MANAGING KNOWLEDGE-INTENSIVE WORK: A TRUST-BASED MODEL

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INTRODUCTION

Research into intellectual capital began in the early 1990s and was mainly concerned with raising awareness about the existence and value of intangible assets within organizations (Itami, 1991; Roos & Roos, 1997). Following this work, intellectual capital creation has become a central topic in the theory of the firm, as scholars have shown that a firm should be understood as a social community, which has particular capabilities in creating knowledge through interpersonal and work relationships (Nahapiet & Ghoshal, 1998).

However, the relationships through which intellectual capital is created in a knowledge-based economy still remain poorly understood. Dirks and Ferrin (2010) suggest that trust is a central element in work relationships as it fosters desirable work-related behaviours, discretionary effort and increased cooperation. Therefore, a further understanding of how trust shapes these relationships can contribute to unraveling the dynamics that lead to the creation of intellectual capital.

In this research, we present a qualitative multi-case study, which specifically investigates the hierarchical relationships between junior and senior knowledge workers, focusing on the variations of cognitive and affective interpersonal trust (McAllister, 1995).

Our findings allow us to identify four typologies of relationships between junior and senior knowledge workers that mirror different levels of these two forms of trust. This provides us with the basis to develop a framework which highlights how cognitive and affective trust interact both in concordance (both are at a high or low level) and discordance (one high-level form of trust co-existing with a low-level form of the other type) in influencing the dynamics of a work relationship in a knowledge-intensive environment.

Overall, this research provides an understanding of the relationship dynamics amongst people working in an innovative context and provides a fresh insight into the theory of trust. These elements are fundamental in an agenda that aims to enhance our understanding of knowledge-based organizations and, ultimately, to disentangle the mechanisms that contribute to the creation of intellectual capital.

THEORETICAL FRAMEWORK

Challenges in Managing Knowledge-Intensive Work

The management of an organization's intellectual capital is critical to organizations wishing to maintain a competitive advantage. This is particularly true for organizations embedded in R&D-intensive areas such as the life sciences and clean-technology sectors (Nahapiet & Ghoshal, 1998; Pisano, 2006). In these sectors, open modes of innovation have created novel challenges in the organization of product innovation and in the management of knowledge-intensive work (Powell et al., 1996).

In particular, the characteristics of knowledge work significantly intensify agency problems that are usually associated with hierarchical relationships (Eisenhardt, 1989). These threats mainly reside in conflicting goals, relationship asymmetries, and mechanisms of monitoring and steering between senior and junior knowledge workers (Mitnick, 1975), and specifically:

1) Knowledge sharing may be partial and/or incomplete;
2) Work coordination may be reduced;
3) There may be difficulties in monitoring processes;
4) Conflict on the aim of the project may arise;
5) Knowledge workers may decide not to respond to others' behaviours, limiting their participation in the relationships.

Trust in Knowledge-Intensive Work Environments

An extensive literature highlights how managers and employees utilize trust to mitigate some of the outlined challenges in knowledge-intensive environments (see Shapiro, 1987; Fukuyama, 1995; Butler & Cantrell, 1984; Hosmer, 1995; Langfred, 2004, for reviews).

Scholars have widely studied the notion of trust, which is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviours of another (see Deutsch, 1958; Dirks & Ferrin, 2010; Kramer & Tyler, 1996; Mayer et al., 1995; Rosseau et al. 1998, for reviews). However, from a sociological perspective, trust must be conceived as an interpersonal attribute, applicable to the interactions among people, rather than merely attributable to their individual psychological states (Zand, 1972).

This latter perspective suits R&D-intensive projects, as they imply a strong interdependence among workers and support through social processes. In this sense, trust represents a key element that is necessary for knowledge workers to face the challenges they encounter, as it impacts upon the social relationships of actors, who through the interplay of their habits, perceptions and judgments respond to the issues of their work relationships.

Cognitive and Affective Trust. The literature on trust has also shown that two forms of trust, cognitive and affective, which are respectively related to the technical competence and the fiduciary responsibility of two parties, are central to workplace interpersonal relationships (Baba, 1999). A further look at this conceptualization helps a comprehensive understanding of how the relationships among knowledge workers are sustained and developed, and of how trust contributes to the creation of intellectual capital. In fact, in knowledge-intensive environments, research projects are social constructions characterized by high interdependence and close interactions among knowledge workers, who develop both an emotional, affective, and a professional, cognitive, attitude towards their superiors and their subordinates.

If we trust in the competence of another worker, we expect that he has the requisite knowledge and skills to perform an action in a way that results in a positive outcome for us; whereas with the affective form of trust, we expect that another will behave in a way that preserves and advances our interests, while abstaining from opportunism. The basis for interpersonal trust, therefore, can be either cognitive or affective. The literature on trust in hierarchical relationships supports this distinction and McAllister (1995) analyzes cognitive and affective trust in peer managers, showing a concordance in the levels of cognitive and affective trust, so that high cognitive trust in a peer will lead to high affect-based trust.

Although this literature provides interesting insights, little attention has been directed at how these two forms of trust might interact to generally shape work relationships and specifically, at how they could contribute to solving agency issues and to the creation of intellectual capital in R&D-intensive environments.

Here, we show that in a junior-senior relationship between knowledge-workers, levels of affective and cognitive trust can interact either in a concordant or a discordant way. Our task is then to explain these variations and how the comprehension of the interaction between these two forms of trust may extend our understanding on the solution of the challenges faced in work relationships and on the creation of intellectual capital in knowledge-intensive organizations.

To do this we focus on the cross-disciplinary context of regenerative medicine. This represents an excellent case study for the purpose of this paper because its research has sparked scientific interest and has led to a remarkable rise in knowledge creation. In particular, it has brought universities and their highly specialized intellectual capital to the centre of scientific research. Because of the technology-oriented goals of the field, new innovation modes have emerged in university laboratories, with a consequent influence on work practices and a reshaping of hierarchies and interpersonal relationships among scientists.

METHODS

As the objective of this study is to develop rather than to test a framework, the study design utilizes a multiple-case dynamic analysis, to allow unplanned themes to emerge from the data (Miles & Huberman, 1999). Our interest in interpersonal trust was not fueled by deductive logic, but by its dominance in the interviews.

We conducted this study amongst seven regenerative medicine university research groups, selected using criterion-based purposeful sampling. We interviewed 22 junior and 16 senior scientists; they all had worked for at least 12 months in their laboratories. This population allowed us to identify 35 dyadic hierarchical relationships between junior and senior scientists.

We conducted the interviews on a one-to-one basis; each lasted at least an hour. The interviews were audiotaped; transcripts were prepared and stored for analysis. We informed the subject of the general purpose of the research; the use of data obtained through the interview; and the confidentiality and anonymity of the information procedure. The research plan followed the ethical guidelines provided by UCL Ethics Committee.

The transcripts were analyzed with the (QSR) NUD-IST software. Findings regarding patterns of hierarchical relationships were generated from this process. We created codes from the transcripts and then compared them to the literature, to examine whether they were systematically related to the methodological approach (Lincoln & Guba, 1985). At the end of the coding process we linked each interview to the codes and grouped the codes to generate a

restricted number of categories, which resembled the major themes that emerged from the interviews.

OBSERVATIONS AND FINDINGS

In a knowledge-intensive context such as regenerative medicine, workers develop different strategies to accomplish their tasks. On the one hand, scientists rely on their skills and abilities in setting the empirical focus of a project. On the other, as working on a scientific project requires strong interdependence among knowledge workers, they rely on others to accomplish their projects' goals. This is particularly relevant in agency interactions among supervisors and subordinates. In fact, subordinates and supervisors seek to resolve projects' issues through a high interdependence, which actively influences and shapes their interpersonal relationships (Ashford & Tsui, 1991; Oldham & Cummings, 1996).

In explaining the high interdependency and the dynamics of the relationships between junior and senior scientists, the participants frequently highlighted the need for a mutual "personal and professional trust", as the basic requisite to overcoming the everyday challenges of their research and managing agency problems. The literature on interpersonal trust in working relationships suggests a clear distinction between a "professional" and a "personal" form of trust, namely cognitive and affective, or emotional, trust (Johnson-George & Swap, 1982; McAllister, 1995).

By systematically comparing scientists' responses in the textual analysis of the interviews, we identified a total of 31 codes related to interpersonal trust in the senior-junior relationship: 14 referred to cognitive trust and 17 to affective trust.

These codes allow us to investigate how, in hierarchical relationships between knowledge-workers, affect- and cognition-based trust may interact in discordant ways. In fact, low levels of cognitive trust can co-exist with high levels of affective trust; furthermore, high-levels of affective trust can be linked to or induce a strong cognitive trust in the other component of the relationship. Although these two forms of trust co-exist as separate and independent constructs, only their interaction will be responsible for the scientists' responses to the challenges of their projects and for the final synergy of a relationship.

In fact, a high-low match between affective and cognitive trust may determine patterns of relationships that represent specific answers to issues of work collaboration and cooperation, conflict, knowledge sharing and monitoring mechanisms.

We create a typology of four hierarchical junior-senior relationships. To facilitate this insight, we array the typologies on a two-by-two diagram in concordance with expressed beliefs and the conceptualization of the two forms of trust (Figure 1). These typologies reflect four situations in which: both forms of trust are high (athlete-coach); both are low (driver-constable); affective trust is low and cognitive trust is high (soldier-captain); and cognitive trust is low and affective trust is high (child-parent).

Figure 1 about here

Figure 1: Four typologies of hierarchical relationships between junior and senior scientists, based on different levels of cognitive and affective trust.

DISCUSSION

By acknowledging the variability in the levels of cognitive and affective trust we are able to provide an understanding of the different ways in which their presence and their interaction may contribute to solving projects' issues, are fundamental to shaping hierarchical relationships and unravelling agency problems, and, overall, in influencing the creation of intellectual capital in knowledge-intensive environments.

In general, both forms of trust are required to create and maintain an effective working relationship in a knowledge-intensive environment. However, the interaction between these two forms of trust is relevant in helping to overcome the agency issues typical of knowledge-intensive environments and in influencing the outcomes of the relationships in terms of intellectual capital creation. In particular:

1)   A knowledge sharing deficiency is solved through both cognitive and affective trust, which actively contributes to creating intellectual capital;

2)   Work coordination issues are addressed through a high level of cognitive trust;

3)   The difficulties in the mechanisms of monitoring and steering are solved with both affective- and cognition-based trust;

4)   The role of the two forms of trust appears to be differently balanced as regards their contribution in helping to ease conflicts that arise over goals. In fact, affective trust seems to be essential in the convergence of scientists' goals. Cognitive trust fails to overcome the issues encountered by the high heterogeneity, diversified methodologies and wide technical approaches proper to these knowledge-intensive projects. A high level of cognitive trust is therefore a necessary, but not a sufficient condition to the creation of intellectual capital.

5)   Scientists may decide not to respond to others' behaviours, developing a low level of both forms of trust. However, this choice considerably constrains efficiency and richness of experience and, overall, does not contribute effectively to the development of intellectual capital.
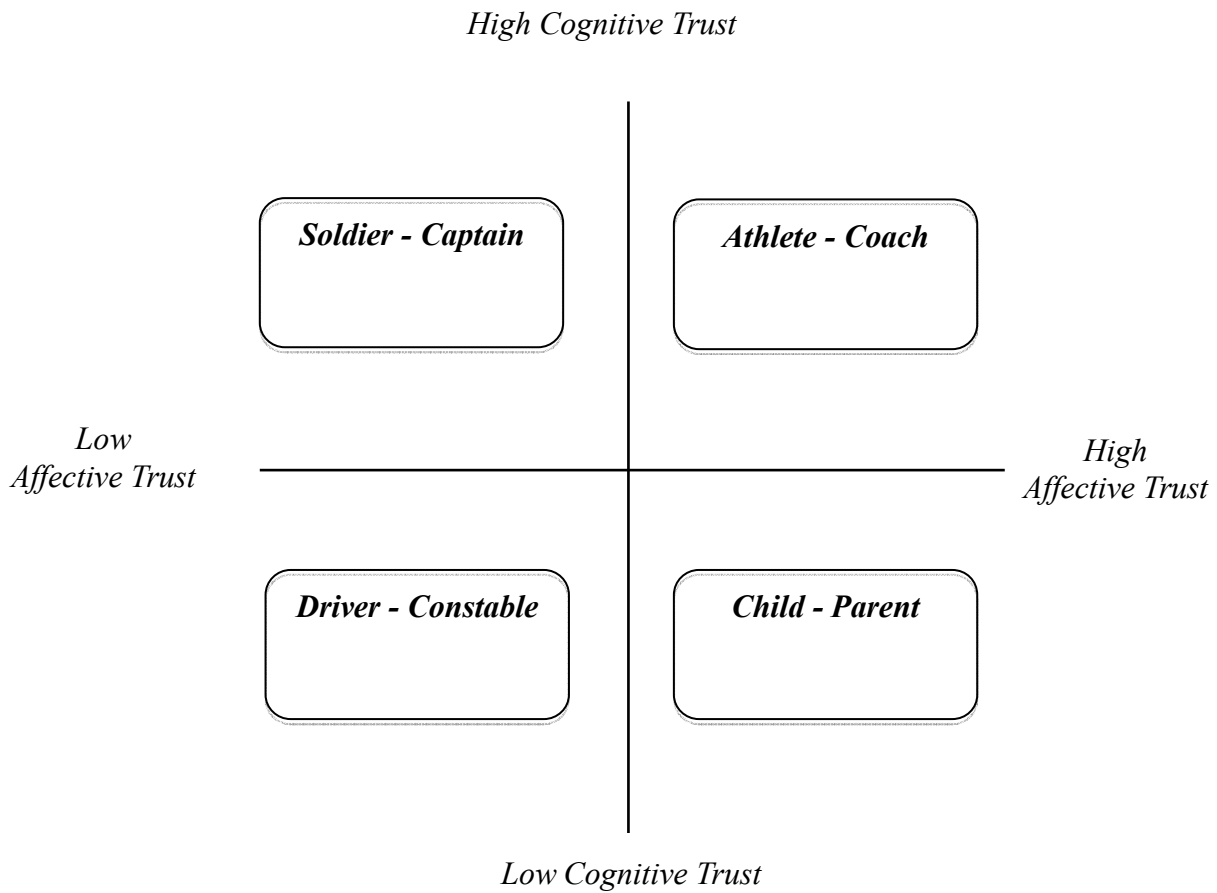
CONCLUSIONS

The growing interest in intellectual capital coincides with the rising importance of the knowledge society, its workers, and their interpersonal relationships. What we have tried to do in this study is to explore the significance of these work relationships in contributing to the creation of intellectual capital in R&D-intensive environments, focusing on the forms of affective and cognitive trust in the relationships between junior and senior scientists.

This paper aims to suggest to managers the importance of knowing the value of their own intellectual capital. Managers should establish and favour a trustworthy environment, taking care and managing both the professional and cognitive, and the affective and emotional, aspects of their organizations' knowledge workers.

Our findings extend McAllister's (1995) model of trust. We claim that cognitive-based trust is not just an independent antecedent of the affective-based form, but that these two forms are distinctive constructs that interact in shaping the dynamics of work interpersonal relationships.

REFERENCES AVAILABLE FROM THE AUTHORS

FIGURE 1

High Cognitive Trust

Soldier - Captain	**Athlete - Coach**

Low Affective Trust — *High Affective Trust*

Driver - Constable	**Child - Parent**

Low Cognitive Trust