The use of traceability information throughout the Brazilian pharmaceutical industry's supply chain

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Abstract

This paper analyzes the information flow along the pharmaceutical industry's value chain, focusing on traceability data that is gathered in compliance with the country's legislation. The objective of the study was to find out how such transactional data converts into information for tactical and strategic decision making. Eight key executives were interviewed, including: the president of the National Association of Pharmaceutical Laboratories; the president of the wholesalers' association and executives of two IT companies that collect and distribute information and market intelligence. Results show that the huge amount of data which results from the obligation of the pharmaceutical industry in tracing its products, can be (and is) used to better understand the market. While the sales force uses it as an instrument to determine sales targets and objectives, marketing people use it as a tool for strategic planning for future market action.
Keywords: pharmaceutical industry; traceability; supply chain; information flow

1. INTRODUCTION

The pharmaceutical industry is one of the most sensitive sectors to external market pressures. As a result of this, what used to be a very primitive industry consisting of the unsophisticated production of teas and magical spells, a few centuries ago, has possibly developed into the most complex field within the chemical industry.

Due to its relevance and the need for safety within the consumer population, the pharmaceutical industry is controlled by governments, through a means of special regulatory agencies that are intended to protect and promote the citizens' health. The Brazilian Agency for Sanitary Surveillance (Anvisa) is responsible for the pharmaceutical industry's control in this country, with the aim of "protecting the population and promoting the people's health, ensuring the quality of the products and services and their availability" (ANVISA, 2006).

The pharmaceutical industry is responsible for the quality of the medicine that reaches consumers through pharmacies or hospitals, within Brazil. This is a legal obligation, which obliges pharmaceutical laboratories to keep track of their products during the whole life cycle of the product. The ability for tracking products anywhere along the supply chain is called 'traceability'.

Traceability is a must, in order to ensure the patients' safety, but it is also a protection for the participants in the supply chain. It helps identify more easily dishonest middle-men or retailers, who sell stolen or fake products. In addition to that, it is a very rich source of information for the industry.

As a result of the legal obligation of being able to trace its products, the pharmaceutical industry records data at several way-points along the supply chain, which provides data on over 1.5 billion SKUs (stock keeping units) of medicine, while they are being transferred from the laboratories to wholesalers, then on to the retailer and finally to the consumers. The objective of this paper was to find out if such data, whose primary purpose was to enable a diligent recall should a problem be found, is also used for marketing positioning and decisions necessary for the required actions in order to achieve that intention. The authors' intention was to understand if that data was used for further tactical objectives (logistical efficiency and sales efforts) and for strategic purposes (long term marketing planning).

An analysis of the information flow along the pharmaceutical industry's value chain in Brazil was performed for the identification of a data management model used by the major players in that market. An attempt was also made to find out if companies in the pharmaceutical industry have market intelligence departments that convert the transactional traceability data into relevant information for tactical and strategic decision making.

2. INFORMATION SYSTEMS AND THE PHARMACEUTICAL INDUSTRY

We currently live in a real time world, "which has as one of its main characteristics the great proximity between idea and action, between beginning a task and concluding it" (McKENNA. 1998, p. 26). The technological arsenal that is available to organizations allows them to continuously generate and collect data. The huge volume of data generated by any operation today makes it difficult though to convert this into useful information for decision making. In such an environment it is more difficult to choose among the available information than it is to obtain it. According to Ansoff (1975), until the 1970's, significant changes were signaled by strong evidences. More recently, the amount of available information increased so much that the signals became weaker and weaker, almost disappearing in the middle of so much data.

Organizations started relying on management information systems in the 1950's, which helped the structuring of the data (KOTLER, 2000). In the 1970's, decision support systems were introduced to the market, as emphasized by Alter (1977). Then, in the 1980's, it was the time for specialist systems, according to Ignizio (1991) and, close to the end of the 1980's and early 1990's, strategic information systems became available in the market, whose qualities were highlighted by authors such as Porter (1987) and Mintzberg (1996).

According to those authors, the adoption of such systems is based on at least two critical elements: constant reduction of technology costs and continuous improvement of interaction computer languages that allow the communication between people and equipment. According to relevant literature, companies initially only focused on control systems but, after a while, they started implementing strategic management systems, when they realized that the systems can also provide a market edge (VENKATRAMAN *et al.*, 1993). Another reason for control concerns to develop prior to strategic ones relate to the way software and business processes evolved over the years (AERTS *et al.*, 2004).

Contrary to what happens in developed countries, though, Leite's (2004, p. 84) research demonstrated that IT executives in Brazilian firms concentrate on operational objectives and are still far from fully obtaining strategic benefits. According to this author, "the executives' preference concentrates on projects that create cost reductions. There is a strong rejection of any projects that intend to improve the decision making process and the strategic use of IT".

Leite (2004) also states that the scenario for investments in IT has two major components: one is quantitative and relates to the reduction of costs category; being used for the optimization of operational capacity. The other concerns the expansion of operational capacity and involves improvements in the decision process and the strategic use of data. Criteria used to justify this second category of investment tend to be purely subjective, which means that the figures created for supporting this second option are very weak, when exposed to discussion; increasing the chances of project rejection.

The pharmaceutical industry has very few alternatives for improving its profitability. According to Falk (2005, p. 130),

> In order to increase profits, pharmaceutical companies can use three different strategies: increase the price, increase the volume of sales or decrease costs. The first option is unfeasible, though, because the sector is being very closely watched by the Brazilian government, which controls the market in a very strict way. The alternatives that are left are to increase sales of prescription drugs and/or to control costs, eliminating operational inefficiencies.

Falk (2005, p. 130) also states that "just using computers doesn't mean that they necessarily create a competitive advantage." He argues that "it is very difficult to encounter companies in the pharmaceutical industry that are thoroughly integrated, internally and/or externally".

The government has imposed the obligation of traceability on the pharmaceutical sector, which has to track the products it commercializes during its whole life cycle. According to Dyer (*apud* EAN BRASIL, 2007, p. 1), traceability "is the ability to trace the history, application, use and location of each individual product [...] by means of identification numbers that are printed on the merchandize".

Traceability is required for the patients' safety and as a protection for the whole pharmaceutical value chain, in any part of the world (HARRISON, INABA, 2006). As a consequence of traceability, the Brazilian pharmaceutical industry generates data on more than 1.65 billion units of products, while they are moving along the value chain. Such data is used to enable a fast recall, should problems be discovered with any medicine, but it can also be used to locate fake or stolen products. These are possible operational uses of data for the industry. But such data can also be used more strategically, for laboratories to decide upon their desired positioning in the market and the measures that are required to achieve that, as one example. Based on an analysis of the company's market share in a specific market, it can formulate tactics and/or strategies to improve its performance.

Rezende and Abreu (2001, p. 168) noted that policies which relate to knowledge, belong to the group of "strategic policies that are created by the upper management...", which differ from those "operational policies that guide the daily routine and basic procedures within organizations. As a result of strategic policies, information policies are also created, which influence and include information systems".

In an unfavorable analysis of the pharmaceutical industry, Falk (2005, p. 117) says that "few experiments are currently being carried out with web services, especially with respect to activities related to the company core businesses". Falk also says that the available IT alternatives for this industry focus specifically on cost reduction, but this statement is refuted by the evidence that was collected based on this current research project, which will be discussed later on in the section that analyzes the interviews given by the specialists.

Next, the methodological procedures that were adopted are briefly presented.

3. METHODOLOGICAL APPROACH

Empirical data was obtained by means of semi-structured interviews that were carried out with key executives from the pharmaceutical industry, companies that gather and provide the industry with the required information for traceability, representatives of associations of laboratories and wholesalers and other specialists. The following people were interviewed:

- participant 1 – president of Interfarma (Association of the Pharmaceutical Research Industry), an association that involves more than 90% of the pharmaceutical laboratories that commercialize patented products and more than 60% of brand medicines in Brazil;
- participant 2 – president of Abafarma (Brazilian Association of Pharmaceutical Wholesalers), an association that represents a group of 20 companies that distribute more than 60% of the medicine (number of units) sold in Brazil;
- participants 3, 4 and 5 – directors of companies that provide the technological means for the data/documentation flow among the pharmaceutical value chain, i.e., Value Added Network (VAN) service providers – the authors interviewed executives of two of the three companies that perform this kind of service in Brazil (Tivit and Genexis) and an executive from a third company that intends to enter the market in the second semester of 2007;
- participants 6, 7 and 8 – executives working in the pharmaceutical laboratories' intelligence area, who asked to maintain confidentiality about their companies' and their own identities.

The authors chose to use a qualitative research tool – semi-structured interview – because the number of participants (specialists in the field) was small and the flexibility provided by this method would allow additional questions for the participants to be included, whenever the interviewer considered it suitable.

The information resulting from these interviews was compared with relevant literature on this theme. In some cases, it supported the ideas of other researchers and, in other circumstances, it conflicted with their conclusions.

4. ANALYSIS OF THE USE OF TRACEABILITY DATA BY THE PHARMACEUTICAL INDUSTRY IN BRAZIL

The pharmaceutical industry's income over the period from February 2006 to February 2007 was approximately 11 billion dollars, which resulted from sales of 1.65 billion units of medicine, according to Febrafarma (2007). Table 1, below, which was extracted from Febrafarma's (Brazilian Federation of the Pharmaceutical Industry) web site, demonstrates the sales of the industry over the last 10 years.

Table 1 – Sales of the Brazilian pharmaceutical market

Year	Sales in US$ 1000	% variation	Base index: 1997=100	Sales in 1000 units	% variation	Base index: 1997=100
1997	8,537,436	-	100	1,854,094	-	100
1998	8,660,434	1.44%	101.4	1,814,337	-2.14%	97.9
1999	6,537,763	-24.51%	76.6	1,778,800	-1.96%	95.9
2000	6,705,678	2.57%	78.5	1,697,822	-4.55%	91.6
2001	5,685,430	-15.21%	66.6	1,640,251	-3.39%	88.5
2002	5,200,494	-8.53%	60.9	1,614,825	-1.55%	87.1
2003	5,589,133	7.47%	65.5	1,497,883	-7.24%	80.8
2004	6,818,295	21.99%	79.9	1,652,125	10.30%	89.1
2005	9,214,189	35.14%	107.9	1,613,828	-2.32%	87
2006	10,891,621	18.20%	127.6	1,664,272	3.13%	89.8

Note: the data for 2003, 2004 and 2005 was rectified by Grupemef.

Source: FEBRAFARMA (2007)

According to Febrafarma, Brazilian laboratories take 39% of the pharmaceutical industry's income in the country, while the other 61% relates to foreign companies that also play the local market. In Brazil, the average price (per unit) of medicine is US$6.50, when it leaves the laboratory, but it reaches the consumer costing US$9.40. Prices and profit margins are controlled by Anvisa, which was created specifically in order to authorize price increases, involving the country's Minister of Treasury, the Minister of Health and the Minister for Chief of Staff.

Figure 1 reflects the information and material flow in the pharmaceutical value chain. Upon examining, one realizes that the 1.65 billion units of medicine are spread through more than 110,000 points of sale, including pharmacies, bars and even warehouses, in some cases.

There are more than 100 thousand outlet sales points that purchase medicine from wholesalers and distributors for the Brazilian pharmaceutical market, 45 thousand of which are pharmacies or drugstores. Medicine is also sold by the pharmaceutical laboratories directly to large pharmacy chains, which are responsible for more than 4 thousand outlet points of sale in the country. Hospitals represent 2 thousand outlet points of sale. The federal, state and local governments are also intermediaries in this supply chain. The pharmaceutical laboratories have to keep track of products that they sell to all those customers, in order to be able to quickly recall products that present any potential risk to the consumer population. The traceability effort generates a lot of data that is used for the operational purposes for which it was originally intended, but also offers important information that can be used for tactical and strategic decision making, which is the major interest of this research project.

It can be observed in figure 1, that the industry has complete control of the destination of all products when they leave the laboratories. According to participant 2 (Abafarma), whose associates are responsible for 90% of the medicine distribution in Brazil, all invoices, except those issued by pharmacies and pharmacy chains, include each medicine's batch number. This occurs when products pass from the laboratories to the wholesalers and other agents, but also from the wholesalers to drugstores.

Figure 1 – Pharmaceutical industry value chain
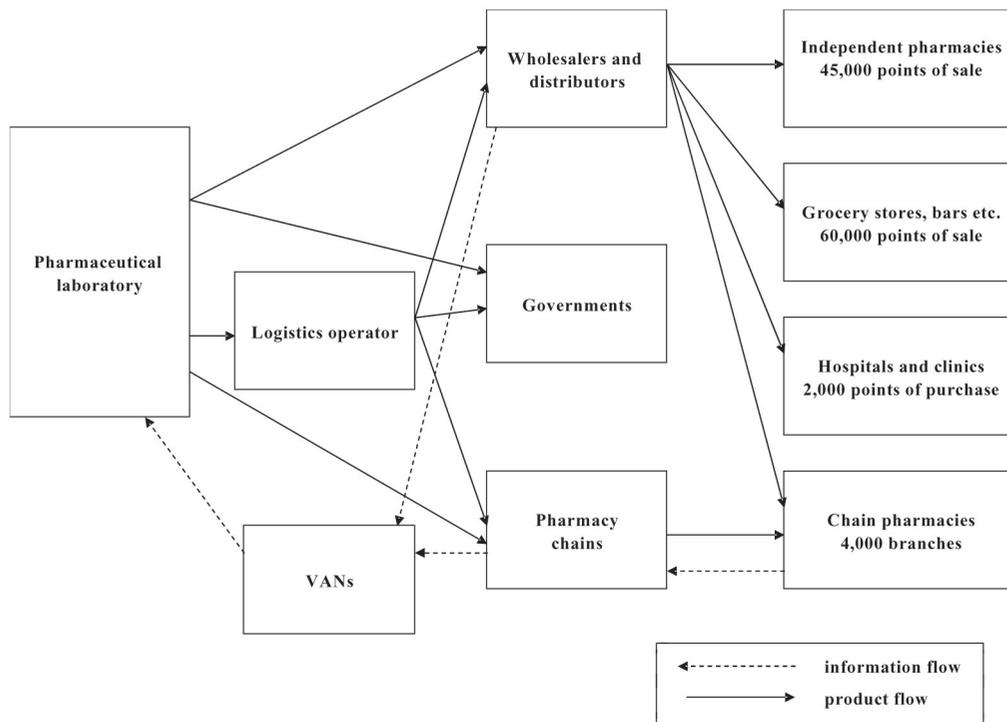
Source: produced by the authors of this paper, based on information provided by the interviewed specialists.

5. VALUE ADDED NETWORKS (VANS) OPERATING THE INFORMATION FLOW IN THE BRAZILIAN PHARMACEUTICAL INDUSTRY

Since the 1970's, there are companies that collect data from the market for the pharmaceutical industry in Brazil. According to participant 5 (VAN executive), the first of those companies to operate in Brazil was IMS Health, an affiliate of Dun & Bradstreet. In the 1990's, Servix was founded, which later became Genexis. Lastly, Proceda created a division (Tivit) to collect process and organize such data, so that it could be converted into information for its customers' decision making.

The opportunity that existed for the last two companies mentioned above (Genexis and Tivit), according to participant 5, related to the fact that IMS was slow in collecting and validating data, with delays of over 90 days from collection to the day the information was made available to the industry. Another discouraging factor, with respect to the services offered by IMS, was its high cost. Servix started offering the same data, just two days after collection and by means of on-line processing. Then, Proceda, which was interested in the EDI business orders, entered the business, providing services compatible with those offered by Servix.

In spite of the poorer service and higher price of IMS, most multinational laboratories use their services due to insistence of head-office, as that company operates in many markets and the information it provides is internationally acknowledged, being used for global benchmarking. But many also buy the information provided locally by Genexis or Tivit, because it is much more up-to-date (in August 2006, Genexis was purchased by IMS).

According to participant 6 (marketing intelligence executive), prior to Genexis' acquisition, Tivit had 19 customers and Genexis had 20.

According to participant 2 (Abafarma), the above mentioned companies trace all prescription drugs sold by large laboratories in the country, as well as all over the counter (OTC) products, also known as free sale products. On the other hand, the control of generic medicine (traditional formulations sold without the support of a strong brand) is not so accurate, because often manufacturers sell straight to distributors and/or pharmacies and that is not tracked by the VANs. Also according to participant 2, the commercial policy of those laboratories generally involves large discounts and bonuses that they prefer to keep as a commercial secret, which would otherwise be lost if the information were available to the VANs.

Participant 3 (VAN executive), one of the executives of the EDI (electronic data interchange) service provider states that the company works for more than 40 laboratories, which use the system to receive orders. This connectivity model has been used in Brazil since the 1990's and, although criticized due to the inflexibility of the data transfer format, which doesn't allow for negotiations order by order, its use is increasing at a fast pace by laboratories that have more than 70% of the market share.

Orders are collected in electronic mail boxes that are maintained by the laboratories for the VANs, which authorize them to be invoiced by the warehouses of the logistics service providers. Furthermore according to participant 3, the rule is that this process does not to require any human contact for orders and invoicing, except when credit problems occur or when there are not enough stock available to meet the demand.

Wholesalers, distributors and pharmacy chains are required to identify each product, the form of presentation and its batch number in the invoice details. Therefore, a box that was delivered by the laboratory (secondary packing) is opened; the products are separated according to the unit of sale and re-labeled with a code created by the distributor, which can be read by electronic means, allowing for automatic scanning. Such an operation, which has to be carried out in order to meet legislative requirements, may create errors during warehouse handling and jeopardize the whole system, according to participant 8 (marketing intelligence executive).

Participant 1 (Interfarma) ignored the possibility of mistakes that could be introduced in the re-labeling process as to be of no great concern. But he revealed that during 2007 the system will be replaced by a more sophisticated one, which addresses safety issues. By means of the new system, each unit of merchandise will leave the manufacturer with the batch number physically assigned to it (printed on the box) and not as a box lot.

When the wholesalers and the warehouses of large chains send products to the various destinations which they supply, they generate invoices which include a great amount of data. They contain information on the customer, such as name and address, the number of units of each product that was sold, the way such products are bundled, manufacturing batches, prices and other less relevant data. Such data can be very useful, when collected in a systematic way, for the interested parties for formulating and implementing more solid marketing strategies.

6. INFORMATION FLOW IN THE PHARMACEUTICAL INDUSTRY AND DECISION MAKING

According to participant 2 (Abafarma), data is sent by the wholesalers to the VANs, on a daily basis. Pharmacy chains sometimes transmit data once a day, and at other times, once a week. Such data is processed and made available to the parties in the mail boxes that the VANs provide in their web sites.

After the data is available in the mail boxes, it can then be accessed by the marketing intelligence departments of several players in the market. They start extracting the data and interpreting it, according to participant 4 (VAN executive). Figures will start to gain significance, as they directly relate to a certain context, which can be analyzed from several different perspectives (time, geographical, product type etc.). That information allows for tactical actions to be taken, because it is up-to-date and relevant to executives within the field, who can react to it immediately. However, a more detailed and overall analysis will assist product or marketing executives to use this information to modify or consolidate strategic moves.

The industry is currently working with information that is only one or two days old, which allows it to act with operational precision on specific markets or clusters that did not respond as expected in accordance to previous sales or marketing efforts. Any situation for which the results are different to those expected, can be quickly analyzed, so that the required measures can be taken. Several of the executives who were interviewed (participants 1, 3, 6, 7 and 8) said that the information made available by the VANs is used by regional and district managers of the pharmaceutical companies to check the performance of their respective territories and customers for which they are responsible. Based on this, they can tactically act in a dynamic fashion because they are in the field. In fact, frequently they will check their performance from their notebook computers, whilst out in the field. Taking measures with the purpose of increasing sales is an expected consequence of having the information in the hands of managers who understand the peculiarities of the specific markets with which they are involved in their day-to-day routine. However, according to participant 4 (VAN executive), the industry lacks professionals capable of suitably dealing with the data in order to do what is really necessary, in real time, but with a broader view of the overall market in mind and a longer term perspective.

All participants agree that large pharmaceutical companies formulate their strategies based on the data that is collected along the value chain and on their analysts' conclusions from such data. Many emphasize the fact that different departments have access to the data when they plan and formulate their budgets.

Participant 1 (Interfarma) highlighted the fact that the main users of the data during the year are marketing managers and directors and, in some companies, the so called product managers. Those executives are the major formulators of strategies for products or lines of products.

However, the model is criticized by participants 2 (Abafarma) and 5 (VAN executive), who consider that:

1) The sales data refer to the retail agent, i.e., the pharmacy, hospital, clinic or other intermediary that deals with the end customer. Ideally, it would be better if the information related to the consumer, or at least when they accept to be identified;

2) Analysts capable of creating relevant information directly from the raw data collected from the transactions along the value chain are scarce. In addition, and as a result of that, turn-over is high; as such, professionals are disputed for within the market. The number of companies interested in that kind of analyst grows faster than the number of professionals who have awareness for the field problems and are prepared to carry out sophisticated analysis based on transactional data from within the industry.

The criticism contained in item 1 continued. The data that the wholesalers provide only identifies the retail outlets: pharmacies, hospitals or even grocery shops. In the United States, there are companies called pharmacy benefit managers (PBM), according to Falk (2005), who manage information on patients. Those companies provide services for insurers, clinics and the pharmaceutical laboratories, mainly because they are responsible for dealing with refunds, which provides them with data on pa-

tients and their relationship with the insurance companies. According to participant 5 (VAN executive), this model will eventually be implemented in Brazil, in the future but it is difficult to determine when because the insurance industry is still expanding and for the moment, it has other more important concerns. The pharmaceutical industry, on its own, will not go any further in that direction because it already has other mechanisms that supply it with the required information to improve customer fidelity. There are specialized service providers that collect such information and make it available to the industry, among which E-Pharma and Prev-Saude deserve mention for using CRM (Customer Relationship Management) technologies for that purpose.

The second complaint is difficult to solve in the unanimous opinion of the participants, because the market intelligence analyst is a very complex professional, who needs to understand the data on its own, but also take it into consideration within the specific context, which makes him/her very difficult to procure in the market. The competence of the market intelligence analyst goes far beyond the ability to just interpret the data using statistical tools. His/her evaluation depends on contrasting the data with specific characteristics of the market that are only known to those who have dedicated years of work experience to the field, such as the consumers' purchasing power, relevance of government action, isolated movements of the competition, performance of the retailers and wholesalers, and so on. Competence in that area also results from the professional's ability to "identify market trends", as mentioned by participant 7 (marketing intelligence executive).

Another interesting issue is that, as shown in Figure 1, the government requires all players to trace their products in the pharmaceutical value chain, but the government itself doesn't do it, when it distributes pharmaceutical products to public hospitals and other assisted organizations. That is the cause of mistakes and excesses, which are frequently denounced by the press. We weren't able to find out, in this study, what the reasons are for the government not to participate in the traceability effort performed so efficiently by the private pharmaceutical sector.

Falk (2005) criticizes the pharmaceutical industry value chain, stating that "the level of competition among wholesalers is so intense that it doesn't contribute to the establishment of partnerships and agreements between the companies within the supply and demand chain".

This is a very complex issue. Falk (2005) suggests that a model similar to that adopted in other countries could be successfully implemented. But he forgets some important characteristics of the Brazilian pharmaceutical distribution market. According to participant 2 (Abafarma), there are more than 300 distributors and wholesalers of pharmaceutical products in Brazil, but only 20 of them, plus 25 pharmacy chains, respond for 90% of the prescription drugs sold in the country.

The North-American distribution model locks in pharmacies and hospitals, by means of permanent contracts and consistent partnerships, according to participant 7 (marketing intelligence executive), differently to the Brazilian model, in which open competition prevails. That situation makes it less interesting for buyers to sign an exclusivity contract which implies having to always buy from the same source. Laboratories do not guarantee exclusiveness to their wholesalers, upstream, and neither are drugstores exclusive to them, downstream. Facing pressure from both ends, it is difficult for the wholesaler to act as an "orchestrator" for the value chain, as intended by Falk (2005). Therefore, laboratories maintain control of the value chain as they have traditionally done so.

7. CONCLUSION

The analysis of the information flow throughout the pharmaceutical industry, based on the interviews that were carried out with key professionals in this sector, shows that those who consider the traceability information is poorly used for decision making are mistaken. The pharmaceutical industry created a sophisticated data network, which provided it with an important and very sophisticated data source for tactical and strategic decision making, even before the government determined that drugs needed to be traced during their entire life cycle. The availability of such information to all interested parties along the value chain improves operational and strategic coordination of efforts among those that manufacture (laboratories), those that are involved with the logistics (logistics operators, wholesalers, distributors, pharmacy chains and government) and those that sell or make products available to consumers (independent pharmacies, chain pharmacies, grocery stores, hospitals and clinics). In fact, no other industry in the country has so much information about where, when and which products are selling, at such a high level of detail and so easily available, according to the authors of this paper.

Traceability could have resulted into an additional burden for the pharmaceutical industry due to the impositions set by the government, if the infrastructure for the collection and handling of such information needed to be built from scratch. However, it was already in place and the collected information was generally used to support sales all along the value chain much before the approval of medicine traceability and the creation of Anvisa, which happened just a few years ago. Therefore, the legislation only reinforced something that was already a regular market practice and regulating its mandatory use for all laboratories; increasing safety in case of recalls or fraud, allowing products to be quickly withdrawn from the market, whenever necessary.

The data generated for traceability purposes can be (and is) organized for other uses. The specialists who were interviewed during the preparation of this paper were not totally unanimous with respect to the use that companies make of the information they have in hands. The majority of them agreed that operational and strategic decisions are taken based on such information. One of the participants, however, did raise the fact that analysts who can make good use of this information for strategic reasons are very scarce in the market. In his opinion, the main use is still primarily tactical (sales support focusing local/specific markets).

VANs are used as data storage centers which provide data and technology used by market players to evaluate and determine their course of action. In spite of the lack of agreement about the extent to which such information is used for strategic decision making, it became clear that pharmaceutical companies do use traceability data as a tool to refine their sales actions and other promotional activities in specific locations. This is a tactical application of such information which is used by sales departments, but it is also available as an input for their strategic marketing considerations too, when their market intelligence sectors try to depict and understand data patterns in order to make long term planning.

The evidence that was collected here conflicts with two of Falk's (2005) findings. Firstly, this author describes the pharmaceutical industry's supply-chain as poorly structured and little intensive in the use of IT. He argues that there is little use of information as a key element for strategic decisions. Following this current study our impression is exactly the opposite.

The pharmaceutical industry molded its market into a format that helps it take tactical and strategic decisions. Based on the information extracted from the wholesalers' invoices and internal transfer bills (in case of pharmacy chains), collected by the VANs and made available to the whole industry, companies only need to put in some analytical effort to convert data into useful information for their decision making processes.

Falk's (2005) second statement which is also not supported by our findings in this current research is that IT information in the pharmaceutical industry focuses on peripheral issues and is only concerned with cost reductions. This is not what one concludes from the interviews just carried out with key professionals in the pharmaceutical industry. Participants were unanimous when they said that collected information is used for strategic decisions, in spite of the disagreement with respect to the quality of the analytical results which are made from this data.

In accordance with McKenna's (1998) perceptions, companies seem to be converting into real time enterprises. Information is readily available and organizations have the chance of immediately responding to changes within their work environment. Those that take their chance and develop internal skills to enable quick analysis of the signals that are coming from the market will develop business strategies that are better suited to the market's needs and therefore build a competitive advantage that will be difficult for others to match.

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