THREE MODELS FOR TRANSFORMING KNOWLEDGE CONTROL/SHARING FOR CO-INNOVATION

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ABSTRACT

Despite considerable exuberance about the value-creation potential of co-innovation, some findings expose a problematic 'darker side.' Without a transformation of the knowledge control/sharing approach characteristic of closed innovation some analysts suggest that co-innovation in unlikely to be successful. Our exploratory study was designed to draw on intangibles management perspectives in efforts to answer the research question: *Why are some firms able to implement effective intangibles-based approaches for transforming knowledge control/sharing for innovation with external stakeholders while others are not?* This work contributes to the design research field through providing a more detailed and nuanced view of the knowledge control/sharing transformation process with its 'models of organizing for participatory innovation' centered on human capital, structural capital and relational capital.

INTRODUCTION

With high-profile multinationals such as P&G and IBM eulogizing about their innovation successes based on open collaboration (e.g., Gabor, 2009; Sakkab and Huston, 2007; Huston and Sakkab, 2006), many firms are rushing to embrace this approach. Yet open innovation has proven to be little more than a "seductive mirage" leading to disappointment and frustration in many cases (Hagel and Brown, 2008: 39).

Analyses suggest that persistence of traditional approaches to knowledge control and sharing is a major barrier to the introduction of open collaboration; some studies have concluded that organizations will not be successful in transforming the innovation process from one that is closed and within-company to one that is open and includes external stakeholders without "deep changes in the way that knowledge is controlled and shared" (Gabor, 2009: 7). Because success stories rarely include detailed insights on the trajectory from initial idea inception to final market entry, we have limited understanding of strategies that firms may adopt to help bring about this fundamental transformation process.

We approach the task of organizing for participatory innovation from the viewpoint of strategies to mobilize intangible resources. The research question that has shaped our study is as follows: *Why are some firms able to implement effective intangibles-based approaches to transform knowledge control/sharing for innovation with external stakeholders while others are not?* The goal of this research is to undertake a small-scale exploratory assessment of the 'front end' of co-innovation with external stakeholders based on three large companies operating in highly distinctive manufacturing sectors with dramatically different operating conditions to capture a 'model' of what they had done. In our view, the models uncovered could provide an appropriate starting point for much

larger scale studies that would offer constructive insights on both successful and unsuccessful applications of these models and also identify other alternative models.

Our analysis drew on the literature on intangibles management in addition to open innovation and stakeholder engagement sources for one specific reason: we contend that this literature provides valuable insights on the drivers and barriers related to value-creation that would include fundamental changes to knowledge control and sharing. Intangibles have been defined in a variety of ways, but they are generally regarded as sources of value often not represented in any way on corporate balance sheets (e.g., DTI, 2001). In the past, organizations have not typically developed intangible assets in a deliberate and systematic way. Today organizational managers are becoming ever more aware that these assets, given appropriate levels of investment and maintenance, may help to unlock sources of competitive advantage at present and in the future. What is the explanation for this superior competitive advantage? One explanation is that these resources can offer significantly enhanced capacity to collaborate. Collaboration can spur the creativity that is a vital driver of sustainable business performance (Nidumolu et al., 2009).

We conclude that our work is an essential first step in the design and implementation of a meaningful research agenda on effectively introducing a participatory co-innovation process. In all three cases studied we found that the company approached the matter of organizing for open innovation in a unique manner, a finding that led us to conclude that there were at least three potentially effective models for co-innovation with external stakeholders.

This paper is organized in six sections. The next section provides a synthesis of the key aspects of three bodies of literature relevant for enhanced understanding of the co-innovation process and the subsequent section presents the data and methods used in the study. A section that summarizes the most relevant features of the three companies studied follows. The final sections of the paper provide discussion on the findings and concluding comments.

LITERATURE AND THEORY

Three streams of literature are brought together to provide insights on co-innovation process of participatory innovation – literature on open innovation, literature on stakeholder engagement and literature on intangibles management. Key findings from each body of literature are summarized below.

OPEN INNOVATION

The literature on open innovation highlights the barriers and drivers to introducing 'outsiders' from beyond the firm's boundaries to the innovation process. In his book *Open innovation* Henry Chesbrough (2003) has observed that "open innovation" approaches have made the entire technology/marketing pipeline open to the inflow and outflow of ideas, a dramatic change from the closed pipeline approaches in which R&D was conducted entirely within a company. As Mark Myers, the former Senior Vice-President, Research & Technology, at Xerox Corporation, and today a Senior Fellow at the Wharton School's Emerging Technologies Management Research Program has remarked: "Great research labs do not operate on the basis of secrecy. Great research labs operate on the basis of openness that enables the exchange of ideas" (Myers, 2001: 5). C.K. Prahalad argued that the real impediment to co-creating unique value with customers was the traditional firm-centric system of value creation and the old established ways of thinking among the management community. To him the real challenge appeared to be in the 'forgetting' curve – not in the learning curve. In his view consumers are ready for this change, but companies are not (Prahalad and Ramaswamy, 2004). In a report by The Economist Intelligence Unit on R&D in a global growth economy, customer collaboration was regarded as highly significant in gaining initial customer buy-in, often a crucial factor in validating technology early in the innovation process (The Economist Intelligence Unit, 2004: 10).

STAKEHOLDER ENGAGEMENT

From the literature on stakeholder engagement we make several observations that have implications for our study of co-innovation. Very often it appears that stakeholder engagement, defined as "the process of seeking stakeholder views on their relationship with an organisation in a way that may realistically be expected to elicit them" (ISEA, 1999: 91), is addressed from a highly theoretical perspective, despite considerable attention from academics and practitioners in recent years (Owen et al., 2001). Grayson and Hodges speak about the "considerable gap" between corporate rhetoric about CSR and actual practices that continue to exist because of difficulties in making practices fully operational" (Grayson and Hodges, 2004). Therefore, companies are left with little guidance when they try to translate the abstract concept of stakeholder engagement into practice. There has been a call for research that provides an analysis of how companies can actually introduce stakeholder engagement into practice (Baldvinsdottir et al., 2010).

INTANGIBLES MANAGEMENT

The literature that focuses on the management of intangible resources often is associated with the subject of value creation – companies realizing their full potential (DTI, 2001). Traditional financial statements provide an historical accounting of an organization's tangible assets – its cash, land, buildings, equipment and other balance-sheet items. Because intangible assets are much less frequently featured in financial reports they are often said to represent the 'hidden' values of organizations. Intangibles are typically not given systematic attention in management and corporate planning. As a result, these assets may be under-utilized or totally ignored. Without a clear understanding of how a company's intangible assets operate as value-drivers, under pressure from an increasingly globalized economy, managers may not effectively capture the value that these resources can offer.

Intellectual capital has been described as "a resource and a capability for action based in knowledge and knowing" (Nahapiet and Ghoshal, 1998: 245) that is created through two specific processes – combination and exchange. The process of combination involves bringing together previously unconnected elements or by combining previously connected elements in a novel way and the process of exchange occurs through social interaction and joint activity (ibid, 1998: 248).

Intangible resources are classified variously, but essentially the classifications recognize that these resources can be treated as forms of capital. One common classification of intellectual capital involves division into three types: human capital, structural capital, and relational capital (Bontis, 1999; Johnson, 1999). *Human capital* has been defined as the summation of knowledge, skills, innovation, and capabilities of employees to reach goals (Sackman et al., 1989; Schultz, 1961) and, as such, can be regarded as the source of revolution and innovation for organizations, including employee innovativeness, attitude, wisdom, experience and capabilities (Grantham and Nichols, 1997). Human capital is embedded in employees and not in their organizations and, as a consequence, can be expropriated by employees leaving the company (Miller and Wurzburg, 1995). Unlike human capital, *structural capital* is embedded in organizations and cannot be taken away by employees. It has been defined as the stocks of patents, trademarks, hardware, software, databases, organizational culture, and organizational capabilities within an organization (Edvinsson and Malone, 1997; Roos and Roos, 1997). Embedded in organizations, structural capital provides the supportive infrastructure of human capital (Bontis, 1999). The third category is *relational capital*, which has been defined as the summation of relationships including customer loyalty, goodwill, trust, etc., with company suppliers, channels, customers, and partners (Bontis, 1999; Johnson, 1999).

The generally recognized function of capital is produce wealth traditionally based on cash and other tangible physical assets such as land, buildings and equipment, but more recently includes intangible assets such as relationships and knowledge, especially in knowledge-intensive firms that are increasing in number around the globe at present. Company managers can make choices about the investments that they make in intangible capital – in human capital, in structural capital and in relational capital, each of which has unique benefits. To many practitioners and researchers intangibles have fundamentally changed the way in which organizations are managed for one main reason – they can facilitate greater effectiveness in creativity and innovation, knowledge leveraging and enhanced learning as well as heightened commitment and involvement and greater flexibility and adaptability among personnel. In other words, intangibles are at the heart of competitive advantage.

DATA AND METHODS

This exploratory research study follows a qualitative approach based on the use of multiple case comparison methodology. The main feature of this approach is its investigation of phenomena in their natural settings according to Miles and Huberman (1994: 10) who have advocated the use of qualitative data as "the best strategy for discovery, exploring a new area, developing hypotheses." O'Connor (1998) and others (e.g., Lynn et al., 1996; Veryzer, 1998; McDermott and Handfield, 2000) have used qualitative data analysis in multiple case comparisons for their research on breakthrough innovation because of their strong interest in addressing questions about how and why a particular phenomenon in a contemporary set of events behaves in certain ways.

To provide us with an empirical foundation for this research we selected three Italian success stories in diverse areas of manufacturing, each of which had documented experience of moving to a more open approach to innovation. The first organization selected for analysis was Dompè, a company that has long focused its innovation efforts on developing innovative drugs for treating diseases without any cure and that plays a leading role in Italy in terms of biotechnological drugs on the market and number of patients treated. The second organization selected for analysis was Finmeccanica SpA, an Italian conglomerate comprised of 25 companies that is the largest high-tech industrial group in Italy. The company has offices in over 100 countries and is partially owned by the Italian government, which holds about 30% of Finmeccanica's shares. It is one of the world's leading groups in the fields of helicopters and defence electronics and is the European leader for satellite and space services as well as having considerable know-how and production capacity in the energy and transport fields. The third organization selected for analysis was Ferrari, the iconic Italian motoring brand that has stood for excellence in technology and design for over 55 years. It attaches the excitement of Formula One technology and lifestyle to exclusive sports cars that deliver both technologically advanced automotive solutions and highly sophisticated image-building.

A further attraction to the use of multiple cases is the additional robustness in the research design that comes from the examination of the phenomenon in more than one setting (O'Conner, 1998). Case study research, by comparison with surveys or secondary sources, has some distinct advantages, in large part as a consequence of the direct contact with founders, managers and others actively involved in the activity under study. Interviews can allow the opportunity to continue questioning on issues of interest and on matters of clarification; in addition, they can provide greater insight on how and why particular steps were taken (Veryzer, 1998).

The number of companies was limited to three to allow for comparability of findings without creating an unmanageable volume of data. Given that this is exploratory research it seemed appropriate to use a small sample size and to subject this small sample to in-depth questioning on a relatively narrow facet of the innovation process. The logic of selecting three unrelated manufacturing sector companies is that maximizing the differences among cases makes it possible to control for idiosyncratic influences in each case and, as a consequence, it is argued that diversity establishes a basis for generalizations from a small sample (Lynn et al., 1996: 12). Each of the three examples had an interesting angle relative to open innovation – Dompè represents the pharmaceutical industry that is notoriously IP-conscious, Finmeccanica represents a very large conglomerate with unrelated operations that make intensive knowledge-sharing difficult and Ferrari represents one of the world's very high-profile brands with long-standing and highly effective customer relationships that may not appear to want or, in fact, need more attention to open innovation and the insights of custom-

ers. We adopted approaches common to qualitative research studies (Lee, 1998; Miles and Huberman, 1984; Yin, 1989, 2003). Data collection involved two sources: semi-structured interviews and archival documents. Semi-structured interviews were held with Eugenio Aringhieri, CEO of Dompè, Atillio Di Giovanni, Chief of Technology Development at Finmeccanica, and Antonio Ghini, Communication and Brand Management Director at Ferrari. Documented sources were used to supplement and substantiate information collected through interviews. We prepared a detailed comparison of the findings from the three companies as a foundation for developing insights on how firms actually go about transforming from more closed to more open approaches to innovation processes using an intangibles management perspective focused on forms of intellectual capital (e.g., Bontis, 1999; Grantham and Nichols, 1997; Johnson, 1999; Roos and Roos, 1997).

EMPIRICAL CASES

A short profile of each of the companies focusing on approaches to initiating major initiatives relevant to the subject of participatory innovation is presented below. This study responds to the call for contributions that analyze how companies actually translate stakeholder engagement into practice in order to identify some of the factors that affect the initiation of open innovation processes. The company analyses are based on an interpretation of interviews made at the three companies triangulated with various secondary information sources.

CASE 1 – DOMPÈ

Dompè Farmaceutici SpA was founded in 1940 by Franco Dompè, a pharmacist in Milan who established a chain of chemist shops throughout England, Switzerland and Italy named Farmacie Italo-Inglesi Dompè. In order to further its strategy of investing in the innovation of new drugs Franco Dompè founded a manufacturing company in Milan. In the 1950s this company built a competitive advantage in three therapeutic areas. At this time the company invested heavily in communication aimed at boosting contact with medical practitioners and patients. In 1976 Sergio Dompè, Franco's son, began to work for the family company. He clearly understood the considerable potential of biotechnology for pharmaceutical production and in 1988 founded Dompè Biotec with the aim of commercializing drugs developed in the United States. That experience gave him the opportunity to develop solid partnerships with some of the most important bio-pharmaceutical companies in the USA, including two major players – Genentech and Amgen. Today the company has grown significantly and is structured into seven companies governed by Dompè Farmaceutici with a global workforce of 800 employees and a turnover of 490 million euros in 2009.

In terms of co-innovation Dompè has long recognized the need to enhance its capacity to innovate new drugs through bringing in talent from outside the organization to overcome its weaknesses in skills and competences for research on new biotechnological drugs and their commercialization. In order to improve scientific collaboration with international companies, Dompè International SA was founded in Monaco in 1997. To allow Dompè International to quickly acquire new technical skills in priority business areas as well as new markets using its highly capable and qualified personnel, the company's structure was designed to be highly flexible. As a consequence, partnerships have been set up with companies in more than 50 countries, two of which appear to be particularly significant – the partnership with Biogen, world leader in recombinant DNA drugs with branches in over 70 countries, and the partnership with Amgen, a Dompe partner for 16 years. Research collaboration relationships were established in chemical fields with several university centers, San Raffaele, Xamen and Tor Vergata. The Dompè Group has introduced a quality policy – ISO 9001: 2000 – that is part of all research, development, production and marketing activities as well as the management of staff, their training and the external environment.

CASE 2 – FINMECCANICA

The Società Finanziaria Meccanica Finmeccanica was set up in 1948 by the Istituto per la Ricostruzione Industriale (IRI) to manage the Italian government's participation in the mechanical and ship-building industries. Finmeccanica was given a clearly defined task and substantial resources to restructure important companies that would become the core of the mechanical industry for the next fifty years – Ansaldo, Alfa Romeo, San Giorgio, Sant'Eustachio, Navalmeccanica and Cantieri Navali dell'Adriatico. Attention was focused on key sectors such as automobiles, ship building, railways and industrial machinery, with an eye on the emerging electronics sector. Headquartered in Italy with a vast industrial base in the UK as well as important production facilities in the rest of Europe and in the USA, Finmeccanica has a workforce of more than 58,000 people and revenues of 18,176 million euros in 2009.

In terms of co-innovation, Finmecannica initiated back in 2003 an Open Innovation Project aimed at valuing the shared technological assets of the conglomerate's companies. The MindSh@re Project was designed with the intention of linking people in a network that could serve to multiply the creation of new ideas, products and skill sets within the Finmeccanica group and other businesses, competitors, partners, technologies and products, universities, communities and research centers. MindSh@re includes a system to measure and report on intangibles that can aid managers to formulate strategy, to assess strategy execution and to communicate performance measures to external stakeholders. Finmeccannica has made a substantial investment in internal relationships, creating a common "language" among its 25 companies with its Mindsh@re software system that has been increasingly extended to stakeholder groups outside the organization. The process underlying the Mindsh@re concept has four steps: (1) The Engage step aimed at entering an existing Mindsh@re community; (2) The Align step aimed at starting operations in the community or aligning with another community; (3) The Innovation step aimed at beginning the innovation process once knowledge awareness is sufficient; (4) The Ambassador step aimed at spreading the Mindsh@re model externally to incorporate others. Technology and innovation are acknowledged to be the keystones of Finmeccanica's success

and its competitive edge.
Mindsh@re was intended to achieve six specific objectives: to support business development, to increase efficient and effective resource use across the Group's companies, to identify synergies based on dissemination of a Group-wide vision, to create individual linkages that could increase the likelihood of new ideas/products/talents, to create a competitive advantage for the Group based on the diversity and wealth of technological competencies and to share, grow and valorize the Group's talent. To facilitate the work of the Group's companies, Mindsh@re has seven technological communities covering the main Group areas of competence – radar, advanced materials and enabling technologies, integrated environment for engineering capabilities, logistics and services, simulation for training, software and intellectual property. This network includes more than 600 Group employees, 35 universities and 28 civilian and military organizations. To "share minds across businesses" requires that about 3000 experts are made known to each other so that they can share their ideas. The Mindsh@re networking event held in Rome on 5-6 February 2008 extended the technological communities beyond the organization's boundaries to include representatives from industry, universities and other institutions to further enhance efforts to convene groups of diverse skills and capabilities that, though discussion, might identify path-breaking ways of combining their disparate areas of knowledge. It could be suggested that the award of Best Innovator 2006 for Finmeccanica is a testimonial to the efficacy of this process.

CASE 3 – FERRARI

In 1929 Enzo Ferrari founded the Scuderia Ferrari in Modena. At that time, he did not want to produce road cars, but rather to support amateur racing driver and started sponsoring drivers and manufacturing race cars. Ferrari prepared and successfully raced various drivers in Alfa Romeo cars until 1938, when he was officially hired by Alfa to head its racing department. During WW II Enzo Ferrari built the Tipo 815, the first Ferrari racing car, and in 1947 Ferrari SpA was founded and it started producing street vehicles. These vehicles rapidly gained a reputation for excellence and were popular with wealthy drivers who appreciated the distinctive style of Ferrari's cars. After Enzo Ferrari's death in 1988 the business model was radically changed with huge investments made in research, innovation, organizational changes, education, and cooperation with public institutes. Demand grew after 2000 leading to an increase of 4.8% in customer deliveries in 2006 for a total of 5650 car sales and 188 specialty cars and racing models.
In terms of co-innovation Ferrari developed The Owners' Club and the Ferrari Challenges, two initiatives that reinforce the legendary image of the car. The Owners' Club offers membership to all who own, or have owned, a Ferrari car. This club organizes events, many of which focus on the performance of the car and racing competitions, as well as a web site and magazines. Customers are invited to be club members rather than car buyers. These events also have a social dimension including 'track days' that allow members to drive on famous race courses and to attend special gala dinners. The Owners' Club develops a network of activities that create identity around the Ferrari brand and strengthen it. The Ferrari Challenges are a set of championship races for Ferrari cars also reinforce the Ferrari brand. Dating back to 1993 races have been organized around the world in various Ferrari models. In addition to the racing part of the Ferrari Challenge, there are also competitions involving the personalization of the car exteriors and interiors. More recently, Ferrari's One-to-One Personalization Program allows its customers to fully personalize the 612 Scaglietti model based on existing options and new additions in a dedicated atelier area of the factory where customers make choices in consultation with Ferrari experts.
As the history of the quality movement has documented and early experiences with open collaboration have suggested, there are major inherent barriers to these transformational processes that can only be overcome through major changes in the knowledge control/sharing approach (Gabor, 2009: 7). Tables 1 and 2 summarize the main empirical data used in the argumentation.

DISCUSSION

Increasingly, researchers and practitioners are becoming aware of the fundamental changes that mobilizing intangibles offer for one main reason – they can facilitate greater effectiveness in creativity and innovation, knowledge leveraging and enhanced learning as well as heightened commitment and involvement and greater flexibility and adaptability among personnel. In other words, intangibles are at the heart of competitive advantage (DTI, 2001).
In each of the three empirical cases one of the three forms of intellectual capital appears to have been dominant in the initiation of a participatory innovation process. In the case of Dompè, human capital appears to be most crucial with the creation of Dompè International SA specifically set up to attract the talent to complement skill sets already present in the company to expediting drug development and market entry processes. The Finmeccanica example appears to provide a good illustration of structural capital based on its Mindsh@re software system, whereas Ferrari's approach to participatory innovation can be viewed as a good example of the mobilization of relational capital in the interests of long-term customer loyalty through relationship-intensifying initiatives. In all three cases it is possible to see how the focus

Company	Innovation challenge	Innovation strategy
Dompè	To develop and market new drugs efficiently and effectively.	To build many research partnerships that bring together complementary technical expertise.
Finmeccanica	To turn the conglomerate into a learning organization in which co-innovation flourishes.	To implement a software-based knowledge-sharing and technology transfer system.
Ferrari	To continuously build sustained costumer loyalty for the long term.	To systematically develop exclusive costumer relationships.

Table 1: The role of innovation strategy for participatory innovation models in initiating major changes in knowledge control/sharing

on a specific form of intellectual capital has helped to structure the design of participatory innovation process, although other forms of intellectual capital can often be complimentary to the process. Although some observations on the functioning of the various forms of intellectual capital are provided with the comments on co-innovation below, this subject is largely beyond the scope of this study.

HUMAN CAPITAL AT DOMPÉ

Sergio Dompè is the current president of Farmindustria, the Italian Association of Pharmaceutical Industries. In his speech on the occasion of his honorary university degree from the University of Urbino he spoke about innovation in the pharmaceutical industry, pointing out the relevance of investment in R&D and in skilled and competent human resources for the development of the Italian pharmaceutical industry (Dompè, 2010).

On the same occasion Sergio Dompè also pointed out that the new paradigm for success in the pharmaceutical industry is to create networks in order to share and create knowledge in an 'open source' perspective. Indications are that open and participatory innovation are central to the future viability of the pharmaceutical industry with new open-source protection systems being adopted instead of the traditional and costly IPR. According to a survey conducted by the international Journal 'Scrip World Pharmaceutical News', quoted by Dompè, over 80% of the most effective innovation at present is created outside company laboratories, often by small biotechnology companies or by collaborations with excellent research centers and other 'best-practice' firms in the same sector. Globalization and its impact on greater global completion among companies has led to a more concerted focus on risk and, in this regard, interest has escalated rather rapidly in quality-based strategies (Pekovic and Galia, 2009). Quality-based strategies have led companies to the realization of higher levels of profitability, productivity and competitiveness (Deming, 1986). At the same time, there is strong pressure on companies to become more innovative. A recent research study investigating the relationship between quality practices and innovation performance confirmed the role that quality dimensions, e.g., customer focus, employee training and teamwork, can have on enhancement of the innovation process and lead to the conclusion that "the objectives of innovation should conform to the objectives of quality" (Pekovic and Galia, 2009: 829). The evidence presented suggests that quality practices pertaining to both researchers and their work can lead to the creation of both an environment and culture that supports innovation. In fact, quality systems enhance workplace behaviour in a host of ways – better customer orientation, employee engagement, more effective leadership, improved access to tools as well as more regular team meetings and better team spirit (Pekovic and Galia, 2009: 838).

Management system standards, such as ISO 9001, can provide a solid foundation on which to build an organization and may constructively help to involve and unite employees in working toward a shared goal and may be a source of employee pride that provides a competitive edge. It can also be argued that, for a low price, the ISO 9001 standards give organizations proven ideas, techniques, and principles that many could not afford to research on their own and for which the immediate and long-term benefits may far outweigh the costs. In addition to increasing customer confidence in an organization, an accredited certification can help the organization to operate more efficiently and effectively. In addition, Dompè International's light and flexible organizational structure allows its highly qualified personnel to rapidly acquire new technical skills in accordance with quality considerations. The company advertizes that its success in innovating new drugs is "guaranteed" by the partnerships that it has with global biopharmaceutical companies.

STRUCTURAL CAPITAL AT FINMECCANICA

To innovate and reinvent the sources of value creation, companies – especially very large conglomerates like Finmeccanica – recognize that they must become learning organizations, acquiring the skills to learn from others and from past experience at individual, team, organizational and inter-organizational levels. Mindsh@re, Finmeccanica's cooperative and interconnected network animator involving the group companies, its markets, clients, complementary suppliers and research centres, includes a system to measure and report on intangibles that can aid managers to formulate their strategies, to assess strategy execution and to communicate measures to external stakeholders (i.e., assess the financial impact of MindSh@re against the activity carried out by each community). Mindsh@re promotes the emergence and flow of information and knowledge through people and communities recognized as active co-innovators, generating value for the Finmeccanica Group. It is based on a process

Company	Innovation strategy implementation	Models of organizing for co-innovation
Dompè	Dompè International SA aimed at 'right' partnership-building and ISO 9001:2000. Certification aimed to continuous corporate improvement.	Participatory Innovation Model based on human capital (skill and competence).
Finmeccanica	Mindsh@re system aimed at sustaining the emergence and flow of information and knowledge through people and communities and specific events aimed at extending relationships.	Participatory Innovation Model based on structural capital (processes and systems).
Ferrari	The Owner's Club, The Ferrari Challenges and the Ferrari One-to-One Personalization Programme and an implementation strategy aimed at global outreach to costumers.	Participatory Innovation Model based on relational capital (relationships).

Table 2: The role of 'models of organizing for co-innovation' for major changes in knowledge control/sharing

of knowledge sharing and technology transfer involving all the operating companies as well as different stakeholders recognized as active co-innovators rather than passive recipients. It facilitates the amalgamation of disparate knowledge pools to produce novel combination in seven areas of activity of high industry priority and in so doing creates a stronger culture of innovation for the conglomerate as indicated by awards, e.g., Best Innovator Award 2006.

Included in the seven "technological communities" were personnel from R&D together with marketing and strategy personnel. Because of the centralized nature of the conglomerate's R&D function it could be argued that one key advantage of the Mindsh@re technological communities was to allow for cross-cutting of the traditional boundaries of this organization's knowledge, thereby making it feasible to identify novel combinations of seemingly unrelated technologies within the rather broad range covered by Finmeccanica's 25 constituent companies to create a stronger culture of innovation.

The effectiveness of the Mindsh@re system is enhanced very significantly through a systematic schedule of in-house activities and an increasing number of external activities on the communities such as the 2008 workshops intended to extend the knowledge-sharing activities that it facilitates outside the conglomerate.

RELATIONAL CAPITAL AT FERRARI

Ferrari shuns the advertising campaigns typically used by other car manufacturers and instead focuses on distinctive approaches to customers. The value of The Owners' Club and the Ferrari Challenges is that they provide a high sense of community, in this case, a highly exclusive community. Customers are not only customers – they are members of the Ferrari community. As such they illustrate self-sustaining exclusive customer relationships for which there are strongly anchored incentives for maintenance and growth in terms of a set of exclusive benefits to which others desire access. The high entry barriers created by the very high cost of owning a Ferrari, the prerequisite for membership, ensures that the exclusivity of these benefits is carefully preserved. It could be said that both The Owner's Club and the Ferrari Challenges serve to make visible the intangible features of the Ferrari brand's exclusivity. Ferrari merchandizing provides non-owners with the opportunity to share in this exclusivity in a small, but highly visible, way.

Based on the concept of "customer intimacy" developed by Treacy and Wiserma (1995), the "customer complete solution" offers an insight into the value proposition of companies that consider building long-lasting relationships with their customers as a critical success factor. With this value proposition, customers feel that the company understands its business and personal issues and they trust the company to develop customized solutions tailored to their wishes. Companies offering such a "customer solution" value proposition stress objectives relating to the completeness of the solution (selling multiple, bundled products and services), exceptional service (both before and after the sale), and the quality of the relationship. Often acquiring new customers is expensive and accomplished through a single, entry-level product. After the expensive acquisition of a new customer, companies must retain the customer (annual retention costs are typically far lower than the cost of acquiring entirely new customers), deepen the relationship with the customer, and broaden the relationship to encompass the sale of multiple, related products and services. The profits from customers in their year of acquisition could be negative, because of high acquisition costs. However, the objective is to capture and retain customers to produce high lifetime profitability.

Companies can develop deep understanding about what their customers value, build strong, trusted relationships with their customers, bundle existing products and solutions to individually customized solutions, and help their customers achieve success. The company's innovation processes focus on finding new ways to create value for customers. Research is directed more at understanding customers' future needs and preferences than at fundamental product innovation. The research may also be directed at finding new ways for customers to access and use the company's products and services, as has been the case with Ferrari's interaction with Ferrari owners.

Ferrari's mission has remained the same over the years: to build unique sports cars destined to represent the excellence of Italian cars, whether on the road or on racing circuits. Because of its activity in racing, Ferrari has a very strong knowledge creation and innovation track record. The production of each new model is always based on the extraordinary engineering that embodies performance and technical originality. Ferrari has continuously remained committed to advanced research, introducing at least one technical innovation per year since its founding. Innovation has been one of Ferrari's key assets – not only does Ferrari realize innovations frequently, but it also brings these innovations quickly to the market. Given the exclusivity of its cars, Ferrari considers the company's integrity, reputation and trust to be the elements that distinguish it. Every Ferrari must be perfect. Ferrari's business model is now largely defined by the exclusive relationships it establishes and supports with its clients. Its strategy to sustain, and build on, its current success is founded on its quest to enhance its innovative process.

The effectiveness of Ferarri's three major relational management initiatives has been enhanced significantly with increasing numbers of events and greater promotion of the One-to-One car customization initiatives that originally started within the Ferrari Car Challenges. A similar initiative was undertaken by Ferrari current owner – Fiat – with its foray into customer co-creation with its Fiat Mio, a car that is built with inputs from participants working in conjunction with Fiat professionals to produce a new concept car.

CONCLUDING COMMENTS

We suggest that our work, despite its exploratory nature, establishes a foundation for a significant research agenda on the 'front end' of participatory co-innovation processes. The study aimed to provide fresh insights on the question of why some firms and not others are able to successfully transform their approaches to the control and sharing of knowledge, a question that would

be answered much more fully through future empirical studies. The current study contributes to downstream research in several respects.

First, our findings identify three 'models of organizing for participative innovation' – one focusing on mobilizing human capital, one focusing on mobilizing structural capital and one focusing on mobilizing relational capital. In each case, one form of intellectual capital dominates, with one or more other intellectual capital forms playing a supporting role.

Second, we introduce intangibles management thinking to the literatures on open innovation and external stakeholder engagement to produce what we believe is a more nuanced and detailed view of the underlying dynamics. We contend that these three forms of non-financial capital largely function like financial capital in that each provides the ability to help in producing other goods, in this case the value creation that is central to sustainable competitive advantage.

The three models can be subjected to rigorous empirical testing through larger scale studies that include a wide range of manufacturing companies. It would also be possible to design a study that included, for example, small- and medium-sized enterprises and even start-up firms to uncover patterns of similarity and difference with the three large Italian national-success-story manufacturing organizations studied. In addition, cross-cultural studies of manufacturing companies could be undertaken to identify similarities and differences on a transnational basis.

A closed, firm-centric system of value creation has been the major stumbling block for firms wishing to co-innovate with external stakeholders (Prahalad and Ramaswamy, 2004). However, the three case studies included illustrate transformed approaches to knowledge control and sharing. These cases make clear the power of bringing together previously unconnected resources – the process of combination – and the power of social interactions and joint actions – the process of exchange, in line with Nahapiet and Ghoshal's (1998) research. In fact, our models show how firms can actually organize themselves for co-innovation, helping at the same time to transform the image of co-innovation from 'seductive mirage' to concrete reality.

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