Network Strategy: A Dynamic Approach

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Network Strategy: A Dynamic Approach

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Abstract
Strategy discourse has focused primarily on the individual firm, evolving from an emphasis on industry positioning, to internal resource allocation, and finally, dynamic capabilities and learning. However, the strategy discourse concerning networks remains focused on network structural attributes and static resource endowments. We argue that a theory of dynamic capabilities or adaptive behavior is lacking for business networks. We define business networks as organizations with one central player (or focal firm) and highly inter-dependent external players that collaborate in order to meet common objectives. Drawing on the literature of learning and psychology, we define four discrete modes of adaptability: 1) automatic responses, 2) assimilation, 3) accommodation, and 4) environmental enactment, describing how business networks display self-renewal behavior, learning and negotiation with the environment. A cross-case analysis of 2 distinct business networks is presented to substantiate how common patterns of business network adaptability can be applied with; a) either greater scope or breadth across industries, or b) focus and specialization in a single vertical niche. The paper concludes with implications for the theory and management of business networks, as well as limitations of our study and prospects for future research.

Keywords: Network Strategy, Focal Firms, Dynamic Capabilities, Adaptability, Theory Building

1 Theoretical framework: network strategy and adaptability

1.1 Business Networks and Strategy
Strategies are business intentions that should be realized in focused or directed actions and policies to choose a path of efficiency (Mintzberg et al., 2003; Galbraith, 1977; Pedersen, 1996). Strategy discourse has tended to focus on the individual firm as a unit of analysis. This firm-centric thinking can be found in the positioning theories in the 80’s, to Resource-Based Perspectives (RBP) in the 90’s, to the more recent Dynamic Capabilities discource (Teece et al., 1997). In the 80’s, “positioning” was the mantra for strategists (Porter, 1980). The positioning school argued that firms
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were basically homogenous, and that competitive advantage could be garnered by assuming a position in attractive industry niches determined by supplier power, barriers to entry, buyer power, threat of substitutes, and degree of rivalry (Porter, 1980; Porter, 1996). Here, the analytic focus is on the position of individual, yet homogenous, firms within heterogeneous market structures.

However, disappointment with the failures of the long range and strategic planning paradigms of the 1970s and the positioning school of the early 1980s has led to the acknowledgment that firms are essentially different, and that analysis of strategy and competitive advantage must begin from this fact, rather than the analysis of more aggregate competitive forces. The resulting theories are broadly called ‘Resource Based Perspectives’, and concede that there are systematic differences across firms to the extent that they control resources, and these resource endowments can cause performance differences. The main goal of the RBP is to account for the creation, maintenance and renewal of competitive advantage in terms of the internal resource allocation of firms (Foss, 1996).

The early literature in the RBP was rooted in traditional economics and focused on the static conditions in which resources can yield economic rents (e.g. Barney (1986)). This early discourse was quickly criticized, and subsequent literature began to play with constructs of resource and knowledge acquisition and endogenous transformation. And where the positioning school was almost exclusively focused on the external environment, many have argued that the RBP completely neglected environmental forces. In response, the Dynamic Capabilities theory argues that resource acquisition, renewal and transformation will be differ across firms (Teece et al., 1997; Prahalad & Hamel, 1990), and these differences will be expressed as distinct strategies and managerial practices. Specifically, the foundations of dynamic capabilities are: (1) how the firm learns new skills; (2) internal and external forces which focus and constrain the learning process; (3) the selection environment in which the firm competes for resources as well as customers. Here we find a balanced emphasis on internal resources, learning, and their negotiation with the environment (Foss, 1996).

In parallel to this evolution in the strategic discourse surrounding the individual firm, theorists have begun to explore how relationships with other trading partners can affect overall firm performance. Here we refer the embeddedness perspective (Granovetter, 1985), which suggests that firms are not atomized entities that make self interested decisions constrained by scarce resources. Rather, they are embedded in a network of relationships that shape access to important resources and are important determinants of their strategic conduct. Accordingly, networked relationships are not just frictional drags on rational agency, but rather, they can also be sources of economic or relational rents (Dyer & Singh, 1998) and are therefore appropriate levels or units of analysis in themselves (Ahuja, 2000; Powell, 1990; Uzzi, 1996; Coleman, 1990).

By definition, a network view is interested in the position of a focal firm in various structures of networks. This approach, for example, has explained settings with low interactivity and low tie density, where focal firms may bridge structural holes between customers and providers to connect participants and resources (Burt, 1992). Alternatively, in dense networks, focal firms may orchestrate collective action (Coleman, 1990). Applied research in this area has argued that Burt rents can be realized through bridging structural holes in sparse networks, thereby increasing network density; where Coleman rents can be garnered through orchestrating collective action in dense networks, thereby decreasing network density (Rai et al., 2003). However, in the extreme, this approach can be equally criticized as “the result
of importing ‘positioning’ theory to business network analysis, sharing the fantasy of an isolated firm in a static environment” (de Witt & Meyer, 2005, pp.153). Within network analysis, if we search for a parallel evolution in the firm-centric strategy discourse, the RBP begins to open the black box of the focal firm to understand the importance of the firm’s asset specificity and specialization. So within networks, the dependence between firms may be explained by the need for trading specific assets, and more importantly, the aggregation of complementary assets to realize relational rents (Dyer & Singh, 1998; Wareham, 2003). Market, hierarchy, hybrids and intermediaries with permanent electronic channels foster mutual knowledge creation, leading to a rise in information flows between participating companies by a high degree of interaction, trust, and commitment (Clemons et al., 2002; Powell, 1990; Soh et al., 2006; Vervest et al., 2005). In this context, focal firms assume a position in a network with given structural attributes. However, as orchestrators of collective action (Lorenzoni & Baden-Fuller, 1995) they realize relational rents by combining complementary assets (Bakos & Brynjolfsson, 1993). In this sense, we find a strong parallel with the RBP, where the coordination and aggregation of unique and complementary assets is not merely inter-firm, but intra-firm, in a network of orchestrated action (Malhotra et al., 2005). However, to a large degree, the previously cited literature from the networking literature suffers from a similar problem we encounter in the inter-firm strategy discourse; namely, that it assumes some kind of static equilibrium as an analytic premise. Since strategy is always the development of something new, “a step into the unknown, the taking of some kind of risks” (Mintzberg et al., 2003, pp.34) there is a natural link with self-renewal behaviour, value generation and innovativeness (Nohria & Ghoshal, 1997), or some kind of evolutionary, dynamic characteristic. Accordingly, we suggest that the evolution found in single-firm strategy literature (e.g. positioning-external, resources-internal, and dynamic capabilities-external/internal), has not been completely realized in the strategic network literature. Specifically, we believe that in a embedded perspective, organizations are networks of relations that move in a fluid environment, where orchestrators enact a strategic apex within the network to generate value for every participant (Lorenzoni & Bader-Fuller, 1995). From this perspective, we will develop a model that stresses the role of the focal firm, or the orchestrator, to delineate a set of organizational functions as dynamic capabilities to assure direction setting and self renewal and adaptive behaviour of the network. To this aim, the following section review the literature on psychology and learning which explicitly addresses issues such as internal learning and capabilities, external actors, and their negotiation with the environment, to develop a theory of business network adaptability. In section 3, we present a cross case analysis to illustrate the conceptual utility of the framework, and highlight important differences between the adaptive behaviour of our case subjects. Section 4 discusses the findings and presents the conclusions.

2 The adaptability framework

The rapid changing business environment has prompted a call to stressing that organizations are better described through its dynamic capabilities (Teece et al., 1997) in order to ensure self renewal behaviour (Vervest et al., 2005), learning capabilities, and long-term adaptation to the environment (Cyert & March, 1963). Drawing upon Piaget (1950), adaptability is composed of two main modes, assimilation and accommodation, with biases on learning, decision-making, change and governance. Moreover, we have extended this logic by suggesting that a third
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mode, environmental enactment (Scott, 2003), where organizations exert substantial resources to affect or change environmental conditions. Finally, we also think that there is a need for one more mode of adaptability: automatic responses in processes and systems programmed between the organization and environment (Zuboff, 1985). Although we use the model of psychology of intelligence from Piaget, we do not apply it in the same evolutionary sense. Rather, we employ it to represent discrete modes of adaptability independent of any distinct evolutionary cycle. Therefore, our framework of adaptability consists of four modes (Busquets et al., 2006):

1. Automatic responses are programmed limits of action that can be carried out by Information Systems without human intervention. For example, a request for service through a Web Portal that triggers a predefined programmed response of the system or organization.

2. Assimilation\(^1\) is carried out by the combination of people and information systems to carry on with the actual repertoire of actions and behaviour.

3. Accommodation is completed by people using information to monitor the processes and to use abstract reasoning (Zuboff, 1985) to come up with (a) new solutions for problems of a particular business environment, and (b) incremental innovation driven by customer’s needs.

4. Environment enactment describes where people and technology create new conditions or new domains of action (Thompson, 1967), opening new markets and innovative services driven by the creativity of the firm.

As depicted in figure 1, two variables govern the adaptability modes: management awareness and organizational energy. Implicit in this framework is an idea of economic efficiency. One mode of adaptability is not superior to another. Rather, each maintains its specific function, its own relative costs and benefits, which are dependent on context and need.

Managerial awareness is the variable that governs knowledge requirements, stressing that theories of attention are better than theories of choice (Scott, 2003). Since too many things may be important, managers need to concentrate to use their scarce time in what kind of information they need to make decisions, selecting sources and facts

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\(^1\) Concepts of Assimilation and Accommodation are imported from the theory of Adaptation of Jean Piaget. See Piaget, J. (1950), The Psychology of Intelligence, Routledge. See Also Busquets et al. (2006)
(Pfeffer & Salancik, 1978) in order to make ex-ante decisions (Pedersen, 1996) to choose the appropriate mix of organizational functions to set the right path for efficiency. Lower awareness may suggest tacit activities and the use of the repository of organizational knowledge (Teece et al., 1997; Cyert & March, 1963): automatic responses (already programmed information systems) and assimilation, suggests routine operations and tacit activities (Polanyi, 1962) performed in planned or “business a usual” activities, while high awareness is required in un-planned and novel activities. From knowledge theory, increased awareness is linked with learning based on higher mental processes (Polanyi, 1962).

Organizational energy refers to the power of organizations and the human action to transform the social and material worlds (Orlikowski & Robey, 1991). We are referring to the allocation of organizational assets and the investment of scarce resources like organizational infrastructures, money, time and information. However, since our approach is dynamic, we also suggest the opportunity for resource mobilization such as people, business relationships and information among the participants in the business network. Therefore managerial awareness is related with resource allocation and resource mobilization, that is “management manages in the face of variety of efficiencies” (Pedersen, 1996, pp. 105). We recognize as well that our model draw upon a organizational learning theory since (1) awareness and consciousness are scarce managerial resources that must be decided to be allocated in order to adapt organizations to environment (March, 1991); (2) the environment is the information and knowledge that management choose to have about it in order to make ex-ante decisions to adapt organization; and (3) actions may also have desired as well as non-desirable outcomes. In fact, many new ideas may be bad or poorly implemented, since there must be a reflective process requiring practice, patience and time to acquire new capabilities and knowledge resources (Schön, 1971).

3 Empirical study: multiasistencia & e-gatematrix

We now turn to a cross case analysis of two focal firms in business networks that demonstrate adaptive behaviour in fundamentally different ways. Multiasistencia was founded as a claims management service that provided transparency and standards to basic processes in the insurance industry. It soon learned that these administrative processes drove the firm to acquire dynamic capabilities that could be easily leveraged across a variety of sectors. In contrast, eGatematrix was founded in an effort to redesign highly inefficient processes in a tightly focused vertical sector, the airline industry. Our analysis demonstrates how differences in scope and focus influence the adaptive behaviour of both types of business networks.

3.1 Multiasistencia

Multiasistencia was founded in Spain in the early 1980s with the creation of the “Comprehensive Claims Management Service” (CCMS). The service standardized the highly fragmented and heterogeneous household repairs field, applying pre-defined prices, transparent conditions, establishing service performance and quality guarantees, ensuring time response (24 hours and 3 hours for emergencies) and warranting the work for 6 months. The CCMS is offered either as part of a fully comprehensive household insurance policy or as a customer loyalty service in Spain, Portugal the UK and France. The Customer Service Representatives (CSRs) are coordinators of the repairs management process who engage in the reception of home repair job requests and deploy repair jobs to the appropriate affiliated trade professional. The firm used ICTs to build up a ubiquitous application based on Contact Centers, the Internet, Web Services and Mobile Systems. This re-engineering
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process took three years (2000-2003). The Control Center manages the process, monitors the jobs in process and executes quality assurance tasks. The Control Center had, in 2005, 375 CSRs who manage over 25,000 incoming and outgoing calls a day from the different countries in which Multiasistencia offers its services.

**Automatic Responses:** In Multiasistencia, the process of managing claims and repair is fully automated. A pervasive Internet based information system connects in real time corporate clients and trade professionals is governed by 100 variables managing (1) the contacts with corporate clients and end customers by electronic means and (2) the network process understood as a standard for behaviour. According to one executive of Multiasistencia, “We have substituted all human communicative elements in the repair service, except the incoming calls, by machines. We develop a sophisticated process supported by ICT allowing people to manage exceptions.”

When the Control Center receives a call (or e-mail or fax), a CSR assesses the request for repairing. After this point, the deployment and closing of the repair is carried out automatically. Next, it is executed an automatic assignment algorithm, which takes into account up to 10 variables such as: place, zip code, professional specialty, insurance coverage or response time required. On ending the repair, the trade professional reports the completion of the service and his new availability. The system automatically ends the administrative task and invoice for the repair.

**Assimilation:** The Control Center integrates communication media like e-mail, mobile communications, SMS messages and Internet access. What is important about the assimilation mode is that every time the Control Center receives the call (or e-mail or fax), a CSR assesses the repair according to the firm’s schema built on previous knowledge and categorizes the claim in order to trigger the CCMS process. In other words, Multiasistencia assimilates the claim within (1) the defined framework or pattern of behaviour, and (2) with the committed Service Level Agreement. Using the information system, once a repair order is open, no one needs to intervene unless an exception occurs. Automation provides: (1) more control and continuity of the process, (2) setting a framework or pattern of expected behaviour, (3) clean information flows between Multiasistencia and the other organizations in the network, and (4) more information. Corporate clients can obtain access to the same information as any Multiasistencia CSR for any direct management with their client or to complement their own corporate systems. To that matter Multiasistencia provides more transparency and a sense of “tangibility” emerges in the service as all activities are reported in real time and information about the status of the repair is available from Web Portals.

**Accommodation:** Accommodation takes place when the existing processes of automatic responses and assimilation are not enough for providing service. As an example, in an exception, the “exception team” of the Control Center is engaged. More informational resources are needed, and eventually other participants in the network need to be mobilized in order to provide the service. Multiasistencia has to allocate resources (physical space, technological infrastructure, time and money) and mobilize resources (information and business relationships) to accommodate not only exceptions, but new requirements. Furthermore, the firm facilitates incremental innovation within the same domain of action with much more agility. First, the firm offers custom-designed services that include a complete range of features, such as “tele-surveys” for assessing claims. The firm has introduced a Web Portal for loss-adjusters and the management of recoveries (negotiated or through a judiciary process). One manager added, “When the repair assessment goes below an economic threshold, loss adjusters can carry out a ‘desk-top audit’ on the Internet with the digital photographs our trade professionals take in customer houses. In the first tests
carried out with the new system, the inspection cost has been reduced by 60%.” Second, Multiasistencia has introduced innovations in the repair process: digitalized signature and electronic invoicing, which have increased savings up to 40%. Third, the creation of new services based on information like the management of claims adjuster reports on behalf of insurance companies or performance indicators for Insurers.

*Environmental Enactment:* Firms can enact the environment by the creation of new domains of action (Thompson, 1967), that is the creation of new markets, services and customers. Multiasistencia quickly learned that its skills in claims management could be leveraged to other administrative processes. Some actual corporate clients asked to the firm to design and manage complex informational processes such as mortgages, or changes of customer information from one bank branch to another. Multiasistencia also develops firm-driven innovation and offers new services like (1) information services for mobile operators; (2) orchestration of information from different agencies in local government, providing a unique point of contact to citizens in different cities; (3) the electronic secretary or assistant to its actual base of customers for finding new market opportunities, and develops new markets like the healthcare and automotive repair sectors. According to one manager, “We want to become the “process factory” for our corporate clients with our main core competences: front office, network process and network management guaranteeing them speed and quality.”

### 3.2 E-Gatematrix

E-Gatematrix was established by AirCo, one of the largest U.S.-based airlines, and its largest supplier, Gate Gourmet, to offer airlines an alternate approach to manage in-flight services responsively and efficiently. In recent years, airlines have faced significant costs pressures along with a myriad of related issues ranging from labor disputes, pilot wages, brand management, and service offerings, all competing for managerial attention. Though the core business of airlines is to provide on-time transportation, above-the-wing services impact customer satisfaction and reputation as passengers experience them on each flight. As airplanes need to be cleaned and complemented with supplies at each airport, AirCo had to maintain direct relationships with suppliers, caterers, and cabin cleaners in geographical and airport locales.

*Automatic Responses:* Prior to eGatematrix, there was limited communication and coordination among members serving different areas or even the same area. Each member developed forecasts and plans individually, little information was exchanged among them, despite the sequential flow of products flowed from suppliers to caterers and to service providers and then to AirCo. Demand signals were provided by sending flight schedules by fax, email, post and EDI to supply chain partners fifteen days to three months in advance of flight departure. Erratically published flight schedules provided only a rudimentary demand signal in the form of a maximum carrying capacity of each scheduled flight, resulting in significant inefficiencies in strategic procurement, requirements planning, inventory management, transportation of services, and transition planning of service changes.

To address the problem, E-Gatematrix deployed three applications for instant demand information access from web-enabled computers. First, *Flight Service Schedule* posts daily updates on flight schedules, with menus, provisions and activity codes assigned to each flight. Second, *Passenger Load Forecast* provides daily updates of reservations per flight combined with a forecast of anticipated loads. Third, *Service*
Demand Forecast, perhaps first of its kind, forecasts quantities of a given service to be boarded on a particular flight based on projected loads and schedules.

Assimilation: High inefficiencies in this vertical sector were created due to deadhead backhauls from distribution centers and lack of competitive bidding. For example, lack of asset management and planning created a need for ad hoc flights to redistribute physical stock (both fixed and perishable assets; dishes, treys, galley equipment, food and beverage) around the country. Essentially, the company did not know how much of each asset they had, or where it was. Additionally, accounting methods did not provide visibility into transportation costs. To address these problems, E-Gatematrix developed intelligent planning modules to evaluate sourcing and to coordinate the flows of distribution trucks, to fill backhauls, and to load schedules. These decision support systems are a combination of automatic asset tracking and planning algorithms to assist company planners.

Accommodation: The supply base is mapped into strategic or commodity suppliers for food, services, and supplies. Based on supply conditions and procurement savings (price fluctuations), heuristics are refined to re-classify products as strategic or commodity. Design of meal services is a very important area, but changes in design cause significant oscillation of production systems and financial losses through perishable goods. By applying the Analytical Hierarchical Process (AHP) structured method, E-Gatematrix develops prioritized, consistent, and agreed-upon meal design parameters to streamline communication and menu transitions among network firms. Additionally, product lifecycle management tools that interface with collaborative forecasting and planning tools are used to evaluate changes in design and their timing. In addition, standardized web-based procurement processes for proposals, bid and auction, and purchase execution are defined and enforced. Finally, based on data related to retail sales and special services (e.g., duty free items) aggregated across airlines, industry trends are used to determine optimal inventory levels and pricing promotions for impulse retail items.

Environmental Enactment: Tremendous waste in perishable inventories result from the fact that even the same airplane manufacturer will have non-standard asset sizes and unique galley design, complicating galley load planning and optimization considerably. To solve this problem, heuristics were derived to standardize packaging products, such as dish and tray sizes, and containers, which increased their scope of use. By building a repository of design specifications of plane galley structures and galley loading equipments, integrating with flight scheduling systems, and applying intelligent forecasting methods, E-Gatematrix optimizes galley loading equipment and reduces overall inventory. This data is shared with supply chain members and vessel manufacturers to help enact a reengineering of the supply chain and facilitate standards harmonization for galley planning in the entire industry.

4 Discussion

In this paper, we have opted to define a business network as organizations with one central player (or focal firm) acting as a strategic apex and highly inter-dependent partners that collaborate in order to realize a network strategy understood as: (1) common objectives and coordinated actions, and (2) dynamic capabilities to show agile, robust and self-renewal behaviour (Vervest et al., 2005) to adapt to the environment, boosting innovativeness and adaptability as a key dynamic capability. When innovation depends on a series of independent innovators, the business network needs a focal firm that governs collective action for the system (Lorenzoni & Baden-Fuller, 1995).
Consequently, both Multiasistencia and eGateMatrix demonstrate how a focal firm in a business network has been able to develop capabilities that are a new and unique way to combine people and technology to adapt to new market needs and requirements. Specifically liberating people and informational resources from the day-to-day operations to invest and mobilize them in order to create new scenarios that transform into new knowledge for developing innovation, novel ways to behave and interact and setting new paths for efficiencies and establishing strategic direction (Piaget, 1950). The two companies have developed an information system, which has helped establish structured and institutionalized patterns of behavior in a cybernetic system that is self-regulating.

4.1 Differences in Adaptive Ethos

The cross-case analysis was completed to highlight two focal firms setting strategic direction and finding paths for efficiency showing a capacity to coordinate actions and innovativeness through adaptability. To that matter, adaptability has been defined as a functional framework of four modes that are a function of managerial awareness and organizational energy. In this paper, we have tried to demonstrate this framework in two different cases highlighting similarities and differences (see Table 1).

In Multiasistencia, assimilation and automatic responses include the structure for running “business as usual” tasks such as claim opening, automatic job assignment and claim closing. As a result of more information, Multiasistencia shows accommodation by developing new services (i.e. virtual, remote surveyor’s inspection), process development (i.e. better task planning) and customer development (i.e. from new customer acquisition to changed interaction in collaboration with corporate clients, for instance, SMS customer information). Finally, environmental enactment occurs through more radical innovation, specifically scaling existing processes from one industry and tailoring them to other sectors in a reengineering process that creates transparency and standards across new, unrelated markets. In this sense, Multiasistencia has identified opportunities to create new domains of action using and developing its core competences, harvesting economies of scale and scope as a “process factory” for many industries.
<table>
<thead>
<tr>
<th>Adaptable Modes</th>
<th>Multisistenciat</th>
<th>Functions</th>
<th>ICT-enabled s</th>
<th>e-Gatematrix</th>
<th>Functions</th>
<th>ICT-enabled s</th>
</tr>
</thead>
</table>
| Automatic Responses | Function: Assignment of jobs to appropriate trade professional  
- Automatic Invoices  
- On line quotations of repairs  
- Claim closing | ICT-enables: Internet  
- Mobile Systems and Mobile Portals  
- SMS | ICT-enabled s: Daily updates for flight schedules  
- Optimal inventory levels as in-flight meals, duty-free, etc.  
- Daily updates of flight reservations | ICT-enabled s: Internet  
- Flight Service Schedule (FSS)  
- Passenger Load Forecast (PLF)  
- Service Demand Forecast (SDF) |
| Assimilation | Function: Claim opening and life cycle management  
- Exploitation of Information - forecast of resources and peak management | ICT-enables: Internet based pervasive system connecting 100 corporate clients and 11,000 trade professionals  
- Web Services  
- Call Centers  
- Data Warehouse | ICT-enabled s: Optimal inventory levels as in-flight meals, duty-free, etc.  
- Forecast of resources and peak management  
- Evaluate sourcing and coordination of distribution trucks,fill backhauls and load schedules and physical assets  
- Visibility of accounting consequences and plan optimization savings of asset management | ICT-enabled s: Asset management  
- Cost/plan optimizer  
- Flight Service Schedule (FSS)  
- Passenger Load Forecast (PLF)  
- Service Demand Forecast (SDF) |
| Accommodation | Function: Ad hoc services and exception management (service improvements)  
- Customer-centric incremental innovation for repair services | ICT-enables: Dynamic control procedures (100 alarms)  
- Internet Web Services Integration  
- Call Center Integration with other partners | ICT-enabled s: Collaborative forecasting  
- Exception management  
- Classification of suppliers as strategic or commodity to respond to supply conditions and procurement savings  
- Registration and response to changing supply prices | ICT-enabled s: Analytical Hierarchical process (AHP), prioritized design parameters for in-flight meals  
- Intelligent Forecasting methods  
- Alarma system for input shortages of price fluctuation  
- Integration of flight scheduling system with labor planning |
| Environmental Enablers | Function: Opening of new geographical markets  
- Fan-driven Innovation on new services  
- Defining new markets as Healthcare and Public Sector. | ICT-enables: Factory of processes  
- System renewal | ICT-enabled s: Standardize packaging products (dishes, tray sizes and containers) that provide logistic efficiency  
- Lead industry-wide efforts to re-engineer supply process and diffuse standards across suppliers and vessel manufacturers | ICT-enabled s: Real time data sharing with manufacturers to improve design processes  
- Integration of systems for service transition planning with production planning |

*Table 1: The four modes of adaptability in Multisistenciat and E-Gatematrix*
eGatematrix, in contrast, coordinates a business network with supplying above the wing services for the airline industry. In this sense, it displays adaptive behavior in a very tightly focused vertical sector. Automatic responses and assimilation are demonstrated by the automatic broadcasting of flight load and demand forecast information to all members of the network. Greater information transparency in the network allows for improved tracking and optimization of both fixed and perishable assets. Accommodation is enabled through the intelligent forecasting systems and the AHP systems that permits the dynamic analysis of commodity specialist input factors, and identifies optimal sourcing options based on market fluctuations. Finally, environmental enactment is shown through its efforts to lead reengineering initiatives to establish industry standards for galley planning across suppliers and vessel manufacturers.

<table>
<thead>
<tr>
<th>Multiasistencia</th>
<th>e-Gatematrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatic responses</strong></td>
<td>Claim management, real time scheduling, information transparency and service tracking</td>
</tr>
<tr>
<td><strong>Assimilation</strong></td>
<td>Claim assessment, service effectiveness, managing and control a standard of behaviour</td>
</tr>
<tr>
<td><strong>Accommodation</strong></td>
<td>Exception management: New services and processes in some domain of action. Customer Centric Innovation</td>
</tr>
<tr>
<td><strong>Environmental enactment</strong></td>
<td>Dynamic redesign of means based on market fluctuations (affecting sourcing and cost options)</td>
</tr>
<tr>
<td><strong>Ethos of adaptability</strong></td>
<td>Identify firm competences (1) front office; (2) complex process re-engineering and (3) large network structuration and leverage them across multiple industries, &quot;process factory&quot;</td>
</tr>
<tr>
<td><strong>Strategic posture</strong></td>
<td>Reengineer inefficient yet specialized vertical niche, scale across single, yet large network of suppliers and clients</td>
</tr>
</tbody>
</table>

|                      | Multiple industries and services based on core competences (Diversification) Economies of scale and scope | Single industry; Economies of scale and specialization |

*Table 2: Ethos of adaptability and strategic posture*

Table 2 highlights the key differences at each mode of adaptability as well as strategic and adaptive postures. At lower levels, the adaptive behaviour for both companies is similar; the focus is on increasing information availability, reliability, transparency, automatic tracking, control, scheduling, and routing optimization. At higher levels (accommodation and environmental enactment) we see divergences. Multiasistencia has focused on identifying inefficiencies in common scheduling and administrative processes in the insurance sector. Given the common problems and broad applicability of these processes, Multiasistencia soon realized that these competencies could be applied to other sectors of the economy with some modification. In this sense, they have become a “process factory” for complex process intensive in information of any specific economic sector. eGatematrix, in contrast, maintains a tight focus on a well defined vertical sector. Its higher level adaptive behaviour is targeted on reengineering inefficient processes and establishing common standards across the industry of suppliers and manufactures. The two cases exemplify how common patterns of business network adaptability can be applied with either a) greater scope or breadth, or b) focus and specialization.
4.2 Management Role in the Business Network
The challenge for management in a business network is to analyze and decide what are the appropriate responses and energy every time management decides to develop new concepts, new services, or enact new domains. The expenditure and mobilization of limited resources on the wrong types of problems can lead to inefficient and ineffective managerial decisions. In other terms, a network can develop new knowledge resources every time network has to face new situations or requirements either in the current domain of actions or in the process to develop a new one. When management has to focus on novel activities more concentration and more energy in needed. In that sense, learning is a costly activity. Management is then an exercise of value generation by defining limits for appropriate action which needs a combination of organizational functions commensurate with appropriate levels of organizational awareness and energy, implying the use, mobilization and transformation of resources. These functions are: automatic responses (machines help with automatic limits programmed by humans), assimilation (combinations of well defined human-machine decision making), actively modifying them to new sets of action (accommodation) or defining and enacting new environments. By managing information and knowledge to accommodate new situations, innovate products and services, and invent new domains of action, managers can ensure that adaptive behaviour remains one of the core competences of the business network.

4.3 Limitations and Future Research
As with all studies, this analysis has several limitations that warrant attention. First, all research on networks suffers from the difficulty of delineating the unit of analysis, where in embedded networks, many levels of analysis are entwined (Monge & Contractor, 2003). Secondly, although we depart from a model of human intelligence of Piaget (1950), we adapt it to represent discrete modes of adaptability in a socially built context. Finally, we have appropriated theories with their genesis in individual learning and applied them towards organizations and networks with little consideration for how the theories become more or less adequate as we transgress levels of analysis. While we suggest that this contribution is novel, we also recognize that future research should consider the coordination and learning mechanisms that govern network behavior and their differences from other units of analysis. Namely, are models of individual or organizational cognition appropriate to study networks? If not, what modifications or other theoretical foundations are more applicable.
References


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