From internal knowledge to customer offering:
The "combination trip" of a resource.

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WIP paper

Abstract

Understanding how resources are combined is a central issue and many scholars have argued that the performance of a company depends on such combinations. These combinations can either take place between resources of the same type or between resources of a different type. Combinations may be intra-organizational (within a company) and also inter-organizational (between resources belonging to different companies). In this work we are dealing with how a "focal resource" (in this case a specific piece of knowledge - which belongs to the "organizational unit" category of resources according to the 4R model (Håkansson & Waluszewski, 2002) combines with other resources (whether they are other pieces of knowledge, or products or facilities...) so as to open, at a moment in time, onto a new resource that is, eventually, combined with the customer's resources. On the basis of a case-study that serves as a support for this work, three "combination paths" are described from the "focal resource" to the final combinations. We propose discussing this case along two concepts that are usually associated with the resource issue: 1/ the embeddedness of a resource (in a resource constellation; cf. Baraldi, Gressetvold & Harrison, 2012) at a point in time may explain the degree of difficulty for this resource to be combined with other resources; 2/ the ability of a company to identify (cf, Harrison & Håkansson, 2006) new kinds of combinations is key to these "combination paths".

Keywords

Resource combinations – ARA model – 4R model.

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INTRODUCTION

The performance a company can achieve has been described as "*always [depending] on the combinations of elements in its collection of resources*" (Håkansson & Snehota, 1995, p. 187). Therefore, the comprehension of how resources "*combine and recombine*" (Baraldi, Gressetvold & Harrison, 2012) may be considered as an important topic of research in management.

Following Håkansson and Snehota's (1995) statement, a large number of scholars, have developed the idea of the value generated by *resource combinations*. Recently, for instance, Cantu, Corsaro and Snehota (2012) explained that "*the potential of a resource to generate economic value depends on how it can be integrated with other resources*" (Cantu, Corsaro & Snehota, 2012, p. 140). Ciabuschi, Perna and Snehota (2012) reviewed different studies demonstrating that "*interaction concerning resources affects the technological development of businesses*" (Ciabuschi, Perna & Snehota, 2012, p. 222). These statements echo previous works from Baraldi (2003, 2008), Ford and Håkansson, (2006), Harrison and Håkansson, (2006).

So as to be combined, resources need "adaptation". Resource adaptation is a central issue because the performance of a resource is going to depend on "*how well* [the resource] *fits with other resources*" (Håkansson, Ford, Gadde, Snehota and Waluszewski, 2009, p. 76). Resource adaptation appears in interaction between resources. It is interaction between resources that enables them to be "*changed, recombined, and developed, used and re-used*" (Håkansson et al. 2009, p. 66). In fact, through interaction two things happen: first, a company can access the resources possessed by others and, second, the resources can be adapted, which affects their value (Håkansson & Snehota, 1995).

Resources, their combination and re-combinations are at the core of our work. Drawing on the seminal works from Håkansson and Waluszewski (2002) we describe what we call the "combination paths" of a "focal resource". We analyse how this resource (a specific piece of knowledge within a research centre of an industrial company) combines with other resources (whether they are other pieces of knowledge, or products or facilities...). We are particularly interested in the nature of these combinations that can be either intra-organizational ones (within the supplier) or inter-organizational ones (between the supplier and other counterparts). Among the inter-organizational resource combinations are those resources of the supplier that are eventually combined with the resources of the buying company.

With this objective, our paper is organised as follows. We will first discuss the resource concept and particularly the different types of resources and the different natures of resource combinations. We'll then describe the case study underlining the different resource combinations that appear. Finally, we will discuss the results.

RESOURCES

WHAT ARE RESOURCES?

Penrose's work (1959) is considered seminal when the "resource" concept is discussed. Penrose considers a company as a "*collection of productive resources*". Resources are central to RBT (Resource Based Theory) where they are described as "*all assets, capabilities organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness*" (Barney, 1991, p. 101). Recently Ulaga and Reinartz (2011) building on Barney's work have defined resources as "*productive assets the firm owns*", and completed it with the concept of capability defined as "*a firm's capacity to deploy resources*" (Ulaga & Reinartz, 2011, p. 6)

Resources in companies sustain activities (Håkansson & Snehota, 1995, p. 30). Through a relationship with a counterpart, a company is able to access and acquire resources but also, in interaction with this counterpart, to create new resources. From a general point of view, we can consider that "*various elements, tangible or intangible, material or symbolic, can be considered as resources when use can be made of them*" (Håkansson & Snehota, 1995, p. 132). Thus raw materials, physical facilities, components, operating systems and finance as well as human knowledge and ability can be considered as resources (Cantù, Montagnini & Sebastiani, 2010, p 224).

The ARA (Activity-Resource-Actor) model (Håkansson & Johanson, 1992; Håkansson & Snehota, 1995) describes business exchanges in terms of three "layers": activity links, resource ties and actor bonds (Håkansson & Snehota, 1995), but, as Sundquist, Dubois, Gadde and Hulthen (2003) have mentioned, there has been rather a strong focus on the *activity* dimension in a number of research studies. The authors considered this focus on activities as problematic as it has led – in certain situations – to "*treat resources as a means to an end*" (Sundquist, Dubois, Gadde & Hulthen, 2003, p. 1). Since that time, things have been changing. For instance, Harrison and Håkansson (2006) indicate that now "*different studies illustrate the importance of increasing knowledge about the resource layer"* (Harrison & Håkansson, 2006, p. 232). And the recent *Journal of Business Research* Special Issue on "resources" tends to confirm a renewed interest in the resource dimension.

TYPES OF RESOURCES

In her seminal work, Penrose (1959) was already describing different categories of resources by differentiating between the physical and human resources. Physical resources are generally described as production equipment, raw materials, semi-finished and finished products and human resources are "*labour and staff*" (Penrose, 1959). Classifying resources then, is not a new task for scholars. About a decade ago Gressetvold (2001) produced an interesting overview of the resource classifications as used by the IMP group. Gressetvold (2001) described Håkansson's (1987) first classification of resources into three categories: physical, financial and human resources. He then mentioned how Håkansson and Waluszewski (1997) later proposed that resources could be distinguished between material and intellectual, following on from the proposal made earlier by Håkansson and Snehota (1995) to divide resources into tangible and intangible ones. Gressetvold (2001) also recalled the five types of resources as described by Axelsson and Håkansson (1979); (1) technology – including patents and licenses, (2) input goods, (3) personnel, (4) marketing and (5) financial capital, which were considered by Gressetvold (2001) as similar to the typology provided by Grant (1990). Then, Håkansson and Waluszewski (2002) proposed their 4R Model and distinguished between *technical/physical* resources on the one hand, and *social* resources on the other. On the basis of this categorization, 4 types of resources are considered: products, production facilities, (which are *technical/physical* resources) and organizational units and organizational relationships (which are *social* resources). We will now look at these different resource categories in more detail.

- The general definition of products is that of "*physical/tangible objects, which a company can design, manufacture and distribute, and which a consumer can use"* (Huemer, 2012, p. 261). For Baraldi et al. (2012) products are "*a combination of goods and services that organizational units exchange with each other*" (Baraldi, Gressetvold & Harrison, 2012, p. 268). As Håkansson and Waluszewski (2002) mentioned, products have a specific position within the 4R model in the sense that they "*are part of both a "selling/buying" and a "using" system*" (Håkansson &

Waluszewski, 2002, p. 35) and as Stromsten and Waluszewski (2012) underline "*the logic governing these systems is not always the same*" (Stromsten & Waluszewski, 2012, p. 234). A similar idea is highlighted by Baraldi et al. (2012) for whom "*organizational units manage products within their boundaries but also within inter-organizational relationships*" (Baraldi, Gressetvold & Harrison 2012, p. 268). Products are developed in relation to other products and other types of resources. Baraldi et al. (2012) describe the whole process as follows: "*Product development takes place through interaction across all four types of resources, as organizational units make use of inter-organizational relationships as well as facilities throughout such processes*" (Baraldi, Gressetvold & Harrison, 2012, p. 268).

- Facilities are those production devices that are used for creating and/or transforming products, or, more precisely, to "*develop, manufacture, and transport products"* (Baraldi et al., 2012). Facilities can be "*equipment for production plants, warehouses, and exhibition outlets" (*Baraldi et al., 2012, p. 268), but also "*ports and trucks* (Huemer, 2012, p. 261). Most of the time one facility works in interdependence with another facility.
- Organizational units can refer to "*parts of an organization, such as a division, section, department, or informal group, or even an individual*" (Baraldi et al., 2012, p. 268). Thus, they are resources that "*incorporate the knowledge, identity and reputation of an organization"* (Baraldi et al., 2012, p. 268). For Huemer (2012), this category of resources particularly calls "*attention to the unit's interaction skills, such as its ability to cooperate*" (page 261).
- Relationships emerge between organizational units from the "*continuous interaction between two units*" (Baraldi et al., 2012, p. 268). Relationships are often seen as the most important category of resources. For Huemer, they are "*the most essential resources*" (Huemer, 2012, p. 261). But they are also considered as very specific. For instance, Håkansson and Snehota (1995) explain that relationships "*are a peculiar type of resource as they cannot be controlled by any single party in isolation but are controlled jointly by the parties involved"* (Håkansson & Snehota, 1995, p. 138).

These four types of resources interact and therefore influence each other. It is important to note that all four resources are interdependent, in other words: "*to produce a product, we need a facility that is owned by a business unit and in order to sell the product we need a relationship*" (Håkansson & Waluszewski, 2002, p. 38).

RESOURCE COMBINATION

RESOURCE COMBINATION CREATES VALUE

As we mentioned in the introduction to this work, the notion of "resource" is not new and constitutes an important concept of the economic literature. Nevertheless, the perspective in which the ARA model considers resources is specific. For instance Baraldi et al. (2007) show that if resources are also central to the resource-based view, RBV largely relies on a primary focus of "*internal allocation and structuring of resources*" (Baraldi et al., 2007, p. 886) while the relationship and network view (as in the ARA model) is primarily concerned with "*the way in which the organization relates its activities and resources to other parties in the network*" (Baraldi et al., 2007, p. 886). Indeed, in the ARA perspective, "*the value of resources is created in the ways in which they are combined with other resources*" (Håkansson et al. 2009, p. 65). If considered by itself, a resource has no value. Value - as far as resources are concerned - can only be created through the interaction of a resource with other resources. The idea of a resource potential being revealed solely through resource combination is a central feature of resources: "*the resources are regarded as heterogeneous in*

the meaning that their value depends on which other resources they are combined with" (Håkansson & Snehota, 1995, p. 135).

IMPORTANCE OF RESOURCE FEATURES IN RESOURCE COMBINATIONS

Resources have different characteristics - different features - that may be technical, economical, social... Those features are activated in the interaction with other resources. When combination occurs, resource features are adapted, and the "*more adaptations in the resource combination, the better are the opportunities for enhanced performance*" (Ford et al., 2009, p. 86). But, this resource interaction "*leaves traces on resources* » (Baraldi & Stromsten, 2006, p. 39). For instance, Håkansson and Waluszewski (2002) show how a product can be adapted to suit the product the customer is manufacturing and how this adaptation (within the buying/selling process) creates « *imprints* » on the product (Håkansson & Waluszewski, 2002, p. 35). Several implications of such a view of resources must then be noted. First, it is "*always possible to discover new features of a resource*" (Håkansson & Waluszewski, 2002, p. 32) as there are always new ways to combine this resource with other ones. Second, when a resource is adapted, it then becomes less easily combinable with other resources, or, as Håkansson et al. (2009) put it "*the more difficult it will be to use the individual resource efficiently in other resource combinations with different characteristics"* (Håkansson & al., p. 86). Finally, another important consequence is that "*it is impossible for a human being to have full knowledge of any resource*" (Håkansson & Waluszewski, 2002, p. 35).

DIFFERENT NATURES OF RESOURCE COMBINATIONS

Resources can be combined in different ways, for instance, two products or two facilities can be combined together, but also a product with a facility, or a product with the knowledge of a certain person (which belongs to the resource category "organizational unit"). Dubois and Håkansson (2000) underline this diversity of resource combinations: "*there are interdependencies between products, between facilities, between products and facilities, between business units, between business relationships, between business units and relationships and between products/facilities and business units/relationships")* (Dubois & Håkansson, 2000, p.6-7). Harrison and Håkansson (2006) summarize this point indicating that resource combinations may be "*within-type*" (e.g. a product with a product) or "*across type*" (e.g. an organizational unit and a facility) (Harrison & Håkansson, 2006, p. 232).

Different authors (Baraldi & Stromsten, 2006; Baraldi et al., 2012; Dubois & Araujo, 2006; Cantu, Corsaro & Snehota, 2012, Jahre, et al. 2006) have pushed the reflection even further and propose classifying these different resource combinations. Technical interfaces, organizational interfaces and mixed interfaces are then distinguished. Technical interfaces involve physical resources (products and facilities); organizational interfaces are those interfaces connected to social resources (organizational units and relationships); and finally, mixed interfaces connect social and technical resources (for instance in the case of a combination between a product and an organizational unit).

METHODOLOGY

This work is based on an in-depth analysis of the combinations and re-combinations of a resource within Nexans, the leading company in the cable industry. Data sources are twofold: (1) in-depth collaboration with an MSc student doing a 6-month internship in the company with a focus on the development of Ecodeclaration; (2) analysis of secondary data from newspapers, websites, market surveys… linked to the different issues associated with Eco-

declaration (for instance the EIME software, the CODDE-Veritas company, the PEP association, etc).

CASE STUDY

THE NEXANS COMPANY

Nexans is known as the global expert in cables and cabling systems for energy and communication networks. Nexans is present in 40 countries and has worldwide commercial activities. Nexans employs 23,700 people and 2010 sales were 6 billion Euros.

Nexans works with the industrial sector (automotive, aerospace, shipbuilding, nuclear power, oil & gas, petrochemicals, material handling and automation, etc.), the building sector (Office buildings; Industrial complexes; Factories; Logistic centres; Offices; Hotels; Exhibition centres; Shopping malls; Individual and multiple housing ; Sports, cultural, educational, social and medical facilities...) and infrastructures (Railroads; Motorways; Ports; Airports; Telecom Operators…). With all these customers Nexans aims at developing a global expertise and has activities from original conception and design of both products and solutions to manufacturing and installation and ultimate recycling.

IN SEARCH OF INNOVATION

One interesting characteristic of the cable product is that often, cables are designed according to very precise technical specifications. These specifications are similar for all the competitors. For instance the “U-1000 R2V” is a well-known industrial cable used in all low voltage power installations and adapted to remote control and tele-control installations. It displays a thick sheath, and is currently used in industrial installations where it can resist severe operational conditions. This cable corresponds to national and international (CEI 60502) norms. Subsequently, whatever the manufacturing company, the cable displays the same characteristics.

The “commodization” of this kind of product has led companies in the sector to look for associated services in different areas. These services are developed for various customer segments such as original equipment manufacturers (OEMs); wholesalers, distributors and retailers; data centres and optical fibre installers, etc. For instance, Nexans has developed a hotline that assures continuous technical support for preventive action and rapid problem-solving for power utilities. An on-site engineering support - through the integration of a Nexans engineer in the R&D department of the customer – has been implemented for Alstom. For Telefonico - a Peruvian telecom operator - Nexans has developed a dedicated warehousing and cable logistics programme to help Telefonico manage its operations better. For Nordex, a wind turbine manufacturer, Nexans supplies customized, pre-cut and pre-assembled sets and kits of cables, which make it possible to improve responsiveness, shorten delivery times and eliminate inventory and waste. For Alstom Transport, Nexans has developed a Kanban cable spool provisioning for rolling stock.

THE PRODUCT LIFE CYCLE ANALYSIS: KNOWLEDGE OF NEXANS R&D TEAMS

Cables, even though they are not directly polluting devices, nevertheless have an impact on the environment (consumption of natural resources, impacts linked to manufacturing, to construction and installation work and to line operation). For many years now, Nexans has been developing important knowledge about the Life Cycle Assessment (LCA) of its products. This capability is that of the R&D teams at the Nexans Reseach Centre (NRC). Through LCA capability, R&D teams are looking for the ability to measure the environmental

impact of a Nexans product, "*from extracting the raw materials that compose the product to its end-of-life disposal including the processes of production, distribution and use*"[1].

THE EIME SOFTWARE

In 1998, Nexans, with other industrial suppliers (IBM, Alstom, Legrand, Schneider Electric, and Thomson, all members of the FIEEC - Federation of Electric, Electronic and Communication industries), engaged in the development of a piece of software to assess the environmental issues of cable manufacturing. This software is a way of translating the initial Nexans' knowledge in LCA - along with the knowledge of the other participating companies - into a tool that could be used easily by eco-designers. The EIME (*Environmental Information Management Explorer)* software is developed so as to allow "*designers to easily understand and assess environmental issues during the cable connection design"* and also to allow *"a company to implement its environmental strategy in a practical way*"[2]. The EIME software is first used for internal purposes at Nexans and the other partner companies to help engineers identify the best production techniques available.

CODDE AND CODDE-VERITAS

In Januray 2003, CODDE (éCOconception, Développement Durable & Environnement[3]) was created by several professional federations (including the FIECC) so as to meet regulatory requirements and market requirements on eco-conception. CODDE offers the EIME software (at that time renamed Environmental Improvement Made Easy) to the market. In January 2008, CODDE joined Bureau Veritas - the global leader in conformity assessment and certification services - as an Eco-designer Environmental Sustainability centre of excellence. Today, EIME is still developed by CODDE-Veritas that will soon be introducing the new version - EIME V5 - of the software. The software is now sold (along with traineeships and other kind of services) to different actors not only in the Electric and Electronic industries but also in the transport, automotive, aeronautic and mechanic industries. The EIME software is today considered as "*the simplest and best value tool for assessing the environmental impact of [a] product"* as its "*user−friendly interface enables users to easily and rapidly model any product or process, without the need for any special environmental skill*[4].

THE ECO-DECLARATION

It is important to point out that cables are not yet concerned with any kind of legal obligation concerning eco-declaration. In 2012, in France, a decree will impose such an eco-declaration, but only for building-shell materials (concrete, windows/doors, insulation, flooring & floor-coverings). The decree concerning cables and wires will not itself be published before 2017. There is, therefore, no regulatory requirement for these electric devices. But, it has been noticed that buying companies do not always know that cables are not considered as building-shell devices... Subsequently Nexans anticipates that from now on, in a growing number of Calls for Tender, specifications are going to include requirements for the environmental impact of products. The eco-declaration developed by Nexans (on the basis calculations made with the EIME software) is a standard document that presents environmental attributes of a product. It can be transmitted to the customers. Such a document is in total compliance with the ISO 14025 standard.

[1] http://www.nexans.com/eservice/Corporate-en/navigate_245575/Life_Cycle_Assessment.html
[2] http://www.see.asso.fr/jicable/TOUT_JICABLE_FIRST_PAGE/2007/2007-A8-5_page1.pdf
[3] Eco-conception, sustainable development & environment
[4] https://www.iaaqaservices.bureauveritas.com/cmark/docs/eng/CoddeEimeEN.pdf

THE PEP ASSOCIATION AND THE PEP ECOPASSPORT

So as to give weight to this kind of "ecodeclaration", and promote it among buying companies, Nexans does not feel that it can develop it on its own. Consequently, in 2010, the PEP (Product Environmental Profile) association was created. It is a non-profit Association, gathering different actors of the electrical landscape (Nexans of course, but also Schneider, Legrand, Prysmian, Platelec, Hager, etc.) along with different professional union trades. Its purpose is to develop internationally an environmental declaration - the PEP ecopassport - concerning electrical, electronic and HVAC (heating, ventilation, air-conditioning, refrigeration) products. This PEP ecopassport is *"created and edited on a voluntary basis by a company under its own responsibility. An independent verification is to be carried out to ensure its compliance with the requirements of the PEP eco-passport Program"*[5].

INFORMATION

At Nexans, an information leaflet is published as a support for the salespeople. This brochure presents the content of the PEP ecopassport in detail and clearly identifies what the ecopassport can be used for, depending on which industry sector the buying company belongs to. Information posters are also specifically designed, distributed and installed in specially chosen places within Nexans. The posters display information about the central concepts of SD (sustainable development) (LCA, PEP Association, standards, etc.). The posters also identify two usual customer requirements concerning 1/ "green cables" and 2/ "carbon footprint" and propose a set of answers and services the salesforce can use to handle customers' requests. An Intranet dedicated to sustainable development is under construction at Nexans. Part of this Intranet will be concerned specifically with the PEP ecopassport. The objective is to provide the sales force with explicit content to understand what can be offered to customers.

SALES FORCE TRAINING

Traineeships are developed at Nexans in connection with the PEP ecopassport and are adapted to different kinds of commercial functions (back office support, internal salespeople, sales representatives, market managers,...) and the type of markets addressed (Building sector, OEM, ...). 105 people have been concerned with the first round of traineeships. Even though these training sessions are adapted according to the commercial functions targeted and to the market sectors that are addressed, their general architecture still remains the same. Four topics are covered systematically: 1/ the sustainable development context; 2/ the PEP ecopasseport; 3/ the value for customers to use such eco-declarations and 4/ the organization that has been deployed at Nexans to answer questions, help salespeople, bring information...

A NEW OFFERING

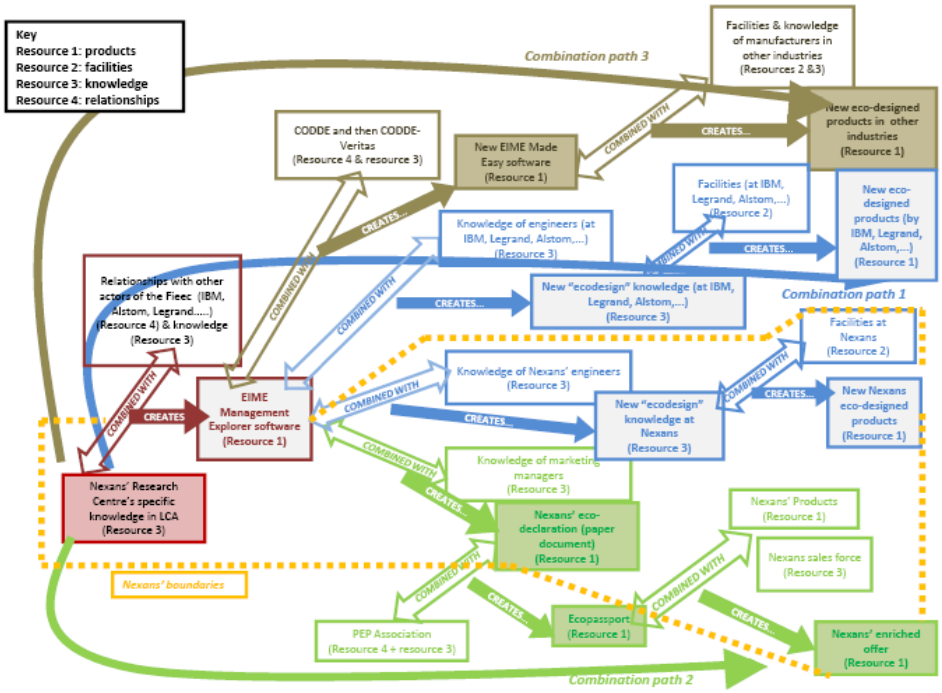
As Nexans explains, the eco-declarations are now considered as additional services for the company. They are no longer an expertise of the NRC, but are part of the offering the company is addressing to the markets. As such, eco-declarations are part of the value proposition. For instance, when targeting the building and civil engineering sector, the PEP ecopassport is presented as highly compatible with CAD software thereby enabling the assessment of the global environmental footprint of building or engineering works.

[5] http://www.pep-ecopassport.org/uk/create-a-pep

CASE DISCUSSION: IDENTIFYING DIFFERENT COMBINATION PATHS

In this part, our purpose is to describe the different transformation stages resources undergo in the Nexans story. We propose to identify three "combination paths" (Figure 1) in this story. All three originate from a specific internal Nexans resource: the specific knowledge on Life Cycle Assessment at Nexans' Research Centre. Through different combinations - that can be considered either "*within-type*" or "*across type*" (Harrison & Håkansson, 2006, p. 232) - these "combination paths" lead to different "new resources" that can eventually be combined with customers' resources.

Figure 1: 3 different combination paths

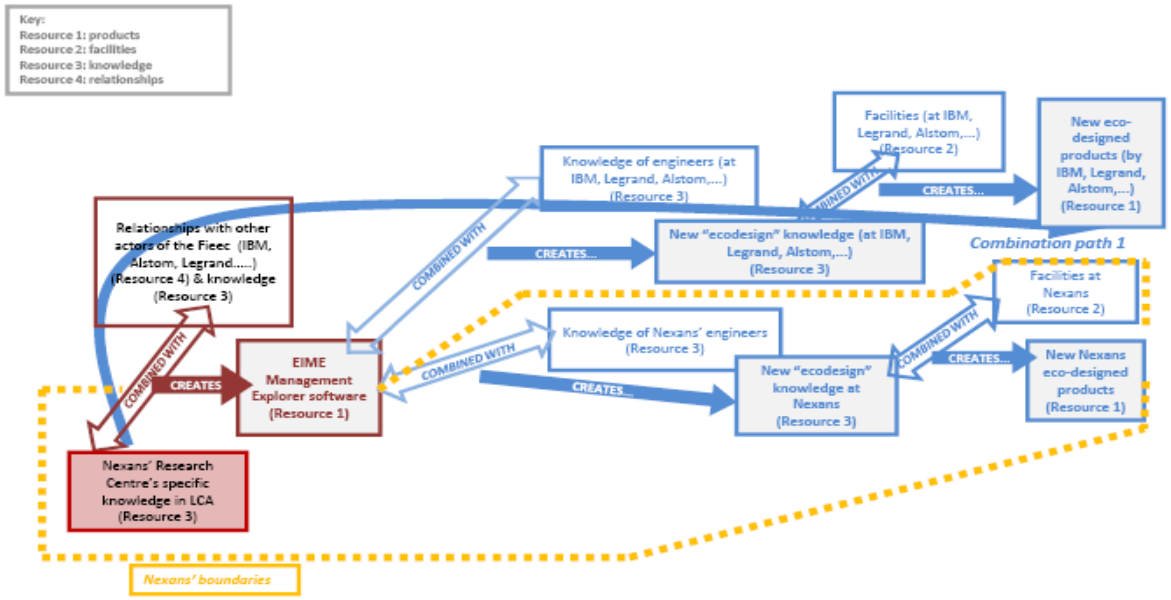


1ST COMBINATION PATH: TOWARD NEW "ECO-DESIGNED PRODUCTS" BY NEXANS & PARTNERS

The first combination path (Figure 2) we describe brings us from the initial focal resource (specific knowledge on Life Cycle Assessment at Nexans' Research Centre) to the new eco-designed products offered by Nexans and other industrial manufacturers involved in the conjoint development of the EIME software. This path comprises "three combination steps". At the beginning of the story the focal resource is of an "organizational" nature. It is knowledge developed internally by members of Nexans' research centre. It is considered in our analysis as the point of departure for the several combinations that we tried to grasp. The first combination makes it possible to combine this focal resource with two other types of resource: 1/ relationships and 2/ knowledge. This combination can be considered as a "within-type" according to Harrison and Håkansson (2006) as it combines resources from the same "social resources" category. One output of such a combination is a piece of software, here considered as a "product" in the sense that it is the "packaged form" of the knowledge that it is at stake. At this first stage, the use of the relationship with other companies within the FIEEC association is to be noted. Relationships are resources of a specific kind as they cannot be controlled by any single party (Håkansson & Snehota, 1995). It is rather interesting considering this because it means that the EIME (Management Explorer) software - as a result of a resource combination involving a "relationship resource" - cannot be considered as an

internal resource for Nexans. This may explain why, in its turn, this "new resource" (the EIME software) needs to be recombined with other Nexans' internal resources to acquire a new and distinctive value. It is because the EIME software, as a resource, is recombined with internal knowledge (within Nexans or within other partner companies) that it can create specific new resources identified as "new eco-design knowledge". Such resources are specific because they result from the combination of the EIME software (common resource for Nexans and its partners) with the specific knowledge of internal engineers (which, we can hypothesize as not being the same at Nexans and at other partner companies). The third "combination step" in this path enables these new pieces of knowledge (whether they are located at Nexans or at other partner companies) to be combined with facilities (at the level of each company) for the manufacturing of new and better eco-designed products.

Figure 2: The 1st combination path

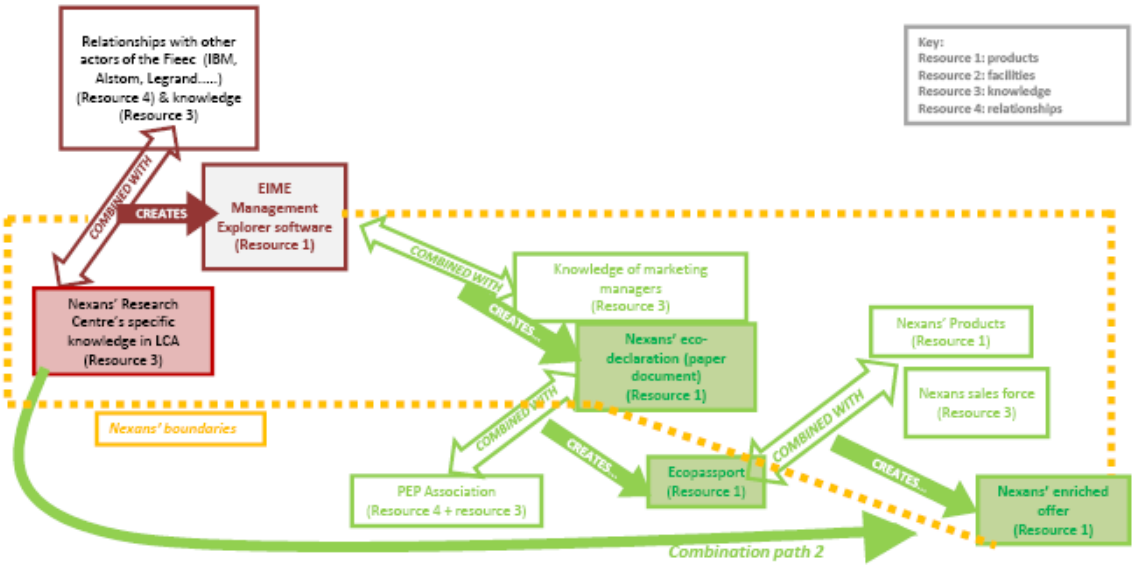


2ND COMBINATION PATH: TOWARDS A NEW NEXANS OFFERING

The second combination path (Figure 3) takes the first stage of the previously described combination path but bifurcates as far as the combination of EIME Management Explorer software is concerned. The software will then be used to produce an eco-declaration which is a paper document that gathers all the information on the environmental attributes of a product. At that level, this eco-declaration only has the value of an internal information device. It follows the guidelines of what could be required in the future by calls for tender. This is why we consider it as the result of the combination between the EIME Software and the knowledge of marketing managers about what, in the future, customers are going to ask their cabling manufacturers. We could consider a combination path ending there with the creation of a new resource (the eco-declaration) being an internal one. What is interesting to comment on is the next step of this combination path that is going to combine the eco-declaration with a "relationship resource". The Nexans eco-declaration is now combined with external resources (other pieces of knowledge) and acquires new features. It no longer appears as a Nexans product only: it is now supported by a set of influential actors of the sector in the PEP association. It becomes a PEP ecopassport. Nevertheless, as in the first combination path, by combining with external (or at least not totally controlled) resources, the Nexans eco-

declaration though acquiring visibility loses specificity at the same time. The PEP ecopassport can be proposed by any member of the PEP association. The PEP ecopassport then needs to regain specificity. This is what is going to be done. The last combination step in this path requires another set of resources to be mobilized and combined with the PEP ecopassport. One central resource at that stage is the sales force that will play a central role in bringing the PEP ecopassport resource to the customers. The sales force and PEP ecopassport need to be combined through information and training. This is what happens. The then Nexans PEP ecopassport has become part of an offering and is ready to be combined with customers' own resources.

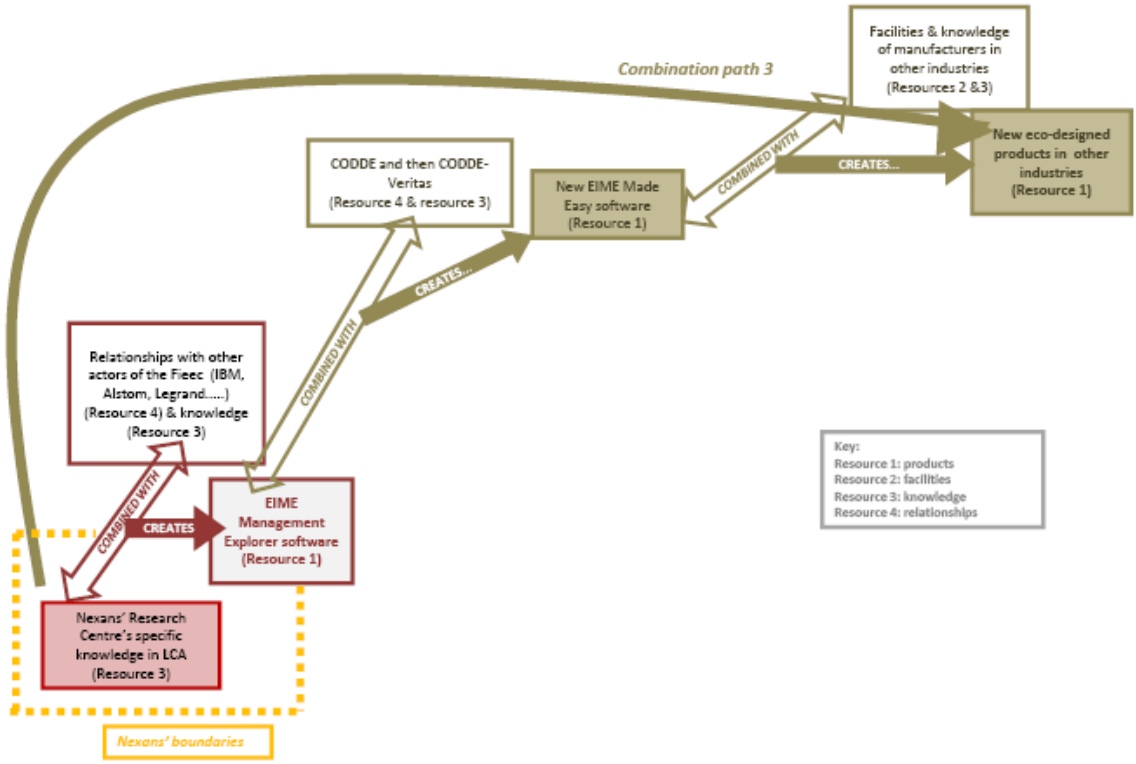
Figure 3: The 2d combination path



3RD COMBINATION PATH: TOWARDS A LOT OF COMPANIES' NEW ECO-DESIGNED PRODUCTS

A third combination path (Figure 4) can also be identified from the same departure point. Once the EIME (Management Explorer) software had been developed, we noted (combination path 1) that it combined within Nexans and potentially within any of the partner companies with other internal resources to create new eco-designed products. Let's come back now to what happened five years later. In 2003, CODDE was created (with, among its members the creators of the EIME software) and the EIME software became one of the products that was offered by CODDE. This corresponded to a new combination step where a product is combined with new relationships (the one between members of the CODDE). The same was at stake when CODDE joined Bureau Veritas (the leader in conformity assessment and certification services) in 2008. The initial Nexans specific knowledge hosted within its research centre has evolved into a product that is now available for any manufacturer in any industry to help produce more eco-designed products.

Figure 4: The 3rd combination path



COMPARING THE 3 COMBINATION PATHS

We have so far described different "combination paths" that lead from an initial internal resource to different "final" resources ready to be combined with a customer's resources. These "combination paths" lead us to make three comments. The first one considers the notion of "resource embeddedness", the second comment deals with the "knowledge resource" as a meta-resource, and the last comment stresses the specific role played by inter-organizational interfaces.

How can we explain that so many options are available for a single resource in terms of combinations? We formulate and discuss a hypothesis based on the notion of embeddedness.

The whole story starts with "knowledge" - or pieces of knowledge - of a set of engineers at NRC. This initial focal resource can be considered as not heavily embedded. As Baraldi et al. (2012) explain, a resource *"may be difficult to change because of the historically developed interdependencies across resources embedded in interfaces"* (Baraldi, Gressetvold & Harrison, 2012, p. 268) But, in the case of our original focal resource, interdependencies have not yet been strongly developed. This resource can then be considered as quite "free" for plenty of different interfaces. Things could have been different with a more "embedded" original resource, for instance a facility or a product. Being "free" for interfaces, this initial knowledge is then easily combined with relationships and external knowledge. But one may also note that once the EIME (Management Explorer) software has been created (that can be considered a product, and then considered as less "free" for interfaces than "pure" knowledge), it continues interfacing easily with other resources. It does not appear as less "free" than the original knowledge, the best evidence being that this software is the real common first step from which all three combination trips are going to unfold. Such a situation

may be a basis for future reflection. On the one hand, when a resource is not heavily embedded it can be considered as totally open for combinations. On the other hand, maybe a too "lightly" embedded resource does not offer enough features that can give ideas for possible new combinations. In the Nexans' case, it is just as if the original knowledge on LCA possessed by the Nexans' research centre needed to become "heavier" before becoming a "good" resource for further combinations. This is what happened with the transformation of Nexans' LCA knowledge into a piece of software, which is going to display enough features to be thought about in further combinations. In this case more features do not hamper further combinations; on the contrary, they facilitate them.

Following the previous point it could be interesting to further discuss the ability a company has to assess how much a resource is embedded into a resource network so as to measure how easy - or not - it will be to complement other combinations with other resources, and how it must be given enough features to become attractive for further resource combinations. Harrison and Håkansson (2006) indicate that "*one key issue seems to be the identification of new combinations, whereby the features of resources can be better utilised but also developed in terms of new features*" (Harrison & Håkansson , 2006, p. 236). One implication is that knowledge is of foremost importance in such situations. Baraldi and Stromsten (2007) underline the importance of such knowledge when considering the notion of control in networks by describing companies with intent "*to orient the combinations of products, facilities, organizational units and relationships towards the objectives pre-set by actors"*. In doing so, explain the authors, companies "*try to identify interdependencies between resources and to exploit them through the design and use of control systems*" (Baraldi & Stromsten, 2007, p. 4). The ability to identify or imagine which resources can be combined seems to be central. As such, if it is knowledge, then it can be considered as a resource. But in such a situation it appears much more as a "meta resource" on which other resources rely to be combined and then to be able to produce value. It then has the characteristic of a capability as it is defined by Day (1994) "*as enabling a firm to make use of its assets*" (p. 38). Nevertheless this "meta resource" we are talking about doesn't fall easily within one of the three types of capabilities Day describes whether they are "market sensing, customer linking, or channel bonding" capabilities. Another problem is that the nature itself of such a capability is difficult to represent in the sense that – as we already mentioned it in the first part of this work - « *it is impossible for a human being to have full knowledge of any resource* » (Håkansson & Waluszewski, 2002, p. 35)...

In the Nexans story, the original knowledge resource undergoes its first transformation through an inter-organizational interface (relationships with FIEEC's actors and their knowledge). Other inter-organizational interfaces are also described in combination paths 2 and 3. Such inter-organizational combinations are interesting because they always seem to be two-sided. These combinations create value, but the new resources that result from these combinations are not controlled by Nexans only. Just as if a resource, when combined with a "relationship" resource, was both gaining strength but losing specificity... For instance, when considering path 2, it is explained that the eco-declaration (an internal Nexans resource) needs the PEP Association to give the passport more weight and promote it among buying companies. But once created, the PEP ecopassport needs to be "re-specified". It is then internally recombined (with information, traineeships, products...) to give it specific Nexans features and make it a real part of Nexans offering. We think that this going back and forth between intra-organizational and inter-organizational resource combinations - and maybe the balance to be found between them - may well be worth further research work.

CONCLUSION, LIMITS & FURTHER RESEARCH

The purpose of this work in progress was to follow precisely how an original resource combines and recombines with other resources (of the same nature or of a different nature) within a company or between two companies. This is what we have done on the basis of the Nexans case that has enabled us to describe "within-type" and "across-type" resource combinations as well as intra-organizational and inter-organizational ones. The three combination paths that have been described have led us to discuss the notion of resource embeddedness. We have underlined a possible ambiguity between the idea of resources being free for combinations because of few features being developed, or resources stimulating new combinations because of features that have been made visible. The paths described also enabled us to discuss the importance for a company to be able to "identify/imagine" possible resource combinations, which can lead to considering such knowledge as a specific capability. Finally, the description of the three combination paths gave us the possibility of discussing inter-organizational combinations which appeared to us as both "giving weight" to new resources created while at the same time reducing their specificity.

Of course, this work only has a status of work in progress, and the Nexans case is far from illustrating all kinds of resource combinations that can occur within and between companies. Yet, we think that such a work can contribute to enriching the knowledge on the resource aspect of business exchanges. On a theoretical level, building on the concept of resource-combination, our work contributes to support the relevance of the ARA model. Furthermore, by linking intra- and inter-organizational aspects of resource combination our work may contribute to the enrichment of the IMP theory that may be considered as having a too predominantly "*external focus*" (Baraldi et al., 2007, p. 891).

As mentioned in the previous part, a number of further research avenues can be identified. The first one may deal with the notion of "resource features" and if and how those features must be kept latent or must be revealed to favour new resource combinations. The second avenue may explore the nature of a company capability enabling it to identify/imagine valuable resource combinations. Are some companies better than others in such identification/imagination? Why? A final further avenue of research may lead us to compare intra-organizational and inter-organizational resource combinations more precisely.

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