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THE INTELLECTUAL CAPITAL DIMENSIONS OF DUCATI'S TURNAROUND: EXPLORING KNOWLEDGE ASSETS GROUNDING A CHANGE MANAGEMENT PROGRAM

GIOVANNI SCHIUMA[*,†,‡,§], ANTONIO LERRO[*,†,¶] and DAMIANO SANITATE[‖]

[*]*Center for Value Management, DAPIT*
University of Basilicata, Italy

[†]*Viale dell'Ateneo Lucano, 85100 Potenza, Italy*

[‡]*Centre for Business Performance*
Cranfield School of Management, UK
[§]*giovanni.schiuma@unibas.it*
[¶]*antonio.lerro@unibas.it*

[‖]*Ex Ducati Motor Holding SpA*
Via Cavalieri Ducati, 3, 40132 Bologna, Italy

Despite the growing awareness of the importance of researching core strategic resources and capabilities for supporting organisational change, the work that has been done to the date has rarely examined and taken into account the relevance of Intellectual Capital (IC) for the success of a company's strategic turnaround program. Moreover, little attention has been given on what encompasses IC and how it can be conceptualised and interpreted in a change management perspective.

Through an extensive review of the literature on IC and along with a case study of the Ducati Motor Holding — one of the leading world brands in the sportive motorcycles manufacturing — this paper aims to bridge this gap first of all by identifying which are the key-knowledge assets involved in a turnaround program, and then focusing on the impact IC has on turnaround actions.

Findings highlight important implications both for theory and practice, and reveal interesting relationships that suggest further effort should be placed on the development of a knowledge base-view of company's turnaround and on the analysis of the dynamics that links knowledge assets and successful change management programs.

Keywords: Intellectual Capital; knowledge assets; turnaround; Ducati.

Introduction

Organisational changes, as complex phenomena, have been analysed from different and complementary perspectives proving that organisation dynamics is the result of a multitude of driving forces (Calori *et al.*, 2000; Sudarsanam and Lai, 2001; Van de Ven and Poole, 1995). Researchers have investigated firm's choices and processes of organisation restructuring, such as the managerial restructuring; the operational restructuring; the asset restructuring; the financial restructuring and the impact of restructuring on firms' stock performance (Bibeault, 1982; Bonnier and Bruner, 1989; Brown *et al.*, 1993; Franks and Tourous, 1994; Gilson, 1989, 1990; Grinyer *et al.*, 1988; Hambrick and Schecter, 1983; Hofer, 1980; Pearce II and Robbins, 1994; Robbins and Pearce II, 1992; Schendel *et al.*, 1976; Slatter, 1984). Others have paid particular attention to the factors driving and hampering a successful change management program (Barker II and Mone, 1994; Hoffman, 1989; Weitzel and Jonsson, 1989).

More recently, there has been an increasing attention on the importance of researching core strategic resources and capabilities for supporting organisational change (Kaplan and Norton, 2004; Lawson and Samson, 2001; Subramaniam and Youndt, 2005). In particular, focusing on the concepts introduced, over the last years, in the strategic management studies, it is possible to incur into a number of alternative and overlapping conceptual constructs, such as invisible assets (Itami and Roehl, 1987), intangible assets (Hall, 1992, 1993), intangible elements (Carmeli and Tishler, 2004), knowledge assets (Spender and Grant, 1996; Teece, 1998), knowledge-based resources (Wiklund and Sheperd, 2003) and so on. On the basis of such numerous and relevant interpretations and attempting to synthesise them into a more holistic and manageable construct, the concept of Intellectual Capital (IC) has been introduced and developed as a new interpretative category of such resources (Edvinsson *et al.*, 1997; Edvinsson and Malone, 1997; Marr and Schiuma, 2001). It can be considered as a conceptualisation that better answers to the managers' need to have an operative notion of a company's cognitive and intangible resources. It allows to group and represent the overall intangible assets that are not included in the traditional balance sheets as well as allows to assess the differences between the market value and book value of today's knowledge-intensive firms.

However, the work that has been done to date has rarely examined and explicitly taken into account the relevance of IC for the success of a company's strategic turnaround program. Moreover, little attention has been given on what encompasses IC and how it can be conceptualised and interpreted in a change management perspective.

Although any organisational change management program involves and is grounded on a knowledge transformation, the problem is that identifying IC

elements and understanding their effect on organisational change performance is often difficult, particularly because IC may not directly impact them, but need to interact with a large set of organisational variables. In response to such unresolved issues regarding IC and change management, through an extensive review of the literature on IC and along with a case study of the turnaround of the Ducati Motor Holding, the Italian motorcycles manufacturer, this paper aims to bridge this gap first of all by identifying which are the key-knowledge assets involved in a turnaround program, and then focusing on the impact IC has on turnaround actions.

To do so, we developed a research aimed to integrate an inductive approach with a deductive one. First, we collected evidences about the change management program by listening to stories told by Ducati's managers as well as by reading the documents of the company. At the same time, we drew upon and synthesised insights from prior studies regarding IC and its relationships to company performance. Based on this extensive review, we developed the Knoware Tree as an interpretative framework for the analysis of IC dimensions. Then, without any particular theory of change in mind, but adopting the Knoware Tree as a lens to identify IC dimensions, we carried out further interviews with a selected group of Ducati's managers who performed the company's turnaround through different stage between 1997 and 2004. Finally, we discussed with them during dedicated workshops, the results of our interpretations. In this article, we provide the overall insights of the analysis. In particular, on one hand, it shows the importance to identify, understand and employ knowledge assets for planning and translating into action a successful strategic change management program. On the other hand, it presents a powerful research approach for adding value to theories in use, for inspiring the development of new, alternative and better conceptual framework and for providing managerial guidelines for action.

The study is organised as follows. The next section presents the theoretical aspects regarding IC and its relationships to company performance improvement. Following this review, we provide a managerial framework to identify the key-knowledge assets involved in a turnaround project. Then, after a short description of the history of Ducati, the presentation and the analysis of the main change management initiatives which took place in Ducati between 1997 and 2004, are provided in the second section. In particular, the IC dimensions of Ducati's turnaround are investigated and analysed. The final section includes a discussion of the results and suggestions for directions of future research.

Theoretical Background

In the last decades the emphasis on knowledge resources, on organisational competencies and, more generally, on *firm-specific* factors, has strongly contributed to create a wide acknowledgement of the strategic role of intangible resources for a

company's success. A number of theoretical and practical contributions, outlining the centrality of knowledge and intangible resources for companies' performance improvement, have been produced. Analysing the strategic literature it arises that a lot of terms, frequently interchangeable, with definitions ambiguous as well as a juxtaposition of their meanings, have been coined to refer and analyse cognitive and/or intangible resources of the companies. In particular, focusing on the concepts introduced, over the last years, in the strategic management studies, it is possible to incur into a number of alternative and overlapping conceptual constructs, such as invisible assets (Itami and Roehl, 1987), intangible assets (Hall, 1992, 1993), intangible elements (Carmeli and Tishler, 2004), knowledge assets (Spender and Grant, 1996; Teece, 1998; Winter, 1987), knowledge-based resources (Wiklund and Sheperd, 2003) as well as social capital (Nahapiet and Ghoshal, 1998), human capital (Hitt *et al.*, 2001), etc. More recently, on the basis of such numerous and relevant interpretations and attempting to synthesise them into a more holistic and manageable construct, the concept of IC has been introduced and developed as a new interpretative category of such resources. It can be considered as a conceptualisation that better answers to the managers' need to have an operative notion of a company's cognitive and intangible resources. It allows to group and represent the overall intangible assets that are not included in the traditional balance sheets as well as allows to assess the differences between the market value and book value of today's knowledge intensive firms. However, over the last years, the economic and managerial literature concerning IC has introduced different and often not shared definitions and characterisations (Table 1).

The ambiguity of the formulated conceptualisations of IC and its components has been encouraged by practitioners' attention (see e.g., Stewart, 1997; Sveiby, 1997). This has determined that, although researchers and practitioners are nowadays using the same concept (i.e., IC), they have different views and interpretations due to then diverse background and experiences. In other words, it is missing a common platform for analysing IC. This is a shortcoming for research as well as for practice. In fact, in order to develop a theory and/or theoretical implications about the role and the relevance of IC, it is necessary to ground the studies on a clear understanding of the concept, which represents the fundamental unit and share of analysis.

The clarification of the IC concept is useful not only for theoretical reasons, but mostly because a better understanding of roots, components and nature of IC is at the basis of management actions. Managers perceive competitive context and define their actions also on the basis of their mental models, schemes, beliefs and points of view about internal and external firm's success factors. Especially the way to conceive intangible resources or capital affects the way by which managers develop and deploy this kind of resources in defining and performing the firm's strategy. In such a prospect, based on the results of a literature review, this section explores the

Table 1. IC definitions.

Authors	IC
Hall (1992)	It is set up by intangible property and intangible resources.
Edvinsson and Sullivan (1996)	It is knowledge that can be converted into value.
Brooking (1996)	It is the result of four main components, which are the market assets, human-centred assets, intellectual property assets, and infrastructure assets.
Sveiby (1997)	It is related to three categories of intangible assets: internal structure, external structure, and human competence.
Roos *et al.* (1997)	It is composed of (and generated by) a thinking part, i.e., the HC, and a non-thinking part, i.e., the StC.
Stewart (1997)	It is an intellectual material that has been formalised, captured, and leveraged to produce a higher-valued asset.
Edvinsson and Malone (1997)	It is the sum of HC and StC. In more detail, it involves applied experience, organisational technology, customer relationships and professional skills that provide an organisation with a competitive advantage in the market.
Bontis *et al.* (1989)	It is a concept under which are classified all organisation intangible resources as well as their interconnections.
Marr *et al.* (2004)	It is the group of knowledge assets that are owned and/or controlled by an organisation and most significantly drive organisation value creation mechanisms for targeted company key stakeholders.

concept of IC tracking back its origin to other concepts adopted into the strategic management literature dealing with the analysis of firm's intangible resources.

The section begins by reviewing some of the most relevant concepts coined and analysed during the last decades in the strategic management literature and concerning a firm's cognitive and intangible resources. Then, taking into account the main insights emerged from the close investigation of literature, we analyse the construct of IC by clarifying its meaning and exploring its components. On the basis of the results of the analysis, we introduce a framework, theoretically founded on the main insights arisen from literature, directed to interpret IC concept and to disclose its components. Especially, the proposed framework represents a conceptual structure for identifying IC components as well as for driving and supporting management in the evaluation and strategic deployment of organisation's IC.

Explicating Intellectual Capital foundations: a literature review

The concept of IC has its origins in the key idea concerning the importance of some specific resources for a company's competitiveness. It has been sustained

by new theories of strategic management such as Resource Based-View, Competence and Capabilities Based-View and Knowledge Based-Theory. According to these theories, a firm's success is largely determined by the resources owned and controlled by an organisation. In particular, the Resource Based-View argues that firm's resources can be important factors of sustainable competitive advantage that drive superior business performance when they posses certain special characteristics (Barney, 1991). A firm's sustainable competitive advantage results from the possession of resources that are hard to transfer and accumulate, inimitable, not substitutable, tacit in nature, synergistic (Teece *et al.*, 1997; Wernerfelt, 1984) and not consumable because of their use (Davenport and Prusak, 1998). In fact, by acquiring, stocking, deploying and continuously nurturing those resources, a company can maintain and achieve its competitive advantage. More specifically, a company strategically differentiates from its rivals both by the imperfect imitability and substitutability of its specific resources and by its capabilities, i.e., the ways of combining and deploying those resources (Amit and Schoemaker, 1993; Grant, 1996; Prahalad and Hamel, 1990; Teece *et al.*, 1997). Value comes mainly from capabilities which are strictly idiosyncratic and accumulated over time (Dierickx and Cool, 1989). Capabilities are founded on knowledge and learning process taking place within an organisation (Iansiti and Clark, 1994; Leonard-Barton, 1995). The concepts of competencies and capabilities are mainly stressed in the mainstreams of Competence Based-View and Capabilities Based-View (Prahalad and Hamel, 1990; Stalk *et al.*, 1992; Long and Vickers-Koch, 1995) which consider the company's ability to recognise, create, strengthen and increase its "core competencies" as the source of a sound competitive advantage. Particularly, the Competence Based-View conceives the company as a portfolio of competencies and its competitiveness is based on the creation and development of core competencies and on the realisation of a strategy able to create an integration between aims, resources and competencies (Prahalad and Hamel, 1990). Capabilities and competencies have their foundation in knowledge. Around this belief, more recently the Knowledge Based-Theory (Grant, 1997; Spender and Grant, 1996) has been formalised. This theory sustains that knowledge is a key resource for a company's success and the main concern of any organisation has to be protecting, developing and integrating the organisational knowledge to create value. In the last decades, grafting on theoretical foundation of above mentioned research mainstreams, the conceptualisation that has better synthesised the growing importance of the knowledge aspects, is IC.

However, in order to improve the explicating capabilities of this conceptualisation, we developed a systematic literature review about the concept of IC. The literature review process has started from the research question "What are the theoretical foundations of the IC concept and how it can be interpreted, identifying its main components, in the light of the strategic and change management literature?"

The investigation of the literature has been performed also assuming a distinction between the following concepts: resource, asset and capital. It is considered resource any factors tangible or intangible that a firm can use in its value chain processes. Asset stands for a company's resource which is strategically relevant to acquire or to produce economic benefits for an organisational system. While capital indicates a stock of assets that are attributed to an organisation and most significantly contribute to sustain or improve its competitive position (Carlucci and Schiuma, 2007). For the purpose of the research we have focused our attention on the concept of capital. Especially, we have investigated the various forms of capital identified in the literature and related to the IC construct, by means of a review of key outlets for scholarly research in the management field (MacMillan and Stern, 1987; MacMillan, 1989, 1991, 1994). Summarising the results of the literature review, the following "pillar concepts" emerged as key ones: human capital (HC), social capital (SC), organisational capital (OC), structural capital (StC), and stakeholder capital (StkC).

Human capital (HC)

The concept of HC is emerged in Human Management Theory as formulated by Becker (1964) and Schultz (1961). According to Human Management Theory, it is possible to apply economic logic to the study of people's decisions dealing with their work, the improvement of their skills and knowledge and, more generally, each occurrence of lifetimes. This in turn means that HC construct can be defined and analysed mainly according to a unit of analysis which is the individual. This is aligned with most of theoretical contributions related to HC. For example, most definitions of HC stress clearly the individual nature of this construct. For instance, Leana and Van Buren III (1999) define HC as people's knowledge and technical ability. DeFilippi and Arthur (1998) describe HC as people's skills. Dess and Picken (2000) and Youndt *et al.* (2004) state that HC consists of the individual's capabilities, knowledge, skills, and experience of the company's employees and managers, as they are relevant to the task at hand, as well as of the capacity to create a reservoir of knowledge, skills, and experience through individual learning. Pennings *et al.* (1998) argue that HC of a firm is the knowledge and skills of its professionals aimed to produce professional services. Bolino *et al.* (2002) declare that HC is reflected by education, training, or experience of people. Adopting an etiologic perspective, Burt (1997) interprets HC as the quality of individuals. Therefore, the individualistic perspective is the primary view of HC.

Summarising the alternative interpretations of HC it seems possible to conceive HC as the knowledge, skills, intellect, relationship, attitude, talent, and behaviour of employees. In accordance with this interpretation, HC is a holistic concept which

denotes the organisation resources and assets related to a firm's people. From the literature analysis it raises that the most important HC's components are: Knowledge of people; Know-how of people; Expertise of people; Skills of people; Problem solving capability of people; Innovation capacity of people; Teamwork capacity of people; Productivity of people; Formal training of people; Learning capacity of people; Education of people; Leadership and management ability; and Ability of people to manage change.

Those resources and assets define the value of the firm, from a static point of view, as well as represent key critical operative factors to support and drive value creation dynamics over the time. Particulary, to this last regard, HC theorists (e.g., Becker, 1964; Schultz, 1961) stress that HC contributes to create value because an increase in worker skills, knowledge, and abilities most likely translates into increased organisational performance. When people possess high levels of knowledge and skills, they generate new ideas and techniques that can be embodied in production equipment and processes; they initiate changes in production and service delivery methods; and they improve the links between employees, managers, and customers (Berg, 1969; Dutta *et al.*, 2002).

Social capital (SC)

The term SC was originally used by social theorists to describe and highlight the central importance of the relational resources, embedded in cross-cutting personal ties for the development of individuals over time in community social organisations (Jacobs, 1961; Loury, 1977). The concept was popularised by Putnam (1993, 1995), and recently has been applied to elucidate a broader range of social phenomena (for a review, see Carlucci and Schiuma, 2007; Fischer and Pollock, 2004). Focusing on firm, Leana and Van Buren III (1999) conceptualise SC "as a resource reflecting the character of social relations within the firm. Organisational SC is realised through members' levels of collective goal orientation and shared trust, which create value by facilitating successful collective action. Organisational SC is an asset that can benefit both the organisation (e.g., creating value for shareholders) and its members (e.g., enhancing employee skills)" (p. 538). Looking outside the firm, Pennings *et al.* (1998) define SC in terms of supporting relationships with other economic actors, most notably, potential customers.

Attempting to summarise its main facets, it seems possible to conceive SC as a set of assets involving two main dimensions: the network of relationships between and among actors, and the content of these relationships. It is an "invisible force" embedded in relationships of individuals, organisations, communities or economic actors which support growth. SC, as a set of assets, plays a fundamental role in defining and creating the value of any organisational system. To this regard, Anand *et al.* (2002)

argue that the role of SC for a company's value creation is increased especially in the last years. According to the authors, several factors have contributed to this increase. "First, in current business environments, managers are faced with increasing knowledge density, a term referring to the amount of knowledge that a manager must have in order to make organisational decisions [. . .]. At the same time, organisations are becoming leaner and reducing their number of managers [. . .]. Second, past knowledge and experiences of organisational employees are less useful today because their firms are increasingly faced with novel and unexpected situations [. . .]. Third, SC is also increasing in importance because of the large number of high-technology industries where knowledge is being created rapidly and is unevenly distributed among several small firms. For firms to survive in such industries, they need to depend on external knowledge and be capable of accessing it" (p. 88–89).

About the ways in which SC contributes to value creation dynamics, Tsai (2000) asserts that SC, as a multidimensional construct, can contribute in many ways to the creation of new value for an organisation. Leana and Van Buren III (1999) sustain that there are four primary ways in which SC can lead to beneficial outcomes. It justifies individual commitment to the collective good (1), facilitates a more flexible work organisation (2), serves as a mechanism for managing collective action (3), and facilitates the development of IC in the firm (4). Nahapiet and Ghoshal (1998) argue that SC increases the efficiency of action. Reviewing benefits of SC, Adler and Kwon (2002) argue that SC influences career success and executive compensation; helps workers find jobs and creates a richer pool of recruits for firms; facilitates interunit resource exchange and product innovation, the creation of IC, and cross-functional team effectiveness; reduces turnover rates and organisational dissolution rates; facilitates entrepreneurship and the formation of start-up companies; and strengthens supplier relations, regional production networks, and interfirm learning.

Organisational capital (OC) and structural capital (StC)

OC and StC are analysed in the literature as interchangeable concepts. Bontis (1998) refers to StC as all mechanisms and structures that can help employee to better deploy their cognitive resources and then improve the company's performance. According to other authors (Ambrosini and Bowman, 2002; Nelson and Winter, 1982), StC consists of organisational know-how which is incorporated in routine or rules, embedding tacit knowledge as well as culture. In particular, routines act as the glue for organisations and contribute to enhance cooperative working and the development of new knowledge (Rumelt, 1984). While culture identifies the "way of doing things" within an organisation. It constitutes the beliefs, knowledge, attitudes of mind and customs to which individuals are exposed in an organisation,

as a result of which they acquire language, values, learning mechanisms, habits of behaviour and thoughts (Bontis, 1998; Hall, 1992). Winter (1987) refers to StC as "intellect of the organisation". Youndt *et al.* (2004) state that OC represents institutionalised knowledge and codified experience stored in databases, routines, patents, manuals, structures, and the like. In the light of the interpretations provided, OC and StC can be considered as the overall organisation's tangible and intangible infrastructures that enable a firm to perform its business processes. They mainly include: routines, procedures and rules; artefacts embedding knowledge like patents and licenses; organisational and reporting structures; operating systems; procedures and task design; information and communication infrastructures; resource acquisition, development and allocation systems; decision processes and information flows; incentives, controls and performance measurement systems; organisational culture, value and leaderships; ways of doing business; and organisation processes. The role of this capital in value creation is mainly related to the fact that it is a primary means through which an organisation can rapidly learn, manage and apply knowledge. In this regard, Stewart (1997) states that OC reduces lead times between learning and knowledge sharing and, therefore, allows to firm to gain a sustained, collective growth. StC and OC are the essential drivers in converting knowledge embedded in individuals and organisation into value. Moreover, this form of capital represents the essential substratum for the growth and right exploitation both of HC and SC.

Stakeholder capital (StkC)

StkC collects different subset of SC, such as relational capital (Ireland *et al.*, 2002), customer capital (Bontis, 1998; Pennings *et al.*, 1998), external SC (Chung *et al.*, 2000; Fischer and Pollock, 2004; Koka and Prescott, 2002). It is about some forms of SC that, due to their importance for a firm's success, have been adressed separately from the broader concept of SC. In the light of the several interpretations provided for this form of capital, StkC can be conceptualised as relationships that an organisation develop with its internal and external stakeholders, as well as knowledge embedded and transferred in those relationships. The components of this form of capital are relationships among firm and its customers as well as, consistently with stakeholder theory (Donaldson and Preston, 1995; Jawahar and McLaughlin, 2001), firm and its stakeholders.

The role of this capital in value creation is mainly related to the fact that this specific form of SC is a primary means through which organisations import external knowledge into the firm. In this regard, Anand *et al.* (2002, p. 88) argue "knowledge acquired from a firm's SC impacts the firm's internal knowledge in two ways. First, as new external knowledge comes into the firm, it can be combined with the

firm's existing internal knowledge. Second, comparing new external and existing internal knowledge can highlight inconsistencies that can identify weaknesses in the firm's existing internal knowledge. The kind of knowledge a firm retains internally determines the benefits that a firm can derive from SC". In addition, the degree to which firms can use external relationships for knowledge acquisition and exploitation is regulated by the amount of SC embedded in such relationships (Yli-Renko *et al.*, 2001).

A new interpretation of Intellectual Capital

Starting from the Edvinsson's (1997) definition, who initially proposed an interpretation of IC as "the possession of knowledge, applied experience, organisational technology, customer relationships, and professional skills that provides 'a company' with a competitive edge in the market", in the last years, this concept has been further developed and analysed by different academics and practitioners, who have proposed complementary interpretations and frameworks (Andriessen, 2005; Brooking, 1996, 1997; Edvinsson and Malone, 1997; Marr and Schiuma, 2001; Sullivan, 1998; Sveiby, 1997; Kaplan and Norton, 2004; Hudson, 1993; Hand and Lev, 2003; Roos *et al.*, 1997; Stewart, 1997). From the analysis of these interpretations, it is possible to underline a common central assumption: the IC of a firm is embedded and made of people and organisation infrastructures, and integrates as well as combines all various forms of human, social, structural and stakeholder capital. Then, the IC is an *umbrella concept*, which offers a broader view and understanding of organisational resources and offers a holistic view for the assessment of organisation soft assets as well as allows to better understand the potential patterns of co-existence among its subcategories.

However, recent scholarship stresses that, in order to fully understand how IC develops and drives performance, it may be helpful to focus on the common and knowledge-based nature of the IC component: knowledge represents the fertile soil where all IC components are rooted (Marr *et al.*, 2001; Teece, 1998, 2000). Recognising the knowledge-based nature of IC components, we interpret them as organisational knowledge assets. The adoption of the concept of knowledge asset to explain IC components allows to consider as knowledge resources not only the organisational intangible assets, but also those tangible assets incorporating knowledge and at the basis of organisational competences. Then, an analysis of organisation IC dimensions which disregards the tangible resources could be a relevant limitation, since the competences of a company are more and more the result of the summa, the coordination and synergetic integration of tangible and intangible assets. Moreover, the nature and the properties of the tangible resources influence the exploitation and the development of intangible ones. According to this perspective, IC is defined as

the group of knowledge assets that are owned and/or controlled by an organisation and most significantly drive organisation value creation mechanisms for targeted company key stakeholders. A knowledge asset can be defined as any organisation resource, both tangible and intangible, made of or incorporating knowledge which contributes to define company's value as well as provides an ability to carry out business processes (Carlucci *et al.*, 2004; Marr and Schiuma, 2001; Marr *et al.*, 2004).

Combining the main insights emerged from the close investigation of the literature with some lessons learnt from the *on-field* investigation of Ducati's case, we developed and adopted the Knoware Tree as an interpretative framework for the identification and assessment of IC dimensions of a company. The concept of Knoware was introduced since we found that many Ducati's managers were recognising the presence of knowledge both into tangible and intangible organisation assets and the knowledge nature was the discriminating factor to distinguish, within the organisation, those strategic relevant resources.

The Knoware Tree (Fig. 1) distinguishes two main categories of IC: the class of knowledge assets related to a company's stakeholders — *Stakeholder Knowledge Assets* — and the class of knowledge assets related to organisation infrastructures — *Structural Knowledge Assets*. This distinction denotes the two main components of an organisation reflected in the different forms of capital: its actors, both internal and external, and its structural components such as all those elements at the basis of the processes of an organisation. Both categories are further divided in other

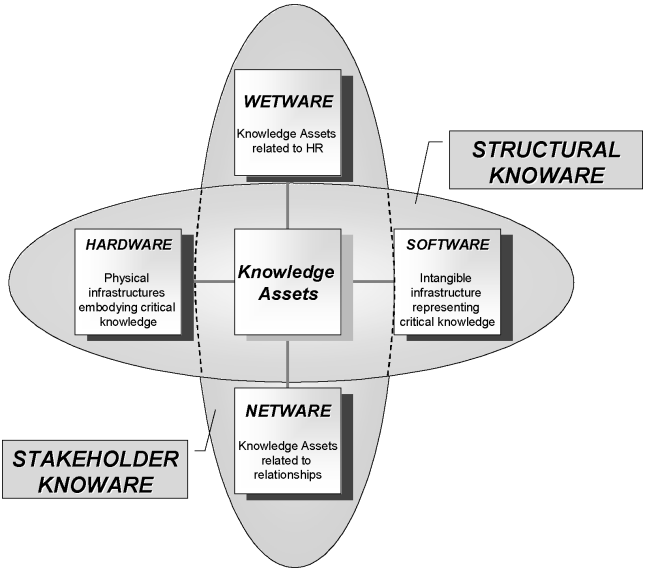

Fig. 1. The Knoware Tree: IC dimensions of a company.

sub-categories: *Wetware* and *Netware* for the Stakeholders Knowledge Assets and *Hardware* and *Software* for the Structural Knowledge Assets. They represent the key building blocks of an assessment map for the analysis of the strategic knowledge components building the organisational IC.

The *Wetware* mainly denotes the HC of a company. It includes individual know-how facets, such as innovation capability, creativity, experience, teamwork capability, leadership, flexibility, tolerance for ambiguity, motivation, satisfaction, learning capability, loyalty, formal training and education, commitment, technical expertise, problem solving capability, and so on. Then, the Wetware represents all that knowledge influencing the behaviour of human resources.

The *Netware* indicates the group of knowledge assets linked to internal and external organisation relationships. The Netware dimension comprises resources such as licensing, partnerships, financial relationships, contracts, etc., and can involve different aspects, i.e., the fidelity relationships with customers and suppliers and the management of the reputation as well as the image of the company. Specifically, internal relationships involve all networking processes developed within the companies, while the external relationships concern essentially the networking processes of a company with its stakeholders, such as customers, suppliers, institutions, regulators and communities.

The *Hardware* includes all structural/organisational assets that embed strategic know-how as well as are important for knowledge development, acquisition, management and application, but are tangible in nature. Among its main components, the Hardware dimension includes the operation technologies, facilities, structural layout, ICT, and context- and company-specific tangible assets. In this, the dimension of IC can be counted also some externalities generated by territory-specific tangible assets, such as specific industry infrastructures, which incorporate relevant know-how for a company, i.e., logistics platforms, local institutions, and geographical localisation.

Finally, the *Software* comprises the structural/organisational assets having soft nature, such as routines, internal practices, procedures and rules, operating systems, processes and task design, decision processes and information flows, incentives, controls and performance measurement systems, organisational culture, value and leadership, ways of doing business, procedures, corporate management philosophies. Patents, copyrights, trademarks, brands, registered design, trade secrets, and all intangible assets whose ownership is granted to the company by law are included as intellectual property in this category.

As above stressed, each IC component plays a strategic role in business success. However, it seems important to underline that in order to effectively and efficiently deploy these assets in conducting business all the IC components have to be considered inextricably combined and leveraged together. This means that at the heart of

value creation there is the dynamic interaction of the different "knowledge assets" composing IC. This statement has important practical implications, often not followed by organisations. In such a prospect, it seems very interesting to study in depth the interactions among the different forms of capital in order to explore interaction amongst knowledge assets that is complementary in that the value of one element is increased by the presence of other elements (Carmeli and Tishler, 2004).

A Case Study for Exploring IC Grounding a Change Management Program — Ducati Motor Holding

In this section, we reflect on the specific case of turnaround which took place at Ducati Motor Holding, the Italian motorcycles manufacturer, between 1997 and 2004. Here, we emphasise the rejuvenation story of Ducati's renewal strategy. This shows, how an old and not-performing business can be successfully turned around, and how it can benefit from a knowledge-based approach to the change management initiatives.

Our study has some valuable lessons. By taking a longitudinal perspective spanning many levels inside the firm, and by making connections to the competitive environment, we isolated the risk of seeing change as a holistic and monolithic phenomenon to exhibit many interconnected facets of activities strongly related to a knowledge-based approach that managers often do not see. Most managers are guided by experience and ours stressed the value of thinking turnaround as a knowledge-intensive project. In studying Ducati, our first stage was inductive. We collected data and information without any particular theory of change in mind by listening the stories told by Ducati staff of their experiences and by reading the documents of the company. In a second step, we interpreted the story in the light of the Knoware Tree theoretical framework that appeared appropriate *a posterior* to explain Ducati's turnaround success.

We begin by a short description of the context of Ducati and the way we collected our material before moving to interpreting the story of the change we observed. In particular, we interpreted the story of the change we observed by identifying a set of actions that highlight and summarise the IC dimensions of what we saw. The observations we make below suggests how the Ducati's turnaround story can positively inspire the development of better conceptual frameworks taking a more integrated and dynamics view and improve managerial practice based on IC exploitation.

The Ducati's history

The business history of Ducati started in 1926, when three brothers, Bruno, Marcello and Adriano Ducati, founded a limited company "Società Scientifica Radio Brevetti

Ducati" specialising in the production of radio, electric and mechanic components and end products. Until the 1946, when the first motorcycle was produced — the "Cucciolo", a 48 cc four-stroke engine bolted to a bicycle frame — Ducati developed know-how in the electrical, optic and mechanic business. During the 1950s, Ducati expanded its business in the motorcycle industry, becoming a manufacturer of complete motorbikes. Moving from the first legendary Cucciolo, at the beginning of the 1950s, Ducati was building ever more ambitious bikes, first the "Cruiser" — the ancestor of today's scooters — and later the "Marianna" — a race motorbike with a 125/250/350 cc engine that quickly became synonymous with spectacular speed records. At the end of the 1960s, Ducati was recognised as one of the leading motorcycle manufacturers in the world. The reputation was built thanks to the motorbike race successes as well as to the launch of different fashioning and performing products. In this regard, particularly important was the role played by the development of relevant technical innovations, such as the new distribution system of the command valves of engine, called "sistema desmodromico". By the early 1970s, with the emergence of Japanese manufacturers, such as Honda, which introduced big-engined motorbikes, the motorcycle market changed profoundly. Motorbikes were not anymore a means of transport for people who could not afford to buy cars, but rather than a sport vehicle for well-off customers.

The Ducati strategic positioning during the 1970s and 1980s was characterised by the production of motorbikes developed for the race world, but manufactured by mass production and sold in the market for passionate customers. Bikes were characterised by high technical components, craft manlike features, and stylistic contents. At the end of 1980s, Ducati developed the twin-cylinder and four valves engine, disproving the assumption that high performance motorbikes could have only four-cylinder engine. There were other winning dimensions, including innovative design, defined by designers, such as Giugiaro, and the myth of the brand Ducati world wide recognised as synonymous with sportive motorbike with high performance. For example, in the motorbike races, Ducati won in 1987 at Daytona with the "851" model and in 1990 the Superbike world championship with the "888" model, showing that the twin-cylinder engine could compete with the Japanese four-cylinder engines.

At the beginning of 1990s, the value proposition of Ducati was losing its edge. Different factors were dropping off business performances. The traditional entrepreneurial formula, more oriented towards an artisan production and stylistic emphasis, rather than an industrial organisation able to compete with the emergent Japanese big manufacturers, such as Honda, Kawasaki, and Yamaha, was showing its shortcomings. The crisis of the whole motorcycle sector, particularly in Italy, affected sales and caused workforce strikes and strife with the labour unions. These and other financial-related causes determined a deep financial and industrial crisis

of Ducati: from 1995 to 1996 the turnover decreased of about 36% and the sell-out motorcycles pass from 21.000 to bit more than 12.000. The deep crisis caused the interest of an American private found of investment — the Texas Pacific Group — that took over the 49% of the shares of the company from Castiglioni, the Ducati's owners since 1986. During the 1998, the Texas Pacific Group and the Deutsche Morgan Grenfell Development Capital Italy together with other investors acquired the remaining shares in order to have the complete control of Ducati. Texas Pacific Group taking over from Castiglioni launched a turnaround program aimed to carry out a change process to rejuvenate Ducati. Federico Minoli was appointed as CEO and Chairman and put in charge of driving Ducati's turnaround program. Table 2 summarises very briefly the history of Ducati.

Table 2. Chronological summary of Ducati's history.

1926	Creation of Ducati by Bruno, Marcello and Adriano Ducati.
1944–1946	Starts the motorcycle era; Ducati develops the first motorbike — "Cucciolo" — as a means of transport for people in the reconstruction period after the second world-war.
1948	The Ducati brothers, after a deep industrial crisis, lose the ownership and the leadership of the company, which is acquired and controlled by an Italian Government Institute — the IRI — aimed to coordinate and control the Italian Industrial reconstruction.
1949	Ducati starts the production of the first complete motorbike: the "Ducati 60".
1950s	The 1st May 1954, the engineer Taglioni is employed. He will design most of the great Ducati's engineering innovations, such as the single-cylinders that triumphed in many races during the Fifties.
1960s	Ducati invests in the mass-production of the single cylinders and parallel twin cylinders.
1970s	The Seventies witnessed Ducati's race competition victories with twin-cylinders.
1970	Ducati passes under the control of EFIM — industrial group belonging to the Italian State Participations Minister.
1983	Ducati is acquired by Castiglioni brothers, who owned another historic Italian motorcycle brand: the Cagiva.
1995	Further financial difficulties; Ducati incurs debts and experiences a deep industrial crisis.
1996	Control of Ducati by Texas Pacific Group and Stock Exchange listing.
1997	After a first financial restructuring, the Ducati's turnaround program starts.
1999	International Best Factory Award.
2003	Ducati strong restructuring process returns to race at the GP500.
2006	On the 1st March 2006, Texas Pacific Group sells Ducati to Investindustrial controlled by Bonomi's Family.

Collecting data and interpreting the story

Our principal data collection effort occurred in 2005, while the major changes in Ducati were finalising. We gathered a mass of documents about Ducati and the industry, from inside and outside the company, and conducted more than 30 in-depth interviews. The documents included some internal memoranda written by senior managers, description of quality control system, audit of different departments and other relevant material. Our interview programme was extensive and comprehensive, conducted using traditional research methods. We also watched people at work. The scope of the study was large. It also delved into perceptions as well as details of operations, and allowed some observations of change processes and their outcomes. The results were written up chronologically in a factual style that emphasised the actors' perspective and minimised interpretation. The whole was checked with the participants to assure accuracy and absence of bias. After some months later, the data have been reviewed. Here we propose an IC-based interpretation of the success of this change process at Ducati.

The Ducati's turnaround

The change process we observed, was both top-down and bottom up. It involved the design of a new image, new operations processes, new relationships with both customers and suppliers, and indeed changes to almost every facet of the business. The scale of changes was significant during the period 1997–2004 and the following business performance was achieved. The number of the motorcycles registered moved from 12.117 to 36.089 units. The global revenue increased from 105.8 to 381 millions of euro, and the margin of contribution passed from 34.5 to 166.5 millions of euro, with an incidence on sales of about 41%. The EBITDA moved from 11.8 to 40 millions of euro, with an incidence on sales of about 16%. The profits achieved 10.6 millions of euro and the market share, in the sportive motorcycle niche market, increased from 3.9% to 6.3%.

The turnaround strategy of Ducati can be synthesised in the Minoli's vision of transforming the company "from a mechanic to an entertainment firm". This fundamental idea at the basis of the change management program was carried out by defining the "Ducati World", i.e., the strategic objectives to be implemented to translate into action the Minoli's vision. Seven strategic dimensions were identified to drive the turnaround program of Ducati rejuvenation. The product — the motorbike — was defined as the focus of the Ducati World, assuming that it represents the brand and drives customer's imagination. Its unique characteristics were defined for a clear marketing positioning against the competitors. The motorbike is considered the essential of Ducati World: the "totem" around which all activities and initiatives have to gravitate.

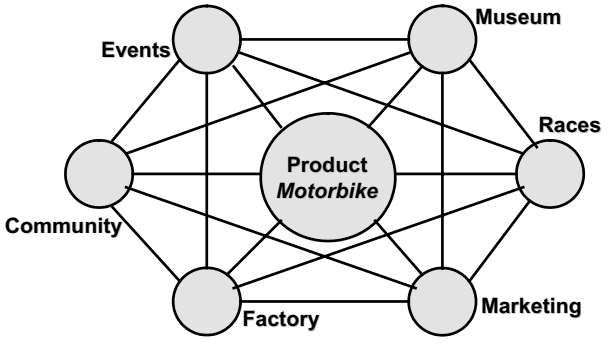

Fig. 2. The Ducati World: the strategic dimensions of the turnaround program.

Around the product, the other defined strategic dimensions of Ducati World were: the museum, the races, the marketing, the factory, the community and the events (see Fig. 2). They drew the strategic objectives of the turnaround program and represented the pillars for the construction of a new knowledge atmosphere of Ducati to prompt a rejuvenation. The strategic dimensions identified by Ducati World drove the overall change management process, which was characterised by the definition of integrated, sequential and overlapped initiatives. This is one, among others, of the reasons of the success of Ducati's turnaround program. In fact, it is argued that one of the main causes why change initiatives fail is because often managers in the attempt to implement corporate transformation end up implementing a number of change initiatives not well integrated and coordinated (Beer and Nohria, 2000).

The definition of the turnaround program was preceded by the identification of those elements potentially enabling and/or hampering Ducati's value and value creation capabilities. Three main dimensions were identified as key factors for the competitive reviving of Ducati: a strong product's image, a qualified technological know-how, particularly in terms of product technical solutions, and an energetic and close-knit research and development team. On the other side, four critical weaknesses were mapped: the lack of a strong fabric of company, a network of relationships with customers and suppliers very weak, production processes mainly based on handcraft abilities and no much structured and industrialised, and an overall low level of process quality. The turnaround project of Ducati was based on four fundamental change management programs. It started, at begining of 1997, with two restructuring programs: the "brand/marketing restructuring" aimed to build a world network of selling points as well as to launch a set of marketing and promotional initiatives to strengthen and re-vitalise the brand visibility in the market; and the "financial restructuring" which allowed Ducati to be quoted in the New York

and Milano stock exchange in 1999. The financial restructuring was led by two main objectives. First, a growth of the global revenues achieved through an increase both of the motorcycle sales volume, and the development of a new business unit, named Ducati Performance, dedicated to the merchandising and customer-service activities. Second, a consolidation of the financial and economic margins achieved through the increase of the premium prices and the reduction of the production costs. Starting from 2000, the attention shifted to the "operation restructuring" aimed to perform a deep transformation of the organisation and production processes. The change process was based on the adoption of the lean production principles and oriented to improve the capabilities of Ducati to create value for its stakeholders, particularly customers, suppliers, employees and shareholders. The organisational and production restructuring was characterised by the return of Ducati to the race world. This had the twofold goal of sustaining the brand promotion and supporting the further development of know-how in the research and development area. In the last years, most of the attention has been focused on the "R&D restructuring" with the aim of developing new products.

A systemic understanding of the IC dimensions of Ducati's turnaround

There have been many studies of firms in changing, but little point to a common set of knowledge factors involved in successful change processes. Here, we reflect on a series of managerial actions that deal with the IC dimensions that impacted change in the Ducati case. Some of these may seem like common sense, such as the importance of improving relationships with key stakeholders; others are more complex and less obvious, such as fans community exploitation. The point we like to make is that all the steps were necessary. For Ducati, not to have done something listed here would almost certainly have resulted in failure. Other organisations in different circumstances may need different steps, but ours are commonly found in many cases of renewal.

Netware: the relationship knowledge assets

Investigating the main knowledge assets building the Netware of Ducati, the following components have been identified. They correspond with the most important relationships focused on and built by Ducati during the turnaround program: relationships with employees; relationships with customers; relationships with suppliers; relationships with institutions; and relationships with communities.

The *relationships with employees* represented a fundamental success factor of Ducati's turnaround. They were developed by the implementation of three main

initiatives: (I) involvement of labour union and restructuring of organisation hierarchy; (II) workforce involvement; and (III) definition of specific project teams. These initiatives were aimed to create an internal networking system able to stimulate and sustain an organisational atmosphere oriented toward a continuous improvement.

The top management since the first stage of the turnaround program involved the labour union in order to guarantee the commitment of the workforce to Ducati's turnaround. The deliberate objective was the integration of a top-down approach with a bottom-up one in order to carry out the transformation process. This allowed to create a trustful relationship between the top management and the employees, who lived and performed day-by-day the changes. In particular, the creation of a trustful and cooperative atmosphere allowed the introduction and adoption of important human resource management initiatives, such as the polyvalence and the polyfunctionality, which have been driven flexibility and operation capacity. The involvement of labour union was followed by a restructuring of organisation hierarchy mainly aimed to facilitate the interactions between managers and the workforce as well as to stimulate cognitive dynamics relationships in the form of knowledge transferring and sharing.

Among other initiatives, in order to involve the workforce the Ducati People initiative was launched. With the planned objective of creating an organisational energy able to involve workforce in the rejuvenation of Ducati, for the marketing campaigns instead of professional actors, employees were used. This allowed to convey the value, the authenticity and the uniqueness of the experience to work in Ducati. This initiative received a remarkable effect in terms of developing corporate culture and sense of belonging.

The workforce involvement in the transformation process was also based on the creation of a cognitive atmosphere creativity-based and oriented to a continuous improvement. Employees were invited to provide innovative suggestions to improve company performances. All gathered suggestions, after a feasibility evaluation, were implemented and the people, who suggested them, were rewarded. Only in 2003, 59 improvements suggestions were collected and implemented with a substantial impact on organisational performance.

In order to support the implementation of the turnaround program, different project teams were created. Particularly important was the establishment of the team "Ducati Design". It was created with the aim of facilitating the cognitive dynamics supporting process and product innovation. The Ducati Design team was defined as an internal multi-functional group of experts composed by designers and engineers. They had the task of supporting the creation of new knowledge as well as the combination of existing knowledge in order to spur and drive innovation processes. It was, in particular, able to stimulate major and more systematic and content-intensive relationships among different critical organisation functions, such as the

new product development department, the technical departments, the marketing and sales department. Ducati Design team achieved different successes in terms of both performance improvements and new product development. In particular, the MH900e motorcycle, a successful product of Ducati, was developed on the basis of the suggestions and insights developed by the Ducati Design team.

The *relationships with customers* represented another important focus of Ducati's turnaround. Recognising the fundamental role of a direct link with the end market, both for controlling and acquiring information, Ducati managers restructured the distribution channels by creating the *Ducati Stores*. Getting over the traditional way of selling through a network of different and independent dealers, that contemporaneously managed other brands, Ducati applied a precise strategy. It comprised essentially two managerial actions: the first was focused to a direct control of the distribution channels in the most important markets, i.e. USA, Germany, UK, Japan, and Italy. The second was addressed to re-organise and select the dealers, in terms of competences about the services, i.e., the qualified technical assistance and the availability of adequate expositive spaces. At present, Ducati owns about 150 Ducati Stores around the world and has created a network of agreements with selected dealers. They are not only sell-points, but more importantly interfaces to interact with the market; sensors to better identify and assess signals of market demands as well as for better understanding of customers' wants and needs.

The strengthening of the *relationships with suppliers* was identified as one of the key factors of the operation restructuring process. The design and management of the supply chain was carried out in accordance with the principles of the just in time. The result has been the creation of a strong network of stable, coordinated and trustful relationships with suppliers which represents a strategic asset for company competitiveness. In order to build the relationships with suppliers, first they were opportunely selected on the basis of their specialisation and reliability. Second, they were involved in different projects aimed to improve the regularity of the supply, the quality of components and services, and the reduction of costs. Third, appropriate contractual agreements were signed in order to guarantee flexibility and continuity of the supply relationship. Today's relationships involve co-design agreements, exchange of workforce in order to keep unchanged the local overall rate of employment as well as, more importantly, for fostering the transferring and combination of knowledge to support innovation processes. In this regard, it is important to note that among other suppliers, Ducati has strong links with Brembo (producer of brake pincers) and Magneti Marelli (producer of electrical systems). Moreover, it is important to stress that Ducati also established important relationships with knowledge-intensive service suppliers, such as Porsche Consulting. This relationship played a key role in the acquisition and creation of new knowledge. With the

support of Porsche Consulting, Ducati implemented the lean production system, which drove the operation restructuring.

The managers of Ducati have indicated the *relationships with institutions* another important asset for the company. With the turnaround program, the relationships with local institutions, such as the technical high schools and the universities, played a strategic role in the overall restructuring. These relationships allowed to select and bring new skilled and energetic workforce oriented to changes.

As regard the *relationships with communities*, Ducati addressed three main categories of communities partially overlapped: internal community (Ducati's employees), local community (people and families living in Borgo Panigale where Ducati is situated), and the global community (which involves all Ducati's fans). The creation of an internal community has been part of the process of workforce involvement. While, the relationship with the local community is part of Ducati's history. There is a deep link between Ducati and Borgo Panigale, a small village in the suburb of Bologna. Since the creation of Ducati by Bruno, Marcello and Adriano Ducati, the company has been situated in Borgo Panigale. Although, during the Second World War it was completely destroyed by bombardment. Ducati chose to rebuild and to be localised in the same place. At present, the localisation is part of the cultural identity of Ducati, which is strongly integrated with the local socio-cultural context. It is one of the industrial symbols of the industrial area of Bologna. This involves an affective link between the local community and Ducati. Finally, the global community has been strengthened and partially created by a planned set of initiatives. Recognising the existence of Ducati's fans all around the world, it launched the *Desmo Owner Club*. It is a non-profit organisation which gathers all Ducati's fans, which today counts more than 400 Ducati Clubs with millions of subscribers. The creation and development of *Desmo Owner Club* has been strongly supported by a virtual platform, the *Ducati.com*, as well as the development of a number of initiatives, such as the annual World Ducati Weekend, the Ducati Revs and the "Motogiro d'Italia".

Wetware: the human knowledge assets

In the following the main knowledge assets of Ducati's wetware are presented. A key aspect of the turnaround program has been the maintenance of high-potential and/or high-performance human resources, through the reinforcement of the particular and positive aspects of the personality of each employee, i.e., attitudes and positive behaviours, besides the technical competences. Human resources were considered by Ducati as fundamental "pillars" to carry out the deep changes involved in the turnaround program. They were developed through the definition of specific characteristics that they had to possess to be considered Ducati's people. For this

reason, the Competence Model of Ducati was defined. It identifies three fundamental competences that have to characterise a "Ducati's man": *being a visionary*, i.e., creative thinking- and strategic-oriented; *being energiser*, i.e., leadership attitude, integrity and coherence to organisation's values, and teamworking orientation; *being result-oriented*, i.e., tenacious, assured, customer-focused and spirit of enterprise. This model drove, along the overall turnaround program, the workforce competence assessment and the design and implementation of individual as well as group competence development programs. In particular, three main competence development initiatives have been adopted: training programs in- and outhouse, mainly aimed to develop specialised professional skills; coaching directed to develop managerial skills by transferring know-how from senior to junior mangers; and benchmarking activities and participation to external seminars, workshops and conferences.

Hardware: the tangible knowledge assets

During the interviews has emerged that Ducati's managers believe that a fundamental dimension of the IC of a company is represented by some tangible assets that ground organisation capabilities. In this regard not only some tangible assets incorporate strategic knowledge as well as support the development, management and application of organisation know-how, but changing the tangible dimensions of IC would have an impact also on the intangible dimensions which have value and/or create value in synergy with the overall organisation resources. Three main dimensions of tangible knowledge assets have been identified by Ducati's managers: the factory; the operation and communication technologies; and some territory-specific dimensions. The factory is considered an integral part of the know-how of Ducati. It was restructured in order to collect and represent the values and passion of the people working for Ducati as well as linked to the "Ducati World". For this reason, the factory was re-designed thinking to it as a "theatre", where employees could appear in carrying out their operation activities.

Daily, the factory is visited by hundreds of people, i.e., fans, students and/or customers. At present, it is an integral part of the museum. The latter, represented one of the priorities of Minoli's turnaround strategy and it is considered a fundamental tangible asset incorporating strategic intangible resources. The creation of the museum had a clear objective. It was aimed to provide a tangible sign that Ducati's future was grounded on its past. This can be considered as the recognition of the importance for Ducati's leaders of taking into account the core cultural tradition and values of the company to engage employees in the organisation transformation. In this regard, Minoli stated that it "was his belief that the Ducati's strengths and potentials derive from its history, from that magic mixture of great

passion, culture and high professional experiences, from that patrimony made of human assets and know-how which has allowed it to achieve the most ambitious goals and that has inevitably involved anyone who has gravitated in its orbit". Therefore, the first efforts and physical restructuring investments were dedicated to the museum, rather than to the factory modernisation. Minoli's vision was the creation of a tangible place in which the values, the culture, and the passion of Ducati could be codified, represented, and made tangible. In order to mark the continuity of past, present, and future of Ducati's cultural values context- and company-specific. The place where to represent and celebrate the brand of Ducati. The set of symbols and memories with which employees and anyone getting close to the world of Ducati could identify themselves. Some specific operation technologies as well as assembly line lay-out are considered important knowledge assets. They have been developed and are continuously maintained by engineers and technical employees. Moreover, most of the knowledge created within the company is codified and has been translated into tools and utensils embedding the employees' creativity. A particular relevant tangible knowledge asset for Ducati is the web platform, the *Ducati.com*, which incorporates the know-how of dedicated team of web-designers, computer engineers, marketing and CRM people. It is considered a fundamental tool to facilitate and manage the networking dynamics with Ducati's communities and other important stakeholders, such as customers, dealers, and suppliers.

The most important asset related to the territory-specific dimension is the localisation. Ducati is situated in an Italian industrial area strongly characterised by a socio-cultural atmosphere and an engineering know-how specialised in the motor industry. Companies such as Ferrari and Lamborghini and a multitude of small and medium enterprises with specialised know-how were located close to Ducati. The localisation guarantees the continuous creation and circulation of information and knowledge as well as the development of logistic and production infrastructures which confer potential competitive differentials.

Software: the intangible knowledge assets

Among others, three fundamental knowledge assets have been identified by Ducati as key IC components building the intangible infrastructure of the company: the organisation culture; a set of practices and routines; and patents. The organisation culture is the result of a mix of components firm- and context-specific. Ducati is localised into an industrial district characterised by a strong work culture, i.e., deep attachment to the job which is considered as a means for personal identification and realisation, as well as by a passion for motors. Then, there is a strong cognitive and cultural osmosis between the company and the local community. Specifically, Ducati employees feel a strong sense of belonging, the pride of being part of a

myth, and the awareness of contributing to an ongoing history of an important Italian motorcycle brand. Ducati has developed routines and practices guided by the lean production principles, i.e., the constant identification of the value of activities, the understanding of the value stream of organisational processes, the management of the flow, the demand-pull approach and the continuous research for perfection. This has involved an improvement in the efficiency and the re-organisation of the productive and logistic processes with the adoption of procedures and principles, such as the pull system, the zero defects standards, the one-piece flow, and the synchronised production. These are recent practices and routines which have been strongly incorporated into employees' behaviours. Finally, the brand, Ducati, represents a fundamental intangible asset, holding the image and the competence of producing excellent motorcycles. Ducati owns different patents of great strategic relevance, such as, in particular, the "sistema desmodromico" and the specific and unique noise of the engine "il rombo ducati".

Discussion: Inspiration for Developing Theories and Improving Managerial Practice

The story of Ducati's turnaround may inspire theorists and practitioners. A single case study cannot test theory, but can help develop it. We suggest that Ducati's story corroborates and innovates some of the existing and emerging frameworks about managing radical strategic change; suggests some important variables that moderate relationships between managerial actions and success; and stimulates the search for an integrative and dynamics theory of change management.

Enriching theories

First, there is a strand of writing that emphasises the multifaceted systemic process of change (Calori *et al.*, 2000). Most managerial actions have a multidimensional character and when describing the practice of change, we believe that it is important to show as many dimensions as possible. Our case extend the traditional financial and operations implications and effects towards another relevant dimension, the cognitive one. The attempt of integrating the strategic and financial perspectives of change management with a knowledge based-perspective allows enriching the theoretical scene, providing important insights for inspiring further development of conceptual models as well as for defining and developing better change management practices.

The resource based-view, the competence based-view, and the knowledge based-view have emphasised that a company's performance and strategic positioning and competitiveness are related to the ownership and control of distinguishing organisational resources, knowledge assets, and competences (Barney, 1991; Peteraf, 1993;

Wernerfelt, 1984; Prahalad and Hamel, 1990; Grant, 1996; Spender, 1994). The concept of IC has its origins in these strategic approaches. It represents those knowledge assets owned and controlled by an organisation which drives and sustains the value of a company and the organisation value creation capabilities. This understanding of IC is grounded on a knowledge-based view of the firm (Grant, 1997; Nonaka and Takeuchi, 1995; Spender, 1996). We have seen IC of a company represents the knowledge foundations of the competences driving and sustaining organisational change capabilities and value creation dynamics. But core competences are generated and exploited when a company develops IC dimensions strictly idiosyncratic to its own organisation. These dimensions have to posses certain special characteristics to be strategic and able to confer a sustainable competitive advantage. They have to be hard to transfer, to accumulate, to imitate, to substitute, and synergistic and not consumable because of their use. Hence, an IC of a company is a system of knowledge assets, which represents, at the same time, the structure of organisational resources and the platform for building the firm's competences. In accordance with this perspective, a company can be understood both as a knowledge asset repository and as a generator and user of knowledge assets. The first interpretation corresponds to a static view of the organisation knowledge resources and it is widely highlighted in the Ducati story. Here, the assumption is that knowledge assets are stratified and institutionalised within the company; they are incorporated into the organisation norms and procedures as well as into the components, which define and build the firm and support its change management processes and aims.

While we call for a new investigation about the interpretation of a company as a generator and user of knowledge assets, able to recognise the dynamic nature of knowledge resources, and to focus the attention on the cognitive dynamics of an organisation, specifically on organisation learning mechanisms, such as the acquisition, development, control, deployment and management of knowledge resources. In this sense, the use of a dynamic capability perspective could coherently enrich the theoretical scene. In fact, assuming that a firm is a system of knowledge assets and knowledge processes, any change management program must take into account the transformation of organisational IC. It represents a relevant factor to lever on, to design and to implement an organisation change as well as the result of a change management program. Although in the change management literature organisation capability transformation has been analysed, little attention has been dedicated to a holistic analysis of knowledge resources involved into an organisation rejuvenation and turnaround process. Most of the attention has been focused on isolated components.

This can be explained through both the choice of an analytic investigation, which tend to prefer a detail analysis of a specific organisation knowledge resource, and the difficulty to carry out a holistic and systemic analysis of the firm's knowledge

resources. Moreover, the understanding of the knowledge resources building a firm's knowledge domains is characterised by high ambiguity. Focusing on the IC it is possible to analyse the knowledge resources involved and caused by an organisation change program. This can have a great importance for change management strategy formulation and implementation. In this regard, a change management program has to specifically address from strategic and operative point of view the renewal and development of IC in order to define the factors affecting the creation of a new cognitive atmosphere, which in turn drives a rejuvenation of a company's competences (Amit and Schoemaker, 1993; Youndt *et al.*, 2004).

Inspiring practice

Practice does not just require good theory, but concrete examples with methods and outcomes (Stadler and Hinterhuber, 2005). The Ducati story tells us the relevance of taking into consideration the development of knowledge assets to carry out a successful change management program. Insights and many other concrete ideas from the Ducati story can be used in other place and circumstances. In particular, the proposed Knoware Tree can be adopted as a tool for the identification of the IC dimensions. It can have a twofold aim: it can drive managers toward the identification of the IC dimensions to be managed in order to support a successful company's turnaround; and can be used as an assessment approach for evaluating and tracking the impact of a change management program on the firm's IC.

Keeping in view the Ducati story, further research and studies can be suggested. Our empirical work is based on an retrospective interpretation of the IC dimensions levered and developed during Ducati's turnaround program. Its nature is mainly explorative and intends to provide an interpretive platform for understanding the role and relevance that knowledge assets play in change management programs. However, one case study can just provide insights for developing other more in-depth empirical studies. In this sense, the Ducati's turnaround provides insights about the importance for the future of explicitly addressing the attention on the identification, assessment and development of IC in the design and implementation process of a change management program. In particular, we believe that particularly useful would be the development of research projects aimed to explore the stages of the definition, implementation, assessment and rethinking of change strategy and programs which take explicitly into account the firm's IC dimensions as factors for carrying out the transformation journey. Authors call also for the development of dedicated surveys aimed to understand the strategic relevance of managing knowledge assets as key factors for the definition and implementation of successful change management programs. Further research is also necessary to investigate the interdependence among IC dimensions. Even if each IC component plays a strategic role

in a company's turnaround and business success, all IC components have to be considered inextricably combined and leveraged together in order to effectively deploy organisation knowledge assets in conducting a change management program. This means that the dynamic interactions of the knowledge assets of a company need to be explored. In particular, it would be relevant to investigate how the definition of a specific combination of key knowledge assets, through a turnaround program, allows the definition of an organisation context-specific cognitive atmosphere which can drive workforce imagination and creativity as well as higher business performance. This, in other words, corresponds to further understand how turnaround program can transform the factors determining the cognitive nature and abilities of an organisation.

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