

An e-Enabled Service Value Network for the Pharmaceutical Industry

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Abstract: Across Australia the pharmacy industry is undergoing major reform and re-structuring. Emerging technologies like e-pharmacies, new low cost players, pressures from supermarkets, doctors, consumers and politicians have changed the nature of this industry. Such pressures are causing the industry to unite, to draw all its component players together, and to deliver a new disruptive solution set that will likely radically change the status of competition. A service value network (SVN) framework is discussed as the likely scenario, and its major underlying dimensions are detailed. Such a SVN approach may eventually lead to better strategic alignment, higher industry performance (capabilities and delivery), greater value-adding solutions, increased customer satisfaction, and more competitive pricing.

Keywords: E-Business Models and Enterprise E-services Architectures, network, e-pharmacy.

I. Introduction

Recent research by the Siegel [33] at US Sloan's School of Management indicate that all players in an industry benefit from aggregation or sharing of information, ideas, and knowledge. They suggest a wealth of knowledge may be garnished by combining organizational expertise. Aggregation analysis delivers relationships with greater combined competitiveness. It was further posited that it is prudent for organizations, like the pharmacy industry, to consider their e-strategy, and to add aggregated information and knowledge capabilities into their competitive frameworks [33],[38]. This supports emerging new business models involving multiple aggregations like e-pharmacies, and the proposed concept of a service value network (SVN).

Emerging technologies often deliver disruptive solutions that may radically change the status of competition [5], [11]. For example, e-pharmacies, networked medical services, direct customer targeted solutions, fully integrated supply chains, logistics solutions, and other efficiencies constitute genuine threats to existing pharmacy industry business structures. In particular, competitive threats from Australia's supermarkets, the Australian Medical Association, and the

Australian Consumers' Association are encroaching on the pharmacy industry, with the aim of opening up this traditionally protected pharmaceutical industry allowing free and open competition. One way in which the industry has responded is through the creation of e-pharmacies. In our research an e-pharmacy may be defined as a virtual shop front pharmacy, often working collaboratively with a physical pharmacy outlet to enable rapid selection and distribution of customized and generic pharmaceuticals and associated products. Since 2000, four major e-pharmacies ePharmacy.com.au; HomePharmacy.com.au; PharmacyOnline.com.au; and PharmacyDirect.com.au (see appendix 1). have emerged in Australia.

This emerging business model creates new challenges of value creation and modes of interaction for customers. Of particular interest is the notion of the underlying service value network (SVN) [16],[17] and its partners, and dimensions and issues that shape its customer interface, service offering, and enabling service delivery system; the identification of which will be the focal point of our research.

The service value network (SVN) in an e-pharmacy setting is hereby defined as a collaborative network of supply chain partners (such as pharmacists, drug companies, distributors, beauty care suppliers, health and natural product suppliers, medical practitioners), sales channels (website e-sales, direct over the counter sales, and referrals), operational and network administration personnel, and customers.

This research identifies major dimensions, drivers, and enablers underpinning the development of a holistic SVN for e-pharmacies. Currently, service offerings are delivered through individual stores or groups of stores, and are largely dependent on the communicative skills of the sales, or front counter, person. A SVN complements, enhances, and value adds to this solution. It is designed as an information storage and retrieval system that is 'datamined', prioritized (deploying approximations using fuzzy logic), and has the capability to deliver additional customer information. Such information may then be used to enhance the dialogue between the business and the customer. Service related value added solutions may include: relevant drug options, possible co-drug side effects, packaging options, consumer allowable limits, claim options, delivery options, nearest doctor, hospital, medical insurance options, tax benefits, local preferences, etc. In addition, this data is directly accessible

via the pharmacy industry website where customers may source/request annual tax return data, doctor’s surgery bookings, local hospital information, health and pensioner claims, and the like.

Figure 1 displays a global perspective of the industry, and the capabilities required from a SVN. Here a national data storage solution is developed that may be accessed by individual stores, store groups, store chains, or e-pharmacies. Development of such a SVN solution requires industry-wide information sharing, and will eventually lead towards cost savings and enhanced value propositions [16],[17].

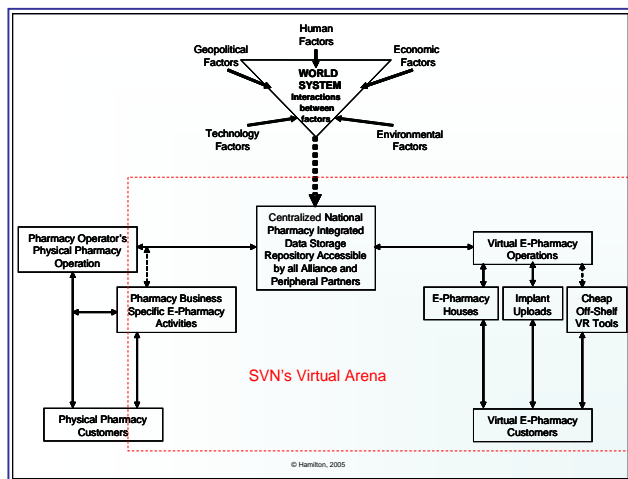


Figure 1: The Service Value Network – Global Perspective (adapted from Anwar & Hamilton [1])

The SVN is designed and managed by a central SVN coordinating group, which in a pharmacy setting might be taken up by the National Pharmacy Guild. Another example is the Australian Tourism Export Council for the Australian Tourism Industry, which is currently compiling a national database in preparation for linking up its industry partners under a SVN-like framework. The generic SVN model is detailed in the following section.

II. Service Value Network

The service value network for the pharmaceutical industry is comprised of a service strategy that drives three dimensions of the virtual service encounter: the services provision, customer targeting, and the underlying operational IT-infrastructure. In turn the virtual service encounter may interface with the physical, when a sales assistant accesses the database, for example to fill in customer prescription details, or to access specific drug information for the customer.

Interactions within the SVN can be viewed from an internal business perspective among supply chain partners in delivering and fulfilling customer orders, for example, a pharmacist replenishing out-of-stock items. On the other hand, the SVN responds to external customers such as a local nursing home initiating bulk drugs supply directly via the SVN. Both internal and external perspectives need to be

considered separately, as they need to be aligned in order to accurately respond to customer needs.

The proposed generic SVN model is displayed in Figure 2.

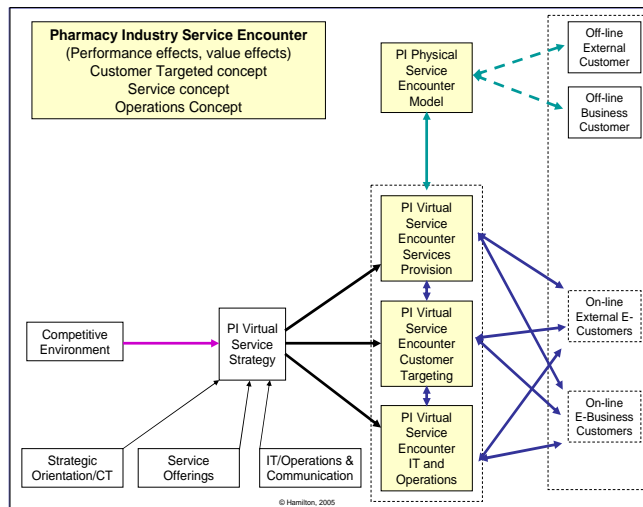


Figure 2: Service Value Network (adapted from Hamilton, [15])

III. Service Value Network (SVN) Dimensions

This paper aims at identifying the various dimensions of the SVN, such that designed service provision, customer targeting, and underlying IT and operations infrastructure are aligned with the set service strategy. The underlying dimensions can be grouped as follows:

1. the impact of competitive environment on the industry.
2. the dimensions of IT/operations and communications, integrated customer targeting systems, and service offerings in determining an industry strategy as set by the SVN Coordinating Group.
3. dimensions of the service delivery system within a virtual network, and the impact of virtual network delivery on potential service performance.

Each of these dimensions will now be discussed below.

IV. Competitive Environment

The competitive environment, displayed in Table 1, is influenced by external forces. It may be enhanced strategically by becoming a first mover, by differentiating, by focusing on specifically defined niches, by being the low cost provider, or by being the dominant player.

The industry strategy will need to be developed, such as to having the agility to adapt quickly to governmental rule/regulation changes. In the pharmaceutical industry this may relate to i.e. new packaging regulations. The SVN will

also need the capability to respond to changes in levels of competition. An example in Australia is the recent introduction of pharmacies within low cost retail chain stores/supermarket chains. In addition, the SVN requires the ability to create and work in supplier partnerships to either capture particular capabilities, or benefit from operational scale effects. As the health care market is growing rapidly because of an aging population, scale effects may become increasingly important. An example is the integration of specific health insurance cover information with pharmaceutical prescriptions.

The SVN should stay abreast of technological evolutions and keep its technological capabilities aligned with its customer and competitive requirements. Furthermore, customers become increasingly better informed and demanding. The pharmacy industry may respond by enhancing its service offerings and/or reaching the customer through various response channels. An example is the recent development of on-line medical encyclopedias in e-pharmacies.

Table 1: Competitive Environment

Competitive Environment	
Dimension	Operational Characteristic
Political	Speed to adopt governmental rule / regulation changes
Economic	Capability to respond to competition changes; Efficient cost conscious scaling of operations
Environment	Respond to competitive changes; Respond to new innovations
Cultural	Cultural monitoring of Cultural targeting
Technology	Industry wide; Networked solutions; Latest offerings; Quick accurate responses

Inputs to Industry Strategy

The Inputs to the pharmaceutical industry strategy are displayed in Table 2. They have a vital connection to the virtual service encounter. If the strategy is one of low service integration then the business will not be delivering high levels of value added service, but rather will deliver more standard service offerings.

Table 2: Inputs to Industry Strategy

Inputs to Industry Strategy	
Dimension	Operational Characteristic
Corporate	POS related Initiatives; Market positioning; Degree of service networking
Competitive	IT capability; Customer understanding; Range of service offerings
Financial	Networks; Customer knowledge; Services offerings
Customer Targeting	Customer demands met; Communicate culturally; Datamine stored information
Service	Industry wide; Networked solutions; Latest offerings; Quick accurate responses
Technology/IT	Customer delivery; Customer analysis; Customer services
Environment	Reactive to business changes; Reactive to customer changes; Updating continuous

Partnering businesses throughout the virtual service value network, position themselves strategically among competitors. They align their strategies internally with fellow value network partners and work towards a common set of strategic goals.

The supply chain side of the physical and virtual service network encounter becomes a cohesive partnership of integrated players working collaboratively as a network. Immediate competitors either mimic aspects of the service network approach, or develop their own solutions. Hence, new points of difference and competitive strategies emerge. Alignment of the service value network, with its alliance partners, to a common set strategic goal and a balanced set of strategic performance measures, is paramount.

Three major classes of inputs to the service strategy are: the underlying IT and operations / communications infrastructure, the customer targeting system, and the service offerings to be delivered. Each of these are detailed below.

IT/operations and Communications

This encapsulates the technical areas of software, knowledge management, business intelligence, and communications. The system must be capable of delivering the demanded customer requests, and of interpreting the request and delivering sensible added value complementary features to the customer.

Since the late 1990's, the five largest software providers: HP, IBM, Microsoft, Oracle, and Sun, in conjunction with a few innovative new entrants, began promoting new standards, new web services platforms, and new activities environments. The internet protocol version 6 (IPv6) software [7], Microsoft's '.NET' and IBM's WebSphere have offered new potential for communication and business operating systems platforms, which may further enhance the virtual environment. In addition, new ways to interpret, interrogate and deliver customer requirements are unfolding, and 'intelligent', responsive websites are emerging. Future applications, such as temperature sensors in clothing linked to illness monitoring devices, may represent yet another possible application area of intelligent information sharing.

In order to enable a value-add virtual encounter with customers, it is paramount that the overall process is driven by top management. IT investments need to be made for building integrated IT networks in order to improve connectivity with customers, and information delivered to customers. The resulting service offerings and customer targeting practices use numerous channels, such as internet, email, SMS, POS transactions, and supply chain partner referrals. Moreover, the IT infrastructure needs to be agile to respond to changes in IT requirements.

Customer Targeting System

The knowledge and data capture concerning the customer is crucial to delivering appropriate services. Site personalization and high levels of recognition may enable the business to enlist its affiliates and jointly target the customer. It may also deliver the identification of new

markets.

The service network customer encounter dimensions include the internal business-to-business customers and the external business-to-end users (or customers). Frohlich & Westbrook [14] have researched some internal business-to-business customer effects, but the business-to-consumer dyad has not been empirically studied [4].

The customer, marketing and advertising based studies have investigated websites with a view to determining effectiveness [2]. Rohm & Sultan [29] have explored strategies to increase customer engagement (time), and thereby strengthen brand-customer relationships. Others [6] in conjunction with their channel partners, have attempted to match the urgency (or criticality) of their customers' varying needs. They aimed to develop buyer life-cycle ownership value, and to deliver intensively loyal groups (segments) of customers. Still others [20], recognized that virtual business solutions (including website purchasing) are moving towards customer empowered, on-line, self paced, exploration of the service (or product) variations, prior to purchase. The customer's readiness to adopt new service value chain approaches also varies, and some customers may desire website interactions that are 'tailorable' to their actual customer requirements. The modern day customer is increasingly more demanding of the business, and its service provisions. Cross [9] suggests over 50 % of consumers are too time-pressurized to enjoy traditional shopping. Foley [12] says this time shortage necessitates targeted, personalized communications specific to their individual needs. Wolfe [37] suggests the statistical averaging of customers is the most failure-prone fault-line in transactional marketing. Hence personalized solutions remain a key to customer targeting. For example:

1. Similarity and dissimilarity [30] – where dissimilarity leads to dislike. Here need satisfaction [8] (where sexual, social and financial needs require matching), and a pleasant experience [23], contribute to the two way communication;
2. Exchange – where the complementary emphasises of value partners contributes to the relationship [36];
3. Human courtship – where targets, goals and the risk of non-compliance of the participants must converge [3];
4. Impression formation – where the emerging model captures first impression or 'wow' factor, incorporating the scripting of information and the richness of the media incorporated [24];
5. Flow theory – where 'perfect dialogue and merging of actions between participants exists [18];
6. Business networks interaction – where the flow of information between participants calibrates the relationship between them repeatedly [13];
7. IT interactions and personalization – where clarity, personalization, trust, dynamic adaptation of content [22], visual systems (that deliver and adapt

to continuously change information) [19], and a full range of text, video, audio, and graphics that deliver real-time 'telepresence' [34] - where the customer is mesmerized for a time [18] are evident.; loyalty and retention interactions – where the business must understand and react to their target market.

Rigby [28] evaluated spending patterns and consumer loyalty and concludes businesses cannot break-even on one-time shoppers' solutions. Customers must be empowered, seduced and converted into lifetime relationships [31]. Feedback loops [21] to direct marketing, and targeting most valued customers, can increase both customer loyalty and retention [27]. Customers demand more reliable services and products, and they expect to have their needs met in shorter time frames [10]. This customer perspective is dynamic and subject to change [32]. Consequently, the business must become agile and more capable of delivering what the customer needs and wants [35].

Customer targeting in a pharmaceutical setting first and foremost focuses on a broad understanding of what customers desire, requiring continual collection and mining of customer data and customer activities. The SVN approach takes this market research information not only to target and better market for specific customer segments, but also to broaden its service offerings by leveraging the unique capabilities of supply chain partners. As such, knowledge building of the customer base is a key activity within the SVN, either directly by the central SVN coordination group, or by sharing information by supply chain partners. Information on customer connectivity and relative use of channel medium are analysed as well.

Service Offerings

The decision as to the level of service is vital to the business. The levels of networking, agility, flexibility, customer targeting, and business supply chain focusing will vary depending on the choice of strategy. The quality of the service, the extent of added value offerings, the level of external partnering, the degree of environmental response, and the like contribute to this dimension.

The virtual strategy for specific service offerings could generically follow the traditional strategy classification by [25],[26] of differentiation, focus, and cost, in addition to a strategy based on flexibility/agility. This in turn will have an impact on the resulting service offerings and their respective customization. The business may be an innovator (like eBay.com), an early adopter (like RealEstate.com), a follower (like Zuji.com), or even a bandwagon copier (like many government departments). In today's highly competitive global environment many models exist, but the business must maintain some points of difference, or risk being out-competed. As such, the pharmaceutical industry may take on a role of innovator, leader, or follower in the underlying technology that enables that particular service offering. For example, a new Australian pharmacy chain

called 'V' Pharmacy is developing a service value network approach as its competitive focus. It is surveying the industry, its customers and the general population to set the frameworks from which it will deliver its customer-centric offerings. It aims to deliver highly personalized solutions in conjunction with its pharmacy script medicines. These will include detailed medical information, optional treatment approaches, linked 'Medicare', health and tax related data. This information will be readily accessible to the customer upon request, or at appropriate times (like a tax time report). 'V' Pharmacy is also building robotic pill dispensing facilities to allow the pharmacist greater time advising and consulting directly with customers or on-line customers.

Relevant metrics on the service offering need to be collected and managed, such as cost, ROI, service rate, and the like. As the service offering in SVN may involve many connectivity modes and SC partners, dependability of the service becomes a key parameter to monitor and manage. From a supply chain perspective, a knowledge base of the supplier network in terms of performance metrics on quality, efficiency, effectiveness, and agility needs to be developed. In addition, web layout, linkages to SC partners, and response times need to be carefully designed and managed. From a demand chain management perspective, automation, internal assistance, and Customer Relationship Management (CRM) all play an important role as well.

V. Inputs Virtual Network and Service Performance

The network dimension of the embedded connectivity of SC partners through varying sales channels implies that delays, incorrect information, and/or security breaches can have a leveraged negative effect on the overall service experience. Alternatively, a synchronous delivery by all partners involved may create a unique competitive edge through elevated service offerings. The quality dimension of providing relevant and targeted information, dependability of the service offering by each SC partner, flexibility to incorporate new updates from suppliers (ie product information), agility to deploy new hardware/software applications, quick response time to information requests, ease of access, security with built-in privacy protection levels, are all factors that enable or impair service delivery in a SVN framework. Table 3 displays the dimensions of the virtual network and its service performance.

Examples of resulting service offerings typically applying to Table 4 may include:

- An on-line pharmacist via
 - a video phone or video conference or teleconference
 - a personal chat room
 - Email or SMS.
- An evaluation of medical and cost alternatives to a prescription
 - A 'side-effects' report

- A home deliver service.
- A doctor - pharmacy direct link so that your prescription could be ready when you arrive, or be home delivered.

A database list of localities of nearby doctors and their current available appointment times.

Table 3: Virtual Network and Service Performance

Virtual Network and Service Performance	
Dimension	Operational Characteristic
Cost	IT networking cost; Customer servicing cost
Quality	Internal information sorting; External customer product delivery
Dependability	Reliable business networks, Reliable customer services
Flexibility / Agility	Capability to change; Uniqueness capability
Response time	Ability to service customer
Personalization	Ability to individually target customer; Ability to individually respond to a customer
Convenience	Multiple customer access modes; Multiple customer response modes
Style fashion	Ability to deliver added value solutions
Ethics	Security and privacy of business information; Security and privacy of customer information
Technology	Strategically operationalize latest technologies

Table 4: Dimensions Influencing Elevated Service Delivery

Dimensions Influencing Elevated Service Delivery	
Dimension	Operational Characteristic
Cost	Access medical & cost alternatives evaluation report to a prescription
Quality	Analyse & identify new markets, customer options, business opportunities
Dependability	Offer a possible drug 'side-effects' report, &/or a home deliver service
Flexibility / Agility	Allow home deliver of prescriptions
Response time	Doctor → pharmacy direct link so customer prescriptions instantly prepared
Personalization	Link secured areas to each customer's personal medical, hospital, ambulance, tax, insurance, banking, etc information & allow emergency in response to a car accident injury that required hospital intervention
Convenience	Provide access to on-line pharmacist by: all methods eg. video phone, video conference, teleconference, personal chat room, Email or SMS
Style fashion	Keep abreast of latest trends
Ethics	Continually learn from individual customers & use knowledge acquired to better assist customers to meet their PI/related areas preference needs
Technology	Allow direct computer access by local doctors, thereby guaranteeing prescription communication accuracy and delivery

Specific attributes/knowledge bases of a pharmaceutical SVN also applying to Table 4 may include:

- Linking of secured aspects of individual customer personal information to medical-, hospital-, ambulance-, tax-, insurance-, and banking information to enable a full emergency response service related to a car accident injury that required hospital intervention.
- allowing direct computer access by local doctors, thereby guaranteeing prescription communication

accuracy and delivery

- delivering personal prescription information (or a purchase), offering new knowledge to the customer about a purchase, and performing all levels of related interactions eg. pill recognition, reaction time, insurance ramifications, deals, best price, etc.

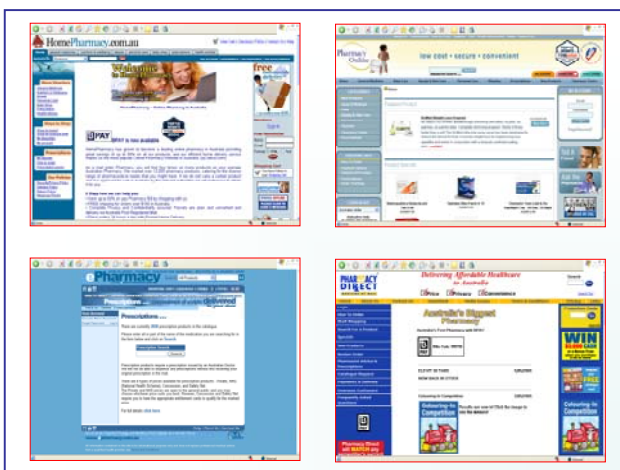
VI. Areas for Future Research

Thus far major dimensions of a generic service value network approach to e-pharmacy were identified. In Australia, on-going research is delivering the components of the pharmacy industry SVN. Future research would need to construct specific relationships among drivers, enablers, and outcomes of such a SVN-framework, and empirically test these for the pharmacy industry at large. Currently, the deployment of a full scale SVN methodology is definitely on the horizon, but still in its infancy.

VII. Conclusions

The concept of a Service Value Network for the pharmacy industry was discussed, along with the major underpinning dimensions. Such a SVN approach may eventually lead to better strategic alignment, higher industry performance (capabilities and delivery), greater value-adding solutions, increased customer satisfaction, and more competitive pricing. Within the Australian pharmaceutical industry, the emerging e-pharmacies are a partial response to industry restructuring and competitive positioning. This evolution was put in context of a SVN approach, and resulting elevated service offerings were described.

Appendix: Major E-Pharmacies Operating In Australia



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