiatives and entrants are driven by the internet and health policy reforms. Cooperation has become a dominant strategic option for pharmacies to cope with these developments. Cooperation has extended from joint purchase and distribution to organisational networks such as retail chains and franchise-based organisations. More recently, the emergence of online pharmacies has become a new and significant development that forces pharmacies to reconsider their traditional business and Information Technology (IT) strategies (Lin and Hsieh, 2006).

This expansion of interorganisational cooperation clearly reshapes the way pharmacies are managed and the related role of IT. Within their traditional model of professional organisations, pharmacists managed all of the business dimensions like small and independent entrepreneurs. With a few employees and a steady number of customers and products, administrations were dealt with by hand or with the aid of stand-alone, standard Information Systems (IS) for the ordering, inventory and sales of pharmaceutical goods. In some cases, cash points were connected to these systems or purchases were supported by Electronic Data Interchange (EDI), but in most pharmacies, IT consisted predominantly of standard, stand-alone applications for data processing, archiving and transaction. Since 1985, Pharmacy Information Systems (PIS) came into existence as a niche market to support pharmacies with one ‘integrative system’, similar to the emerging trend in Enterprise Resource Planning (ERP) systems and packaged enterprise software around that period (Navarro, 1999; Swanson, 2003). Subsequently, IT governance and the business-IT alignment (Henderson and Venkatraman, 1993; Luftman et al., 1993) have become key concepts for managing extended pharmacies in general and pharmacy chains, in particular. As mentioned before, the internet and web applications will further drive the need for a network-oriented IT strategy.

The central management of a pharmacy chain has a clear goal in the interconnection of all pharmacies to one central IS platform. To realise a management IS on the chain level, centralising and standardising the extended IT infrastructure and improving its potential economies of scale is needed. Most pharmacies, however, wish their current PIS to be improved, but fear high switching costs. Traditionally, they prefer independence and ownership with regard to their own IT policy and deciding on their IT applications locally and in a flexible manner. In addition, the vendors of PIS prefer retaining their own new ‘closed’ applications and releases, thereby actively protecting their market power and market share. Hence, as is often the case in supply chain and multiparty collaboration settings, the goals and interests of the actors (i.e., the chain’s central management, the pharmacies and the PIS vendors) do not necessarily coincide (cf. Schruijer, 1999; Wickramasinghe et al., 2007).

From the above, it follows that the potential deployment of an IT strategy on the network level will strongly depend on the current experiences that pharmacies have with their current PIS. The pharmacies’ satisfaction with their PIS is essential and so are the main determinants of the pharmacies’ satisfaction. This insight can provide the management of pharmacy chains the handles to mobilise its members and identify the critical success factors for IT governance on the central network level. As a matter of fact, however, little is known about the (user) satisfaction with PIS. While a large number
of models are developed to measure user satisfaction with and user acceptance of IS/IT in general (Venkatesh et al., 2003), user satisfaction with PIS seems to be a white spot in this type of research.

This paper develops a model to define and measure user (i.e., pharmacy) satisfaction with PIS. Next to its construction, the model is validated by a large-scale survey that was held in 2004 among 142 members of a Dutch pharmacy chain. This study serves as a unique opportunity to apply the existing theories on the use of and satisfaction with (enterprise) IS to the relatively unexplored area of pharmacies and PIS. While the deployment of (enterprise) IS in the healthcare sector is an emerging field of interest, both theoretically and empirically, little is known about the pharmacy retail practice (Aydin, 1998; Lenz and Kuhn, 2004). In contrast, large pharmaceutical corporations have been an empirical setting for several implementation studies (Krumbholz et al., 2000; Wynn, 1989).

The paper is structured as follows. The next section is dedicated to conceptually modelling the measurement of pharmacies’ satisfaction with their current PIS. Then, this measurement model is validated by scale analysis that is performed on the answers provided by the 142 Dutch pharmacies. A conceptual framework is designed to model the factors that are important in understanding the pharmacies’ level of PIS satisfaction. Multivariate regression analysis is performed to resolve the validity of this explanatory model. In our conclusion, we evaluate the models and instruments that measure satisfaction with PIS and its implications for the IT governance of pharmacy chains.

2 The satisfaction with pharmacy information systems

2.1 The pharmacy information system satisfaction measurement model

In the case of pharmacies, the owner or general manager (i.e., the pharmacist) is responsible for the purchase, implementation and use of IT and IS. As the number of employees and users of PIS is limited to five to ten, the pharmacist is well informed in judging the average user satisfaction of his employees. In addition, the pharmacist is, in most cases, a PIS user as well. This implies that, in contrast to other empirical research on the satisfaction with IT in organisations, the measurement of user satisfaction on the level of the pharmacy is not problematic if the pharmacists are willing to cooperate as the key respondent.

When measuring user satisfaction, an extensive number of approaches, models and measurements is available. Much cited are the approaches of IS/IT success models (DeLone and McLean, 1992; Seddon, 1997), end user computer satisfaction models (Doll et al., 1994) and behavioural approaches (Melone, 1990; Joshi, 1991). Since a PIS is basically a standard software package, we primarily focus on the ease of use of the system as a central dimension of satisfaction. Hence, the core of our measurement model is based on the concept of usability. Following the broadly accepted approach of Nielsen (1993), we start from his five basic dimensions to operationalise usability:

1. Learnability: How easy is it for users to accomplish basic tasks on the first time they encounter the design?
2. Efficiency: Once users have learned the design, how quickly can they perform tasks?
Memorability: When users return to the design after a period of not using it, how easily can they reestablish their proficiency?

Errors: How many errors do users make, how severe are these errors and how easily can they recover from the errors?

User satisfaction: How satisfactory (‘pleasant’) is it to use the design?

Given the relative simple context of pharmacies and PIS, learnability and memorability are the factors that are closely related and depend on the same system features. In a common pharmacy, each employee learns how to use the system on their first day and continues using the system on a daily basis. As briefly described above, most of the current PIS have been rather stable in their functionality and appearance. The same holds for the users, as knowledge of IT and PIS is generally not specifically connected to a certain function or position. For these reasons, we combined learnability and memorability into one factor, indicating the relative learning time of pharmacy employees.

Next, we added three new factors to Nielsen’s (1993) list of four (five) dimensions to improve their applicability to PIS:

1. Interface
2. Completeness of the system
3. Service of the supplier.

The interface characteristics of the PIS can be considered a basic determinant, because PIS fundamentally differ in this respect. As we will show later in this paper, one of the three major PIS packages used in the Netherlands runs under Windows NT, while the other two packages have a character-based interface under UNIX. Hence, the question of whether the common transformation of standard software to a Windows interface influences (user) satisfaction with the PIS can be researched within this context.

In addition, the completeness of the PIS is specified as an important satisfaction dimension. In the case of PIS, completeness is crucial, since a standard pharmacy is basically concerned about the coverage of the standard procedures and not about the advanced or potential functionalities. As in most healthcare-related industries, standards and controls are essential. Hence, what is most important for pharmacies is relying on the sufficient and correct administration of their activities by the PIS. Completeness is more relevant than flexibility, in analogy to the professional and governmental regulations that are traditionally steered by a closed-shop system of pharmacy occupations.

Third, the initiatives and service of the PIS suppliers will strongly influence its functioning and satisfaction, as pharmacies are in a very dependent situation with regard to the knowledge of IT products. For instance, software suppliers maintain the system and its source code, while new regulations or governmental rules need to be imputed to the system by the suppliers. This increases the suppliers’ responsibility to deliver updates and versions so that pharmacies can keep up with the legal and policy regulations in time. Obviously, pharmacies are strongly dependent on their PIS suppliers because of information asymmetry, path dependency, lock-in effects and switching costs (Liebowitz and Margolis, 1995).
Taken together, seven factors complete our PIS-specific satisfaction model. The concept of overall PIS satisfaction is basically separated into the satisfaction with a supplier’s service, the completeness of the system and the system’s usability. The system’s usability is further broken down by the five subdimensions that were previously discussed. The complete model is depicted in Figure 1.

Figure 1  The PIS satisfaction measurement model

For each of the seven dimensions at the right-hand side of the model, a number of items (agree-disagree) were developed to enable their measurement. The items are formulated in such a way that they can be applied to all types of respondents, i.e., the small and large pharmacists that are part of a pharmacy chain. Table 1 presents the complete list of items per dimension. After that, the next section describes its empirical validation.

Table 1  The items used to operationalise the conceptual satisfaction model

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Itema</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIS supplier service</td>
<td>I am not satisfied with the PIS supplier service. The PIS supplier takes care of the customer complaints. The PIS supplier promptly implements the updates and changes in functionalities if these are needed, e.g., because of governmental regulations.</td>
</tr>
<tr>
<td>PIS completeness</td>
<td>The system is complete. The quality of the system is low. The system fits with the requirements and demands of the pharmacy.</td>
</tr>
</tbody>
</table>
Table 1  The items used to operationalise the conceptual satisfaction model (continued)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIS usability interface</td>
<td>The system’s menus are not logically organised.</td>
</tr>
<tr>
<td></td>
<td>Data are presented by the system in an understandable and clear manner.</td>
</tr>
<tr>
<td></td>
<td>The choice and selection boxes are visible at any time on the screen.</td>
</tr>
<tr>
<td>Efficiency</td>
<td>The system reacts quickly to the users’ actions.</td>
</tr>
<tr>
<td></td>
<td>The execution of standard tasks requires too many actions.</td>
</tr>
<tr>
<td></td>
<td>The system regularly behaves in a non-understandable way.</td>
</tr>
<tr>
<td>Learnability/memorability</td>
<td>The appropriate usage of the system requires a short training time.</td>
</tr>
<tr>
<td></td>
<td>Some operations are too complicated and need to be performed by a specific pharmacy.</td>
</tr>
<tr>
<td></td>
<td>It takes considerable time to work with the system after not using it for some time.</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>I would recommend this system to my colleagues.</td>
</tr>
<tr>
<td></td>
<td>I do not expect to change from our current PIS to another system.</td>
</tr>
<tr>
<td></td>
<td>Using this system is often frustrating.</td>
</tr>
<tr>
<td>Errors</td>
<td>Errors are hard to undo within the system.</td>
</tr>
<tr>
<td></td>
<td>Errors are often made during the usage of the system.</td>
</tr>
<tr>
<td></td>
<td>The error feedback of the system is clear.</td>
</tr>
</tbody>
</table>

Note:  a Answer categories for all items are (1) disagree, (2) neutral, (3) agree.

2.2  The validity of the PIS satisfaction measurement model

In the Netherlands, only three different types PIS are sold by professional vendors:

1  Apcos/Gecos, offered by Euroned
2  Aposys, offered by Microbais
3  Pharmacom, offered by Pharmapartners.

Interestingly enough, two of the three PIS have been initiated through cooperation between pharmacies (Aposys), while Apcos/Gecos was developed in collaboration with general practitioners and health centres. Pharmacom is the only application that was developed within the portfolio of an IT vendor (i.e., PinkRoccade, one of the main IT players in the Netherlands). Within the chain of 185 pharmacies, Apcos/Gecos occupies a 42% market share, Pharmacom, 36% and Aposys, 22%. This situation is comparable to the complete Dutch market for PIS and has been stable for 10 or 15 years.

In general, pharmacies are experienced in leveraging their PIS for operational and administration tasks, but a large number is dissatisfied with its limited functionality, usability and flexibility. This is partly due to the legacy-related characteristics of the applications. Apcos/Gecos, for instance, was developed in 1985 and was hardly
changed ever since. Its non-experienced users are confronted with much non-interactive functionality, non-graphical UNIX interfaces and file management by peculiar tree structures. A Windows and web-based version of Apcos/Gecos is under development and will be offered as an Application Service Provider (ASP) application. Pharmacom is also UNIX-based, but offers more functionality with regard to integrative electronic patient filing and is more geared towards close cooperation with other local pharmacies and general practitioners. The vendor is currently working on a limited ‘Graphical User Interface (GUI)’, data entry flexibility, towards an ASP application. Aposys might be considered as the most ‘modern’ PIS at the moment, but showed problems in stability along Windows’ platform migrations.

In spring 2004, 184 subsidiaries of one particular Dutch pharmacy chain were approached to participate in a postal survey on their PIS. The survey was accompanied with a recommendation letter from the headquarters. The general manager of the pharmacy was requested to complete this questionnaire, which was pretested and reviewed by several managers from the headquarters. The questionnaire consisted of 15 pages and 35 questions and required an average of 30 min to complete. Return envelopes were enclosed to convene the responses. The respondents received a feedback report containing the main results. Furthermore, it was communicated that the questionnaire would serve as a report for the annual review of their PIS. Clearly, this was an additional incentive for the pharmacists to be involved with the central IT policy that the headquarters of the chain was planning to deploy.

After four weeks, 142 of the 184 pharmacies returned a completed questionnaire. The response rate of 77% is high, compared to the common organisation survey research. The response rates differed slightly between the three types of PIS. The response group of 142 pharmacies and the population group (all 184 members of the pharmacy chain) are equally composed according to PIS. A non-response analysis showed that large pharmacies responded somewhat more compared to the smaller pharmacies and so did the pharmacies located in the western part of the Netherlands. From Chi-square-based tests, it appeared that these differences were not significant (p = 0.05).

To validate the measurement constructs of our conceptual model, we first present the results from the measurement of the general satisfaction of pharmacies with their PIS. As expected, the 21 items that represent the seven satisfaction components (see Table 1) strongly correlate with each other and significantly fit one latent factor model. The strong internal consistency of this 21-item scale is validated by a Cronbach’s alpha score of 0.87 (Nunnally, 1978; Hair et al., 1998). To use this scale as a variable for further analysis, all of the items’ scores were summed, weighted by the one-factor loadings from principle component analysis and standardised to z-scores (mean = 0, standard deviation = 1).

Based on this scale, we describe the differences in satisfaction between the three PIS involved. Significant differences between the three types of PIS can be expected from their different background characteristics, as described earlier. Table 2 presents the results of a one-way variance analysis, which was executed to interpret the differences between the three PIS with regard to the satisfaction of their users, i.e., the queried pharmacists.

The one-way variance analysis shows that the satisfaction significantly differs between the three types of PIS. Keeping in mind that 0 is the natural mean of this variable, the respondents using Apcos/Gecos are relatively dissatisfied, while the
pharmacists working with Aposys are moderately satisfied and those that are using Pharmacom are most satisfied. The Analysis of Variance (ANOVA) (F-test) confirms that the between-group variance is significantly larger than the within-group variance. In addition, by performing a pairwise analysis of the means, it is confirmed that both Aposys and Pharmacom significantly differ in satisfaction from Apcos/Gecos, but Aposys and Pharmacom show no significant mutual mean difference at a 5% level. In conclusion, Apcos/Gecos is clearly judged as a problematic PIS in comparison with the two other systems.

Table 2  One-way variance analysis: the standardised mean differences in the satisfaction with the type of PIS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Satisfaction scores</th>
<th>Satisfaction mean differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>St. dev.</td>
</tr>
<tr>
<td>Use of Apcos/Gecos as PIS</td>
<td>-0.42</td>
<td>0.97</td>
</tr>
<tr>
<td>Use of Pharmacom as PIS</td>
<td>0.59</td>
<td>0.83</td>
</tr>
<tr>
<td>Use of Aposys as PIS</td>
<td>0.18</td>
<td>0.91</td>
</tr>
<tr>
<td>ANOVA test</td>
<td>F = 13.44</td>
<td>df = 2</td>
</tr>
</tbody>
</table>

Note: ** Significance according to the Bonferroni test: p < .00.

3 Explaining satisfaction with pharmacy information systems

3.1 The explanatory pharmacy information systems satisfaction model

After the measurement of satisfaction – the dependent variable in this study – we focus on the potential determinants of pharmacies’ satisfaction with their PIS. Similar to the concept of satisfaction, we depart from the assumption that all users within each pharmacy have comparable knowledge and backgrounds in IT. In general, pharmacists and their employees are primary care-oriented, with little IT skills and interest in this supportive domain of their work. Pharmacies do differ in this respect, however, which implies that we need to explore the IT-related characteristics of pharmacies to specifically determine their satisfaction with PIS.

With regard to the explanation of user satisfaction in general, the Unified Theory of Adoption and Use of Technology (UTAUT) (Venkatesh and Davis, 2000; Venkatesh et al., 2003) can be considered as one of the most-used approaches. From this theory, it is argued that besides the performance, expectancy and effort expectancy of the system, demographic differences and the experiences of its users are important moderating variables to explain the use of IT. The core idea is that satisfaction is the result of an alignment between the system and the user characteristics. Applying this theory to this case, the type of PIS is obviously an important determinant of user satisfaction, as there are only three types of PIS and these will directly determine the (effort) expectancy of the
users. In addition, the size of the pharmacy will be relevant, because large pharmacies will be more dependent on PIS to support their planning and administration, compared to the small pharmacies. Finally, since pharmacists do not differ in education or occupation, their specific knowledge and experience with IT as a background variable will be of most importance to their user satisfaction.

Connecting these determinants to the satisfaction measurement model we presented in the previous section, results into the next extension of our conceptual model that is visualised below (Figure 2).

**Figure 2** The explanatory PIS satisfaction model

Figure 2 depicts that three subtypes among the five determinants can be distinguished: two that concern the type and use of the PIS itself, one that indicates the general IT knowledge of the pharmacists, and, finally, two determinants that are general characteristics of the pharmacy and pharmacists, respectively. The central hypothesis that we aim to test is focused on the expected positive relationship between the pharmacists’ experience and satisfaction with PIS (cf. Mahmood et al., 2000). This means that for the specific context of PIS, the widely accepted proposition that satisfaction comes as time proceeds is validated. Although the circumstances can be different, the claim is that after adopting a new technology (like PIS), persons get acquainted with it through regular usage and adapt their expectations and satisfaction to it. The type of PIS, the pharmacists’ work and IT experience, as well as the size of the pharmacy, are therefore the determinants that will be treated as control variables. Hence, we do not formulate and test the hypothesis with regard to these variables, but hold their variations constant to perform a controlled test of the experience-satisfaction relationship.
3.2 The validity testing of the explanatory pharmacy information systems satisfaction model

The survey, as previously described, can also be used for the validation of the explanatory PIS satisfaction model. In this case, the validation is in the investigation of the empirical strength of the defined determinants of the pharmacies’ satisfaction. For this purpose, multivariate Observed Least Squares (OLS) regression analysis is applied with the scale-constructed PIS satisfaction model as the central dependent variable. Next to the pharmacies’ PIS experience, IT knowledge and size, the type of PIS is also included in this analysis as a determinant. The type of PIS is not only included as a control variable (as it has a significant effect on satisfaction, as shown above), but also as an intermediate or interaction variable. In this way, we can test if the relation between the model determinants and satisfaction differ by PIS system. This provides an additional robustness check for the validity of the modelled determinants.

Table 3 presents the results of the OLS regression analysis. Obviously, the type of PIS can only be involved by including two of the three dummy variables (the use of Apcos/Gecos, Pharmacom and Aposys) as independent variables in the regression model. Based on the previous outcome, we decided to use Pharmacom as the reference category.

Table 3  Regression analysis (OLS): the standardised effects of the determinants on the satisfaction with PIS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>T-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience with PIS</td>
<td>.57</td>
<td>3.27</td>
<td>.00</td>
</tr>
<tr>
<td>Knowledge of IT</td>
<td>.13</td>
<td>1.74</td>
<td>.09</td>
</tr>
<tr>
<td>Size of pharmacy</td>
<td>-.07</td>
<td>-0.93</td>
<td>.36</td>
</tr>
<tr>
<td>Use of Apcos/Gecos as PIS</td>
<td>-.44</td>
<td>-3.05</td>
<td>.00</td>
</tr>
<tr>
<td>Use of Aposys as PIS</td>
<td>.02</td>
<td>-0.16</td>
<td>.88</td>
</tr>
<tr>
<td>N (degrees of freedom)</td>
<td>131 (7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explained variance (adjusted R²)</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:  

- a Practical experience with PIS (in years).
- b Self-rated knowledge of IT (1 = very limited, 2 = limited, 3 = average, 4 = large, 5 = very large).
- c Measured by the number of prescription lines processed on a monthly basis (* 1000).
- d 0 = not in use, 1 = in use; the use of Pharmacon as PIS = reference category.

The results from Table 3 show that, independent of the type of PIS, the pharmacists’ level of experience and IT knowledge have significant effects on satisfaction (beta = +.57 and +.13, respectively; p < .10). In contrast to the explanatory model, the size of the pharmacy holds a non-significant relation with PIS satisfaction.

The regression analysis also showed that (not in Table 2) the positive effect of experience is not influenced by the type of PIS, as the two pairs of interaction effects are not significant at a 5% level. This result is subsequently confirmed if we estimate the similar regression model for the three systems separately. For each of the three PIS, the absolute and relative experiences of the pharmacists remain to have positive and significant effects on satisfaction.
4 Discussion and conclusion

With the emergence of pharmacy chains, insights are needed to connect and integrate the different types of PIS that are used by the different members of such a pharmacy network. In particular, a major challenge is overcoming the legacy-related, local IT policy of the pharmacies that become a member of this chain. If the objective of the chain’s management is to establish an integrative platform to improve the alignment between IT and business developments, a critical success factor for achieving this is the experiences of the pharmacies with their current PIS. In this paper, a measurement model is developed to analyse the satisfaction of pharmacies with their PIS, including the potential determinants of the pharmacists’ satisfaction. Tailored to the specific characteristics of PIS, both a descriptive and explanatory model were developed, aimed at understanding the PIS satisfaction of pharmacists.

Both models are empirically validated by a dataset collected in 2004 among 142 members of a Dutch pharmacy chain. All of the respondents completed a written survey that queried their use, satisfaction, experiences and expectations with regard to their current PIS. The dataset validated a coherent measurement of user satisfaction based on an extension of Nielsen’s (1993) usability dimensions. In addition, it validated two of the most important features of pharmacists that were modelled as determinants of user satisfaction, i.e., experience with PIS and IT knowledge.

If we draw back on the initiation of this study – the achievement of a common IS platform for the members of a pharmacy chain – these results comprehend both the opportunities and barriers for the central management. In the case of the investigated Dutch pharmacy chain, an opportunity is that almost half of the sample is unsatisfied with their current PIS. This is a driver to improve the collective IT situation within the pharmacy chain. In addition, however, it also appears that PIS satisfaction is primarily dependent on pharmacies’ IT experience and PIS knowledge. This might become an even stronger barrier in the case of the pharmacists that are both experienced and satisfied with their PIS. This group will probably strongly protest against a new solution and resist adapting their own system to the suggested ‘chain solution’. As the Dutch case shows, integrating different PIS ‘blood groups’ as part of the collective might seem conveniently arranged, but it also strongly restricts the available options.

In any case, for each alternative to realise an IT policy on the level of the pharmacy chain, it has to be realised that it will take time to achieve a certain level of satisfaction (Sanborn, 2007). This will be especially true as globalisation and the emerging online opportunities for pharmacies will increasingly affect the pharmacy sector, which demands that supply chain partners in diverse parts of the world need to be governed (Lin and Hsieh, 2006). As this study shows, investments in increasing the IT knowledge and experience of pharmacies, as both users and entrepreneurs, enforce pharmacists to handle these opportunities. The proposition that an experienced user is an effective and innovative user also applies to the pharmacy sector, stressing the importance of IT training and involvement (cf. Yaverbaum and Nosek, 1992).
References


