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How Information Systems Enable Digital Transformation:

A focus on Business Models and Value Co-production

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Abstract :

The digital economy has now a widespread impact on the whole economy and leads companies to transform and adopt new competition rules. Our objectives in this paper are 1) to analyze these evolutions and 2) to understand the role of informations systems in these changes. We have investigated two opposite environments: a pure Internet player selling an SaaS offering, and a traditional business that distributes products through a physical network of thousands of outlets. Our results show that both Internet players and traditional companies experience changes in the industry value chain, a growing importance of services, and develop new business models focused on an extended value proposition and cooperation with customers. The role of information systems is characterized by the evolution of the IT infrastructure, the expansion of inter organizational information systems and digital platforms and the development of new IT capabilities.

Keywords :

Information systems, digital economy, business models, value proposition

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¹ The CIGREF is the French association of CIOs.

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Introduction

The purpose of this research is to analyze the evolution of business models that accompany the transformation of the dominant industry value chain model in a range of economic sectors. The increasingly intensive use of information technology has had a significant impact, and has made possible new forms of value co-production. These new forms of cooperation have important implications for Information Systems and the role of information technology.

In this paper we recall the main advances in the scientific literature on this research topic. This literature review focuses on the concepts of change in industry value chains, new business models and value co-production, as well as the adaptation of Information Systems to these changes. We will also present the main results of two case studies² with Rexel and Salesforce that were conducted in order to test these theories.

The globalization of business and the development of services associated with products are transforming the role of distributors, and are generating new forms of co-production of value; these changes have highlighted important issues for Information Systems in distribution businesses within the electricity sector and constitute the basis for the REXEL case.

The development of applications such as Software as a Service (SaaS) and the emergence of exchange platforms (Platform as a Service) have made possible the creation of ecosystems with many avenues for innovation and co-production of value. We illustrate these changes by studying one company in particular, Salesforce.com.

From a methodological point of view, first we conducted a review of the scientific literature. The main challenges in our multifaceted research program were to identify and select - from a variety of fields including strategy, marketing, supply chain management, innovation, etc., and of course Information Systems - sources that seemed most likely to shed light on the subject of our research. Our hope is that this review of the literature, necessarily imperfect and incomplete as it is, helps to "clear the field" and will contribute to the subsequent efforts of the research community.

For the Rexel case study, we analyzed a series of publications about the company and explored the Internet, which gave us access to articles and videos referenced in the case. We conducted a series of semi-structured interviews with the Group Chief Information Officer, who was our entry point into the company, as well as the Director of the Supply Chain, the Director of Strategic Planning and the Director of Marketing and Customer Relations and Vice-President of the South American zone. The interviews were recorded and transcribed and the subject matter they provided for analysis came from verbatim comments.

For the Salesforce.com case study, we analyzed a number of professional and academic publications dealing with the company and conducted interviews with the Director of Marketing, France, and with thirteen partner companies of Salesforce.com in their AppExchange. We also used professional sources such as Forrester Research to validate certain market assumptions.

The remainder of this paper is organized as follows: first, Section 1 discusses the evolution of business models in the digital economy, and then Section 2 focuses on the contribution of information systems to this changes. Section 3 then presents the main findings of our two case studies, with Rexel brick and

² We wish to thank the two companies that collaborated with us for these case studies, and in particular Olivier Baldassari, CIO at Rexel, and Pierre-Olivier Chotard, Director of Marketing France at Salesforce.com, for their valuable assistance.

mortar case on the one hand and Salesforce cloud offerings on the other. Finally Section 4 shows our conclusions as exemplified on our cases: the digital economy, enabled by information systems, rebuilds the value chains in sectors, with an emphasis on actors who can provide additional services; business models evolve with a focus on accessing the customer directly and creating a network of collaborations with customers and partners to build an enhanced value proposition.

Section 1 – New rules of the digital economy and the evolution of business models

In the 1990s, companies invested massively in what used to be called “the new information and communication technologies”³. Attracted by the potential of these technologies, they innovated: many transformed, others disappeared, and at the same time we saw the emergence of new players that had grown up with these technologies and founded their business models directly on a radically different idea of how an organization interacts with its ecosystem.

Here we will analyze this evolution, firstly on a macroeconomic level, highlighting two aspects (the transformation of industry value chains and the growing role of services), and then by observing the characteristics of the evolution of corporate business models.

The transformation of industry value chains

In most sectors, the industry value chain and the relationships between the stakeholders that make it up were disrupted. New mediation strategies appeared, challenging the traditional Producer-Distributor-Customer organization.

Andal-Aucion & al. (2003), relying on a study carried out with twenty large American corporations in various business sectors, identified structural modifications having an impact on the traditional vertical relationships between companies operating in the same business sector. As well as questioning the traditional industry chain, the authors highlight two main phenomena.

- 1) The **intermediary** position (distributor, wholesaler) is direly affected. The disappearance of retail stores is clearly apparent in the book, CD/Video and travel sectors. According to the authors, certain factors linked to information technologies work in favor of disintermediation, as in the informational intensity of products and services or the reduction of research costs; others encourage remediation such as the aggregation effects between products and services, which used to be purchased separately; for a third group of factors, the impact does not appear to be systematic, for example regarding the customization/adaptation to customer’s specific needs.
- 2) We also see the development of **networked mediation** strategies, in which a group of players develop a cooperative effort to co-create an offering. The authors identify various IT factors facilitating these new forms of organization: standardization, real-time interfaces, networking effects, pooling of skills, or reductions in research costs for the customer.

³ ICTs assemble the techniques used in the processing and transmission of information, mainly IT, internet and telecommunications.

Networked mediation strategies have given rise to a number of studies in the strategy, marketing and information systems fields (see Katz & Shapiro (1985), Fjeldstat & Haanoes (2001), Rai et al. (2008), Agarwal et al. (2009), Evens (2010), Lusch et al. (2010)).

We designed our field work to address these two issues. Our first case study, the Rexel case, focuses on the intermediary position of a leading distributor in the electricity sector. Our second case study, the Salesforce case, addresses issues related to networked mediation strategies.

The growing importance of services

The potential impact of digital technologies on the economy was analyzed at a very early stage by M.E. Porter. In a seminal article (Porter & Millar, 1985), the author identified the upcoming transformation of a products-based economy to an economy of services, and highlighted the importance of the “informational component” of products and associated services for the customer.

Lovelock & al (2008, p.12) offer the following definition: “A service is an action or provision offered by one party to another. Although the process can be linked to a physical product, the provision is transitional, often intangible in nature and is not normally the result of possessing one of the production factors.”

Karsenti and Ulaga (2010) thus describe the specificity of services:

- the intangibility of the traded object;
- the active role of the customer;
- the inherent variability of the service;
- the inseparability of the service (a service is typically produced and consumed simultaneously);
- the perishable nature of the service;
- the use of short distribution channels.

According to Karsenti and Ulaga⁴, the growing importance of the role of services associated with a product can be explained as follows: The service associated with a product can either be incidental to its usage (in which case the differentiation with the competitor will be the result of its superior technical know-how) or, on the contrary, can be central (in this case, the differentiation will come from the solutions, or even from its customization when it is unique, provided by these services). In all cases, the standardization of industrial products now implies an ever-shrinking technical superiority, and the product’s price fast becomes a key issue as low-cost strategies appear, in which the associated service is diminished. As a consequence, if companies wish to avoid increasing the commoditization of their products, the importance of associated services becomes decisive.

This strategic reasoning shows the growing importance of the creative solutions that services enable (Chesbrough, 2011). Perhaps the oldest analogy is the hook-and-bait strategy: you sell a product for a modest sum (the bait), then you charge a much higher price for a recharge or an accessory (the hook). Business models reflect this creative process. According to Karsenti and Ulaga, the business model in its broadest sense is about how a company is organized and structured and how it operates to do

⁴ In the publication mentioned previously, these authors conducted a study on the service strategy of 250 European industrial corporations.

business and generate value. Service companies have perfectly understood the benefits of distancing themselves from excessively rigid structures that do not allow them to react quickly to customers' demands. The business models existing in the service sector are often more sophisticated than those of industrial companies.

The changing nature of the relationships between players in the same industry value chain and the growing importance of services have dramatically changed the corporate environment. It is against this backdrop that the issue of business models has developed.

The development of the Business Model concept

The now widespread term "Business Model" is actually a relatively recent creation, and intimately linked to the innovative opportunities offered by the development of informational technologies, Lehmann-Ortega (2008). Stähler (2002) links its dissemination to the appearance in the 1990s of start-ups whose activity was mainly focused on the Internet.

Hamel (2000) defines the components of a business model as follows:

- core strategy – business mission, product and service range, differentiation factors;
- strategic resources – strategic assets, processes and core competencies;
- customer interface – fulfillment and support, information and insight, relationship dynamics and price structure;
- value network – all interactions with suppliers and partners, coalition building.

The goal of Hamel's model is to highlight not only the classical internal components of a company, namely "business strategies" and "core resources", but also two key aspects of business models that go beyond the borders of the company:

- the issues of interfacing with customers, the value proposition geared towards them, and the dynamics of interaction;
- the co-creative strategy of the offering via a network of partners (once again we come across networked mediation strategies).

Espousing the idea of extending the company's borders, Stähler (2002) identifies four key elements of a business model:

- 1) the value proposition made to the two stakeholders interacting with the organization,
 - its *customers* (how does the company create value for its customers?);
 - its *partners* (what added value can it offer to the partners involved in the co-creative process?);
- 2) the range of products and services,
- 3) the value architecture,
 - part of which refers to the internal value chain (resources and core processes, activity coordination);
 - but which also refers to the intricacies of the relationships with *customers* (distribution channels, interactions between the firm and its customers, or directly between the customers themselves) as well as with *partners* (the role they play, exchanges of information, coordination of activities);

4) the income model, which identifies the structure and composition of the turnover generated by the business model and the payment of those involved in the value proposition.

More recently, Osterwalder and Pigneur (2010) systematized the study of business models by defining an analytical framework with nine components. These components are detailed in Table 1.

Table 1 – Components of Business Models. Source: adapted from Osterwalder & Pigneur, 2010	
VP – Value Proposition	All the products and services that create value for a particular customer segment. Key elements: newness, performance, customization, “getting the job done”, design, brand/status, price, cost reduction, risk reduction, accessibility, ease of use.
CS – Customer Segments	Customer targets (mass market, niche markets, segmented, diversification towards radically different offerings, two-sided markets, multi-sided platforms, etc.). The segments are separated if the customers are differentiated by one or more of these factors: nature of the offer, distribution channels, nature of relationships, profitability, and valorization of different aspects of the offering.
CR – Customer Relationships	Nature of the relationships in order to acquire, retain, and develop turnover. Six relationship categories: personal assistance, dedicated vendors, self-service, automated services, communities, co-creation of value.
CH – Channels	Interaction channels raise awareness about products and services, disseminate the value proposition, encourage the purchase, deliver the services, perform after-sales service. The authors distinguish between internal channels (sales force, web sites, outlets) and partners channels.
R\$ – Revenue streams	Sources of revenue (single transactions, recurring revenues): product sales, usage fees, subscription fees, lending/leasing/renting, licensing, brokerage fees, advertising. Variety of pricing models: fixed (depending on the product, on the options, on the customer segments, on the purchase volume) or variable (negotiation, yield management, real-time adjustment, auctions).
KP – Key Partnerships	Alliances contributing to the business model: between non-competitors, cooperation, joint ventures, vertical alliances (buyer/supplier). Objectives: economies of scale, reducing uncertainty/risk, extending resources / activities (skills, licenses, customer access).
KA – Key Activities	Core processes to implement the business model (production, innovation, meeting the customer’s specific needs, managing the customer/partner platform/network interactions).
KR – Key Resources	Business model core resources that the company has or gets via partners: physical, intangible, human, financial.
C\$ – Cost Structure	The main cost factors associated with the business model (fixed and variable costs, scale and scope economies). The business model can be more or less oriented towards the creation of value or cost optimization.

Osterwalder and Pigneur applied their analytical model to numerous businesses and economic sectors, and identified a set of template configurations (long tail, multi-sided platform, freemium, etc.). However, the model does not address the differentiation between products and services and the prominent role played by services in our economy. It also fails to deal with the companies’ *value proposition* for its *key partners*, despite the fact that it is vital in initiating, developing and maintaining the partner network. Lastly, the distinction between partners and customers in two separate groups

in the model does not acknowledge that customers are often resource contributors, notably in regard to the improvement of products and services and to innovation.

Customer/partner outreach and value coproduction

The analysis of business models clearly shows the key strategic challenge that is the ability of companies to go beyond their boundaries and ground their value proposition on their interactions with a market environment that it helped organize and create. The core elements of this environment are:

- on the one hand, the customers, with whom a company strives to develop a closely-knit relationship, and whose role can extend to co-production of value alongside the organization (participating in the development of products/services, informing other customers, etc.);
- on the other hand, the partners, whose nature (suppliers, competitors, independents, providers, distributors, customers...) and function (providing resources, skills, complementary service offerings, access to the customer, contributing to the network effect...) can be constantly re-invented in order to strengthen the value proposition.

In that regard, the business models' strategy is based upon the continuous management of the market ecosystem and the co-production of value within this same ecosystem.

The traditional concept that the "customer" consumes the "value" as the result of a production chain involving several stakeholders has since been revamped by Richard Norman and Rafaël Ramirez (1998) in their book "From Value Chain to Value Constellation". According to them, the value created by a product or a service can be used in different ways by many different customers in order to create new values.

"In other words, a product or a service, everything which takes on value for a customer, is created by the conjunction of activities due to various actors and made available to the supplier who offers the customer value".

The value-creating process is the result of a co-production between the company, its partners and its customers.

"We use the term "co-production" to qualify that reciprocity between actors that characterizes the service economy".

The more the value proposition is focused on an important problem for the customer, the better chance it has of contributing towards the differentiation of this offer: "The job is the fundamental problem a customer needs to resolve in a given situation. When customers find that they need to get a job done, they "hire" products or service to do the job", Christensen et al (2007).

We will now study the role Information Systems may play in these developments and how they may help businesses transform the value chain in their sector and offer new value propositions.

Section 2 – The role of Information Systems

The role of Information Systems in the emergence of new business models has been the subject of numerous studies, both in the academic and professional worlds. Zhu (2004), in a study of 114

companies in the retail sector, shows a strong positive correlation between IT infrastructure and the capacity to develop e-commerce. Combining the two has led to increased sales per employee, lowered operational costs, and accelerated inventory turnover. Among the emblematic case studies dealing with this issue, the story of the transformation of Dell has had a particular impact.

We come back to this case because, while it has now lost some of Michael Dell's initial radical innovation, the history of the Dell company is very revealing. It very early took a different approach to the traditional value chain of the sector, pursuing a strategy of disintermediation, and thus provides us with a good illustration of the role played by Information Systems in a company's strategy.

Dell's early change strategies in the sector supply chain

In their case study of Dell's strategy in the 1990s, Kraemer et al. (2000) sought to analyze the role of Information Systems in the implementation of Dell's business model, with the main axes being:

- the choice of direct sales to the final customer;
- on-demand manufacturing.

Dell's strategy is characteristic of a move towards disintermediation in retail supply chains. Dell stripped out one downstream level (the distributor) to deal directly with the customer, while continuing to provide an attractive range of services. This highlights two major trends in the digital business environment: the reorganization of industry value chains and the key role of services, orchestrated by one business with a view to cornering the market.

Among the benefits of disintermediation, the authors highlight the major advantage of direct access to the client, which is key to understanding the client and their needs more fully.

- 1) Establishing direct relationships with clients allows Dell to collect information, to have a better understanding of their expectations and to come up with new services that enhance the attractiveness of the offer (cf. Ulaga and Karsenti).
- 2) Dell is able to segment its customers effectively and to provide a range of personalized services tailored to different targets.
- 3) Information obtained via the direct relationship between Dell and its customers helps to optimize business processes upstream, and to provide indicators of any change in demand.

To introduce its new real-time manufacturing model, Dell had to strengthen its ties with a limited number of suppliers, optimizing its supply chain, reducing its inventory of components and maximizing its interactions with suppliers. Information Systems played the dual role of fostering knowledge sharing and supporting business processes.

Kraemer et al. summarize the role of information technology in the development of the Dell business model and highlight *operational efficiency* (coordination of the procurement process, logistics, production, service and support) as well as *virtual integration* with suppliers, partners and customers. The impact that this development of Information Systems has had can be seen in:

- cost reduction (drastic reductions in inventories, lower overheads);
- faster lead times (logistics, production);

- financial optimization (cash);
- segmentation of important customers (key accounts, "relationship customers");
- redefinition of the product portfolio (drop in the number of desktops – now one of the less profitable segments);
- growth of sales, especially internationally.

This change in the use of Information Systems has led to a radical transformation in terms of techniques and business organization affecting the whole gamut of business processes and was carried out at a furious pace.

In addition to the applications developed, the authors give an interesting perspective on the evolution over time of the IT strategy in response to market changes and business strategies.

- In the 1990s, Dell pursued a strategy of centralizing its widely dispersed Information Systems. The goal was to *provide the information* necessary to divisions centralized in Austin, Texas. A very ambitious SAP/R3 project was launched.
- In 1995, Dell reorganized around four main regions (Americas, Europe, Asia and Pacific) and decentralized its decision-making centers. The SAP project was abandoned because it was considered unable to take into account the customer segmentation approach at the heart of the new strategy, and the CIO left the company.
- Two years later, Dell set up a new IT architecture, called G-25⁵, which was designed to accelerate development cycles. It enabled incremental improvements to the Information System without disrupting operations and facilitated communication between multiple applications. The IT teams were largely decentralized. Overall, the challenge was to harmonize the flexibility introduced into the Information System with that introduced into the business operations.

Dell's IT strategy was a dynamic alignment as described by Chen et al. (2010). The authors emphasize the key role played by the CIO in the transformation of Dell's business model: "Yet the IT organization is deeply involved in extending the business model, and it plays more than a mere support function in the company" (Kraemer et al., 2000, p.19).

The key role of the IT infrastructure

Weill and Vitale (2002) have analysed the evolution of the IT infrastructure for the development of e-business models⁶ in traditional businesses.

The authors define an IT infrastructure as the union of four fairly stable central components:

- hardware and Basic Software (IT components) that form the technical foundation;
- skills, methods, standards and the experience of the computer specialists (Human IT infrastructure);

⁵ Interested readers can find in the article by Kraemer et al. a technical description of this architecture.

⁶ Study based on an analysis of 50 e-business initiatives conducted by 15 "traditional Australian enterprises". Note that the authors use the term "e-business", but predict its disappearance, e-business becoming an integral component of "business".

- shared Services (intranet, network access, management of shared data);
- standard applications shared by all in the company and which typically cover domains like accounting / finance or human resources, but whose range now extends to more and more standardized business processes based on best practices (ERP, supply chain).

These various elements are supplemented by local applications which are likely to change quickly depending on business needs.

The results of the analysis of 50 e-business initiatives conducted by the authors show major changes in the architecture of Information Systems in the companies concerned:

- *global growth* in numbers, complexity and diversity of capacities and services;
- a strong tendency towards *centralization* of services that are not locally implemented but are shared applications – this limits costs, and promotes the sharing of information (especially with regard to customers) and the implementation of a global strategy;
- more frequent use of *external suppliers*, particularly when it comes to the outsourcing of "commodity" type services - external suppliers also help with maintenance or internal development (often with the help of vendors or consultants) of strategic services;
- and, unexpectedly, no greater sharing of IT infrastructure for enhanced cooperation between players in the same sector.

It is hardly a surprise that the evolution of business models increases the demands on enterprise Information Systems. Unlike the case of Dell previously studied, the authors found a trend towards a centralized set of management services. This is not just for cost reasons but also as a way, in the face of an increasingly global e-business market, to coordinate customer relations and the supply of products and services, whilst avoiding the multiplication of heterogeneous local applications and the risk of information silos.

Finally, cooperation with partners (suppliers, customers) has not involved sharing joint Information Systems (IS), but rather has been achieved through interoperability (process optimization by implementing workflow and information exchanges) or the extension of web platforms that can provide new services to customers.

Cooperation with partners: from inter-organizational Information Systems to "Value Nets"

The issue of the competitive advantage of inter-organizational Information Systems is an old chestnut in the literature of Information Systems. Very early on, they were found to have the potential to speed up flows with suppliers or to interact with customers (Johnston et al., 1988). The evolution of information technologies and business models extend the impact of this today. Saraf et al. (2007) identified two major roles for Information Systems as a means of solidifying partnerships between firms:

- support for **processes** carried out jointly by the company and its partners;
- sharing **knowledge** about the market and expectations between partners, to improve the overall value proposition for customers.

These two elements are present even when the main objective of the inter-organizational Information System is focused on the organization and flow of processes operated conjointly. These configurations have been studied extensively, especially in the case of the supply chain (Rai et al., 2006). The authors define the integration process of the supply chain as "the integration of information flows, physical flows, and financial flows between a firm and its supply chain partners." The information does not pertain only to the data needed for operational processes (EDI), but also the sharing of market-related knowledge (on-demand information, volumes of inventory and sales, anticipated production schedules, and performance indicators).

Kim et al. (2010) focused on the ecosystem linking a pilot business to its partners when both intend jointly to create a value for the market. They defined four configurations depending on the speed of change in the environment (product life cycle) and the intensity of knowledge to be shared to ensure value creation. Each of these four configurations is represented by one key factor in the inter-organizational Information System:

- *interoperability* (stable business ecosystem and low intensity of shared knowledge);
- *robustness* (dynamic business ecosystems and low intensity of knowledge);
- *productivity* (stable business ecosystem, knowledge-intensive);
- *creativity* (dynamic business ecosystem, knowledge-intensive).

While the first two configurations are more oriented towards support for business processes, when the ecosystem requires significant exchanges of information between partners, the IS becomes a technology platform and provides a common work environment, which combines agility and efficiency (productivity). It may become a platform for continuous innovation, helping to reduce the uncertainty in the market for partners, and allowing them to identify opportunities and quickly implement coordinated product and service offers (creativity).

The inter-organizational Information System becomes, in the words of Rai et al. (2008), a support for the "Value Net". Value Nets are "the architecture of sourcing agreements and alliances that firms implement to gain complementary resources and capabilities from other firms. They are a source of innovation, growth, and competitive success". The authors use the term "IT-enabled Business Models" to characterize the strategy of these companies. In this case, all relations between actors in the network, including product innovation and development, market access, customer relationships, etc. revolve around a digital platform that serves as a means of communication, control and coordination.

In dynamic business ecosystems characterized by the need for continuous renewal of products and services, the Value Net, because of its openness to multiple stakeholders, is particularly effective in stimulating creativity and encouraging innovation. **Open Innovation** has recently attracted the attention of researchers and lies at the confluence of many research areas including Strategy, Innovation, Research and Development (R & D), Knowledge Management, Customer Relations, Open Source Networks, etc ⁷.

⁷ See Lichtenhaler (2011) for a synthesis of the literature on this subject.

Chesbrough, who fathered the open innovation concept, highlights the importance of interactions between the organization and its environment⁸. It is through a continuous exchange of knowledge between the company and its ecosystem that the former strengthens its own capacity and is able to exploit the sources of innovation present in its markets, that is to say, customers, partners, voluntary contributors, etc.

Chesbrough emphasizes the **strategic paradigm shift** induced by open innovation. The traditional vision of the strategy required companies to put in place defences to fight competition, with relations in the sector chain being structured around power relations⁹. This new approach involves collective creativity, achieved through the company's opening up to its environment.

This trend is most noticeable in the software industry, which has managed to create an ecosystem that promotes Open Innovation, with Linux in many ways being the driving force. Thousands of programmers have joined the Open Source community and contributed towards making Linux a genuine threat to proprietary systems, which have often fallen behind in terms of safety, reliability and flexibility (Chesbrough, 2007). Thus the notions of inter-organizational systems and business models based on the co-creation of value come together.

The evolution of Information Systems raises questions as to the role of the IT department and the capabilities it needs to adapt to these changes.

The evolution of key IT capabilities to support new business models

The concept of "IT capabilities" has been widely used to study the relationship between Information Systems and organizational performance. Bharadwaj (2000), adopting a resource-based perspective, defines a firm's IT capability as "its ability to mobilize and deploy IT-based resources in combination or copresent with other resources and capabilities"¹⁰. Value is created by aligning Information Systems with business strategy.

IS capabilities are based on three key resources:

- *tangible* resources (physical IT infrastructure components);
- *human* resources (technical and managerial IT skills);
- *intangible* IT resources (knowledge assets, customer orientation and deployment of synergies).

According to Bharadwaj, IT resources are critical to firms only if they correspond to a set of capabilities mobilized and used by the business to optimize activity (see Table 2).

Applied to our context of business models beyond the borders of companies, this analytical framework helps to focus on a set of core competencies for the Information System suited to these changing business models.

⁸ "Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" Chesbrough al., (2006).

⁹ M.E.Porter 5 forces model is emblematic of this vision.

¹⁰ "Capabilities, thus, refer to an organization's ability to assemble, integrate, and deploy valued resources, usually, in combination or co-presence" (p. 171).

The physical infrastructure has to remain flexible and cross-functional, and must be open to partners to enable them, at the very least, to access applications, data, and processes necessary for the performance of joint activities. In the most extensive forms of cooperation (Open Innovation), the technical infrastructure is the operational support for synergies of co-creation of applications, data and processes carried out on these shared platforms.

Table 2 – Key Capabilities of the Information System. Source: adapted from Bharadwaj (2000)	
Nature of the Resource	Corresponding Capacities
Tangible Resources Physical Infrastructure: computer and communication technologies, technical platforms, databases	<ul style="list-style-type: none"> - quickly identify and develop key applications; - share information about products, services, different geographical localisation; - implement a common transactional process and manage supply chain cross-functionally across all activities; - exploit synergies between business units.
Human Resources Technical and managerial aptitudes	<ul style="list-style-type: none"> - tightly integrate operational business processes with IS; - design and develop, quickly and cost-effectively, reliable applications that are genuinely adapted to business needs; - communicate and work efficiently with business lines; - anticipate future needs and support product and service innovation ahead of competition.
Intangible Resources Knowledge, customer orientation and deployment of synergies	<ul style="list-style-type: none"> - contribution of IS to the implementation of client-oriented strategies, permitting follow-up and prediction of client behaviours and preferences; - development of knowledge assets (intellectual capital) through knowledge management systems¹¹; - deployment of inter-activity synergies enabling better coordination and flexibility.

The technical and managerial skills of the members of the IS division should be extended to include the development of technical platforms open to partners and taking into account the expectations of the "extended enterprise users", namely customers, suppliers, and partners.

Intangible resources in this context refer to customer focus, management of shared knowledge and development of synergies within the extended network. Speed and flexibility become key issues.

Partnership between IT and Business as a factor of agility

Recent research has revisited the longstanding issue of the strategic alignment of Information Systems (Chen et al. 2010, Preston and Karahanna, 2009a, 2009b, Tallon and Pinsonneault, 2011, Wagner and Weitzel, 2012). In a rapidly changing economic environment, dynamic alignment and agility are key factors of the strategy (Sambamurthy et al. 2003, Tallon and Pinsonneault, 2011).

Chen et al. (2010) propose three views of IS strategy:

- (1) IS strategy as the use of IS to support business strategy;
- (2) IS strategy as the master plan of the IS function;
- (3) IS strategy as the shared view of the IS's role within the organization.

¹¹ See Nonaka and Takeuchi (1995) on knowledge management cycles.

The first approach gives the role of initiator of strategy to the business lines with the Information Systems having to adapt. The second approach focuses on the ability of IS function to effectively manage its resources. The authors emphasize the importance of the third approach: the creation of an organizational perspective in which all members of the organization share a consensus on the role of Information Systems. In the latter paradigm, the alignment of the Information System is a dynamic and continuous process driven jointly by the IT and non-IT decision makers.

For Preston and Karahanna (2009a), achieving IS strategic alignment requires the existence of a *shared understanding* between the CIO and the organization’s top management team (TMT). It is important for IS strategic alignment for all involved to use a shared business language, and for the CIO to have a good understanding of the business challenges and, conversely, for the TMT to have an understanding of the impact of technology. In addition, formal exchange structures that include the CIO and the management team need to be put in place to facilitate the implementation of a shared vision.

Sambamurthy et al. (2003) identify three areas of digitally enhanced agility: customer agility (co-creation of value with customers), partnership agility (co-creation of value with partners), and operational agility (speed and efficiency in the implementation and management of processes). IT acts as a platform for agility, enabling companies to understand the changing demands of customers, to develop new value propositions and to establish processes in co-operation with partners. The flexibility of the IT infrastructure and the proximity between IT and business lines, as well as a shared vision, are essential factors for agility.

Summary of evolutions

Figure 1 summarizes the evolutions analyzed in these first two sections.

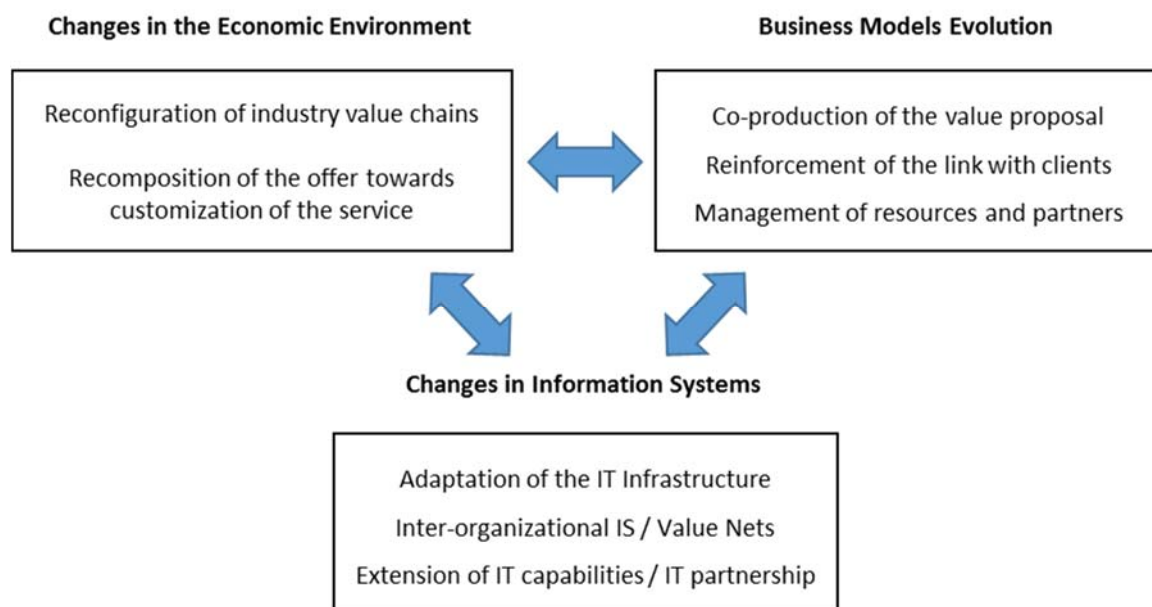


Figure 1 – Summary of concomitant evolutions of the digital economy, business models and Information Systems

Changes in the economic environment involve:

- a **transformation of industry value chains**, which includes the phenomena of disintermediation, remediation, and network mediation. Digital technologies enable actors to operate common processes and to exchange information; both play a vital role in the transformation process;
- a **redefinition of the offer based on personalized services**, seen as a source of differentiation, and which is heavily dependent on IT.

New Business Models involve:

- the co-production **of the value proposition** by the company and its customers, which can be expressed in different forms, such as accessibility, personalization of services (as a comprehensive solution with consequent cost reduction, or as a solution to various client problems);
- a **marked reinforcement of links with customers**, through interaction over the Internet, mobile, and multi-channel communication, as well as careful segmentation of customer targets made possible by increased customer knowledge (CRM);
- the **management of resources and partnerships**, in some cases by creating alliances of actors around the co-production of value. Value Nets, as alliances for resource acquisition, require significant interaction, particularly regarding processes and knowledge, are facilitated by IT support and can lead to bottom-up innovation.

In this context, Information Systems involve a set of developments summarized in Table 3.

Table 3 – Evolutions of Information Systems in the digital economy	
Adaptation of company IS infrastructure	<ul style="list-style-type: none"> - Growth in services - Centralisation of services - Outsourcing of commodity-type activities - Sharing of infrastructure in the same sector - Synergies between classic IS and e-commerce
Evolution of inter-organizational IS and creation of digital platforms linking Value Net partners	<ul style="list-style-type: none"> - Complementarity between the support of operational processes and the sharing of knowledge to maximize created value - Platform supporting interactions between partners (product development, innovation, access to market, client relations) - Exchange of knowledge and bottom-up innovation
Extension of IT capabilities and IT Business partnership	<ul style="list-style-type: none"> - Opening of technical infrastructure to partners - Adaptation of the CIO's technical and managerial skills in the extended company - Reinforcement of customer orientation, of shared knowledge management and of the management of synergies with partners - Common view of the role of IT enabling strategic dynamic alignment (strategic agility)

Section 3 – Cases analysis and key findings

Following this review of the literature, we conducted two case studies (Rexel and Salesforce), that are centered on the parallel development of their business models and Information Systems.

Our choice of two very different companies in terms of business and presence in the digital economy has two goals:

- 1) The first is to gain a deeper insight into the actual economic developments described in the literature, and also to analyse the forms taken by these developments in these two companies, in particular their successes and limitations: reconfiguration of industry value chains, increased importance of services, changes in the value proposition in the context of new business models, strengthening ties with customers, creation of alliances of actors around a proposal for joint development.
- 2) The second goal is to study the actual role of Information Systems. In this respect, our choice of a mainstream company (Rexel) and an iconic business in the digital economy (Salesforce) provides a broad framework for the enquiry.

The Rexel Case

The **Rexel** group is a world leader in the distribution of low-voltage electrical equipment. After a difficult period in 2009 due to the economic crisis when sales fell 17.9%, Rexel managed to recover sales in 2010, increase profitability by a point and reduce its debt of 128m euros. In 2010, it achieved a turnover of 12bn euros. It has a presence in 36 countries with 40 commercial brands and 28,000 employees.

Rexel's environment and value proposition evolved a lot these last years. We will only present here the main results we draw from the case, and focus on the transformation of the industry value chain.

Our objective here is not to study all of Rexel's end markets and customers, but to illustrate certain changes in Rexel's positioning – firstly, through the example of electricians and small contractors, and secondly, through key accounts and major projects in the Industrial and Commercial markets.

Electricians and small contractors: use services to boost the competitive position

General and specialty contractors in charge of electrical installations represented 61% of the Rexel Group's sales in 2011. This customer group includes large contractors (such as Cegelec, Eiffage, ETDE, Ineo, SPIE, Vinci Energie) and a lot of small- and medium-sized contractors, which are Rexel's key partners. Although Rexel has developed its sales to major companies, small contractors are still central to its activities and its culture.

For a number of markets (particularly the individual residential market), relations between those involved in the industry value chain traditionally stand as outlined in Figure 2.

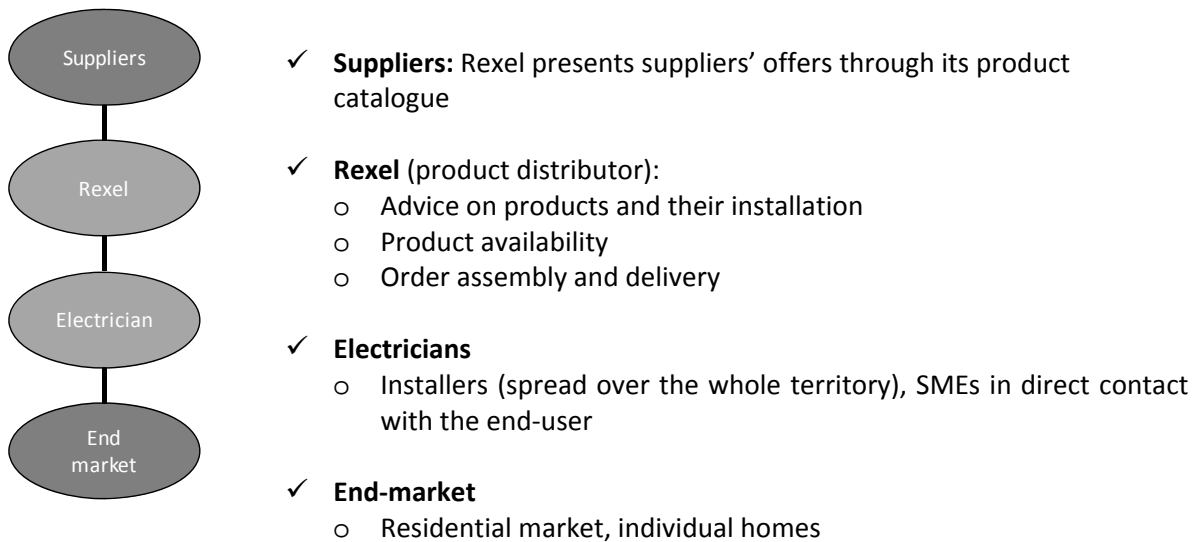


Figure 2 – Traditional value chain: sales to small- and medium-sized contractors

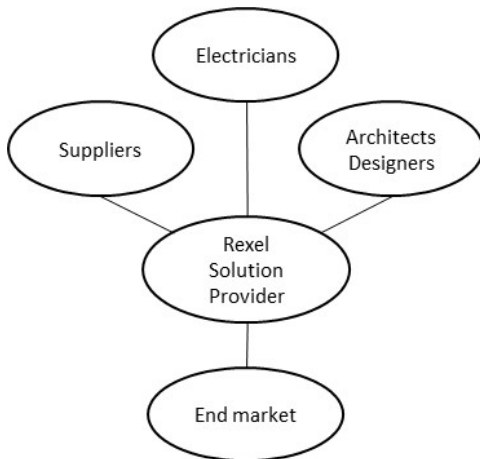
In this framework, Rexel has little to fear from those upstream (the suppliers), which do not have the necessary structures to target a scattered clientele of electricians. Rexel is generally in competition with other distributors. Its concern is to keep the loyalty of its electrician customers. In order to do that, the group has focused on **services** linked directly to its core business (logistics) or complementary services (assistance and support for electricians).

The Internet has begun to play a major role in logistics: "Our clients are small business owners, who are often very busy on their sites during the day, and who therefore place their orders in the evening. As the agency is not open, they use the Internet. We are B2B, so each customer has their own price list. Depending on their needs, and their specialty, electricians find prices that suit them. So the electrician logs on and finds the right products with prices, can see if they are available, and can also indicate where they should be delivered to. Customers can arrange purchases and give options to each of their employees. The electrician can track his orders over the Internet - even though things usually go very quickly when the product is in stock – and, the next day, the product is delivered." (Director of Marketing and Customer Relations).

We see here that Rexel aims for a high level of personalization within its customer relations. This approach includes product catalogues with references and prices that are adjusted according to the consumer's activity.

Furthermore, Rexel believes it has a major role to play in terms of informing and training the electricians who are the distributors of its products. Though this role is normally taken by the branch network, the internet is beginning to play an important role in the relationship with electricians, by enabling Rexel to provide information about new products¹² and training on the set-up and maintenance of new equipments. Rexel's new objective is to be the interface between various value chain actors (design firms, architects, installers), in order to deliver value-added services to its customers. This leads to a new configuration of the industry value chain (see Figure 3).

¹² Rexel positions itself as a go-to source of information about the changing electrical world, particularly through the Inexel TV channel (www.inexel.tv)



Suppliers are mobilized on the basis of the specificities of the products.

Rexel identifies partner **installers / electricians** who are both geographically close and have the necessary competence.

Rexel is the "link" (market co-ordinator) defining the solution and mobilizing other actors (suppliers, installers, architects, designers) for delivery of the solution.

The **client** is in direct contact with Rexel.

Figure 3 – Evolution of the value chain: small- and medium-sized contractors

Rexel's role in these market situations is based on its ability to combine many skills, sources of information and capacities: in-depth knowledge of suppliers, products, procurement lead times, etc.; knowledge of end-users; knowledge of its electrician partners and their specialties; complementarity of physical (welcome, agency training) and technological (professional website customers, general information websites, tablets, electronic ordering) interactions with installers and electricians.

Key accounts and major projects: working in-depth with customers

Customer relations with key accounts (Industrial or Commercial big companies) are very different from customer relations with small contractors/electricians: 'There is another way of working with major customers, where little by little you become part of them. You have to be there, at their side, before construction starts, and afterwards you will perhaps send one of your salespeople to see them. You work with the design office that they usually work with, and you maybe end up starting an agency in the factory. You go there to provide services, and finally you manage the electricians in the factory. And at that point, you are working in-depth with them; you have integrated the customer. The challenge is to get more involved with the customer, and to make yourself indispensable to them.' (Head of Strategic Planning).

In order to compete in this environment, Rexel is implementing a range of services, in a classic or ad-hoc way, to meet the needs of its customer:

- installation of a Rexel agency on site, giving support and advice;
- supply and inventory management, up to extending the catalogue towards non-electrical products, based on the customer's needs;
- timing of supplies based on how quickly construction progresses (JIT);
- interactive terminal enabling to make orders on the website and to follow up all multi-channel orders (internet, telephone, counter);

- computerized and personalized card system provides purchases, in which each purchaser has a profile (order limit, available budget) and a daily report is sent to the team leader, etc.

The objective is to position Rexel as a **value-added partner** for the company, allowing it to maintain its profit margins: ‘We are not merely a pick and pack company. When you go to see customers at that point – I remember vividly a negotiation with an industrial group in Brazil – you never talk about prices. The price is not the issue. The issue is maintaining the range, reducing the number of suppliers while maintaining the company’s quality of service. Eventually, however, there is a negotiation, but it is never just a question of haggling over money or deadlines. Not at all.’ (Head of Marketing and Customer Relations).

Rexel’s position in these operations becomes that of a partner with extended skills (Figure 4).

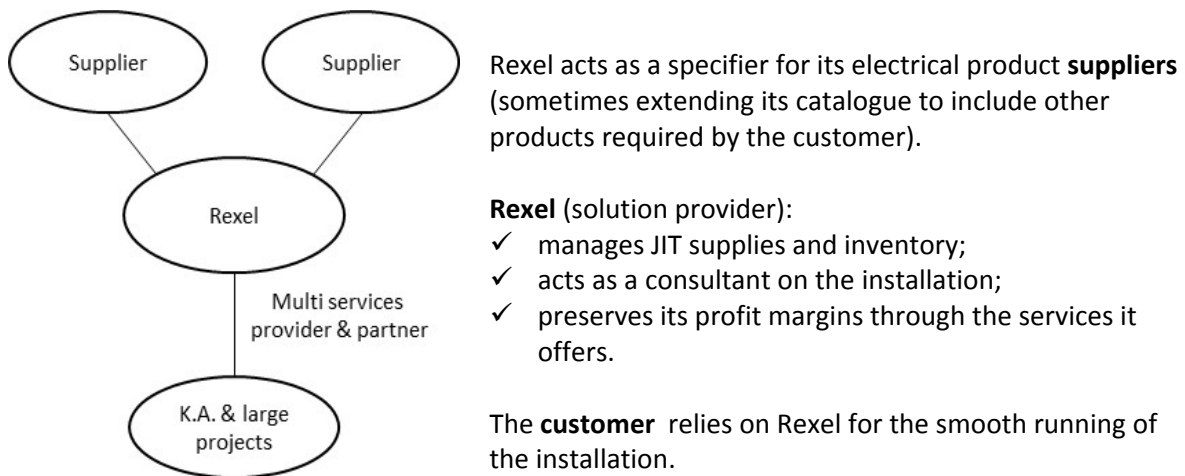


Figure 4 – Evolution of the value chain: key accounts and major projects

Note, however, that for these types of projects, relations with suppliers may also be directly competitive. Schneider Electric (which bought out Areva Distribution) won a key contract in April 2011 from the American public works company Bechtel for installing the electrics in a Natural Gas Liquefaction project in Australia. Schneider’s ambitions and positioning are, here, in direct competition with those of Rexel: ‘By taking an active part in such a project, Schneider Electric is demonstrating its capacity to act as the customer’s sole contact, taking total responsibility for the project’s implementation and improving the responsiveness of its intermediaries. This contract is a clear example of the capacity for the cooperation and involvement of all Schneider Electric’s teams to take control of every stage of this project. (J. Kieffer, Head of Projects & Services, Schneider Electric).

The Salesforce Case

We will now consider an American company emblematic of a strong trend in the digital economy, Salesforce. From its inception (1999), the company has been focused on "Software as a Service" (SaaS). It was the first customer relationship management (CRM) system offered online rather than on-premise. After presenting the company, we will consider, as we did for Rexel, the role of the co-production of value in its strategy.

The Salesforce Company and its environment

Salesforce was founded by Marc Benioff, the current CEO, and a small engineering team in February 1999. In an article published in June 2003¹³, the founding idea is reported thus:

"While browsing one day on Amazon, he asked himself why business software could not be delivered the same way: via a web browser. People who shop at Amazon do not, after all, have to worry about installing, upgrading or maintaining anything: they just fire up their browsers, and it works. The service is secure and reliable and has millions of users. "Amazon showed it was possible," says Mr. Benioff."

The company launched the first version of its product in February 2000. Fifteen years later, it has become the world's number one provider of CRM solutions. As of August 2015¹⁴, it is expecting \$6.6bn revenue for year 2015 with its 16,000 employees serving 150,000 customers. Salesforce position is stronger in the Americas which provides 74% of its revenue, of which 94% come from the U.S.A. The typical 30% yearly increase has been maintained over the years. Market capitalization reached \$50bn. However, Salesforce had only one beneficial quarter in the last 5 years.

Salesforce is an IT provider for business applications developed with web technology available in the "Cloud Computing" model. Its offers can be deployed, customized and integrated with other software applications. In 2015, it advertises¹⁵ five SaaS "Clouds" for Sales, Service, Marketing, Community and Analytics, which are essentially billed on a per-subscriber basis, but also include professional services for less than 7%. The first three Clouds account for 84% of the revenue; the latter two are recent, non-CRM offerings which show an attempt at applying the same model to new market segments. The historical "Sales Cloud" offering now represents less than half of the revenue and a lower increase (+10% year on year compared to +30% for other offerings).

A complementary offer is the Salesforce1 Platform, a PaaS (Platform as a Service) that allows clients to run their applications on Salesforce's hardware and software infrastructure. Such applications include both extensions or customizations of Salesforce Cloud services, but also independent applications. The AppExchange directory lists applications and services that can be used with Salesforce SaaS and PaaS offerings.

Noticeably, detailed figures about the actual number of users (subscribers to SaaS offerings) have not been available since 2007, probably because they would allow to infer the net price incurred by customers, as opposed to the official price for the services. The per-user per-month net price is reported to be "in a consistent range" over a two-year period, following a steady decline from \$80 in 2006 to probably about \$50 in 2011. The current exact level is unknown, but Salesforce underlines it its Annual Report that "the market [...] is highly competitive".

Salesforce relies on partners to implement its solutions, including Oracle, for key software components, and Equinix, for hosting services. Interestingly, Salesforce partners may also be competitors: competitors on the CRM and PaaS offering include Microsoft, Oracle and SAP. For

¹³<http://www.economist.com/node/1826138>

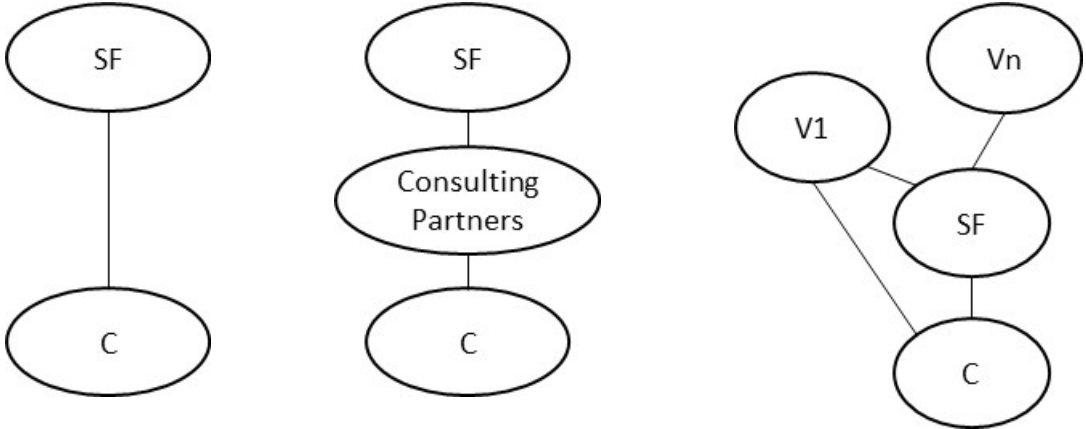
¹⁴Salesforce Fiscal 2016 Second Quarter Results, August 2015.

¹⁵Salesforce 2015 Annual Report, March 2015

instance, Microsoft Dynamics CRM is offered both online and on premise, and Microsoft Azure is Redmond's Giant PaaS offering. Salesforce paved the way for SaaS and PaaS has been followed.

Value Co-Production in Salesforce's Strategy

Value co-production is achieved by Salesforce (SF) and in partnership with customers (C), consulting partners and independent software vendors (Vi).



Case 1: Customers Case 2 : Consulting Partners Case 3: Independent software vendors

Case 1: Customers

Salesforce develops innovative solutions with some clients, such as the partner relationship management module that initially helped CISCO to communicate with its many partners, then integrates these solutions into its "as a service" offer.

Another form of co-production is the IdeaExchange tool that allows to collect customers' ideas, which are then put to a vote and eventually developed.

Case 2: Consulting partners

Salesforce does not install its software for its customers. This is the role of a network of 2000 approved consulting partners¹⁶, which are in charge of set-up, interfacing, training, etc. They are supported by a center of excellence and second level Salesforce experts, who can come to validate integration project at key stages.

Co-production focuses on informal exchanges in both directions and on joint responses to tenders.

Case 3: Independent software vendor (ISV) through the AppExchange

AppExchange, Salesforce applications directory, should not be confused with Apple's App Store or Google Play, which enable payment and direct downloading of applications to devices. Although it includes some simple applications, most applications require configuration, integration or contracts and additional subscriptions or payments on request. Moreover the software procurement by a

¹⁶Liz Herbert, The Forrester Wave: Salesforce.com implementation, Q2 2011, May 13, 2011.

company involves a selection process or a formal tender, including joint responses by Salesforce, an ISV and an integrator.

Maintenance of complementary applications is integrated in Salesforce development cycle and implies close collaboration. Salesforce vendors are seen as solution “prescribers” by ISV, hence the importance of appearing in their shortlist.

Products and services proposed on AppExchange have very different economic models and variable levels of cooperation: co-investments (financial participation for Salesforce), co-developments (mixed teams), co-marketing (sales of a same product), co-sales (joint responses to tenders), co-mplement (new features), co-nnector (inter-application data synchronisation), co-llaboration (joint work), co-opetition (complementary production which may compete with some basic functions), co-integration (products are compatible with new releases).

Some examples collected at CloudForce Paris 2011:

ISV Partner	Value coproduction
RemedyForce, BMC Software	<i>Co-investment, co-development, co-marketing</i> : an application for managing IT services, following ITIL best practices.
Ibolt inter-ERP connector, Magic Software	<i>External connector, co-integration</i> : data synchronization between SAP, Oracle... and Salesforce. The Salesforce connector is just another connector, but perceived as strategic because it operates according to the cloud model.
Omniure, Adobe	<i>External complement and connector</i> : Omniures does email delivery and click tracking for marketing compaigns. The connector allows a bi-directional connection with Salesforce, but the interface remains independent. An additional subscription is necessary.
Camelon software	<i>Complement, co-sale</i> : this configuration tool for complex products helps build responses to tenders. This high value-added product is needed by Salesforce for some markets, as part of joint proposals. There is a direct contract with the customer to provide and support the product as a service, next to Salesforce. Such products create strong loyalty from customers because the entry ticket to use them is quite high; thus Salesforce is very keen to link them to its CRM offer so as it help make it “stickier” ¹⁷ .
Bureau van Dijk	<i>External interfaced complement</i> : provider of economic and financial information on companies. The small app integrates this information into Salesforce, and the service is paid for independently.
Ideal-Analytics	<i>External complement, connector, competition</i> : a BI data visualization tool to better analyse data extracted from Salesforce.

Salesforce strategy, Reflections on its business model

In the words of Graham Smith, VP and CFO of Salesforce¹⁸, its value proposition is a “low-risk proposition for a customer”, as it does not entail large hardware and software investments. The main switching cost is that the client base must be moved into the system: this cost is manageable as these data are limited in a CRM application.

¹⁷Interview with Lionel Chapurlat, VP Alliances and Business Dev., Cameleon Software, April 2011

¹⁸Graham Smith, VP, CFO, Salesforce, The Wall Street Transcript, April 2008

Bill McDermott, SAP CEO, outlined this commoditization risk when denying any intention to buy Salesforce: "I think it's pretty clear that Salesforce automation, in its current format, has become a commodity"¹⁹, which means that "prices are going to drop"²⁰.

In this context, attrition, the rate of clients that do not renew their contract, is a key indicator of Salesforce continuous success, and Salesforce strategy is to counter this risk by encouraging customization through the AppExchange, creating a better offer for its clients while providing only basic services and enabling ISVs to provide the much desired "stickyness".

The AppExchange ecosystem created by its double-sided platform, which connects ISV and users, in some case the same people, provides endless customization options to specialized markets, in effect deploying a long-tail strategy.

Another element of Salesforce strategy is to target markets globally, both with local teams but also through its many partners. Through ISV and other partners, Salesforce has build a rich ecosystem, which makes it more competitive.

Section 4 – Conclusion and openings

This study of the new rules of the digital economy, with its changing business models leading to the adaptation of Information Systems, has enabled us to identify a set of revealing findings, but has also raised a certain number of questions.

One of our main motivations for this research was to describe, analyze and understand how these phenomena are embodied in two opposite environments, one being that of a pure Internet player selling an SaaS offering, and the other a traditional business that distributes products through a physical network of thousands of outlets.

Changes in the Digital Economy

What have we learned from these two case studies? We return here to our initial assumptions for further discussion.

Changes in value chains in the sector

Our research has allowed us to clarify and refine our understanding of changes in industry value chains, as well as the role of services in the value proposition. It also highlights the strong impact on businesses that want to remain competitive in this new environment.

Overlap of participant roles and capacities. Whereas in traditional sector channels every company had a precise role and acted within a specific domain, be it as "supplier", "distributor", or "installer", as in the case of Rexel for example, it is now clear that each player must try to acquire new skills to expand its control over the entire chain. New players from other sectors can enter the market when a technological change occurs, and thus contribute to the disruption of traditional business positions.

¹⁹ www.crn.com/news/applications-os/300076728/sap-ceo-no-interest-in-buying-commodity-salesforce-com.htm

²⁰ bloomberg.com/news/articles/2015-05-20/sap-ceo-mcdermott-says-salesforce-com-revenue-under-pressure-i9wgsokc

Providers extend the scope of their activities to address end users (see the case of Schneider Electric). In the Salesforce ecosystem, each partner may at one and the same time be an initiator of a project, competitor, partner, or independent, depending on the situation and according to the market needs.

Multiplicity and instability of configurations in response to market opportunities. The extension and overlap of roles as well as the implementation of co-operation strategies has resulted in multiple configurations of industry value chains. They seem to form a diverse and ad hoc response to market conditions, forcing players to constantly re-examine their own role and their interaction with other companies in the same sector. According to market segment or operational situation, these companies can position themselves either as actors in a cooperative situation, or as rivals in a struggle for leadership or competition, and may encroach on the territory of another player, or alternatively act as a partner in co-innovation to develop the market ecosystem.

Cooperation between industry value chain actors to co-create the services offer. Rexel has allied itself with small installers to provide a full service consisting of products and installation. Salesforce uses the AppExchange platform and its ecosystem of partners to expand its value offer through a range of value-added services. The extension of a role can no longer be taken on by one company alone; it needs to create partnerships to acquire new skills. The proliferation of services needed to fight the commoditization of products or basic services is strengthening this movement towards alliances and cooperation.

Search for a global offer for the client. Supply takes the form of a "solution" developed from a portfolio of services. Some are derived directly from the original core business and other components in response to customers' expectations in order to secure direct access and enhance the attractiveness of the value proposition. Rexel has shifted from the position of being a distributor of products to being that of provider of solutions. Salesforce has also been forced to evolve to counter the commoditization of its basic services offer (SaaS).

This environment is forcing businesses to redefine their "core business" by integrating a growing range of services. It has also created a new form of competition in which the issue is direct access to the client through an alliance with a comprehensive range of partners. The ability of a company to understand its role and influence in the sector value chain and achieve the position of central "network coordinator" providing pivotal support has emerged as a key strategic issue.

Growing importance of services but difficulties in monetization and implementation

The search for differentiation through the development of services and solutions around an initial offer (physical distribution for Rexel, SaaS for Salesforce) is obvious in both cases studied.

However, especially for Rexel, it is difficult to add value to services. While the company has moved away from a product-only model ("we are not merely a pick and pack company"), it maintains a very strong presence in its traditional physical distribution, and has so far failed to find an independent billing model for new services to its customers. It is thus in a seemingly paradoxical system where services are at the heart of the value proposition for the customer but are masked in terms of billing in the overvaluation of products (25-27% margin). So, it is debatable whether this development is sustainable in the long term; the risk is that the company may be challenged both in:

- the distribution of products (by a distributor competitor or a supplier offering lower prices);

- service provision by participants such as large installers like Cegelec, Eiffage, etc., whose core business is the provision of services.

The emergence of Smart Grids as an issue for the market for electrical equipment and power consumption is also likely to move clients' service expectations towards solutions that integrate the control and regulation of electricity consumption. Rexel has so far not taken a position on this market, which requires specific capabilities to process considerable flows of information. Suppliers like Schneider, installers such as Cegelec, and new players from the world of IT and consulting, or even pure players, are already positioned on these services.

What is obvious here is the difficulty inherent in the model of differentiation through services, which led Rexel away from its traditional skills. While some services close to the original core business activity can be developed in-house, others, like the management of Smart Grids, require cooperation with companies that have a completely different core business such as IT or telecommunications. The almost insurmountable difficulty facing the company is to understand a new business, identify potential partners, define a common business model and then find attractive forms of cooperation for itself and its partners.

For Salesforce, the problem lies not in the creation of new services as the AppExchange platform enables renewal and continuous innovation. The main advantage of these services does not seem to be for Salesforce in terms of directly generating additional revenue, but rather in helping to counter the threat of commoditization and thus attrition of its traditional offer (SaaS). The company is faced with the reluctance of customers to commit to PaaS. The challenge here is to overcome these reservations by establishing a strong value proposition through access to the many value-added services in the ecosystem of partners.

Evolution of business models

Struggle to keep direct access to the end user

We were interested in seeing in our two case studies how central the issue of development or preservation of access to the end customer is. New services and partner networks can be seen as two key levers in this strategy.

For Rexel, the issue is to preserve and strengthen its ties, firstly with the community of electricians, both through customized logistics including a tailored catalog, delivery to site, picking, etc..., as well as training in market development and linking up with other businesses, including suppliers, architects and consulting firms. The customer is changing, and electricians, although appreciating the interpersonal contact found in Rexel agencies, are sensitive to innovations in terms of processes and knowledge that the web channel can bring. In the relationship with key accounts and major projects, Rexel wants to be "a supplier of solutions" and a single point of contact for customers for a range of services. Unfortunately, this position is highly coveted, especially by vendors like Schneider.

Regarding Salesforce, its whole strategy is based on keeping customers (stickiness). The base product (CRM SaaS) is becoming commonplace as Cloud solutions become more widespread. The Salesforce ecosystem has generated a constellation of services that ties customers to the basic package. Salesforce has a strong strategic advantage in that, thanks to these services, it can maintain its network of partners via its control of the exchange platform.

Extension of the value proposition, intensification of client relations, diversity of models for resource and partnerships management.

We identified three major characteristics of the new business models:

- co-production of the value proposition;
- strengthening of the relationship with customers;
- management of resources and partnerships.

These two case studies highlight the following similarities.

- The *value proposition* includes increasingly broad competences designed to capture customers by offering a comprehensive solution. In the case of Rexel, this translates into the development of services, firstly in close association with the original physical job such as managing the supply chain, inventory management and JIT supply, and then in the fields of information and partner training for installers / electricians, as well as providing complete solutions to end customers (major projects, key accounts). In the case of Salesforce, the company has set up an ecosystem with its partners (clients, consultants, vendors) for the co-production of value. It is therefore the overall ecosystem that provides services.
- Regarding *client relations*: both cases point towards an increasing need for in-depth knowledge about customers, as well the personalization of the relationship (services for installers and custom catalogs at Rexel, complementary offers on Salesforce AppExchange).

However, the striking difference between the business models of these two companies lies in the management of *resources and upstream partnerships* aimed at creating value. Although both companies have embarked on a strategy involving the creation of an ecosystem for supply, this has taken a radically different form in the two cases.

- Rexel has tried to implement a special relationship with small installers, becoming a "link" between them and their customers. However, the ecosystem thus created is unstructured and loosely coupled. The value proposition is based essentially on internal company resources and the overall upstream customer relationship remains a client-supplier relationship. When Rexel involves electricians as part of a comprehensive solution for the end customer, it adds to its product catalogue services that it "buys" from installer-suppliers to "sell" to its clients²¹. Rexel's contribution to improving the quality of an installer's service (contributing to their training) and its efforts to retain them by offering additional services can be interpreted as a means of securing its supplies.
- The Salesforce case study meanwhile shows remarkable flexibility and creativity in positioning and in the management of relationships of the various actors within the orbit of the "business driver" at the heart of the business model. These include alliances, agreements, cooperation within the framework of tenders, establishment of short-lists of complementary applications, co-investment, co-marketing, complements, connectors, etc... Clearly a symbiotic relationship between co-resources and value-added players has been established.

²¹ Rexel does not insist on selecting the electricians who operate on its sites; the company does not want to "favour" certain installers and antagonize others.

The question of whether the type of organization that Salesforce embodies, as a hyper-reactive co-producer of value, with constantly changing contours while remaining highly structured around the driver of the Value Network, is transferable, and to what extent, to other areas of activity remains valid. The Salesforce technology platform is indeed a point of passage for its partners and provides de facto dominance over its network of alliances.

The role of Information Systems in these changes

Our study has led us to a set of initial findings about the changing role of Information Systems. These would need to be expanded and challenged in future research. However, a set of conclusions emerge from our study, the first being that, in the strategic landscape of the digital economy, Information Systems are a vital resource for making an attractive value proposal operational for customers. Three levers seem essential:

- mastery of IT architecture;
- optimization of inter-organizational processes via the Information System;
- orientation of IS capabilities to the extended enterprise;
- proximity to the business.

Confirmation of the central role of the IT infrastructure

We discussed, through the Rexel case, the evolution of the IT infrastructure in the context of new business models (Kraemer et al., 2000, Weill & Vitale, 2002, Zhu, 2004). We have found, as did these authors, a significant development of the capabilities and services available, and a trend towards centralization and sharing. This is balanced in the case of Rexel, by the respect for a decentralized culture and a consideration for the particularities of local markets. Centralization helps to reduce costs, share information and ensure the consistency of services. To achieve the goals of efficiency, flexibility and speed of implementation with regard to the Information System, Rexel CIO has used innovative solutions (SaaS) and made extensive use of external services (offshore, Atos Origin contract). Our study casts light on how important it is to adapt the IT infrastructure to strategic business developments as shown in the history of the development of Rexel's IS. It was initially decentralized and then moved towards standardization and sharing to reduce costs, and finally oriented towards sharing for value creation. This type of development has now become a key issue for companies²².

The key areas of the development of Information Systems in the digital economy for us are:

- re-examination of the global / local balance, with a strong trend towards centralization to reduce existing costs and faster development of new services, as well as ensuring consistency and access to information on the activity and customers;
- knowledge, use and integration of market solutions (Cloud Computing) when these contribute to reducing the cost of "commodity" components of the Information System or to accelerate the provision of new applications;

²² See Kettinger et al. (2010) for a discussion on balancing standardization and flexibility in the design of IT architecture.

- agility, i.e. the ability to operationalize business processes developed on an ad-hoc basis in response to specific customer requests. The current move towards agile methods is part of this strategy, as are the in-sourcing of key programming and data management competencies that can be observed in companies experiencing deep digital transformation.

Inter organizational Information Systems and digital platforms: convergence on the support for processes, various options for knowledge management

As we have seen in the literature review, research into inter-organizational Information Systems (links with customers and suppliers and partners) has identified two complementary roles:

- support for business processes;
- sharing knowledge about the market and its expectations.

These two elements reinforce the overall value proposition.

The Rexel case analysis shows that the development of an inter-organizational IS became a reality, including integration of the supply chain, development of interactions with utility customers on the web etc. However, it was almost solely focused on "support processes". The information exchanged is mainly operational data necessary for the proper functioning of the process. Information and training offered to small contractors are also very operational and focus on the characteristics and uses of products. Overall, market knowledge and expectations seem to be a key factor in Rexel's standing in its market and sharing it too widely may destroy its value.

Salesforce's problem is quite different. Process facilitation and exchange of knowledge through its platform are the very foundation of the business model of the company. They provide two basic resources: creativity (bottom-up innovation) and market development through complementary offers deriving from the network of alliances, which ensures the continued loyalty of customers to the basic SaaS - CRM offer.

The issue of knowledge sharing in inter-organizational IS poses the problem of possible information asymmetry between participants and their respective ability to use the information as leverage to develop new offers or expand the market. Salesforce is neither the owner nor the main contributor to the knowledge exchanged via its platform. Knowledge is the common property of the system, so that each player contributes to the development, use, and enhancement of the system.

Orientation of IS capabilities to the extended company and proximity with business lines

The two companies that we chose to study face very different issues in terms of Information Systems. However, they each show a real ability to use IS as a lever to promote their strategy. Regarding IT capabilities, for which we relied on the work of Bharadwaj (2000), we observed in these two companies three leading principles:

- Close attention to technical infrastructure appears to be a key factor of operational leverage in support of strategy. Throughout its history, Rexel has adapted its IT infrastructure to be coherent with the organization and enable it to drive cost reduction and increase value creation. To do this, the company is willing to reach out to cloud computing resources and to involve other businesses,

for example creating a common technical platform for websites. Salesforce has, for its part, managed to boost its initial product (SaaS CRM) by creating the AppExchange platform.

- Inclusion of external partners among the "IT customers". Having optimized its business processes (upstream and downstream supply chain), Rexel has now turned its focus on the expectations of its customers and small installers and is considering which technological solutions to provide for them as part of loyalty building strategy. A key resource for Salesforce is its ability to manage its technology platform as a way to facilitate its partners' operations.
- IS Human resource management involves both taking into account complex technical environments that are co- built and / or co- operated with external service providers, and strengthening links with business as well as having a good understanding of the latter's activities and thus contributing to innovation.

Rexel's CIO has demonstrated the need for proximity to the business line, and the sharing of a common vision of the role of IT. The history of Rexel's Information Systems shows co-development of the strategy and architecture of Information Systems: decentralization, then standardization and pooling of resources to reduce costs and, more recently, mutualisation with a view to value creation. The definition and implementation of the new web platform were CIO's initiatives, and it was immediately taken up by marketing and four operational divisions. The proximity between IT and business fuels innovation and explains the agility of Rexel. As another sign of this close co-operation, the CIO has since taken over the responsibility of Vice-President of Operations for France and Southern Europe.

The diversity of situations and mechanisms observed via our two vastly different case studies proved to be highly revealing. Of course, focusing on two subject cases is an intrinsic limit of the scope of this study and there remain numerous avenues of research to explore to confirm and generalize our preliminary findings.

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