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## The role of business relationships in new product development. The case of Antrox-Nel Design

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### Abstract

This paper focuses on the study of a new product development process in business-to-business setting. By adopting a case study research strategy, the main findings show how the evolution of a business relationship influences the whole product development process. The research also clearly shows how business relationships initiated from pre-existing social relationships tend to evolve continuously, better adapting to the external environment and regenerating more easily compared to relationships established just for economic exchange. In addition, a novel product has been conceived that integrates lighting and architectural elements and exploiting a shared model of production. The result is an enrichment of design values and an increase of both turnovers.

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### 1. Introduction

In business-to-business settings, dyadic relationships between firms are of paramount interest. In the recent years, great attention has been directed to explore the context within which these relationships take place, how firms keep connected and develop shared business opportunities. Numerous models of firms' networking are emerging in

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literature. For instance, some firms create coordinated relationships with other firms to arrange different value-adding functions to develop an innovative product or a competitive market offering [1]. Another model is the “value-adding partnership” which is a set of independent companies that work closely together to manage the flow of goods and services and compete favorably against larger companies [2]. Another one is that called “virtual corporation or extended enterprise”, that is a temporary network of firms that work together for the length of the market opportunity [3].

This work proposes an analysis of the first form of interdependency and coordination by illustrating the case study of two small-sized Italian firms that started a collaboration to create new product that influences the development and change of their subsequent business relationships. In addition it aims to demonstrate that the partnership had a significant positive influence on product innovation results and hence to confirm what literature points out about the promising role of external support for companies growth [4].

The case study is represented by two companies: Antrox and NEL Design. Antrox is a manufacturer of tailored LED lighting solutions. NEL Design is specialized in polystyrene carving for architectural and design purposes. They differ not only for the type of products they design and produce, but also for the size, organization, personnel skill, exploited Information Communication Technologies, etc. What they have in common are a) the manufacturing paradigm they follow, that is based on strong product customization and b) the market sector where they move, i.e. architecture and contract furniture.

In 2004 the owners of the two companies met and started a preliminary collaboration focused only on financial affairs. Only ten years later, the two firms funded a more structured business relationship to produce innovative lamps with a polystyrene structure. However, this business idea resulted in poor market results. The companies, rather than stopping the relationship, decided to change the goals of their collaboration: they moved from the production of a peculiar lighting systems to the supply of architectural decorations developed by one of the companies. This shifting had an impact on inter-firm dependences, initiatives and strategies.

We will adopt the Industrial Marketing and Purchasing Group (IMP) perspective to investigate how the shifting influenced the relationship development trajectories. As the relationship evolved, the cultural and technical distance between the actors of the two companies reduced, the power dependence and level of commitment between the parties changed. After two years, the cooperation was enough mature to lead the companies to the creation of an innovative architectural solution where both competences merge and enrich a shared offer.

The paper is organized as follows: the IMP view about business relationship development is presented, then the methodology used and the background of the companies’ object of the exploratory study are illustrated. Finally, the findings of the collaboration are discussed to point out the achieved level of product innovation.

## **2. Related Work**

The role of business relationships in b2b markets has been object of many studies carried out in order to analyze how companies develop new products. The Industrial Marketing and Purchasing Group (IMP Group) consider Business-to-Business (B2B) markets as complex network settings in which every company is interdependent on many others and in which business landscapes are shaped by the interactions that take place between firms: “business relationships are built from interaction processes and are embedded in their counterparts’ context, which takes the shape of a network” [6]. This is the so called “Industrial Network Approach”, where companies and their relationships can be viewed as part of a complex network of interconnected relationships. No single company owns all the resources it needs to achieve its goals, but every company is dependent on other counterparts providing them [7]. The outcomes of a business relationship can be described in terms of actor bonds, activity links and resource ties between the counterparts [8]. Each layer is interconnected to the others and each affect and is affected by the constellation of resources, pattern of activities and web of actors in the wider network.

Companies establish relationships to access third party resources, whether they are tangible (equipment and machineries) or intangible (skills or competences). Therefore, relationships are a way to foster innovation, through

the combining of each party's set of resources [5]. Companies may also establish relationships to benefit from its position in the network occupied by the counterpart. A firm's network position can be defined as "its set of relationships and the benefits, restrictions, obligations and reputation that it has acquired through its unique interactions with those relationships. Each company's network position is affected by changes in those around it.

Relationships affect the technical, administrative and social features of the involved firms. They need to be built up over time; they require investments and willingness to learn and adapt from both the parties. The level of mutual control, dependence and commitment can increase or decrease the efficiency of both companies and impact on the quality of the market offering. In literature, there are several models identifying the different stages companies pass through to create a value chain. Each model considers each stage as a time-bound process [9]. Ford (2011) recognized four stages as follows: pre-relationship stage; exploratory stage; developing stage and stable stage. No company performs all the stages in a predetermined manner; some organizations may fail to develop after the first stage, other may go backwards from the developing stage to the exploratory stage.

No relationship can develop without a willingness from both the parties to adapt, in terms of own resources (i.e. equipment) and activities undertaken to better fit economically or technically with those of the counterpart [9]. Such adaptations may result also in an increasing dependence (e.g. social, cultural and technical) between the actors, resources and activities of both parties, as the company's ability to adapt to other actors may reduce. The development of a relationship typically creates power dependence situations, in which a party may be dependent on the other for a certain dimension (i.e. technical skills) and be in charge for another dimension (i.e. market access). B2B companies always must take in consideration their set of relationships, when setting their strategies, as each company depends on the resources and commitment of their counterparts. The strategy process, rather than independently developed, is interactive [6].

Therefore, for each relationship, companies should be able to set the right level of commitment and dependence. Companies manifest their strategic intentions to the counterpart, through initiatives "displayed by making contact and coming with proposals and suggestions to the counterpart with the aim to accomplish own goals within a relationship" [10]. As the relationship develops, the initiatives of both parties may shift in different directions, with consequent changes in the interdependences previously established. Only through interactions between the parties, the relationship will develop and assume certain features: these are not only partially predictable a priori [11].

### **3. A note about methodology**

Our goal is to investigate the level of interdependency and coordination in case of networks created to arrange different value-adding functions to more competitively position in the market. A case study is used to analyze the business relationship within a real-life context in all stages of relationship development. Data have been collected during one year of research by interviews to both companies' staff, spanned from 30 minutes to 1 hour length and meetings. Additional data have been retrieved by the analysis of e-mail, companies' websites, internal reports and brochures. A detailed discussion of the information collected is reported in Perna et al. [12]

The investigation adopts the action research methodology because it can capture the dynamisms of the context, it pursues action and research outcomes at the same time, it is reflective, participative and responsive to a continuously changing situation as that characterizing the B2B relationship between the two companies under study [13].

### **4. The Antrox-NeiDesign case study**

#### *4.1. Antrox*

Antrox is an Italian small company specialized in providing tailored Led and Cold Cathode lighting solutions. It was founded in Italy (Ancona, Marche Region) in 2000 by the initiative of two business partners. In 2014, the Antrox governance changed and both partners were replaced by two younger ones, that respectively are in charge of management and marketing strategy and of technical and sales processes. The company employees consists of four people: an engineer, a salesperson, an IT expert and an accountant.

The cold cathode represents the technology which has provided the most part of business opportunities. It is highly customizable in shapes and colors, but it requires substantial technical knowledge to be realized. Only in 2015, Antrox approached the widespread market of Led lighting to bring new business opportunities.

As for Antrox business model, the company usually develops and sales tailored projects for customers; the production of the solution is carried out by different first-tier suppliers internationally located. Antrox's customers are primarily distributors of lighting solutions, architects, and contractors. 80% of revenues come from outside Italy, extra UE customers are one important source of business. The company's revenues range from Euro 700.000 to 2,4M Euro according to the size of the architectures they supply.

#### *4.2. NEL Design*

NEL Design is a micro Italian company located in the Abruzzo Region, founded in 2010. It is specialized in polystyrene carving for construction and design purposes. Their products aren't simple blocks of polystyrene; they are highly resistant but very light in weight. The company produce objects in any shape at a very small cost. Two persons run the company: one in charge of management and strategy, and the other, in charge of the technology development. The company also employes three cutting machine operators. Every year revenues vary from Euro 200.000 to Euro 250.000 Euro. NEL Design invested highly in technological equipment, most of which are numerically controlled. The company supports the customers also in the design process. In particular it is expert in virtual prototyping. Once finally approved, the 3D digital models are sent to production to create tailored shapes whose are subjected to a coating process to make the structure resistant. The material resulting from this process is called Porotex. Porotex is primarily sold to the construction industry and specifically to specialized company's in outdoor decorations for buildings, objects for interior design. The company sells exclusively in the Italian market for some reasons related to the lack of capabilities to engage with foreign distributors; the marketing function is not developed and nobody speaks English.

#### *4.3. The beginning of the relationship: a failure*

Antrox and NEL design got in contact in 2008, when one of the actual business partner of Antrox started collaborating as consultant at Policor company whose administration manager was the current owner of NEL design.

When he left Policor and created NEL Design, he decided to strengthen the relationship with Antrox to develop a new product line based on lamps made in Porotex. However the project flied out only in 2014 when the old managers left Antrox. The spark of the project was the strong need of Antrox to combine the Led technology with new materials in order to get to the customers with a potential interesting solution. As mentioned, Antrox saw new business opportunities as provider of LED solutions although LED market looked rather competitive. In one of the first meeting the two companies agreed to start together the design of decorative lighting systems in Porotex. The Antrox Lab project was born. They decided to mark their product "Antrox Lab", to take advantage of Antrox's name, which is renowned in the professional lighting market and in contract furniture industry.

Both Led and Porotex are technologies easy to mold and quite cheap to produce. They decided to create Led lighting systems with a Porotex structure. The lamps were expected to be economical, efficient, resistant, light in weight and completely customizable in any shape. According to both the entrepreneurs, Antrox Lab would be innovative, unique in the market.

Moreover, Antrox would have benefit from Nel Design technical skills and from their machineries, whereas Nel Design would have benefit from Antrox brand, its commercial network and its experience in selling in foreign markets.

#### *4.4. Reshaping the relationship: the construction of Antrox Lab*

In October 2014, the companies started prototyping and presenting their creations to their customers through an email marketing campaign. Both companies' websites were redesigned. Two months later during a lighting design exhibition in Italy, some architects got interested mainly for Antrox Lab lightness and attractive shapes. From February 2015 the products were also promoted by Antrox, sending to architects a brochure via email, a letter with 1

€ coin inside, with the slogan: “Please give me the time of a coffee and read my brochure”; a sample of a 10 cm high lamp in Porotex (so they can touch and appreciate the material’s lightness and resistance).

During that period, intensive interactions took place between the two companies. Face-to-face meetings were arranged at least twice a week, in order to discuss product characteristics and the value proposal, whereas the technical people of the two companies worked together on a daily basis in order to fix issues and improve the functional features of the lamps.

Antrox played the leading role in this phase: it managed the designing process of the lamps, as the company knew better than NEL Design which solutions would satisfy the customer requirements, both in terms of shapes and functionalities. Antrox’s engineers were constantly pushing the Led technology to its limits, to fit within extreme shapes. LED had to be highly flexible, but without losing transmitting efficiency and they didn’t have to generate excessive heat (higher than 70C°) or they would damage the Porotex structure. For this reason, Antrox had to adapt their product to fit with the counterpart, and decided to use only highly efficient lights, with low or medium voltages. Nel Design supported the process, confirming or denying, the possibility to realize certain shapes. Indeed Nel Design’s 5-D machine showed some constraints mainly linked to the maximum size of blocks. Antrox took responsibility of all the promotion and marketing activities.

In this first phase, Nel Design was mainly a supplier than a partner with equal responsibilities. Actually 70% of the Lab outcomes was done by Antrox and the remaining 30% by NEL Design. Although both parties were highly committed, Antrox had the control of the overall process and put more energy for the shared project realization.

Antrox asked feedbacks to lighting experts to test perceptions and main criticalities. Their product resulted to be lighter in weight, more customizable and slightly more affordable than traditional lighting solutions, but they had to face a skeptical attitude towards polystyrene, as it was generally considered as a fragile and low value material. Therefore, Nel Design needed to work on the coating to increase the feeling of resistance and durability.

The design process was quite complex and was characterized by iterative cycles to adapt solutions to both customer’s needs, manufacturing and installation requirements and LED limitations. This increased time to market and delivery time. The process started with a technical draw the customer gave to Antrox. The drawing reported a sketch of the demanded lamp shape. Mostly the sketch is hand-made and is not technical. Then, Antrox activated both NEL and Antrox engineers to develop the project. A feasibility study was performed to assess if the lamp could be realized in Porotex without losing cutting precision. It was very probable that either the customer or Nel Design, or Antrox had to change the project requirements, in order to fit within the counterparts’ constraints. For instance, the customer could ask for a certain voltage that was not possible to realize with the desired shape; therefore, they had to change either the Led voltages, or the Led positioning, or the lamp shape. This process required a lot of time, phone calls, meetings, preparation of technical draws and several emails between customers and the two companies.

At the end of this process, Antrox could finally make a quotation, but most of the time the price resulted to be too high for the client, as it was slightly lower than to the price required by traditional providers of architectural lighting. This was particularly true for linear shapes, whereas Antrox Lab’s price resulted to be more competitive on curvy shapes. Without a real price advantage, most of the potential clients preferred a lamp in a traditional material, rather than in Porotex. Even with the coating improvements, they still considered it as a low value material. In March 2015, after 6 months from commercialization, Antrox Lab products registered only two sales.



Fig. 1 – An example of Antrox Lab’s first proposals. A prototype made of Porotex and two installations

#### 4.5. Recovering the relationship: the creation of Deko line

Both Antrox and Nel Design realized the initial project failure, specifically due to the high cost of production and to the complicated process of realization in order to meet the client requirements and respect the technical constraints of Led coupled with Porotex. The main criticalities of Antrox Lab project are:

- the lack of specialized human resources to create competitive artifacts to enter the market of decorative and architectural design lamps,
- the numbers of iterations, the sometimes loose of the initial design intent due to the numerous iterations necessary to satisfy the customer needs and the production constraints,
- the complexity of the production and sale processes
- the lack of unique control of the overall process that guarantees the delivery time respect,
- the bad market perception of Porotex that considers the artifact composed by a less valued material compared to traditional ones (plasterboard for instance),
- the higher price (+30%) than expected by the architectural market.

In April 2015, the relationship between the parties was at a dead end: the companies weren't able to cut production costs without losing quality. Two months later they decided to put aside Antrox Lab project and to change the purpose of their collaboration. Nel Design proposed to Antrox to sell its products – architectural decorations - under the name of AntroxLab. The idea was to 'exploit' Antrox's worldwide network of contacts to offer their expertise. Antrox would have to propose to its distributors Nel Design's realizations by retaining a commission for the sale of Nel Design's creations. Antrox would follow the promotion and the sale process; Nel Design would oversee the physical realization.

In November 2015 Antrox proposed the furniture of Porotex walls for Palm Jumeirah Hotel in Dubai. In few weeks Nel Design proposed a technical project, which, after some modifications, obtained the approval from the contractor. In March 2017 the construction began.

Thanks to this experience and to other similar ones, the companies renewed the Antrox Lab project. This time they thought to a new product line that consists of lighting walls (i.e. Wallux) and decorative architectural lighting elements (Deko) (Figure 2). New lines were born from the merge of companies' competence and specialization. Antrox expected an increase of 2016 turnover about +20%, while NEL to enter the World Market.



Fig.2 - Deko and Wallux lines

## 5. Discussion and conclusions

The paper focuses on the investigation of the mutual relationship between two small-sized Italian firms operating in the architecture and contract furniture sector with the aim to demonstrate how B2B relationships can bring to new market opportunities, initiatives and developments. An action research methodology is applied to a case study to show the shifting in the goals occurred during the relationship evolution and to give evidence of the impact on both companies' initiatives, reactions and interdependences.

The development trajectories of a business relationship are never completely predictable a priori and are the result of the intensive interactions that occur between the counterparts. In our case study, Antrox and Nel Design became aware of the criticalities of the first version of Antrox Lab only when the collaboration was already in place

and when a third party expressed a negative opinion about the chances to successfully commercialize such technology.

The two firms never doubted of the counterpart's capabilities, but the prevision that the first Antrox Lab would lead to successfully results was not fulfilled due to several issues which arose during the development and production process: mutual technical adaptations necessary to let Led to fit with Porotex increased costs and affected the final price which was perceived to be too high from distributors.

At least one element could be identified as important in having affected the 'recovering' and 'transforming' phase of AntroxLab: the mutual interest of Antrox and NelDesign in rescue part of the investments done for starting up the second AntroxLab project. Antrox Lab turned out to be important 'test' platform where the two companies scrutinized their capabilities and understood their business models. Therefore some kind of relationship energy allowed the company to reshape the relationship when it seemed to be over, facilitating the exploitation of potential new market opportunity: Antrox could make larger its offering by proposing to its customers' complementary products developed by NelDesign, and NelDesign could benefit from Antrox distributor network to aim at selling more products outside Italy.

Our case can also be used for discussing how the two companies interacted before, during and after AntroxLab creation and transformation. During the first setting of the Antrox Lab, Nel Design accepted and implemented the suggestions coming from Antrox regarding how to organize the production activities. Antrox took a leading position in organizing the project but later, with the recognition of the project failure, Nel Design assumed a stronger role to redirect Antrox Lab towards a different brand identity. Nel Design abandoned its "wait and see" position and challenged the existing project structure. This shifting produced a modification in the power dependence structure of the relationship, in the activities performed, in the actors performing them, in the use of resources, and in the level of commitment of the parties. The new strategy requires less interaction between the firms and simplifies the whole sale process. This has a positive impact both on time of delivery and on price. The shifting also produced changes in terms of proposed solutions that are more competitive on both lamps and architecture markets.

These novel projects give access to NEL Design to larger international audiences while allow Antrox to increase its turnover, enlarge its staff and achieve a better position in its reference market.

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