

Managing Strategic IT Adoption

EDI at Leroy-Merlin: A Standardized Success?

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Abstract

Leroy-Merlin is the second-largest distributor of Do-It-Yourself products in France and is part of the international Auchan group. The company procures its goods from about 1,000 regular suppliers and sells them to end-consumers through the 59 company-owned outlet stores. In 1988, initially aiming at improving the operational efficiency of processing its purchase orders, Leroy-Merlin began installing an EDI application based on the standardized EDI-service 'ALLEGRO'. The case discusses the implications, benefits and drawbacks of adopting such a standard from a medium-sized company's perspective. It also highlights future development opportunities for the current system with respect to the number of integrated partners as well as its functional and geographical scope.

Industry Overview

The Do-It-Yourself (D.I.Y.) sector¹ in France mainly exists in the form of average-sized stores developed by independent companies such as

M. Bricolage and Bricomarché, and specialist superstores including Leroy-Merlin and Castorama. There are currently 1,772 D.I.Y. stores and superstores of at least 400 square meters with Castorama and Leroy-Merlin owning respectively 14 and 6 of the 20 largest D.I.Y. superstores.

The French D.I.Y. market is undergoing some changes. On the one hand, market leaders such as Castorama and Leroy-Merlin, who seldom operate with a shop floor space of less than 10,000 square meters, have been strengthening their position; on the other hand, the number of stores in urban locations with floor space ranging from 1,500 to 3,000 square meters is expanding dramatically. Market growth is supported by the fact that 61% of the population want to improve/decorate their homes; over 12 million households need partial renovation; a total of 7 million housing units do not meet their occupants' furnishing requirements; and 1.5 million housing units require complete renovation.²

Company Overview

Leroy-Merlin, a family business founded in 1965 and now part of the Auchan group (one of France's largest hypermarkets),³ is a distribution company of D.I.Y. products with administrative and operational headquarters located in Noeux-Les-Mines, in the north of France. It employs 6,000 people: 400 employees are based in the corporate headquarters and 5,600 individuals work in the 59 company-owned outlet stores where they sell directly to customers. The average area of a Leroy-Merlin store is 7,500 square meters, representing more than 60,000 references and 30,000 check-outs per month. The company's products can be divided into several categories, such as electrical appliances, tools, sanitary products, paints, and plumbing products. Says Christophe Dubrulle, Leroy-Merlin's General Manager: 'From a mass market, we have moved on to a multi-specialist market, thus meeting the expectations of a new generation of D.I.Y. enthusiasts. Today, Leroy-Merlin offers millions of customers a wide range of products for D.I.Y., building, decorating and gardening.'

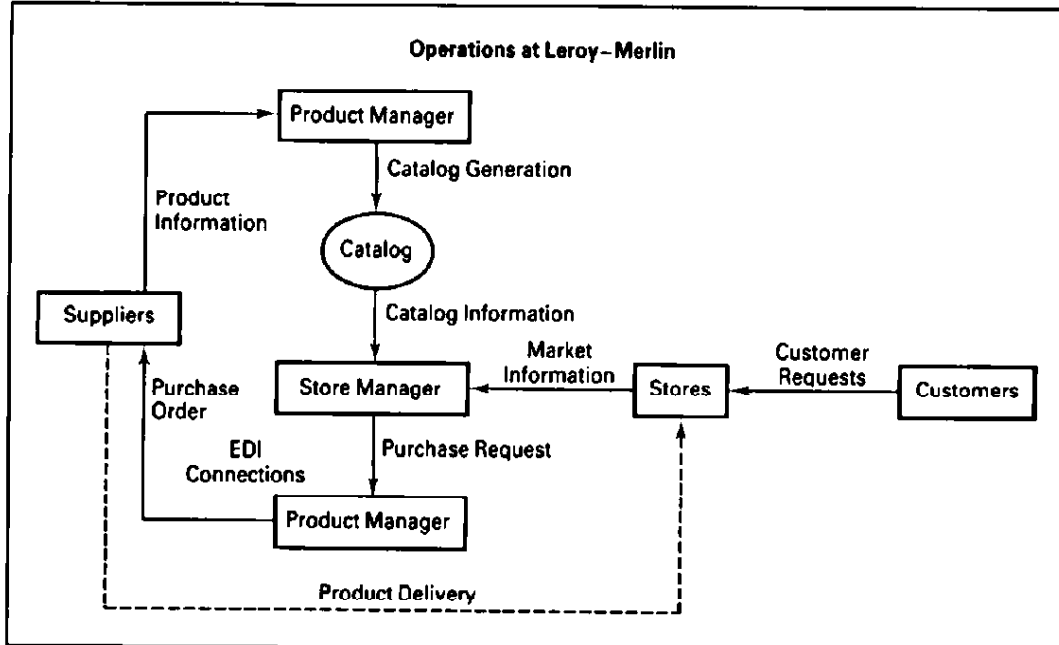
Leroy-Merlin does not manufacture any of the products it markets; it buys them from about 4,000 suppliers, including 1,000 suppliers with whom it deals on a regular basis. Ninety percent of the suppliers are located in France with the remaining 10% in Italy, the UK, and Taiwan.⁴ The main competitor is Castorama; it has a slightly larger market share and operates in a similar fashion. Leroy-Merlin stores exist mainly in France; however in 1989, the company started doing business in Spain where it now owns 3 stores. Sales in 1984 were about FF 3 billion and are expected to reach FF 6 billion in 1992.

The Information Technology (IT) Department is a centralized function based in Noeux-Les-Mines and employing 50 people. The IT infrastructure at Leroy-Merlin is well developed; it was a key factor in the implementation of the Electronic Data Interchange (EDI) application which required three internal IT professionals. The company outlet stores extensively use bar code scanning both at the point of sale (POS) and at the merchandise delivery level. The scanned information is stored in each store on a back-office computer and is used for generating stock control and purchase requests generation. All stores information is forwarded to the IT Department's centralized database where it gets analyzed, then all related management and accounting functions are performed.

The Business Process under Consideration

Exhibit 1 shows Leroy-Merlin's operating procedure for product purchase and distribution. Each product manager is responsible for one or more product categories and selects a suitable range of products from the suppliers. All selected products are assembled in a catalog which is then forwarded to each store manager. The store manager chooses from the

Exhibit 1 *Operations at Leroy-Merlin*



catalog a set of products that is best suited to the needs of the local market. This selection list is sent electronically (however not yet in EDI standard) in the form of a purchase request to the headquarters which act as a focal point for products ordering. The 59 stores are connected in real time to Leroy-Merlin's computers in Noeux-Les-Mines. Once the purchase request is received, the product manager sends the purchase order either by post or electronically (via EDI)⁵ to the supplier, depending on whether or not the supplier is connected to the EDI network. This process is done in batch mode at the end of the day.

The EDI Project

The Beginning

The idea to use EDI originated in 1988 from middle-level IT managers. During the decision process, Leroy-Merlin's IT manager did not really consider the possible strategic impact of the project, but rather focused on how EDI could benefit the company in its daily operational work. The main expected benefits consisted of reducing:

1. paper and administrative work
2. lead time and inventory
3. data input and transmission errors.

The repetitive strikes and long delivery time by the postal service caused high lead times, making the overall ordering process inefficient and totally dependent on the PTT. There was pressure from the stores to send purchase orders to suppliers in a more timely fashion and more accurately. Moreover, some high volume suppliers have expressed an interest in EDI.

Top management was not initially involved in the project for two reasons. First, EDI did not appear to have strategic implications. Second, the implementation budget was relatively small (FF 50,000) and therefore did not need top management approval. Once the project was successfully implemented, it was 'sold' to the product managers.⁶ Very soon all of them recognized the potential benefits of the EDI application and subsequently promoted it within the company. This resulted in a *posteriori* top management support and even push for further EDI development. Product managers also showed enthusiasm for and interest in pursuing EDI.

The Implementation Process

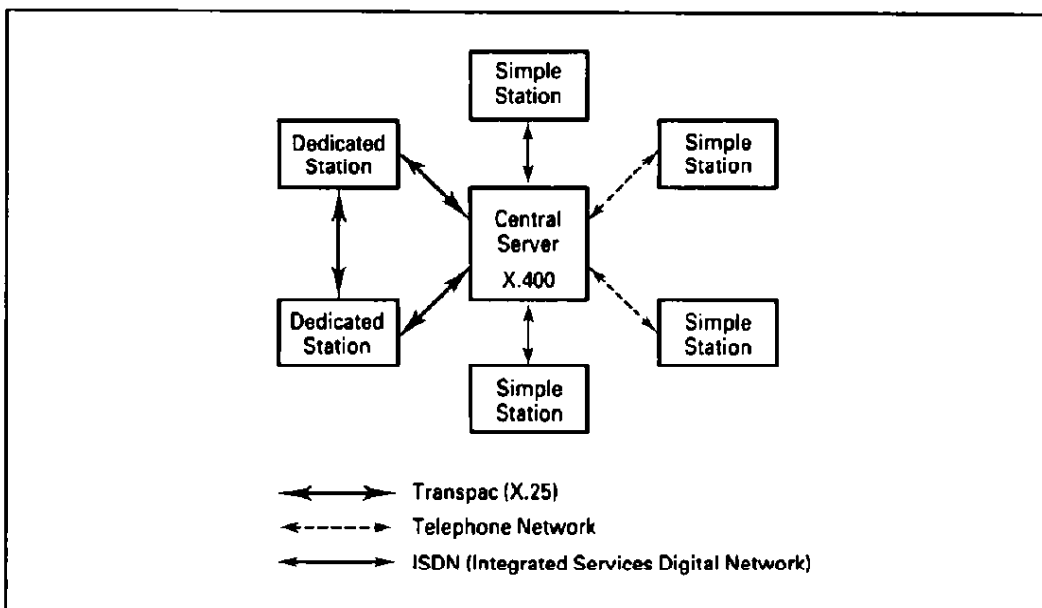
Adopting a Standard

The main factor in the implementation process was the choice of the network and the EDI standard to adopt. The availability and widespread use in the industry of GENCOD⁷ and ALLEGRO⁸ have convinced Leroy-Merlin to select this system platform. Probably Leroy-Merlin would not have started such an EDI project if there had not been any standard third-party network and EDI services available.

ALLEGRO can be accessed through various methods: the X.25-based Transpac network,⁹ the telephone network and the Integrated Services Digital Network (ISDN) – see Exhibit 2. The choice of the network mainly depends on the volume of transactions between the two business partners. Most companies have adopted the telephone network, unless they were already connected to an alternative network (Transpac or ISDN).

Two types of PC stations can be used: a dedicated station or a general-purpose one. The former may be used if the receiver, also equipped with a dedicated station, wants to receive messages directly without having to connect to the central server. For the latter, sending/receiving messages can only be done through the central server.

Exhibit 2 ALLEGRO: access methods



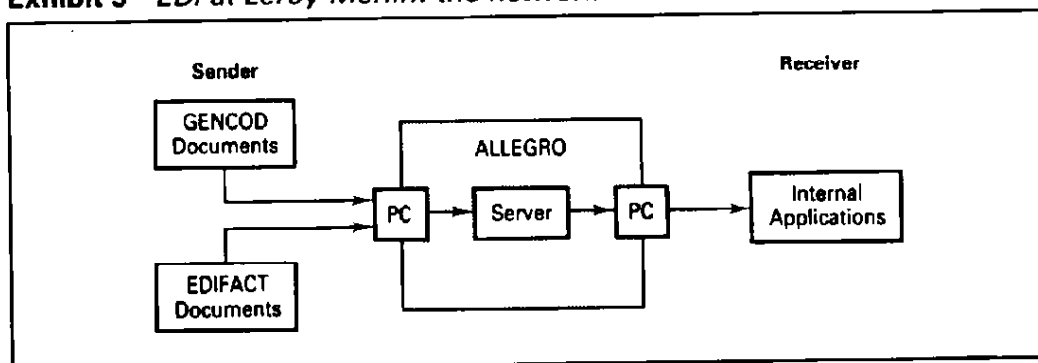
In addition to subscribing to the ALLEGRO service, companies need to build a front-end interface to their internal information system. Such an interface can either be purchased or developed in-house. As soon as those two steps are accomplished, the EDI link becomes fully operational. The only remaining task for a company such as Leroy-Merlin is convincing/motivating its business partners (e.g. the suppliers) to also adopt the system. ALLEGRO has been used in a variety of industries; however, it is mostly adopted in the D.I.Y. sector with a penetration rate of about 40% of all EDI users in this industry.¹⁰ Through ALLEGRO, a user (e.g. Leroy-Merlin) sends formatted messages as specified by either the GENCOD or EDIFACT standards. These messages get transmitted to an ALLEGRO 'mailbox' from where the receiver (such as the supplier) retrieves them for internal processing (see Exhibit 3). To date, 12% of ALLEGRO traffic consists of EDIFACT-based messages.

First EDI Partners

At the beginning, Leroy-Merlin selected some suppliers as its first EDI partners for the project. It chose the ones for whom EDI would be most valuable both from a supplier and a customer perspective. To do so, Leroy-Merlin ranked its suppliers in order of importance; the criterion used was not the purchase value to the supplier but rather the total number of purchase orders and the number of product lines per order. Each product line corresponds to an order of one product with a specified quantity, delivery date and estimated price.

Leroy-Merlin was able to convince the suppliers with whom it has a high number of orders to switch to EDI due to the foreseeable benefits of reducing

Exhibit 3 *EDI at Leroy-Merlin: the network*



input errors and processing cost per order. At the beginning, Leroy-Merlin reached an agreement with a couple of suppliers in order to jointly install and test the system. For a period of 2–3 weeks, both EDI and the traditional paper-based approaches were used in parallel. As soon as the validity of the EDI system was 'proven', the traditional procedure was abandoned.

Resistance towards the EDI Project

In spite of the successful introduction of the system with some suppliers, the project faced some external resistance from other suppliers. These had limited product lines and thus received only a few purchase orders from Leroy-Merlin. Therefore, they were not motivated to switch to EDI mainly due to the cost involved (FF 20,000 to FF 60,000). Furthermore, many suppliers who were in the middle of restructuring their information systems were reluctant to adopt EDI because of the incompatibility with their existing IT platform. Others were already connected to other systems such as ATLAS 400,¹¹ General Electric's Information Service or IBM's Information Network¹² and were less inclined to implement EDI through ALLEGRO as promoted by Leroy-Merlin. Product managers were assigned the task of convincing their suppliers to adopt the EDI system; the time they spent on this task greatly varied. Says Patrick Fontaine, Manager of the EDI Project at Leroy-Merlin:

Only about 20% of our time was needed to install an interface between the supplier and our headquarters; we spent the remaining 80% convincing and motivating potential partners to hook onto the system. On average, a supplier accepts to adopt ALLEGRO within one month of the initial discussion. It usually goes well and quickly with those suppliers who designate a person to take care of this matter and be our contact. However, with some suppliers, it took as long as one year.

Only the medium-sized suppliers have easily accepted to adopt the EDI system suggested by Leroy-Merlin. The large suppliers often have too much weight and bureaucracy to accept EDI. The small ones do not have the IT infrastructure nor the skills to adopt EDI, and for them the solution is often a costly outside service. Although Leroy-Merlin does business with some suppliers who do not use EDI, several product managers have decided that, after a certain date and for certain products, they will deal only with those suppliers who have implemented EDI or are willing to do so shortly.

As far as internal resistance from Leroy-Merlin personnel is concerned, Patrick Fontaine says: 'EDI has not encountered much internal resistance.

This is mainly due to the fact that the EDI implementation has not yet changed the organization and the way people work. However, we expect that EDI might face some resistance in the future when new phases get implemented.'

Security and Legal Aspects

Security and legal aspects have not really been considered during the implementation. Explains Patrick Fontaine:

So far, there have not been any problems concerning those issues. This is mainly due to the high quality and reliability of the ALLEGRO service, which has several mechanisms in place to ensure data integrity. Both Leroy-Merlin and our distributors keep an electronic copy of the transaction which could be used to compare transactions and track errors and problems if necessary. Plus, as far as I know, within the last four years, there has been only one case where the central ALLEGRO server was down for about thirty minutes. Since we operate in batch mode, this incident did not have any dramatic impact on any participant's operations.

The System at Work

At Leroy-Merlin a dedicated PC is linked at one end through Transpac to the ALLEGRO server and at the other end to the main computer of the company. It allows Leroy-Merlin to send data directly from its information system to the suppliers' mailboxes on the ALLEGRO server, and to retrieve data from their mailbox on the ALLEGRO server to the company's computer. At the supplier site, another PC plays a similar role to that of Leroy-Merlin. Some suppliers have not yet linked the ALLEGRO PC to their own information system and therefore have to enter the data manually.

For the time being, Leroy-Merlin has only implemented one EDI service, namely the electronic processing of purchase orders. The sequence of operations is fairly simple. Once the purchase order is generated on Leroy-Merlin's information system, it is formatted using the appropriate GENCOD standard and sent, via the PC, to the supplier's ALLEGRO mail box. At regular time intervals, the supplier retrieves purchase orders from its mail box on the ALLEGRO server. If the supplier's ALLEGRO PC is integrated into the internal IT application, the order gets automatically transferred for further processing. Otherwise, the order data needs to be entered manually in the supplier's system.

However, not all Leroy-Merlin suppliers have, like Française de Métallurgie, a PC dedicated to ALLEGRO. Roussel as well as Cuivrierie Centrale, two suppliers of Leroy-Merlin, use a shared PC to connect to ALLEGRO. Says Mrs. Morand from Cuivrierie Centrale, 'We have been using the system for almost three years now. We cannot dedicate a machine to it, and that constitutes a drawback. Sometimes, we want to access our ALLEGRO mail box, but either our machine is used for other tasks, or we cannot connect to the server due to a busy line.' However in spite of this shortcoming Cuivrierie Centrale, like many other suppliers, is satisfied with the overall performance of the system and certainly does not want to go back to the previous paper-based operating procedure. The cost and time savings along with the added convenience are cited as being the major benefits of using ALLEGRO. Says William Ben Said, from Française de Métallurgie, 'Today, 15% of all purchase orders are electronically processed. We also send through the system delivery notices and, starting next March, it will be the invoices. There the cost savings will be tremendous: from FF 30-40 per invoice today to a fraction of FF 1.' Another benefit for some suppliers is freeing personnel previously in charge of keying in data. Says William Ben Said, 'We did not lay off people, but we assigned them to other tasks. They now deal with customers and help us sell more.'

However, the system has some drawbacks and constraints. Explains Mr. Ben Said, 'There are different norms and standardization is very slow. The ideal is to have one uniform system through which we can do business with all our customers and partners.' There is also a slight disappointment in the present number of system users. Adds Mrs. Léger, from Roussel Co.:

Like many other suppliers, we were 'pushed' by some of our customers to use ALLEGRO. We believed in the benefits that it gives and we thought that it would attract a lot of users. However, this is coming very slowly. Some companies have been confused by the different systems available out there; others preferred to take a 'wait and see' attitude.

ALLEGRO – The Use of a Standard in the Distribution Sector?

ALLEGRO versus ATLAS 400

GENCOD Corporation manages both the national product codification standard (also referred to as GENCOD) as well as the ALLEGRO service. This was an attractive feature for Leroy-Merlin since they have to deal with only one company. Had they chosen ATLAS 400, they would have ended up having two partners: Transpac Corporation (who manages ATLAS 400)

and GENCOD who is in charge of the product codification standard. Comparing the two systems, Miss Virgili from GENCOD Corporation says, 'ALLEGRO is a system specially developed for the distribution sector and is not a generalized system like ATLAS 400. I see this as an advantage; the drawback is that it runs only on PCs while ATLAS 400 also operates on minicomputers and mainframes.'

Choosing between a general-purpose system (such as ATLAS 400) and a sector-specific one (such as ALLEGRO) has some business consequences. Says José Gauvin from Transpac Corporation, 'You have to think about the access methods that a system provides. ATLAS 400 allows the use of different computing platforms as well as Telex, Teletex and Fax. The latter methods [which are also not supported by ALLEGRO] are especially important for users who are not subscribed to the system.'

Another differentiating factor between ALLEGRO and ATLAS 400 is the international connectivity of the system. Explains José Gauvin, 'A user abroad can access ATLAS 400 through the telephone network, INFONE1 or any public service that is based on X.400. For example, a subscriber to MCI Mail in the US or to TNS in the UK can access our system. Moreover, ATLAS 400 allows the use of both GENCOD as well as EDIFACT formats.'

In spite of the distinctive features (in terms of usage flexibility and functional capabilities) that ATLAS 400 offers, ALLEGRO is still the most widely used system in the distribution sector. Says José Gauvin, 'We are "bothered" by some sector-specific systems like ALLEGRO. This system must open up [to other existing ones]; technically, it can do it. A user subscribed to ALLEGRO should be able to communicate with those subscribed to other systems, e.g. ATLAS 400.'

Under the pressure of their customers, such as Leroy-Merlin, some suppliers had to adopt two or more different EDI servers. This was the case for example at Cuivrierie Centrale, where the company ended up adding a front-end interface to its system allowing it to access ALLEGRO and ATLAS 400, as well as other servers. Such an interface, usually developed by software houses, is the 'best' solution to the multiple-server problem and therefore it is becoming commonplace.

Advantages and Disadvantages of Adopting a Standard

The use of an industry- or sector-wide standard necessarily leads to a close linkage between Leroy-Merlin on the one side and GENCOD (ALLEGRO) on the other. The main advantage of such a close relationship is the use of EDI services without taking any risk in developing them. Through

ALLEGRO Leroy-Merlin has access to more business partners in the distribution sector than through any other system currently operational in France. However, such a relationship also has important drawbacks with major consequences for the strategic impact of EDI. Leroy-Merlin as well as other users of the standard are totally dependent on GENCOD, i.e. they cannot set the pace in the industry and therefore cannot get first-mover advantages. Since any competitor connected to the system can at any time use exactly the same ALLEGRO services (which Castorama did),¹³ the EDI system cannot provide a sustainable competitive advantage.

Costs of Leroy-Merlin's EDI Application

According to Leroy-Merlin,¹⁴ the EDI application costs that it incurred as well as those of its suppliers are as follows:

	<i>Set Up Fee</i>	<i>Monthly Fee</i>
ALLEGRO Subscription	FF 1,500	FF 250
Equipment:		
PC 286 ¹⁵	FF 9,000	
X32 card with integrated modem (ALLEGRO card II)	FF 7,000	
Windows 3	FF 1,790	
Subscription to Transpac X32	FF 370	FF 50
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	FF 19,660	FF 300

In addition to these expenses any participating company has to establish an interface between its ALLEGRO station and its internal information system. The development or acquisition¹⁶ cost for such an interface varies between FF 10,000 and FF 50,000.¹⁷

Benefits of Leroy-Merlin's EDI Application

Quantifiable Results

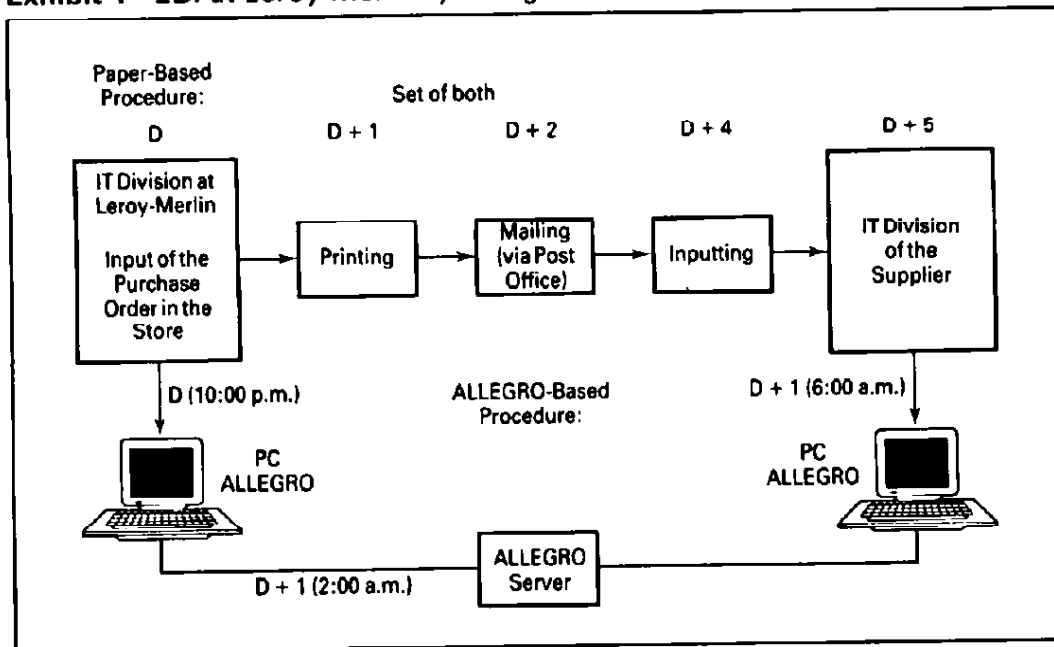
More than 50% of purchase orders are sent via EDI. Three years after introducing EDI, Leroy-Merlin has successfully implemented the electronic purchase order with about 160 suppliers. Although this figure represents only

16% of their regular suppliers, it refers to about 55% of the total number of order lines and about 30% of the total purchases value. Regarding future prospects, Patrick Fontaine thinks that about 300 of Leroy-Merlin's 1,000 regular suppliers are 'potential EDI candidates'.

Reduction of lead time between the order's entry at Leroy-Merlin and its acknowledgment by the supplier from an average of 5 days to about 1 day now (see Exhibit 4). This factor allows Leroy-Merlin to order more frequently and in smaller quantities. Thus it has *increased sales by 1% since the more frequent products deliveries* have led to less out-of-stock items. Furthermore the more frequent deliveries have enabled Leroy-Merlin to decrease its inventory levels, and thus to reduce working capital requirements. The company has also been able to save space for inventory. Beyond these quantifiable benefits, the reduced lead time has resulted in *offering an improved customer service* due to less out-of-stock items.

Furthermore Leroy-Merlin's EDI project has *reduced the cost of sending about 200,000 purchase orders per year*. With the traditional approach of sending orders via mail or fax, the average cost per order is about FF 3. The EDI system has significantly reduced this cost to FF 0.40. Therefore, although the number of orders has increased by about 15% due to the technical capabilities of the system and the convenience of placing an order through it, the total order cost has been significantly reduced.

Exhibit 4 *EDI at Leroy-Merlin: placing an order*



Qualitative Results

- *Less paper and administrative work.* EDI has reduced the amount of paper and administrative work, for example it is no longer necessary to put the orders in envelopes. The time spent on the phone with the suppliers has also decreased.
- *Independence from the postal service.* Not only has the lead time been greatly reduced, but Leroy-Merlin and its suppliers do not depend on the postal service any more, an important development given the frequent strikes in France.
- *No more data re-entering at the supplier's site.*
- *More reliability and accurate data.* Since data is entered only once, there are no longer various copies of the same data in use (no data redundancy).
- *No tangible effects on the organization.* At this stage, EDI has not changed the organization's structure and processes and has not affected the way people work.

Outlook and Future Issues

Leroy-Merlin works – with different intensity – on four main areas to further develop its EDI applications. Says Patrick Fontaine:

Our two main areas of interest are the number of connected suppliers and the scope of the integrated functions. We certainly count on a steady increase of the number and percentage of our suppliers connected to us via EDI. At the same time, we need to expand the functions and processes covered by our EDI system. To exchange only purchase orders was a good start, but by now it is time to integrate additional functions.

In the near future Leroy-Merlin intends to exchange with its suppliers, via EDI, the delivery bill and the product characteristics. For every new function, a new set of GENCOD messages must be created and therefore a committee has to approve it. For dispatch orders and electronic billing, standardized messages have been created. While the electronic exchange of the dispatch orders is currently not available due to the necessary organizational adjustment at Leroy-Merlin, ALLEGRO's electronic billing messages are still waiting for approval by the French taxation authorities.

Leroy-Merlin's final goal behind its EDI applications is to eliminate all repetitive tasks that do not add value. Says Patrick Fontaine, 'At each point

of sale the ideal would be to have salespeople spending 100% of their time taking care of our customers.'

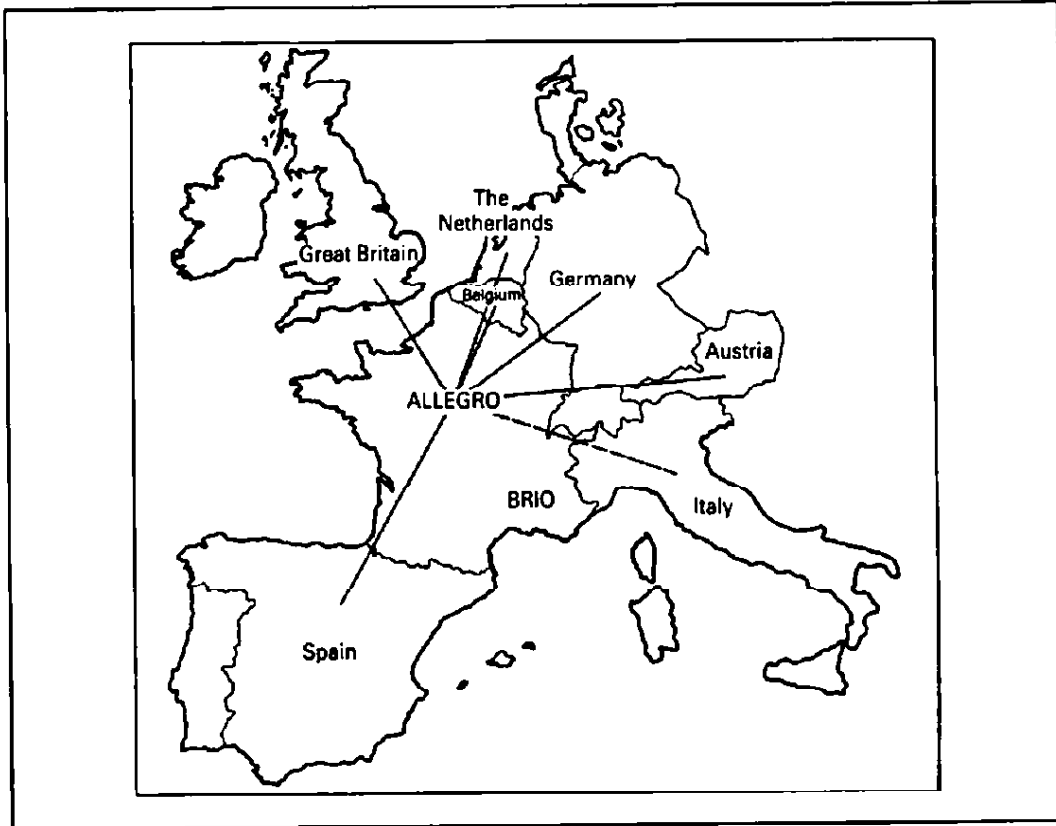
Another important development for Leroy-Merlin's EDI system is extending its usage outside of France. In this case, the messages are not transferred in the GENCOD format, but in the internationally common standard EDIFACT/EANCOM,¹⁸ which can also be handled by ALLEGRO. Says Miss Virgili, 'Using ALLEGRO abroad is not problematic. It can be done in two different ways: either through an ALLEGRO station based in the host country or by interconnecting the national systems, that is [linking] ALLEGRO with its foreign counterpart such as AECOM in Spain.'

To electronically exchange data with suppliers located in the Netherlands, Austria, and Belgium, local ALLEGRO stations were installed at each supplier's site (see Exhibit 5). For example, such a station is now available at ALLPAC INTERNATIONAL, a Dutch supplier of Leroy-Merlin. It allowed reducing the delivery time from 14 days to just 1 week. Today, ALLPAC INTERNATIONAL delivers directly from the Netherlands to Leroy-Merlin's 59 retail outlets. An even more ambitious project, sponsored by the European Community's program on Trade EDI Systems, is currently implementing an electronic interconnection between the French ALLEGRO system and its Spanish counterpart AECOM. A further development in this area concerns setting up INFONET, a Europe-wide electronic platform.

The last area to further develop Leroy-Merlin's EDI application consists of technical enhancements which are mainly beyond the company's control. One foreseeable trend for the next 3 to 5 years is Interactive EDI (IEDI). While current applications of EDI are usually batch-processed, future applications will allow a user to interrogate the partner's computer (up to some mutually agreed levels), and thus to further customize EDI applications with regard to timing.

Reflecting on the EDI project at Leroy-Merlin, Patrick Fontaine says:

I consider the EDI project at Leroy-Merlin as a clear success. It has achieved what we expected within a relatively short time frame (2 years) and with a small budget. Furthermore, I think, it shows that an EDI application does not need to be expensive and complex when it is well thought through and really tailored to the company needs. The incremental implementation process has proven to be the right one for our project. We have started with some of our suppliers and with only one electronic document, namely the purchase order. Although sometimes we are considered as being at the forefront of EDI in our industry, we think that we are certainly still in an early EDI stage and we have a long way to go in order to increase the level of integration, the number and types of transactions handled and the number of business partners.

Exhibit 5 *ALLEGRO: an international service?*

Executive Summary

Leroy-Merlin is a typical candidate for EDI since it has a large number of suppliers and executes numerous repetitive tasks and transactions. For the medium-sized French distributor of D.I.Y. products, the availability of a third-party network and the decision for the EDI service 'ALLEGRO' were crucial in taking advantage of the EDI technology when aiming at reducing cost and lead time. Adopting a standard instead of striving for an in-house development allowed Leroy-Merlin to implement its EDI application quickly, cheaply, and without risk. The biggest barrier to diffusion was some resistance from a number of suppliers who were rather reluctant to adopt the system. Future developments in terms of extending the functional and geographical scope of Leroy-Merlin's EDI application will have to follow the lines predrawn by the service provider ALLEGRO. Thus, the EDI success regarding operational efficiency is likely to be repeated and extended;

however, a competitive advantage due to EDI cannot be achieved since competitors have access to exactly the same service.

Notes

1. The D.I.Y. sector covers home repair and home care goods as well as gardening products.
2. Source: *Nachrichten für Aussenhandel*, April 14, 1992, page 6.
3. The Auchan group is established in France, Spain, Italy, and the USA. [Food: Auchan, Al Campo (more than 50 hypermarkets); Do-It-Yourself: Leroy-Merlin; Catering: Flunch, Pizza Pai, Pic Pain, Chandeleur; Sport: Decathlon; Electric Household Appliances: Boulanger; Textiles: Kiabi.]
4. Leroy-Merlin warehouses are decentralized throughout France; they cover altogether 45,000 square meters and 42,000 storage pallets. About 50 trucks deliver D.I.Y. products daily from these warehouses to the company's stores.
5. An internal interface transforms the electronic purchase requests received from the retail outlets into messages in EDI-standard.
6. Product managers are responsible for the commercial policy, reference marking, order generation and dispatching. They are also responsible for making the necessary improvements to fulfill customer needs.
7. GENCOD (Groupement d'Etudes de Normalisation et de Codification) is a private French institution that nationally provides product codes and offers the ALLEGRO service.
8. ALLEGRO stands for 'Automatisation des Liaisons avec les Langages EDIFACT et GENCOD par Réseau d'Ordinateurs'. It is an EDI service offered by GENCOD since 1989. ALLEGRO runs on a central server managed by the French computer company BULL.
9. Transpac is a public packet-switching data network that is used to connect the companies' computers to the ALLEGRO server.
10. *GENCOD Informations*, No. 44, July 1992, page 16.
11. ATLAS 400 is a publicly available electronic messaging system based on the X400 standard.
12. Although all these systems use the same GENCOD language, they are not interconnected, therefore requiring that a company subscribes to the same service as its trading partner.
13. Castorama, which originally decided to be on another system (ATLAS 400), decided later to be connected to ALLEGRO as well (due to the large number of suppliers connected to ALLEGRO). The number of Castorama's suppliers has not changed and they maintain the same business relationships with them.
14. Source: printed company information, distributed in 1992.
15. The PC can also be used for different tasks; it is needed only for approximately 5 minutes per day.
16. Leroy-Merlin provides its suppliers with contact information of software companies who offer such interfaces.
17. Source: company information.
18. EANCOM is based on the European Article Numbering (EAN) system.