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Enterprise Web portals for Supply Chain coordination: a case study

F. Garcia, B. Grabot

Laboratoire Génie de Production / INP-ENIT - Université de Toulouse
47, Avenue d'Azereix, BP 1629, F-65016 Tarbes Cedex – France

fabienne.garcia@iut-tarbes.fr, bernard.grabot@enit.fr

Abstract. The performance of the supply chains is highly linked with the quality of relationship between partners. Web portals are more and more used for facilitating this relationship, but the consequences of their implementation on real cases are still seldom analysed. Such analysis is provided in this communication, highlighting the interest but also the problems of supplier portals thanks to a questionnaire filled by more than 130 suppliers of a large company.

Keywords: Supplier web portal, supply chain, coordination.

1 Introduction

The use of the Information and Communication Technologies (ICT) is now quite mature inside companies, with the generalisation of the ERPs (Enterprise Resource Planning) systems), and in Supply Chains (SCs), with EDI (Electronic Data Interchange) and Internet as privileged communication tools [1]. The study of the influence of these tools on the relationships and quality of cooperation between customers and suppliers is as a consequence a field of growing interest. In this context, this communication focuses on the use of supplier web portals in a multi-site company of the high-tech sector, characterised by long cycle times, short series and high need of reactivity, in which each factory has to synchronize many suppliers. In that case, the diversity of size and culture of the partners, leading to quite different maturity levels towards ICT, considerably complicates the coordination between partners [2].

After a short survey on the role of ICT in integration and coordination of Supply Chains, we investigate the case of Inter-Organizational information Systems Infrastructures (IOSI), and more specifically supplier web portals. As a second step, a case study is presented: the use of the supplier web portal of a French large company, "Electra" (fictive name). The methodology of the study and its main results are then discussed.

2 Role of information systems in the Supply Chain coordination

There is an interesting chronological correlation between the development of the concept of SC, appeared in the 80's, developed in the 90's and generalised in the 2000's, the evolution of ICTs and the context of globalisation. These three phenomena are indeed intrinsically linked: the strategy of the companies aiming at developing their SC has relied on the new possibilities of information systems, especially linked to Internet, in order to benefit from the ever increasing globalisation of economy. In their survey, Arshinder at al. [3] suggest a classification of the themes attached to the coordination of the SC: the Information and Communication Technologies are one of the considered mechanisms for coordinating a SC, information systems and contracts allowing information sharing and collaborative decision-making.

The integration of functions inside a company is usually performed thanks to the large functional coverage of an ERP, while with an external point of view, the EDIs have improved the quality and the quantity of information exchanged by the partners of the SC. A study realised on an important panel of French companies [4] shows that the companies using an ERP have a better external degree of integration with their suppliers and service providers (transporters for instance), using tools like EDIs, internet, web portals, than those who do not internally use an integrated information system. In that context, an IOSI is a collection of information technology resources, which includes communication network, hardware, IT applications, standards for data transmission, and human IT skills and experiences. IOSI helps organisations to establish and maintain interfirm relationships such as alliances, partnerships, and buyer-supplier relationship [5].

Fours stages of evolution of IOSI may be distinguished [1]:

- stage 1: IOSI using paper supports (order forms, delivery orders...). We suggest to extend this stage to the use of Excel or Word files.
- stage 2: IOSI using EDIs.
- stage 3: IOSI using an ERP.
- stage 4: IOSI using internet portals or platforms.

We shall see that these four stages coexist in the IOSI used by Electra and his suppliers.

Finally, it is possible to characterise IOSI according to the inter-enterprise coordination mechanisms [6], by distinguishing those based on bilateral relationship, e.g. an EDI between two companies; those centred on a partner who is in relation with multiple customers or suppliers (this is the case for the considered portal) and finally IOSI putting in relation multiple customers with multiple suppliers (like electronic marketplaces, but also supplier portals like Boostaerospace[1], providing a unique portal for customers of the aeronautical industry and thousand of their suppliers).

[1] http://www.boostaerospace.com/

3 The supplier web portal: an inter-organisational technological tool allowing coordination of customer and supplier

Under different names ("B2B portal", "Enterprise Information Portal", "Corporate Information Portal", or "Corporate Portal") the concept of enterprise web portal appeared in the end of the 90's with the development of Internet [7]. According to [8], "Enterprise Information Portals are applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions". Enterprise portals can have various contents, aims, technologies or targeted users. It is possible to classify them according to [9]:
- the content provided by the portal: transactional (order entry, facture payment) vs. informational (technical documentations techniques, price catalogue),
- the targeted portal users: wide target and generic purpose portal (horizontal) or more specific target with deep technical content (vertical),
- a public-private dimension, with portals open to a wide audience or restricted to given users.
In the case of Electra, the portal is a transactional, vertical and private one.

In addition, three distinct orientations of B2B portals may be distinguished in SCs: customer oriented portals, supplier oriented portals, and digital marketplaces where customers and suppliers can meet [10]. Most of the existing studies deal with customer portals in the domain of Customer Relationship Management or e-commerce, or with digital marketplaces providing new opportunities to the company through a new marketing channel [11]. In contrast, little research has been conducted on supplier portals with a technical point of view [12]. These supplier portals may be the forefront of an evolution of the customer-supplier relationship and of the integration of the SC information systems, since they allow to streamline and integrate the information flows between partners of the SC. Some examples of integration of the information flows by means of supplier portals have been reported, e.g. in the US Air Force [12] in a Taiwanese company [10], or in the supply chain of a company of the automotive sector [13].
Often imposed by the customers, supplier web portals may create an asymmetry in the customer-supplier relationship, since the supplier is committed to use the customer's tool (the web portal), follow the rules of utilisation of the portal, train on the tool, and provide the information requested by the customer, in the required format.
The supplier hopes in return to consolidate his relationship and obtain a better quality of information, that he will be able to integrate in his internal information system. Moreover, the necessity to be integrated with the customer through a supplier portal creates a "barrier" for new suppliers, which protects as a consequence the "old" ones. In practice, it can be noticed that this barrier increases the feeling of security of the supplier, together with his trust in the customer. After a study on Ferrari's supplier portal, [14] even concludes that the use of a portal more impacts the improvement of the communication and relationships with the customer than the logistic performance

or the purchasing process. Nevertheless, Robey et al. [15] analyse the inter-organisational impact of IOSIs, focusing on EDIs, and conclude that the use of EDIs reinforces the power of the customer at the expense of their suppliers, while the quality of the customer-supplier relationship influences the good use of the EDIs, and as a consequence the integration and coordination mechanisms.

4 Case study

The inputs of the literature summarized in section 3 have been confronted to a real case: the Electra company and its relationships with its suppliers through its supplier portal.

4.1 Context of the company

Electra manufactures high tech products on several production sites. Its activity is based on contracts on several years; its cycle times are long; the company has long-term relationships with many highly specialized suppliers. The company uses the SAP ERP for many years, and has recently implemented a supplier portal integrated in SAP. Within this portal, the exchanges between the customer and the suppliers are performed according to the process summarized in Fig. 1.

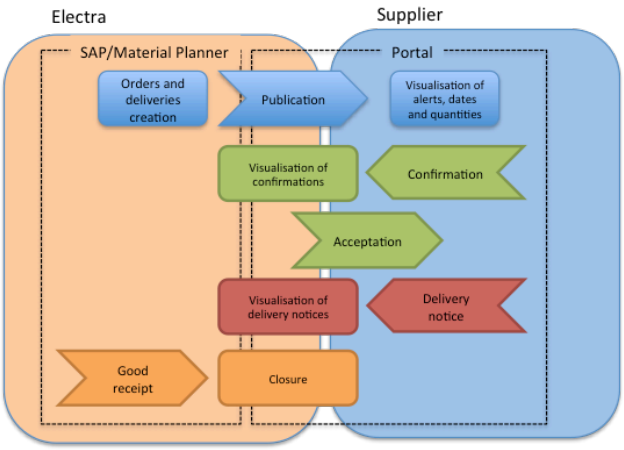

Figure 1. Information exchange between Electra and its supplier through the portal

The project of implementation of the portal at Electra's was launched in the beginning of 2010, with a progressive deployment since 2011 on pilot sites and pilot suppliers, until the integration of all the sites and a majority of suppliers in 2013. In 2014, all the industrial sites of Electra, and about 450 suppliers, were using the portal. Our case study concerns the post-implementation phase of the project, and studies the appropriation of the portal by the suppliers, from their perspective.

4.2 Methodology

One of the authors has followed the implementation of the web portal in a pilot site during two years, and has had meetings with the project leader on the site, with the supply chain leader and with the project leader in the head office. An investigation has then been decided with two main objectives: for Electra, in order to better understand the modalities of use of the portal by the suppliers and the linked problems; for the authors, in order to analyse how this portal influences the relationship between customer and supplier.
A questionnaire with 45 items has been created using a methodology of investigation based on questionnaires used in social sciences [16]: 38 questions are "closed" while 7 are "open" in order to allow comments and reactions to the closed questions. It has been decided with Electra to keep the questionnaire anonymous but to give to the suppliers the possibility to provide their name if they want a feedback from Electra.
The questionnaire was sent to the supplier user (mainly supply chain user or sales administration user) and addresses four main topics: general information on the supplier and his information system; use of the portal; integration of the information coming from the portal in the IS of the suppliers; evolution of the collaboration with Electra since the implementation of the portal.
The questionnaire has been created using a dedicated web tool, the access link being sent to 450 suppliers by Electra. The questionnaire has been available during five weeks, a reminder being sent after three weeks.
138 questionnaires have been collected, 134 of them being considered as exploitable. This number so that the quality of the answers (nearly all the exploited questionnaires were complete, and included argued answers to open questions), allows to consider that the sample is good, which was confirmed by Electra. This is also shown by the distribution according to company size (25% having less than 50 employees, 27% between 50 and 200 employees, 26% between 200 and 1000 employees and 12% more than 1000 employees) so that by country (46% of French suppliers, 54% from Europe and Asia).

4.3 Results

Even if the answer could be anonymous, 59 suppliers have given their name. Most of the answering suppliers have stable relationships with Electra: 86% work for Electra for more than 5 years. In the supply domain managed by the portal, the relationships are frequent and intense: the supplier work in average for 5 sites of Electra. Two to three persons use regularly the portal at the supplier's, and log on 14,6 times per month in average. Usage is then regular, almost daily in 33% of the cases. A majority of the suppliers also use this type of tool with other customers (57% use other portals, and 32% EDIs).

Most users benefited from training on the portal. Nevertheless, 18.7% have not been trained, mostly because they got their position of web portal user after the training period. How new users should be trained is so an important question.

The opinions on the improvement of the relationship with Electra, so that on the quality of the exchanged information, are dispersed: 50% of the respondents see an improvement while 32% do not see any change, 18% estimating that the situation worsened. This may be set in relation with 69% of the users expecting an improvement of the portal, and 59% providing their expectations as free comments.
Globally, the users know and use the simple functions of the portal (delivery programs, confirmations, delivery notices), but much less the advanced functions.
They criticize:
- the slowness of the system (26%) (due to poor web connections),
- its poor user-friendliness (in 44% of the answers), which does not facilitate its appropriation (complex menus, many manipulations required, missing lines on the screen),
- a vocabulary not always understandable or well translated (12%),
- non optimized processes: redundancies, necessity of useless back and forth exchanges with Electra (21%),
- the poor quality of the data, not always reliable (18%),
- the difficulties for integrating the data in their own system (18%),
- a deviation of the use of the portal by its users at Electra (11%), that can be indirectly related with the number of suppliers receiving additional Excel files from their contacts at Electra (45%),
- marginally, an insufficient training (9%).

Almost all the respondents use production management tools (70%). These tools are mainly integrated tools (ERPs) but sometimes specialized ones. Nevertheless, Excel is still considered as a basic tool for forecasting.
72% of the suppliers integrate the forecasts provided by the web portal, and 64% the orders. Between a quarter and a third of the respondents do not integrate them at all.
This integration, when done, is mainly performed manually (47%), often after correction of the data using Excel files (46%), which is accepted by the portal. This correction of the data can be explained by free comments underlining in 18% of the cases a poor reliability of the data (presence of null quantities for instance).
The suppliers clearly suffer from difficulties for performing a more systematic and automated integration of the data provided by the portal. The EDI solution can provide an improvement, but only 13% of the present users ask for such a solution.

45% of the suppliers receive Excel files from their contacts at Electra, in parallel with the information provided by the portal. These files may concern forecasts, orders, and deliveries, all theoretically provided by the portal. The suppliers complain about redundant, and sometimes conflicting information, the data provided on Excel files being considered as more reliable than the ones provided by the portal.
On the other hand, the reaction of the suppliers when facing a problem also shows unexpected behaviours: 40% call their usual contact at Electra and 15% call a colleague, instead of referring to the user manuals (18%) or contacting the key users (23%) as recommended. A familiar human relationship if therefore preferred through phone or email, even if it leads to neglect the nominal procedure.

A very positive point of the investigation is that the suppliers do not reject the portal but ask for improvements. 56% of the suppliers consider themselves as "members of the users' community". The analysis of the correlation between answers shows that this feeling is correlated to a more positive opinion on the portal, and to a better internal integration of the forecasts and orders.

Although the sizes of the companies and sectors of activity and country are diverse, no correlation can be established between the use of the portal, the satisfaction felt and the type of company (especially its size). This may set into question the usual consideration that small companies are more reluctant than large ones to use ICTs.

Technically, it is clear that the portal would need some improvements: better connexion to the portal from some places and better ergonomics (especially in the structuration of the screens) for instance.
In terms of training, tools or training modules should be systematically suggested to the new users, the supported process being relatively complex. An extensive training of all the users on all the functions of the portal could be of immediate benefit.
A better communication with the suppliers on the resources and competences that could support them should be done. The animation of a real "users' community" using social tools (Facebook or dedicated tools [17]) could be considered.
The reasons for the use of Excel files should be investigated more thoroughly, and solutions inside the web portal should be found.
The suppliers should be helped for finding practical solutions in order to integrate the data provided by the web portal in their information system.

5 Conclusion

Supplier web portals are becoming a key tool of the collaboration between customer and supplier. Through a questionnaire, we have investigated the first results of a recent experiment of such portal in a high tech industry, showing that in spite of high potential, many practical (and sometimes anecdotal) problems may set into question the efficiency of such tools.
This investigation has intrinsic limits that could provide new perspectives for this topic of research. Firstly, the domain of activity of Electra concerns industrial products of high technology. The results can clearly not be generalized to other domains like the automotive sector or mass-market products. Moreover, the study addresses the appropriation of the portal by the users at Electra's suppliers, but does not analyze its appropriation by Electra's users. Nevertheless, our study shows that such investigation would deserve some interest. Finally, it would be interesting to deepen the conclusions by meeting some suppliers. In spite of these limitations, we hope to have shown the great potential of these tools for a better integration of the partner's processes and information systems in nowadays supply chains.

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