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REGULATION AND SELF-REGULATION OF TEAM LEARNING AND INNOVATION ACTIVITIES

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Regulation and Self-Regulation of Team Learning and Innovation Activities

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Dedication

To my parents, whose goodness and unconditional love made it conceivable for me to
live a life of curiosity and exploration

and

To Sabatino, who has loved and supported me through all these years

and

To my daughter, my all, who has given me so much joy. As you grow older I want you to
go forth and pursue all your dreams as I've attempted to do all my life.

I love you all

Sammanfattning

Självstyrt lärande och innovationsaktiviteter inom team är processer där gruppmedlemmar själva kollektivt aktiverar och upprätthåller lärande och beteenden som är systematiskt orienterade för att uppnå gruppens mål. Genom att själva sätta mål skapar gruppens medlemmar återkopplingar genom vilka de kan kontrollera sin effektivitet och anpassa sin funktionalitet.

Självstyrande grupper bör agera proaktivt för att kunna sätta mål och komma in i en självstyrande cykel. Tron på det egna lärandet anses viktig. Självstyrt lärande är inte att beakta som rent individualiserat lärande då det involverar självinitierade former av socialt lärande, exempelvis i form av att fråga om hjälp från kollegor, coacher och lärare.

I denna avhandling används därför ett socialt lärandeperspektiv för att studera gruppens självstyrda inlärningsprocess, som en viktig källa för att förstå skillnader mellan gruppens prestation, och som ett medel för att kunna förbättra gruppens lärande och innovationsförmåga.

Trots att forskning avseende självstyrande grupper redan finns, så finns det ännu oklarheter vad gäller många frågeställningar så som vad självstyrning faktiskt är och hur självstyrt lärande och innovationsaktiviteter egentligen utförs.

Det primära bidraget från denna avhandling är att introducera ett teoretiskt ramverk för att analysera och applicera reglerande åtgärder inom en organisation. Syftet är att öka förståelsen för hur styrning av självstyrande gruppens lärande och innovationsaktiviteter kan uppstå genom analys av de självstyrande lärandeprocesserna hos individer i självstyrande grupper.

Avhandlingen har tre mål:

1. Att beskriva gruppinterna mekanismer som påverkar självstyrande gruppens lärande och hur dessa interagerar
2. Baserat på denna förståelse, identifiera åtgärder för att indirekt påverka gruppens självstyrda lärande och innovativa beteende
3. Att erbjuda empiriska bevis för hur specifika åtgärder påverkar gruppens lärande och innovativa förmåga

Vi har i studien identifierat fyra mekanismer som kan användas för att påverka gruppens lärande och innovationsaktiviteter:

1. Återkopplingslingor och mål som kombinerar lärande och effektivitet
2. Ett nätverk av påverkare såsom chefer och andra intressenter som interagerar med gruppen genom systematiska rutiner
3. Utbildningsprogram för gruppmedlemmar
4. Ett dialektiskt perspektiv på lärande och innovation

För att illustrera kopplingen mellan chefers hierarkiska styrning och lärande på team- och organisationsnivå har ett flertal fallstudier genomförts i två multinationella organisationer som på olika sätt genomfört samma förändring: - en övergång till agila arbetsmetoder -, och som uppvisat olika grad av organisatoriskt lärande relaterat till olika styrsystem. Som komplement har också kvantitativa resultat samlats in medelst en enkät, i samma organisatoriska miljö.

Abstract

Self-regulated learning and innovation activities within teams are those processes with which team members collectively activate and sustain cognition, affects and behaviors which are systematically oriented towards the achievement of their team's goals. By setting goals, team members create self-oriented feedback loops through which they can monitor their effectiveness and adapt their functioning. As self-regulated team members should be proactive in order to establish their goals and engage in a self-regulatory cycle, motivational belief is here considered important, whereas self-regulated learning is not conceived as an individualised form of learning since it involves self-initiated forms of social learning, such as asking for help from peers, coaches and teachers.

Therefore, in this thesis, a social learning theory perspective is utilised to study teams' self-regulated learning processes, being an important source for understanding the difference in performances of different teams, and a means through which regulation actions aiming at improving team learning and innovation performances can be identified and suggested to organisational practitioners.

However, although research on self-managing teams exists, there remains considerable confusion on many issues including what self-regulation is and how regulation of self-regulated learning and innovation activities is carried out. A primary contribution of this dissertation is to introduce a theoretical framework for analysing and applying regulative actions in organisational environment. The aim of this dissertation is to advance the understanding on how regulation of self-managing team learning and innovation activities can happen starting from an analysis of the self-regulative learning processes of individuals within teams and of their own determinants. This dissertation has three objectives: 1) to present internal team mechanisms involved in the self-regulation of teams' learning activities, their interactive dynamics and their corresponding major organisational determinants; 2) to rely on this novel understanding to detect relevant regulative actions which are able to indirectly influence teams' self-regulatory learning and innovative behaviour; 3) to offer empirical evidence of how specific regulative actions affect team learning and innovation performance.

We discover that there are four major constructs associated with the regulation of teams' learning and innovation activities: feedback loops and goals equally combining learning and performance items, networks of influence made up of managers and stakeholders interacting with teams through systematic routines, training programmes for team members, dialectical perspective on learning and innovation to force in the managerial layers. To illustrate the links between management control and organisational learning, this research undertook multiple case studies in two multinational organisations which approached a common environmental change differently and exhibited different levels of organisational learning related to different management control system characteristics. Additionally, we collected results from a multilevel survey launched in the same global environment which has been affected from the same recent change, the transition to agile software development methods for the development of their software product.

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List of appended papers

- A. Annosi M.C., Magnusson M., Martini, A., & Appio F.P. (2016) Social conduct, learning and innovation: an abductive study of the dark side of agile software development *Creativity and Innovation Management*, early view.

- B. Annosi, M.C., Magnusson, M. & Brunetta, F. (2015). *Self-organizing coordination and control approaches: the impact of social interaction processes on self-regulated innovation activities in self-managing teams* In *Innovation Management and Computing (Vol I)*. Eds. Apple Academic Pres- Editor Cyrus Nourcan

- C. Annosi M.C., Foss N.J., Magnusson M., & Brunetta, F. The interaction of control systems and stakeholder networks in shaping the identities of self-managed teams. (Revise & Resubmit -minor revision- in *Organization Studies journal*)

- D. Annosi M.C., Khanagha S., & Magnusson M., A Multi-Level Study of Managerial Control Influence on Self-Managed Team Innovativeness, in proceedings at the *75th Annual Meeting of the Academy of Management*, 7-11Aug. 2015, Vancouver, Canada

- E. Annosi M.C., Foss N.J., Martini A., & Magnusson, M. A Multilevel Framework for Organizational Learning in Self-Managed Team Organizations: an abductive micro-foundations study. (Revise & Resubmit in *Journal of Management Studies*)

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1 Introduction

In a competitive business environment, where innovation and agility are seen as vital for a firm's competitive advantage, organisational learning has become progressively more central in order for a firm to survive. At the same time, new organisational forms, mainly relying on self-managing teams, have also been introduced implying a shift in the power that has not been emphasised within the organisational learning literature (Easterby-Smith, Snell & Gherardi, 1998). As a consequence, scholars who have underlined the value of dialogue in organisational learning have tended to overlook the point that people differ in their abilities and their interest in building the parameters of debate within an organisation (Coopey, 1996). However, as pointed out by Coopey (1996), a purely functional orientation to organisational learning allows management discourse and reduces organisational learning to an ideology of control. Thus, he recommends that organisational learning scholars should try to shed light on differences of interest and abilities in the context of controls.

This dissertation provides both theoretical and practical contributions to this arena by advancing the understanding on how regulation of self-managing team learning and innovation activities can happen, starting from an analysis of the self-regulative learning processes of individuals within teams and of their own determinants. The derived multilevel framework offers an explanation of how knowledge production and acquisition in such types of firms coevolve with the emergence of new organisation forms without managerial intervention and under the effect of a specific management guidance. Our research conclusions rely on multiple case studies from telecommunication R&D organisations and the results collected from a multilevel survey launched in the same global environment which has been affected by a recent transition to agile software development

methods (Martin, 2003) for the development of their software products.

This introduction must necessarily be critical in order to problematize the emergence of regulative organizational control actions inducing generative teams' learning activities. It is organised as follows. First, we emphasise the links between self-managing teams, regulation and self-regulation, then challenges in regulating the self-regulatory dynamics of team learning process are summarised together with the overall thesis purpose. To conclude, a description of this dissertation's structure is provided.

1.1 Self-managing teams, regulation and self-regulation

In the following I answer the following basic questions: what is a self-managing team, what is self-regulation and how does it fit in the analysis of self-managing teams' conduct and what meaning is given to the management of regulation to allow organisational learning to be decentred within self-managing teams-based organisations.

Self-managing team is a term used to express the observation that related management does not, and the proposition that they should not, have a monopoly on regulation and that regulation of organisational behaviour is occurring within and between other social actors, for example, collective associations, technical committees, etc., all without management's involvement or indeed formal approval: there is regulation in many rooms (Manz, 1987; Alvesson & Willmott, 2002)

Self-managing team is also used to report the observation (and less so the normative goal) that managers are more constrained in their actions, with their removal from the conceptual centre of organisation. But it can be used, positively and normatively, to express 'de-apexing': the removal of the conceptual hierarchy and the move to a heterarchical relationship in which the roles of governors and governed are both shifting and ill-defined (Aime, Humphrey, DeRue, & Paul, 2014).

The themes of self-managing team are reflected in a changed understanding of regulation of organisational conduct. In that changed understanding, self-regulation covers a particular role both in practical policy debates and in more conceptual discussions.

Indeed, one of the central implications derived from the adoption of self-managing teams is that self-regulation is not just as an option that executives can use or not use as they see fit, but is an inescapable fact of organisations.

In this new context, regulation of self-regulation is a new challenge.

Self-regulation does not contemplate management's involvement in direct steering. Self-regulation requires some form of collective exercise on the part of non-managerial actors. For many, self-regulation involves the delegation of power to the professions to regulate themselves. Others (Baumeister & Heatherton, 1996) view it as a regulation voluntarily started, whether on a unilateral, bilateral, or collective basis, and that the jurisdiction of any enforcer is voluntarily submitted to, which is the hallmark of 'pure' self-regulation.

The absence of any management's involvement in the initiation and/or operation of the regulation is for some seen as the key aspect within the definition of self-regulation and it is on this basis that 'self' -regulation is distinguished from most definitions of 'co'-regulation.

The prescription is, then, that regulation should be indirect, focusing on interactions between the self-system and its environment. A variety of external factors, acting as organisational controls, can serve to exercise a reciprocal influence on the operation of a self-system (Bandura, 1978a), such as the self-managing team. Additionally, the self-system refers to cognitive structures that offer reference mechanisms and to a set of sub-functions for the perception, evaluation, and regulation of own behaviour (Bandura, 1978a).

A comprehensive theory is, then, needed to analyse how individual conceptions inside a team are converted in the team's actions and to understand how to induce individuals

within teams to play an active role in creating information-generating experiences as well as in elaborating and transforming informative stimuli that occur to them. With this research we seek to understand what conception of regulation the usage of self-managing team uses to realise the alignment of self-managing teams' behaviours to organisational learning and innovation goals.

1.2 Generative learning as a defining characteristic of a learning organisation

Success in changing environments requires learning - identifying a need for change, analysing new possibilities, and realising new courses of action. Market-oriented businesses, for instance, are devoted to detecting both the expressed and latent needs of their customers, and the capabilities and plans of their competitors, leveraging on the processes of acquiring and evaluating market information in a systematic and anticipatory manner. With respect to customer-led businesses, market-oriented businesses scan the market more widely have a longer-term focus, and are much more likely to be generative learners. Generative learning is a process conducive to innovation (Senge, 1990). It is proposed that generative learning leads to innovation as a defining characteristic of the learning organisation (Gardiner & Whiting, 1997; McGill et al., 1993; Senge, 1990a), and innovation is viewed as an important outcome and benefit of the learning organisation (Porth et al., 1999; Teare & Dealty, 1998). The adaptation to change done on the surface of the customer-led philosophy is insufficient to maintain organisational competitiveness. This philosophy is reactive and short-term in focus, and generally leads just to adaptive rather than generative learning (Senge, 1990). This problem is described by what Hamel and Prahalad (1994) call the 'tyranny of the served market' in which managers look at the world only through their current customers' eyes.

Christensen and Bower (1996) argued, in fact, that customers' excessive power can contribute to business failures; by focusing too strongly on the needs of a company's principal customers, the resulting myopia can imply that successful technologies arising beyond the boundaries of attention may be neglected. Berthon et al. (1999) claimed that market orientation, as a process of information acquisition about environment, the distribution and interpretation within the organisation of this intelligence, and the organisation's responsive action, reduces innovation. Atuahene-Gima and Ko (2001) also report that it does not have the proactive qualities needed for effective innovation.

Generative learning, on the other hand, as a process of the generation of new distinctions and ideas, the distribution and interpretation of these ideas, and organisation risk-taking action, happens when core organisational competences are unlearned and new competencies are explored in a proactive sense. In this process, new markets are verified, existing markets shaped in a process of creating competitive disequilibrium (D'Aveni, 1994), and new markets generated. Thus, the process involves assumptions that are questioned, new distinctions made and new ideas produced. These new ways of viewing and behaving are processualised giving the collective basis for risk-taking action (Senge, 1990).

Customer orientation, instead, centres on adaptation to a particular niche and although it secures short-term improvements may be not adequate for long-term growth (Kirca et al., 2005; Slater & Narver, 1995). Generative learning, on the other hand, is more related to adaptability which is the 'capacity to expand niches or to find new niches' (Boulding, 1978, p. 111) and has been suggested to be a distinctive capability an organisation should have in a competitive environment.

Organisational learning literature is inconclusive on the role of self-managing teams' intentionality in learning failing to convey rules for regulating generative and innovative behaviour and to contribute to the better understanding and practice of motivation to learn. Generative learning is viewed here as an activity that team members do for themselves in a proactive way rather than as a covert event that occurs to them as a reaction to teaching. Team members in self-managing teams are proactive learners in their efforts to learn because they are aware of their decisional autonomy, of their strengths and limitations. They monitor and check their behaviour in function of their goals, self-reflect on their effectiveness, and self-regulate their behaviour as outcome of established social forces like norms, institutions or identity.

There is a little empirical research in the organisational learning literature on how an organisation's self-managing teams affect its overall learning goals. Self-regulatory mechanisms responsible for team learning at micro level are still not identified in the previous organisational learning literature. Thus, the implications of Senge's (1990) proposition that teams are the unit of organisational learning have remained mainly embryonic, with poor empirical research on team learning in real organisations and a dearth of theoretical work on how different kinds of teams and team processes influence organisational learning (Edmondson, 2002).

Moreover, the dominant discourse on learning still advances by using single theme theoretical silos. Despite team learning seems to be a key determinant for both individual learning (Slavin, 1996; Sweet & Michaelsen, 2007), and organisational learning and innovation (Crossan, Lane & White, 1999), research on team learning increasingly lacks integration of multiple disciplines (Kozlowski & Bell, 2008) which is required to achieve a more complete understanding of its complexity (Dodgson, 1993).

For that purpose, as the team's intentionality to learn is a motivational phenomenon - one that involves self-regulatory processes like identification, internalisation, and compliance (O'Reilly & Chatman, 1986) - we have considered the joint contribution of social identity, and social cognitive theories in order to be able to disclose cognitive and motivational mechanisms involved in the self-regulatory dynamics of teams within the new institutional context and examine their effects on team innovativeness and individual and team level self-regulated generative learning activities. Additionally, by identifying the crucial organisational antecedents of major self-regulatory mechanisms affecting team and individual behaviors, we advanced understanding on how to regulate teams and individuals' generative learning and innovation activities. Consequently, **the aim of the thesis is to explore the self-regulative dynamics of team-based organisations by identifying and analysing key mechanisms involved in the self-regulated generative learning activities of individuals within teams and their determinants. This is the basis to identify relevant organisational regulation actions which aim at improving learning and innovativeness at team and organisational levels.**

More specifically we identify the self-regulated learning processes of self-managing teams as the underlying phenomenon of interest as a key part to identify the regulation actions needed to align teams and individual behaviours to strategic organisational learning objectives.

1.3 Challenges with a decentred regulation of self-managing teams' generative learning conduct

Traditional command and control regulation demands a particular effort for management against which the 'decentered logic of a self-managing team ' is counterposed. Command and control regulation is 'centred' as the underlying assumption is that the management

layer has the capacity to command and control, to be the only commander, and to be potentially effective in commanding and controlling. It is supposed to be unilateral in its approach (managers telling, others doing), based on simple cause-effect relations, and envisaging a linear progression from policy formation through to implementation (Baldwin, 1997).

Its failings are variously recognised as being, *inter alia*, that management has not enough knowledge to find the causes of problems, to develop solutions that are appropriate, and to identify non-compliance (information failure), that implementation of the regulation is not proper (implementation failure), and/or that those being regulated are insufficiently inclined to comply (motivation failure) (Baldwin, 1997).

On the other side, the decentred understanding of regulation deriving from the adoption of self-managing teams introduces other possible reasons for possible regulatory failures.

The first aspect to consider is complexity. Complexity regards both causal complexity, and the complexity of interactions between actors in the organisation. There is, then, an awareness that social problems are the outcomes of different interacting factors, not all of which may be known in advance, the nature and importance of which changes over time, and the interaction between which will be only imperfectly understood. Those interactions are themselves complex and intricate, and actors are different in their goals, intentions, purposes, norms, and powers (Kooiman, 1993; Foucault et al., 1991; Rose & Miller, 1992).

The second reason for failure could be the fragmentation, and construction, of knowledge. This is sometimes described simply as the information asymmetry between regulator and regulated (Van der Vegt, De Jong, Bunderson, & Molleman, 2010): that management are not able to know as much about the operations as the operation does about itself.

Nevertheless, in the decentred understanding of regulation, the information problem is

more complicated. For unlike the traditional analysis, it does not state that any one actor has all the information needed to solve social problems: it is not a question of teams having, management needing. Rather, no single actor owns all the knowledge needed to solve complex, different, and dynamic problems and no single actor owns the overview necessary to employ all the instruments required to make regulation effective (Kooiman, 1993; Foucault et al., 1991; Rose & Miller, 1992). The problem can be more radically framed. That is, that not only is knowledge fragmented but that information is socially built up: there are no such things as 'objective' social truths. This conclusion is arrived at via various theoretical routes, most influential in regulatory writings has been autopoiesis (Termeer et al., 2012). Autopoietically closed sub-systems, such as self-managing teams, build their images of other sub-systems only through the distorting lens of their own perceptual apparatus - that is, through experiences of their environment and in terms of their own oppositions. Thus the information which systems have about other systems is simply that which they have themselves constructed in accordance with their own criteria (Termeer et al., 2012).

The third dimension to take into account is fragmentation of the exercise of power and control. This is the acknowledgement that management does not have a monopoly on the exercise of power and control, rather that is fragmented between social actors and between actors and the organisation (Black, 1997).

Regulation occurs in many locations, in many forums: 'regulation in many rooms'.

The fragmentation of the exercise of power and control results in the fourth aspect of the decentred understanding of regulation: an acknowledgement of the autonomy of social actors. Autonomy is not used to express a sense of freedom from influence and intervention by management, but in the sense that actors will go on to develop or act in their own way in

the absence of intervention. Regulation therefore cannot consider the behaviour of those being regulated as a constant.

Regulation is, as Foucault said of governance (Foucault et al., 1991), the 'conduct of conduct'. This leads to many implications, most obviously that regulation will cause changes in behaviour and outcomes that are unintended (though not necessarily adverse) (Grabovsky, 1995), and that its form can be different depending on the attitude of the regulatee towards compliance, an attitude which it can itself influence (Kagan & Scholz, 1995) and that the autonomy of an actor will to an extent render it unsusceptible to external regulation. Further, no single actor can hope to dominate the regulatory process unilaterally as all actors such as the team members can be severely restricted in reaching their own objectives, not just by limitations in their own knowledge, but also by the autonomy of others (Kooiman, 1995).

The fifth aspect of the decentred understanding of regulation is the presence and complexity of interactions and interdependencies between social actors such as team members, and between social actors and management in the process of regulation. This is both a descriptive and a normative claim. Descriptively, the observation is that regulation is a two-way, or three- or four-way process, between all those involved in the regulatory process, and particularly between regulator and regulatee in the implementation of regulation.

The dynamic of the relationship embraced in the new understanding of regulation is that interdependencies and interactions happen between management and social actors (Kooiman, 1995; Rhodes, 1995).

Further, it is not the case that teams have needs (problems) and management have capacities (solutions). Rather each should be seen as having both problems (needs) and

solutions (capacities), and as being mutually dependent on each other for their resolution and use (Kooiman, 1995).

The claim that governance and regulation are the product of interactions and interdependencies leads into a sixth aspect of the decentred understanding of regulation. In the decentred understanding of regulation, regulation occurs in the absence of formal sanction - it is the effect of interactions not of the exercise of the formal, constitutionally recognised authority of government. Additionally, governance and regulation are seen to be the outcome of the interactions of networks, or alternatively 'webs of influence' which act in the absence of formal governmental or legal sanction (Rhodes, 1995).

So complexity, fragmentation and construction of knowledge, fragmentation of the exercise of power and control, autonomy, interactions and interdependencies: all are elements of the composite 'decentred understanding' of regulation of self-managing teams' generative learning conduct that this research will seek to uncover producing a more advanced understanding of the variety of externally and within team set of controls which can shape behaviour and cognition of teams.

1.4 Dissertation structure

The main body of this dissertation consists of five empirical chapters, based on extensive data collection undertaken in different Ericsson R&D organisations during 4 years' research, and a cover paper. All of these chapters revolve around the learning process in self-managing team-based organisations. However, they can be read independently from each other. The empirical chapters presented in this dissertation are based on research that I conducted in collaboration with my supervisor and other co-authors.

In the following chapters, I will therefore use "we" rather than "I" in order to reflect their contribution.

The cover paper starts with an exposition of theory relevant to sustain theoretically the concepts used to accomplish the dissertation aim, hereafter the methodological considerations are presented. Each of the appended five papers is thereafter presented in a summarised manner, followed by an overarching analysis that combines the results from the individual papers into a proposed analytical framework. The thesis is concluded by a discussion about its implications for theory and practice, including avenues for future research.

2 Exposition of theory

The aim of this dissertation is to advance the understanding on how regulation of self-managing team learning and innovation activities can happen starting from an analysis of the self-regulative learning processes of individuals within teams and of their own determinants. Thus, this chapter positions the work within the organisational learning theory and introduces existing research on organisational learning and organizational control systems. Next it presents the main research gaps followed by the definition of five research questions that this thesis seeks to answer.

2.1 Organisational learning

According to Argyris (1977) organisational learning is defined as the process whereby members of the organisation respond to changes in the internal and external environments of the organisation by detecting errors which they then correct so as to maintain the organisational learning and organizational control systems 'central features. When the process advocates the organisation to carry on its present policy or achieves its objectives, the process may be called single loop learning. The current strategies, structures and actions—the existing operational paradigm—are kept: only minor changes to operating policies are implemented. When learning includes not only identifying errors but also understanding underlying policies and goals it may be called double loop learning (Argyris, 1977). Double loop learning resolves incompatible organisational norms by settling new priorities or rebuilding norms, and generating a new operational paradigm. Double loop learning may happen in organisations due to: (1) a crisis caused by some event in the environment; (2) a revolution from within; or (3) a crisis generated by current management in order to shake up the organisation. Strategic change or double loop learning may follow long periods of strategic stability and happen in response to a crisis which demonstrates that

the current operational paradigm is not functional, inducing a search for a new paradigm (Mintzberg, 1978; Hedberg & Jonsson, 1978). Senge (1990) defines organisational learning as a fundamental shift or movement of mind, favouring the environment to be perceived differently, and to realize that the organisation's actions generate problems and solutions. Adaptive learning (Argyris' single loop) includes learning enough to allow the organisation to merely survive (Senge, 1990). It is relevant and necessary, but does not need major change. Generative or fundamental learning (Argyris' double loop) increases the capacity to create new paradigms. Organisational learning demands people who practice generative learning at every level in the organisation, to expand the organisation's capacity to generate its future (Senge, 1990). Marquardt and Reynolds (1994) define learning as a process by which individuals gain new knowledge and insights to change their behaviour and actions. Learning can only occur if the learner acknowledges a problem (detects an error) and is motivated to learn (corrects the error or solves the problem). Organisational learning requires individual learning, but is more than the sum of individual learning, as it is influenced by a broader set of social, political and structural variables. It includes the sharing of knowledge, beliefs or assumptions among individuals. Hames (1994) defines learning as including the acquisition and practice of new methodologies, new skills, new attitudes, and new values necessary to live in a world that is changing. Learning is preparing to deal with new situations. The purpose of learning is 'informed action' and demands more than being told (concepts) and being shown (skills): it requires transforming experiences. In summary, organisational learning is the process by which the organisation: (1) identifies problems both within the organisation and with the organisation's 'fit' with the environment, and identifies environmental changes which will result in a lack of 'fit' between the organisation and the environment; and (2) develops the solutions to problems

and how to react to environmental changes. Organisational learning is thus determinant for the organisational survival. Organisations should learn not only at a single loop or adaptive level for short-term survival but also more importantly at a double loop or generative level on an organisation-wide basis for long-term survival. Individual learning is no longer enough; it is also necessary to better understand how teams learn and how to generate infrastructures and networks to share learning experiences within organisations (Marquardt & Reynolds, 1994). Organisational learning at a generative or double loop level is the critical difference between success and failure (Argyris, 1977; Senge, 1990). Organisational survival derives from a constant process of learning how to create the future rather than react to the past: both generative and adaptive learning are essential (Senge, 1990). The complicated nature of organisations may make organisational learning not easy to obtain, and some types of organisational form may be more conducive to learning than others (Euske et al., 1993). The best organisation structures are those that favour learning and are developed to enable change (Lowe & Puxty, 1989). In the remainder of this chapter it is suggested that differences in management control system structure may result in different types and amounts of organisational learning.

2.2. Organizational control systems and organisational learning

Both organisational control systems and organisational learning are concerned with changing or adapting an organisation to realise its fit with its environment. However, some research studies suggest that organisational control systems may inhibit generative learning. As the environment changes, organisations should detach action from the dominant paradigm and connect it to a new paradigm (Dent, 1990). Several diverse ways in which organisational control systems are associated with organisational learning have been proposed. Den Hertog (1978) and Markus and Pfeffer (1983) argue that control systems

modify in response to strategic changes in a reactive manner, accomplishing current power distributions. Moreover, planning and control systems can be developed to confirm old rationales for action (Dent, 1990), by fostering a sense of clarity and comfort.

Organisational control systems can be adopted as organisational defensive practices to defend existing routines (Argyris, 1990), for instance standard costing systems and variance analysis, or they may be perceived as ineffective and irrelevant in times of environmental uncertainty (Hoque & Hopper, 1994). Nevertheless, Hopwood (1987) and Dent (1990) suggest that control systems can be proactive in the management of organisational change by inducing the consideration of new possibilities. Planning and control systems can be developed to encourage curiosity and experimentation (Dent, 1990), and can open up possibilities for generating new images of the organisation and the way it interacts with its environment. For instance, accounting systems may be modified to favour the flow of information required for organisational change as a result of environmental pressures (Cobb et al., 1995), such as the development of cost of quality reporting to support a new emphasis on the quality of output in a highly competitive environment. Argyris (1990) argued that accounting (as part of a control system) can be utilised as a learning tool by offering a means of 'Looking ahead, thinking, removing unrecognised biases' and thus enabling organisational change. For instance, product costing information and benchmarking can bring about a better awareness of competitors' performance and the need for change (Cobb et al., 1995). At the same time, accounting can be 'anti-learning', depending on how it is used (Argyris, 1990) - for instance, making budgets easily achievable in order to cover up crucial problems. In studies analysing the ways in which organisational control systems refer positively to organisational learning, Simons (1990, 1991, 1995) describes organisational learning as the ways that organisations adapt

defensively to reality and utilise knowledge to increase the fit between the organisation and its environment. Simons (1995) argued that traditional diagnostic management control systems are developed to tell top managers when things are wrong, when actions are not in agreement with plans, and thus favour single loop learning. In contrast the aim of interactive use of identified management control systems is to sense when things are right for seizing new opportunities and shifting direction. The search, surveillance, dialogue and debate which are part of the interactive process let new strategies emerge and generative learning happen. There remains a question as to whether organisational control systems delimit organisational learning (Simons, 1990, 1991, 1995) or whether the relationship between them is recursive: organisational control systems both affect and are affected by organisational learning (Gray, 1990). The recursive view received support from Otley and Berry (1994) who argued that previous studies demonstrate both perspectives in the process of learning and adapting to change. Pensco (Knights & Willmott, 1993) is an organisation which adapted its cost control system as a result of change; British Coal (Otley, 1990) maintained its cost control system whilst adapting the use of the system as a response to external change.

Contingency theory (Otley, 1980; Otley & Berry, 1980) proposes that the environment is one of the factors which determines the organizational control systems used. A partial collectivist perspective would suggest that the management control system structure can shape the organisation's perception of its environment. An organisational control system is a lens or filter through which it senses its environment (Dent, 1990; Miller, 1993), defining what environmental information is measured and communicated within the organisation, and in doing so influences the way external reality is sensed (Macintosh, 1994).

Organisational learning relies on perceiving the environment in diverse ways (Senge,

1990). Managers implicitly decide which aspects of their environments to attend to and their world views, interests and biases influence these choices. The environment is then an artefact, or product of a manager's mindset (Miller, 1993), and the organisational control systems contribute to this mindset.

2.3 Generative learning and organizational control systems

Organizational control systems can also cover a critical role in recognising and solving problems originated in the environmental change, leading to a paradigmatic change (double loop or generative learning). Organizational control systems can influence the perception that current goals and processes no longer match external challenges, and the adoption of wider perspectives, tapping creative solutions (Coopey, 1995). Information collected by the control systems may be used to challenge the existing rationales for action and see if the current strategies and structures fit in a new environment. The properties of organizational control systems, such as the extent to which the environmental scanning or surveillance (actively seeking external information) applies, or the degree of participation in the decision-making process (actively both seeking and communicating internal information), can partly influence the response of an organisation to environmental change. The interactive or diagnostic adoption of diverse parts of the control system can also partly influence the response to environmental change (Simons, 1990, 1991, 1995). Generative organisational learning happens when those responses result in organisational change at a fundamental level.

2.4 Organizational control systems enabling generative learning

In dynamic environments new forms of organisations are introduced to cope with external turbulence (Kanter, 1989; Coopey, 1995) and traditional accounting systems have lost their

robustness due to uncertainty (Macintosh, 1994). Thus, organisational control systems need to expand beyond management accounting systems to be effective even in uncertain environments. With many organisations facing reduced market growth, increasing the rate of technological change and transforming information processing technologies, new organisational models have been designed which focus on roles and relationships within the organisation, rather than on bureaucratic structures in which hierarchical and staff-led processes tend to hamper initiatives and innovation (Bartlett & Ghoshal, 1993).

Organisational models changed in many ways in the last decade, characterised by high uncertainty. Down-sizing, flatter structures relying on self-managing teams, re-engineering focused on business processes and value chain analysis are all answers to new environmental turbulent dynamics. Organisational control is closely connected to models of organisation, and new perspectives on the potential of control system practices such as accounting are emerging from consideration of alternative forms of organisation (Hopwood, 1979; Nahapiet, 1988). There has been a relevant shift towards diminishing the size of business units with an important reduction in the numbers of middle managers, who have an increased range of responsibilities (Otley, 1994). Organisations approaching learning generatively are, usually, less structured than more traditional forms such as bureaucracies, and there is likely to be a good amount of informal communication as people seek to resolve uncertainty created by ambiguity (Coopey, 1995). Such organisations are also supposed to be less hierarchical than conventional forms, with flatter structures: fewer managerial levels and positions and the usage of self-managing teams (Bartlett & Ghoshal, 1993; Coopey, 1995). These different structures bring about implications for control systems. Flatter structures no longer need traditional hierarchical control systems and employee empowerment, while they demand employees take more responsibility for

decision-making and outcomes. This suggests a replacement for traditional control systems. New systems should be centred on horizontal relationships, rather than on vertical relationships of traditional systems (Otley, 1994). In Bartlett and Ghoshal's emerging organisational model, organisational control systems have been developed and simplified as the focus has moved to adding value rather than on internal procedures: for example, total quality implementation, product development and customer focus. Permissive forms of control, which stress the internalisation of control, typical of self-disciplined professionals, are more relevant in such a context.

2.4.1 The relevance of social identity as form of control

An internalised cognitive structure of the organisation and its goals (Albert et al., 2000) becomes the basis of new control strategies, designed to coexist with established bureaucratic frameworks.

Identity is central to the coordination discourse in such new organisation forms. Dutton, Dukerich and Harquail (1994) describe organisational identity as a cognitive image held by individuals within the organisation that is used to make sense of the world. Identity provides rules of action that help organisational actors deal with ambiguity and cognitive limitations by emphasising particular issues and problems. It also helps them define those that are urgent and demand attention, and therefore solutions (Thorthon, 2002).

According to Deci and Ryan (1985) and O'Reilly and Chatman (1986), individual identification reflects a desire for affiliation, which causes actors to align their self-identity with the target party (e.g, their belonging group) and behave in ways that are consistent with the party's expectations because the actors accept the merits of such behaviours.

Internalisation occurs when actors' values and goals become congruent with those of the target party because actors have integrated them into their self-concepts (Pratt, 1998). At

this level people are driven by the norms and goals related to the groups they belong to.

People with collective identities identify with and internalise their group's goals and norms, and they are motivated to fulfil their responsibilities as group members.

Team members, having a robust collective identification, give higher priority to group-level features and properties (e.g. group goals, missions, tasks) than to social contact or interdependence with other members (Brewer & Gardner, 1996; Hogg & Terry, 2000).

Consequently, the collective level of identification favours the establishment of the standards that individuals adopt to drive their behaviours which are derived by the social norms, values and goals enacted by the team individuals belong to (Johnson & Yang, 2010). Thus, under a strong collective identification, individuals feel the obligation to uniform their behaviours to the group prototypes and to favourably answer the self-evaluation question of whether if they are successfully fulfilling the roles and the responsibilities prescribed by their own group membership (Johnson, & Yang, 2010).

Under these circumstances identity heavily influences people's cognition at the base of people's self-regulatory focus which is seen as a central component shaping their motivations and behaviour (Higgins, 1997, 1998).

In the following, people's self-regulatory focus within teams is better explained and the type of potential intervention of regulative managerial actions it demands is further clarified leveraging on the adopted perspective of social learning theory (Bandura, 1978a). Research questions are then finally introduced.

2.4.2 Impact of self-regulation under the perspective of social learning theory

Self-monitoring and self-regulating mechanisms with discipline, guidance and support given by senior management groups under the form of coordinating committees are the focus of control in modern organisations (Bartlett & Ghoshal, 1993).

The analysis of self-regulation regards the reciprocal interactions between behaviour, thoughts and environment events as they happen at the individual level (Bandura, 1978 a).

This is presented as a basic principle for examining psychosocial phenomena at different levels of complexity, ranging from intrapersonal development, to interpersonal behaviour, to the interactive functioning of organisational and societal systems (Bandura, 1978a).

At the intrapersonal level, individual conceptions have an impact on what they perceive and do, and their conceptions are in turn changed by the effect of their action and the observed consequences accruing to others (Bandura, 1977a; Bower, 1975). Information-processing models mainly regard internal mental operation.

A comprehensive theory should then examine how conceptions are translated into actions, which gives some of the data for conceptions. According to social learning theory, people have a proactive role in generating information-creating experiences as well as in elaborating and transforming informative stimuli that happen to them. This implies reciprocal transactions between thought, behaviour and environmental events. People are not only conceived as perceivers, knowers and actors. They also act as self-reactors with capacities for reflective self-awareness that are generically ignored in learning theories. If at interpersonal level, people reciprocally determine each other's' actions (Bandura et al.1960; Patterson, 1975), at a broader societal level, as within teams, reciprocal processes are mirrored in the interdependence of organisational elements and transnational relations (Bandura, 1973; Keohane & Nye, 1977). In such a context, the areas of interest are the

patterns of interdependence between entities, criteria and means used for assessing systemic performances, the mechanisms that are established for enacting reciprocal influences and the conditions that impact the degree and the type of reciprocal control that one system can exercise over the other (Bandura, 1978a).

It is within the framework of reciprocal determinism that the concept of autonomy and freedom assumes meaning (Bandura, 1977b). In fact, people's conceptions, their behaviours and their environments are reciprocally determinant of each other, thus individuals are neither powerless objects controlled by environmental factors nor entirely free agents who can do whatever they want. People can be considered partially free as they influence future conditions by shaping their course of action. By developing structural mechanisms for reciprocal influence, such as organisational controls, people can bring their influence to bear on each other.

The nature of the organisations made up of autonomous teams, now often simply bundled up into the term 'self-regulating', as highlighted above, poses limits on the scope of managerial intervention. However, that autonomy poses risks for the team itself, as teams are entropic, and for other teams, as each system will fail to be responsive to others. Thus, some form of 'regulation' is then seen as necessary both to secure the survival of the team and to secure its responsiveness to its environment. The self-regulation of the team, however, provides the only key for intervention, for if it is to achieve its ends then intervention has somehow to alter the criteria for the dynamic for change within that system. Self-regulation is, thus, not simply one policy option amongst many that a management might choose. Rather, it is the inescapable 'problem', and it is the object of all the various 'solutions'.

The prominence of self-regulation in the decentred understanding of regulation is thus unsurprising: it is the diagnosis of regulatory failure that lies at the heart of the self-managing team analysis. Management could never govern if people were not 'self-governing'. One of its central insights is that social systems are steerable from the outside or from within only if the system itself can make use of its major component systems to effect correcting action, and each component is only reliable if it can keep its variability within bounds, i.e. it is self-regulating.

The normative aspect of the new understanding of regulation is that intervention in the self-regulation of social actors (not all analyses take systems theory so seriously as to replace actors with communications) has to be indirect and relies on the awareness of the reciprocal interaction of behaviour, cognition and environment. It has to harness that self-regulatory capacity but ensure that it is used for organisational ends, by adjusting, balancing, structuring, facilitating, enabling, negotiating, but never directly telling and never directly trying to control.

How these self-regulating capacities can be harnessed is now the current topic of this dissertation which introduces the following research questions.

2.4.3 Research questions

Scholars have long documented that interaction with individuals with diverse expertise, knowledge, and experience is an important source of individual and collective learning. Exposure to dissimilar others fosters learning and innovation by stimulating individuals with new paradigms and perspectives and by favouring (and often requiring) the cross-fertilisation of ideas. Past studies, in organisational settings, have shown that diverse groups tend to be more creative and innovative. Bantel and Jackson (1989) argued that diversity in

functional backgrounds was correlated with more administrative innovations in a sample of bank management teams.

Ancona and Caldwell (1992) suggested that new product teams whose members derived from a more different set of functional areas talked more outside their teams, which implied the development of more creative solutions. Wiersema and Bantel (1992) found that management teams constituted of individuals with varied educational specialisations were more likely to embrace change. And reviews of empirical research on group diversity have reported that teams generate more creative solutions when they are made up of individuals with diverse sets of backgrounds and experiences (Jackson, 1992; Milliken & Martins, 1996; Tsui et al., 1995). However, the findings have not been wholly consistent. For example, Ancona and Caldwell (1992) found that though diversity in functional assignments was related to greater external communication, which was in turn related to greater innovation, the direct effect of functional diversity on innovation was negative. Likewise, there is no consistent evidence that expertise diversity leads to higher learning performance, and some evidence has verified a negative relationship (see the reviews by Jackson, 1992; Milliken & Martins, 1996; Tsui et al, 1995; Webber & Donahue, 2001; Williams & O'Reilly, 1998). Thus, interaction with people having a diverse set of backgrounds, experiences, and perspectives within a team may not always stimulate team innovativeness or team learning performance and may, in fact, reduce both. This is a puzzling pattern of results, leading to the thoughts think that current explanations of the reasons why organisations fail to learn seem incomplete, although they admit cognitive limitations (Bettman & Weitz, 1983; Einhorn & Hogarth, 1986; Feldman, 1989; Hedberg, 1981; Kahneman, Slovic, & Tversky, 1982; Levitt & March, 1988; Nystrom & Starbuck, 1984; Starbuck & Milliken, 1988), prior learning (Miller, 1993; Weick, 1995) political

games (Pfeffer, 1981), and certain cultural and structural features of organisations (Dodgson, 1993; Huber, 1991; Levinthal & March, 1993; Salaman & Butler, 1994) as barriers to learning. Past research has neglected, for instance, the role of organisational factors in individual and organisational identity maintenance and the negative effects such factors might lead to learning. The malleability of organisational identity can induce, in fact, the issue that learning is restricted by organisations' efforts to preserve their identities (Gagliardi, 1986). This is worsened by the presence of multiple levels of analysis: individual, team and organisational (Klein, Dansereau & Hall, 1994; Rousseau, 1985) given that individual identity is influenced by both one's personal identity and the identity that is impacted from one's relationships with others, although the effect of each of these factors will change between individuals and over time. An individual is motivated to maintain/defend his or her personal identity through an individual level of self-esteem and this implies to act to preserve an existing identity (Brown & Starkey, 2000). However, organisational learning can demand that individuals be ready to challenge the team's or organisation's identity (Brown & Starkey, 2000). Thus, learning may become problematic to the degree to which individuals and teams consider their individual identity in that of the group or organisation and see themselves as representative of that social category (Banaji & Prentice 1994; Brown, 1997).

Additionally, team learning literature needs to include other multiple influences in the organisational context as well. Research shows that team learning relies on factors both internal and external to teams. Specifically, depth of understanding is existent regarding internal team dynamics (e.g., diversity, demographics, processes, and attitudes) enabling team learning (see Argote, 1999 for a review). Past studies also show that beyond internal dynamics, contextual variables like leadership, training, feedback, and technology influence

team learning as teams are interdependent with and socially embedded in their organisational settings (Gibson & Vermeulen, 2003; Sole & Edmondson, 2002; Zellmer-Bruhn, 2003). Despite the fact that team learning research has analysed context, it has stayed close to the team boundary, primarily analysing factors in a team's local, or micro, context (Zellmer-Bruhn & Gibson, 2006). Our research study supports the idea that team learning depends on organisational controls, beyond a team's immediate micro context and aims to demonstrate that the macro context is relevant as well. Current research on team learning has yet to address whether, when micro contextual features are controlled for, aspects related to the macro organisational context affect team learning. Additionally, existing literature focuses on elements of context that sustain team learning but says less about equally important elements of context that hinder team learning (Zellmer-Bruhn, & Gibson, 2006). In this study we investigate the influence of macro organisational control factors in a multinational organisation setting.

Additionally, self-regulation processes are considered as well. In the context of self-managing teams, learning is viewed here mainly as an activity that team members do for themselves in a proactive way rather than as a covert event that happens to them as a reaction to teaching. Self-regulation relates to self-generated thoughts, feelings, and behaviours that are turned to attaining goals (Zimmerman, 2000). These self-managing teams are proactive in their efforts to learn as they are aware of their strengths and limitations and as they are driven by set goals and task-related strategies. These teams monitor their behaviour in terms of their goals and self-reflect on their increasing effectiveness. This potentially enhances their self-satisfaction and motivation to persist in improving their methods of learning. Because of their superior motivation and adaptive learning methods, self-regulated team members are not only more likely to succeed in the

organisation but to view their futures optimistically with a positive impact on the setting of future actions. Self-regulation is important because a major function of education is the development of lifelong learning skills.

The motivation of teams can be greatly enhanced when and if they use high-quality, self-regulatory processes. Becoming a self-regulated learner to identify subtle progress in learning will enhance their levels of self-satisfaction and their beliefs in their personal efficacy to perform at a high level of skill (Schunk, 1983). However, their motivation does not originate from the task itself, but rather from their adoption of self-regulatory processes, such as self-monitoring, and the effects of these processes on their self-beliefs.

This leads to the crucial questions of how a team's use of specific learning processes, level of self-awareness, and motivational beliefs are connected to produce self-regulated team learners and of how the external environment can affect the self-regulated learning experience of teams.

In this thesis, we adopt a multilevel approach and integrate emotions and cognition aspects by leveraging the combination of different and complementing theoretical paradigms to open the black box of micro, meso and macro organisational level processes involved in the regulation of team learning activities. First, this will allow us to see how expertise diversity translates into improved or impaired learning performance (Lawrence, 1997). Specifically, it needs to be determined whether a given relationship between expertise diversity and adaptive team outcomes does, in fact, occur through integrative learning and the cross-fertilisation of ideas, as has been assumed in past research (e.g., Kanter, 1988: 175). If such a relationship can be seen, then the inconsistent findings presented in past research may be the result of the presence or absence of team learning behaviours. It would then follow that a careful and explicit consideration of the organisational structural conditions under which

team learning behaviours will be present or absent can point to conditions under which expertise diversity will result in improved or impaired learning performance. Second, the relevance of a distinction between a micro and macro context of influence, allows us to demonstrate that different organisational control variables may provide competing influences on team learning and to move a first step toward uncovering specific characteristics of macro organisation context that matter to team learning. Specifically, we choose to focus more on a relevant set of core theories which have been previously highlighted to give focus and direction to four important questions, each of which is centrally connected to the broad goal of this thesis which is the following: to explore the self-regulative dynamics of team-based organisations by identifying and analysing key mechanisms involved in the self-regulated generative learning activities of individuals within teams and their determinants. This as the basis to identify relevant organisational regulation actions which aim at improving learning and innovativeness at team and organisational levels.

Research question 1: *What team factors are involved in the self-regulation of team learning activities?*

Research question 2: *How do these factors enact teams' self-regulation processes?*

Research question 3: *What regulative mechanisms, in the social environment of self-managing teams, influence the self-regulation of team learning activities?*

Research question 4: *How do these regulative mechanisms interact with team properties to influence the process of self-regulation?*

Research question 5: *How do these regulative mechanisms affect teams' learning and innovation?*

3 Research approach and methodology

This chapter aims to give an overview of the research studies at the basis of this thesis. It also gives information on the nature and the quality of data collected and provides a description of the performed data analysis with a description of the reliability and validity checks executed in each performed research study. Before that, the epistemological and ontological position is clarified.

3.1 Epistemological and ontological position

“The way we think the world is (ontology) influences: what we think can be known about it (epistemology); how we think it can be investigated (methodology and research techniques); the kinds of theories we think can be constructed about it; and the political and policy stances we are prepared to take.” (Fleetwood, 2005, p.1)

Thus, having a clear ontology does not ensure that the resulting meta-theory, theory and practice will also be clear but relying on an ambiguous ontology makes everything harder.

Within social research, key ontological questions regard 1) whether or not social reality is present independent of human conceptions and interpretations; 2) whether there is a common, shared, social reality or just multiple context-specific realities; and 3) whether or not social behaviour is governed by 'laws' that can be seen as immutable or generalisable.

The key ontological debate is, thus, centred on whether there is a captive social reality and how it should be constructed. To a large extent, there are three different positions: realism, idealism and materialism. Realism affirms that there is an external reality which exists independently of an individual's beliefs or understanding about it. In other words, a clear distinction between the way the world is and the meaning and interpretation of that world owned by people is proposed. Materialism also sustains that there is a real world but that only material features, such as economic relations, or physical features of that world hold

reality. Values, beliefs or experiences are considered as 'epiphenomena' - that is features that derive from, but do not influence, the material world. Idealism, on the other hand, claims that reality is only knowledgeable through the human mind and through socially constructed meanings.

These three positions have been repeatedly discussed but also modified to be expressed in less extreme terms. For example, Bhasker (1978) introduced 'critical realism', Hammersley (1992) 'subtle realism' in which social phenomena are thought to exist independently of people's representations of them but are only accessible through those representations.

Meanwhile, there are also differing positions within idealism. Some idealists argued that it is possible for meanings and representations to be shared or collective, while those holding a relativist position argue that there is no single reality, only a series of social constructions (see Hughes & Sharrock, 1997 for a fuller discussion of these two positions). This thesis rests on the foundation of critical realism.

Embracing the assumption of reality as an at least partly mind-independent entity, which is made knowable through abductive reasoning, critical realism relies on key realist premises while relaxing the strict ontological commitments of theories and methods. It, thus, foresees the possibility of using a wide range of theories and methods in producing valid knowledge claims. The rationale for this hides a profound skepticism of the possibilities of reaching a final state of theoretical closure, since theories are human constructions that can rarely, if ever, be conclusively tested. A critical realist approach sees all theories as potentially fallible and in need of refinement based on complementary frameworks. It also acknowledges that the theoretical frameworks available to researchers, at any point in time, are influenced by the values and background assumptions of larger research communities (Niiniluoto, 1999).

Critical realism gives more clearly articulated ontological and epistemological premises than are retrieved in many pragmatist approaches to mixed methods research (see e.g., Greene & Caracelli, 2003; Teddlie & Tashakkori, 2003). In particular, it provides a sophisticated ontology which does not oblige researchers to strictly subscribe to particular theories and methods. Similar to pragmatist approaches, such choices are seen as contingent on the values and background assumptions of wider research communities.

Following a critical realist approach, this thesis combined mixed methods research with an element of abductive reasoning. The latter was as a means of deriving theoretically informed explanations while preserving our sensitivity to variations in situated meaning and of shedding light on the multiple mechanisms and causal powers underpinning empirical observations. Referring to a critical methodological pluralism, this thesis proposes a mixed model design which leverages on both an intensive (qualitative) and extensive (quantitative) research design. So doing, our research touches areas that traditional approaches would not be allowed to cover. Concerning the possibility of using a wide range of theories, models and paradigms that can contend and challenge each other, the access to adequate and different theories had an important influence on our ability to make sense of empirical observations, and this was not taken for granted even if theories have reached a seemingly ‘mature’ state.

3.2 Research setting

3.2.1 Agile Software development and Scrum

Agile software development represents a major deviation from traditional, plan-based approaches to software engineering (Dyba & Dingsøyr, 2008). Its methodologies emphasise the need for lean processes and dynamic adaptation rather than the detailed front-end plans

and heavy documentation (Nerur & Balijepally 2007) common to more traditional approaches to software development. Agile software development is often viewed as the answer to the uncertainties related to detecting, identifying, and responding to emerging user requirements (Beck & Andres, 2005; Schwaber & Beedle, 2002). Software development agility rests on the capability of a team to efficiently and effectively respond to changes in user requirements (Lee & Xia, 2010) with minimal formal processes (Cockburn, 2006).

Agile principles, first published in the “Agile Manifesto” (Fowler & Highsmith, 2001), are based on (Dingsøyr, Nerur, Balijepally & Mode, 2012): 1) business-value generation through the delivery of software at regular, short intervals; 2) self-organising teams, whose members work at a sustainable pace, allowing for creativity and productivity; and 3) customer (or their representatives’) involvement in the development process, which favours feedback and reflection aimed at ensuring more satisfactory outcomes.

“Scrum” is one of the most common agile methods (Dingsøyr et al., 2012), emerging from the “new product development game” (Schwaber, 1995), a holistic approach to product development in which self-managing teams implement innovative products in a relatively short period of time (Takeuchi & Nonaka, 1986). The Scrum method prescribes the delegation of decision-making to the operational layer in the organisation and the adoption of self-managing teams. Scrum is suitable in contexts where it is difficult to plan ahead (Dyba & Dingsøyr, 2008) because it involves feedback loops that serve as mechanisms for exercising control over product-release planning processes and for handling changes as a project evolves (Schwaber, 1997). The software is realised in increments (called “sprints”) that last from two to four weeks, each starting with a planning session and ending with a review. The Product Owner (PO) decides items to be developed and listed in the product

backlog, which embodies the current knowledge of what needs to be done (Sutherland & Schawaber, 2007). During sprint planning, team members select the top priority items from the product backlog and include them in the next sprint. Daily meetings are held to coordinate the team's work. One team member, acting as the "Scrum Master" is responsible for solving the issues that prevent the team from working effectively.

3.2.2 Description of the main case organisation

This section describes the context of Ericsson, the main case organisation in which all the PhD research has been carried out.

Ericsson has been a world leader in communications technology and services for around 140 years. The company currently provides support for networks with more than 2.5 billion subscribers. Approximately 40% of the world's mobile traffic is supported by networks delivered by Ericsson. Ericsson is a research-focused company that holds more than 33,000 patents providing its customers solutions to stay at the forefront. It has over 115,000 employees and customers in more than 180 countries. Software development is a major activity in the organisation, involving around 30,000 employees and, according to PwC (2015), exceeding \$8+ billion in revenues, making Ericsson the fifth largest provider of software in the world.

In the summer of 2009, a division of Ericsson's R&D organisation started embracing agile practices in order to deal with intensified competition which put pressure on the organisation to outperform its competitors. Later on, to increase their ability to fulfil customer needs in a timely, cost-effective and superior manner, more and more Ericsson departments realised the need for overarching changes by embracing the conversion to more decentralised structures as prescribed by agile methodologies. By 2015 it was no

longer easy to find an Ericsson software team that had not been transformed by agile methodology.

In most of the cases, the agile transformation efforts were set by top management in the Ericsson organisations and cascaded down through a strong vertical hierarchy leveraging a powerful communication strategy devoted to informing people in the company about the expected advantages from agile for them and their business. To outside observers, such an approach and structure might appear to be excessively bureaucratic, with all the related problems of inflexibility and sloth. But while the vertical hierarchy appeared rigid in these organisations, there was also a high degree of horizontal flexibility, allowing for smooth and rapid flows of knowledge and information in different departments and functions about the correct functioning of agile and its effect on different organisational dimensions.

With the introduction of agile methods, the R&D Ericsson companies challenged their conventional approach in preserving their integrity of their products in an effort to gain in workforce flexibility. They pushed the boundaries of people's competence, deploying the agile team members – who had different backgrounds and experience – within a set pool of skilled engineers and technicians and delegating to them the whole responsibility of delivering products. Additionally, they divided high-level customer requirements into small parts with the aim of assembling the related developed parts later on along the supply chain process with the aim to accelerate the deliveries and turn results back to their customers more quickly. The overall R&D development process was, then, divided into two major steps - early stage and implementation. In most of cases they assigned highly specialised staff with a higher level of seniority and experience to the first step and normal “R&D workers” to the second step. They invested in automation for the integration of software releases (which was associated with high capital costs). Moreover, they symbolically

reduced status distinctions between individuals and managers through the use of a common physical space for team members and managers to work within. They invested in training on agile practices and principles to allow correct implementation of related methods. From this highly industrialised approach they, in some cases, succeeded in reducing end-to-end lead time by 60% and maintenance costs by 40%, most likely becoming twice as efficient than before.

This big transformation allowed the Ericsson R&D organisations to coordinate all the critical elements: 1) the interface with their customers which was improved by securing them more frequent releases and more responsiveness to any of their requests, 2) the focus on people's growth and motivation giving team members ways to stretch their competence beyond the boundaries of their core competences working in cross-functional and cross-product teams, and the autonomy to operate having just a few organisational constraints to still direct, control and align teams to the organisation's strategic choices; 3) the enhancement of the IT infrastructure and the development of maintenance and customer service protocols.

These changes had huge implications for their consolidated knowledge management processes, essential to keep on with the achievement of long term goals such as product innovation. In fact, after one year from the first implementation of agile, team members reported pressure from project deadlines. Agile practices seemed to be guiding teams to continually reorganise themselves according to time pressure and strong interdependencies among team members arose. On this basis, members tended to choose "safe" forms of work organisation that could be quickly enacted, but not necessarily using proper routines enabling product learning. As such, team members seemed not able to find enough time to devote to learning and innovation.

Thus, when the Ericsson organisations launched the first version of agile implementation, they started investigating its effects on different organisational dimensions including product learning and innovation examining the long term impact of agile. As result, an industrial PhD project was launched between Ericsson Group Function Technology department (hereafter Ericsson) and the Integrated Product Development group at the Royal Institute of Technology (hereafter KTH). The general aim was to generate knowledge that could serve both research and practice and increase the level of understanding about a new phenomenon of interest at Ericsson in a way to become beneficial to both the company and academia.

Different Ericsson R&D organisations were then involved in huge assessments a few months after their transformation project was completed.

Thus, in a series of studies at Ericsson, the fifth largest provider of software, we delved deep into one of the biggest organisational adoptions of agile practices.

Ericsson R&D organisations constituted a good setting for our investigation, since R&D teams were generally required to produce creative ideas and translate them into tangible improvements in products and processes in a way to better satisfy customer requirements and needs. Hence, teams in R&D environments represented a unique domain for investigating factors affecting a team's ability to learn and produce major, novel and creative innovations with more challenging criteria for success. The firms were selected for the interest they showed in improving their product innovation performances as they were observing a year-to-year reduction in the number of patents, system improvements, and product ideas in many R&D departments. Additionally, the software development setting could be considered well-suited for a multilevel study of team learning aiming to combine emotions and cognition, as it allows for the simultaneous evaluation of relatively stable

between-team factors and more variable within-team beliefs and behaviours. This setting favoured, then, the empirical analysis of team self-regulatory learning processes being in the context of a multitude of organisation/work-based structures. As relations and connections can easily be discerned, this setting was also suitable for analysing specific forms of organisational preconditions, as well as contradictions in organisational learning processes.

3.2.3 The space between: on being an insider-outsider in qualitative research

The PhD student conducted research as an employee of one of Ericsson's R&D organisations where she was employed before starting the research while, at the same time, being affiliated with KTH.

During the completion of the PhD project, the author combined the work on PhD studies with the task to act as advisor for the different R&D organisations being assessed during the collection of data and to report results to the higher organisational entity, Ericsson Group Function Technology, which was the main stakeholder in the research project. This favoured the formation of an in-depth experience of organisational learning on an operational level which is quite rare as regards research into an organisation. Additionally, the constant involvement of senior management in each assessed R&D organisation and of main stakeholders at Ericsson Group Function level ensured an ongoing validation of the findings and a practical relevance for all the results collected while the academic supervision ensured the theoretical relevance for this dissertation.

Specifically, since the beginning of the PhD project a steering committee had been established at Ericsson Group functional level. It included the participation of four senior representatives from the Group Function Technology and Strategy departments and one

academic supervisor who met regularly to discuss different aspects of the research project and to take major decisions. In the early stages of the project attention was mainly given to aligning the expectations of and the demands on the PhD student from all the involved stakeholders, both from academia and from the organisation. This steering group also helped in analysing the findings within the related research context. Additionally, the steering committee was made aware of each single publication, seen as a way to disseminate internally produced new knowledge. In the later stages of the project the supervision of the research activities was shared between Ericsson Research in Sweden and KTH. At the same time this created conditions for a wider and continual dissemination of research results to a wider context than the PhD student's organization.

The research was performed as insider research in two of three research studies. For insider research, we mean research conducted by complete members of organisational systems and on their own organisations. On the other side, organisational research is driven by researchers who temporarily are based in the organisation for the purposes and duration of the research (Adler & Adler, 1987).

Being part of the Ericsson Group and specifically part of an Ericsson R&D organisation having implemented similar processes and being driven by the same agile principles as the organisations assessed, the PhD student, in line with Bonner and Tolhurst (2002), experienced three main advantages along the course of the projects: (a) having a greater understanding of the culture being studied; (b) not altering the flow of social interaction unnaturally; and (c) having an established intimacy which promotes both the telling and the judging of truth. More generally as stated also in Smyth and Holian (2008), the author had a great deal of day to day knowledge, which an outsider could take longer to gain (Smyth & Holian, 2008).

However, the author, not having complete membership of the specific organisations assessed, reduced the potential and common problems associated with being an insider such as a loss of objectivity derived by a greater familiarity and the researcher's prior knowledge interpreted as bias (DeLyser, 2001; Hewitt-Taylor, 2002).

Additionally, the author added a great number of players from the academic field to different stages of the PhD project. This enabled a wider range of perspectives to be brought to the research process, and for a more balanced and objective view of the reality to be provided. Regarding the access to sensitive information, the respect for ethical issues was observed through the anonymity of the organisation and its individual participants in most of the produced papers.

3.3 Overall research design

The research results reported in this thesis derive from one single research project consisting of three embedded research studies carried out over the course of approximately four years (Table 1).

The research project was directed as an industrial PhD project implying that the author was employed in the organisation where all the research was performed.

The first research project was performed in an Ericsson organisation with approximately 550 employees, 400 of them using agile methodologies for their product development activities, distributed in three main R&D organisations with a reputation for product and management innovation. The study was conducted 18 months after their transition to agile software development with ended in May 2011 with a massive re-organisation; and an agile way of working competence ramp-up ended with all the workforce working in self-managing teams. It was a field investigation performed through a multiple cases analysis chosen for theoretical reasons such as replication, extension of theory, contrary replication,

and elimination of alternative explanations (Yin, 1994). The project served as data source for paper C.

The second research project was conducted as a comparative case study following an abductive research approach. It was performed in four R&D Ericsson organisations within the same multinational telecommunications company. All the R&D units selected adopted agile Scrum software methodology for product development activities. Following the principles of purposive sampling, the sample comprised organisational units with different types of involvement in product development activities. This ensured variation across the cases which helped to assess construct viability (Singleton & Straits, 1999). The transition to agile was adopted in the organisations studied in 2011 and was considered complete when all employees were working in Scrum teams, which was achieved by the end of 2012 with the formation of 90 teams (cross the four selected R&D organisations). Our analysis started one year after this completed transition to agile working. The project served as data source for papers A and E.

The third research project was a multilevel survey study that addressed a number of statements concerning the organisational controls. This survey was launched globally in Ericsson in July 2014. The project served as data source for paper D.

Table 1: Illustrative description of research studies conducted within the scope of this research

	Study 1	Study 2	Study 3
Aim of research studies	Exploring how short-term project priorities develop over time and how long-term goals such as learning shift to be low priority in agile organisations	Exploring how the control systems of self-managing organisations emerge, are experienced by team members, and impact the self-regulated learning process in teams	Exploring factors and processes that allow agile teams to operate effectively

Type of data collected	Qualitative, initially open-ended data that need to be interpreted for meaning	Qualitative, using an interview protocol	Quantitative data with focused measures
Illustrative methods for collecting data	Observation of meetings, semi-structured and unstructured group interviews, communication logs, and access to company documentation that yielded qualitative data about team task strategies, actions, changes, and task completion	In-depth semi-structured interviews that yielded qualitative data about team interactions and control systems; an interview protocol for team members and other organisational roles, with resultant qualitative data later systematically coded to produce quantitative measures of relevant constructs in team learning literature	A survey instrument built up on quantitative measures of established constructs in the team learning literature;
Case size	3 R&D organisations, 550 employees	4 R&D organisations, 90 cross-functional teams	About 2000 respondents
Goal of data analysis	Pattern identification	Preliminary or exploratory investigation of new propositions or new constructs	Formal hypothesis testing
Data analysis methods	Iterative, exploratory content analysis	Thematic content analysis coding for evidence of constructs	Statistical tests: team agreement tests (ICCs), followed by hierarchical regression
Contribution	A suggestive model of team identity construction	A suggestive model of how teams move from values to injective norms that	Two new constructs— diagnostic and interactive control

Papers*	C	A,E	D
		become binding, limiting, and invisible A suggestive model of how self-managing teams self-regulate their learning activities and learn from a co-evolving environment	systems—and a suggestive model of how the combination of horizontal (concertive control) and vertical forms of control (diagnostic and interactive) affects team innovation and effectiveness.

*Paper B was derived from all the sources of data shown above. It analyses the roles of two types of norms, descriptive and injunctive. It examines the nature of the stimuli likely to lead to the formation and activation of these norms. It also emphasises the influence of the source of these norms and shifts the unit of analysis from team to individual.

3.4 Research methods

Bouchard, focusing on how to implement research techniques such as interviews, questionnaires, and observation, stated “The key to good research lies not in choosing the right method, but rather in asking the right question and picking the most powerful method for answering that particular question” (1976: 402).

We approached the development of new theory by viewing it as it falls along a continuum from nascent to more mature stages of understanding.

We ended this research (research study 3) with the development of more mature concepts by presenting well-developed new constructs and models that have been studied over time

with increasing precision, and that represent cumulative knowledge gained. By contrast we started with a nascent understanding of the phenomenon (research study 1) by proposing tentative answers to novel questions of how and why, often merely suggesting new connections among the focal phenomena. We passed through an intermediate stage (research study 2), positioned between mature and nascent, giving provisional explanations of phenomena, often introducing a new construct and proposing relationships between it and established constructs.

The followed patterns of fit between theory and research methods implement the rationale that the less is known about a specific topic the more open-ended the research questions are, demanding methods that allow data collection in the field in a way that strongly favours the researcher's understanding of the phenomenon (e.g. Barley, 1990). On the contrary when a topic of interest has been studied more deeply, prior literature - to determine relevant independent, dependent, and control variables and to explain general mechanisms underlying the phenomenon - could be used. Finally, when the understanding is at an intermediate stage of development new studies could open up unexpected insights through a systematic analysis of qualitative data.

Thus, by drawing mainly on the topic of agile teams, we show that the state of prior knowledge for specific research questions within the broader topic of this dissertation could vary from nascent to mature.

In the first and second studies, we used case studies to develop theory about topics by creating conditions for having the “most interesting” research (Bartunek, Rynes & Ireland, 2006). Building theory from case studies leads to executing a research strategy which necessarily includes one or more cases to create theoretical constructs, propositions and/or mid-range theory from case-based, empirical evidence (Eisenhardt, 1989b).

The central concept was to utilise cases as the basis from which to build a theory. It was done inductively in the first research study and abductively in the second research study. The theory emerges from recognising patterns of relationships among constructs within and across cases and by detecting their underlying logical arguments. That is, each case helps as a separate experiment that stands on its own as an analytic unit. As a series of related laboratory experiments, multiple cases can be considered as discrete experiments that help as replications, contrasts, and extensions to the emerging theory (Yin, 1994).

However, while laboratory experiments separate the phenomena from their context, case studies highlight the rich, real-world context in which the phenomena happen. In the first research study, our theory-building process has been developed via recursive cycling among the case data, emerging theory, and later, extant literature. In the second research study an abductive approach was adopted allowing more for the potential of prior theory, literature, and personal and professional experiences of researchers.

Despite being sometimes seen as “subjective,” good theory building from cases is, surprisingly, “objective,” due to its adherence to the data keeping researchers “honest” (Eisenhardt & Graebner, 2007).

Thus, while single-case studies can abundantly define the existence of a phenomenon (Siggelkow, 2007), multiple-case studies usually give a stronger base for theory building (Yin, 1994). Using the analogy of laboratory experiments, the theory is better grounded, more accurate, and more generalisable (all else being equal) when it is founded on multiple case experiments. Additionally, multiple cases also favour comparisons that explain whether an emergent finding is simply idiosyncratic to a single case or constantly replicated by several cases (Eisenhardt, 1991). But, despite multiple cases leading to better theory, theoretical sampling is complicated. In the first research study the multiple cases have been

chosen for a theoretical reason of replication (Yin, 1994). In the second research study multiple cases have been selected for favouring the contrary replication and elimination of alternative explanations (Yin, 1994). Specifically, the theoretical sampling approach of “polar types” has been considered in which we sample extreme (lightweight approach towards agile and very strong adherence to agile principles) cases in order to more easily notice contrasting patterns in all the data. This sampling led to very clear recognition of central constructs, relationships and logic of the focal phenomenon.

3.5 Research studies

This section provides a detailed description of each research study in terms of its goals, related data collection, data analysis and techniques used. It also includes information about the validity and reliability checks performed in each study to improve the quality of the results provided in the appended papers.

3.5.1 Study 1: Multiple case study

The first research study used a multiple case study relying on multiple sources of data. It was used to explore the dynamics through which short-term project priorities develop over time and long-term goals such as learning shift to be of low priority for the agile teams.

Data collection

As triangulation of data collected from multiple sources at multiple times strengthens confidence in the accuracy of findings (Jick, 1979), different data sources were used: (1) extensive archival data, (2) 17 group interviews, (3) attendance at multiple team and firm events, (4) repeated semi-structured interviews with executives of the focal R&D units, (5) informal follow-ups through e-mails, phone calls, and observations, and (6) 65 texts

generated from a secondary data source. Archival data were an important source for this study, and they were gathered from relevant projects and organisation publications.

We started collecting qualitative data through four individual pilot interviews conducted with managers in two of the three focal units, and through two group pilot interviews. with: (1) the head of the multinational firm, the head of innovation at the firm level, and the rest of the leadership team, and (2) the organisational innovation coaches. Initially the aim was to comprehend the key problems the firm faced after the radical transformation to agile software development and self-managed teams.

After the initial data collection, we interviewed members of five groups in each R&D organisation: line managers, team members, Scrum Masters, product owners, and systems managers. The interviews lasted from 60 to 90 minutes. The interviews were recorded and most of them were reviewed within 24 hours. After the initial interviews, we posed 17 closed-ended questions to a subset of interviewees in order to collect specific factual information (e.g. dates, events, managers involved, issues discussed, deal terms). We complemented our interview data with observational data. In a three-day visit to two out of the three involved units, we observed six teams while they worked on the production of new telephony software. We also conducted a two-hour workshop with middle and senior managers about the perceived barriers to innovation. We also relied on our analysis of 65 text comments derived from a secondary data source.

Data Analysis

We started our data analysis by focusing on individual case histories derived from interview, observational, and archival data (Eisenhardt, 1989; Yin, 1994). We then triangulated that data. Our approach was confirmed by different data-collections and different informants (Jick, 1979). In addition, we checked e-mails and chat logs in order to

gather missing details. Each case was reported in tables that included relevant quotes and organisation information. Two researchers worked on the data in order to develop independent views and to reduce the influence of any personal bias. The cross-case analysis was performed by looking at similar emerging concepts and themes (Eisenhardt & Graebner, 2007), and highlighting organisational performance trends that emerged in the years of the agile transformation. This process began when most of the data had been gathered in order to ensure the integrity of the replication logic across the cases (Eisenhardt, 1989; Yin, 1994). Similarities and differences between cases were identified. The emerging common constructs and themes led to the construction of initial relationships via the replication logic, which relied on continual efforts to return to each case in order to confirm the occurrence of specific constructs, relationships, and logics. This iteration between theory and data eased the refinement of theoretical relationships between emerging constructs (Eisenhardt, 1989). As we identified the theoretical framework, we continually performed a comparison with the extant literature. Then, we undertook recurring iterations among data, literature, and theory. We did this in order to underline similarities and differences, to reinforce the validity of findings, redefine concepts, and boost the generalisability of the emergent theory. Appended paper C is based on the results from this first research study.

3.5.2 Study 2: The abductive approach

The second study was carried out as an abductive study through a multiple case study which included a within-case and cross-case analysis. The study had in focus the exploration of organisational control systems as emerged in self-managing team-based organisations, with the analysis of their impact on a team's self-regulated learning process.

Data collection

Interviews, free comments embedded in an organisational survey launched in parallel with our interviews and organisational documents were used as sources of data. Overall, from August to October 2013, 44 semi-structured face-to-face or telephone interviews were conducted by two researchers. A third researcher validated the transcriptions, looking for expansion or qualification when required. Insights were cross-validated with relevant literature. The interviews included respondents from different R&D organisations covering diverse agile roles. Table 1 shows the distribution of interviewees' roles and their distribution across the four organisations. In the first round of interviews, purposeful sampling was used (Schatzman & Strauss, 1973) with the aim of selecting information-rich cases that purposefully fit our study. Specifically, Patton's (1990) strategies were adopted by using:

- stratified purposeful sampling to gather information from different subgroups: main agile roles (product owner, Scrum Masters, agile team members), organisational entities (teams, individuals, supporting teams), and organisations (all 4 were involved);
- maximum variation sampling to capture a wide range of perspectives related to our study. In particular, we interviewed all members of senior management in the four firms.

The interviewees for the second round of the interviews were selected using theoretical sampling (Draucker, Martsolf, Ross & Rusk, 2007) in order to gather additional data and help shape second-order themes that emerged from the first round of interviews. In the third stage, we re-contacted some of the interviewees from the first phase to confirm specific

emerging concepts, and also included additional agile team members from the different organisations. Interviews lasted between 60 and 80 minutes and specific questions were targeted to the informant's expertise. Following the interviews, post-interview discussions took place among the researchers to cross-validate each other's observations (Gioia & Thomas, 1996). Archival data including reports on business unit operational descriptions, metrics and other R&D documents were collected to help minimise retrospective bias (Langley, 1999). All interviews were tape recorded, transcribed and sent to interviewees for feedback and validation. They were assembled into manuscripts containing details of the four units for qualitative data analysis (Miles & Huberman, 1994; Gioia & Thomas, 1996). The interview process was concluded when no significant additional insights were obtained from additional data points and theoretical saturation was thus reached.

A second round assessment consisted of 121 free-text comments from a survey of the four organisations administered in August 2013 (secondary data source) in parallel with the interviews (primary data source).

Data Analysis

The qualitative data analysis started with a within-case analysis followed by a cross-case analysis (Miles & Huberman, 1994). Data analysis included three types of coding as prescribed by Strauss and Corbin (1990): open, axial, and selective coding.

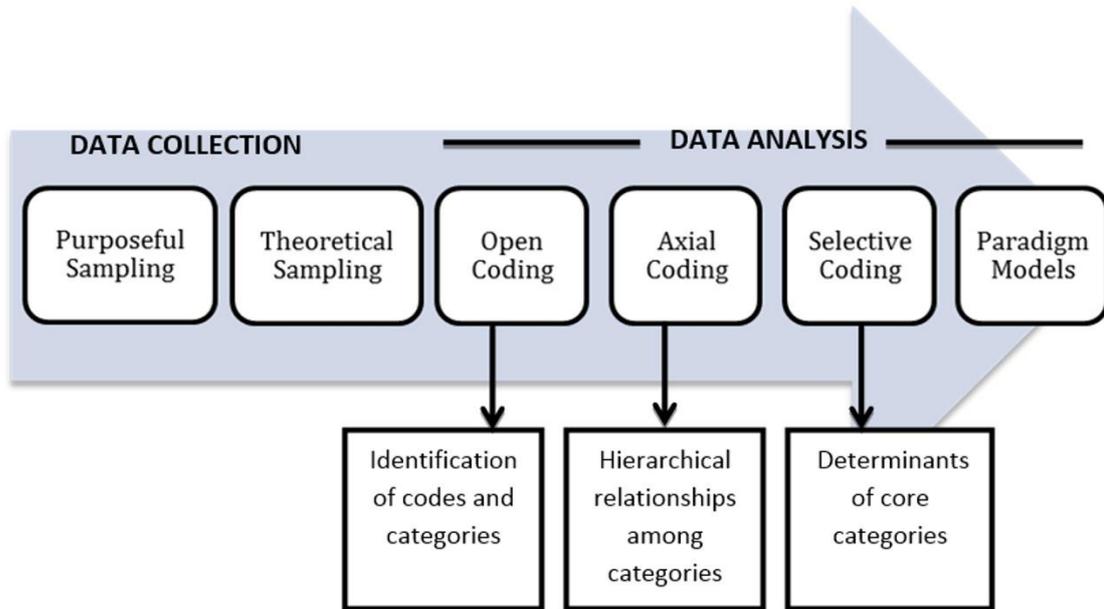


Figure 1: Data Collection and Analysis

A computerised data management program (MAXQDA 10plus®) was used to organise the huge amount of data and identify codes, categories and sub-categories. The codebook created was also applied to the set of secondary data and a parallel analysis of both the 44 individual semi-structured interviews (comprising 979 codes) and the 121 free-text comments deriving from the secondary source of data (comprising 334 codes) was conducted. Analysis of text from the secondary data sources was guided, but not confined, by the first codebook, which allowed us to assign new inductive codes to the data segments describing new emerging themes. This allowed us to confirm the findings from the analysis of the first data set and enrich our initial understanding of the phenomenon. The results of this step are presented in the following table. They served as the basis for refining our initial theoretical framework.

Table 2: List of identified categories from coding

Category	Sub-Category	Sample of the codes within a category
Team's prior related knowledge	Team's Knowledge Stock	Individuals are pushed to broaden their competence. Knowledge broadening damages expertise
Team's self-regulated learning process		Competence building based on the need to implement new features. Despite management encouragement, low team commitment to learning
Team's collective efficacy¹		Teams are unable to handle the wider scope of their activities
Team's absorptive capacity	Assimilation	Difficulty to analyse/interpret changes along feature development
	Transformation	Difficulty to understand how to implement functional impacts
Control systems	Team's Beliefs	Learning and innovation are not prioritised as developing features
	Time Pressure	Pressure inhibits team's ability to allocate time for learning and innovation (i.e. Time Pressure)
	Managerial Support	Lack of support for competence build up and directions

¹ collective efficacy is the group's (or organisation's) collective belief that it can successfully perform a specific task

	Concertive Control	Social pressure within teams
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Finally, during selective coding all analyses were integrated into one "core category" (team self-regulating learning process). A paradigm model was constructed showing the relationships between the most relevant concepts linked to the selected core category and the most significant codes belonging to subsidiary dimensions. Both papers A and E used data from this second research study.

3.5.3 Study 3: Multi-level survey

The third research study used a multi-level survey to allow for the quantitative evaluation of the combinations of organisational control systems over the main team's outcomes having the general aim to explore factors and processes that allow agile teams to operate effectively.

Data collection

We collected survey data from 97 research and development (R&D) teams, their internal team managers, and their higher-level managers in 20 large organisations located in 11 different countries belonging to a telecommunication multinational corporation (MNC). Data for developing reliable scales were obtained from 44 exploratory interviews held in the same MNC over a three-month period. The degree of participation of each company varied depending on the top management's commitment and ranged from a few teams, selected on a voluntary basis, to involvement of all the organisation's teams and involvement of their internal and external management working in the specific R&D departments. The team types, team size and the level of task complexity were very similar in all the organisations. Most of the teams involved (84%) were allocated to new product

development activities implementing new SW functionalities while a few of them (9%) were working on SW maintenance activities. Average team size was 7 members (ranging from 5 to 9) and average agile team tenure was about 1.5 years. In our study, a team was defined as a group of people 1) working together on a permanent basis; 2) which reported directly to the same supervisor and group of stakeholders; 3) which were coordinated by the same internal team leader and 4) which recognised themselves as belonging to a team with a unique identifier, - the team name. The teams were well-defined: the members identified themselves with their teams and the management (internal team managers and higher level team managers) identified themselves as assigned to the teams. Without exception, team members interacted at least once a day during stand-up meetings and/or during tasks. All the members of the selected R&D organisations were invited to complete a web-based survey. Participation was voluntary, and the respondents were assured of the confidentiality of their responses. The surveys were completed during working hours. To reduce potential common method biases, we gathered data from three different sources. Team members reported on the team's concertive control²; the team's internal leaders; on team size and team tenure and the team's higher level managers on diagnostic and interactive controls, and team innovativeness. All respondents were repeatedly encouraged to participate and reminded of the importance of high response rate to increase the reliability of results which would help their belonging organisation. From a total of 226 team's manager questionnaires sent, we received 200 completed ones (88% response rate). Among the 206 internal team leader surveys distributed, we obtained 179 completed ones (87% response

² “concertive” control is a new form of control which represents a key shift in the locus of control from management to the workers themselves, who collaborate to develop the means of their own control. Workers achieve concertive control by reaching a negotiated consensus on how to shape their behaviour according to a set of core values, such as the values found in a corporate vision statement. In a sense, concertive control reflects the adoption of a new substantive rationality, a new set of consensual values, by the organisation and its members

rate). Of the 1441 team member surveys covering 226 teams, we received 726 related to 140 teams (50% response rate). After cleaning the data and retaining only teams with at least two members in order to assess inter-rater reliability, we obtained a final sample for the analysis of 248 team members, 97 teams, 97 internal team leaders and 97 high level managers. Their demographic data are as follows: 18.6 percent of the team members were female; their average age was between 30 and 39 years; of the internal team leaders, 29.2 percent were female; their average age was between 30 and 39 years; of the higher level managers, 25.2 percent were female; their average age was between 40 and 49 years.

Operationalisation of variables

The questionnaire consisted of a large set of constructs targeting different organisational roles, team members, Scrum Master, line manager/product owner. The surveys were in English, the common language used in the reference MNC. The surveys mostly included scales taken from previous research which, in some cases, were slightly adapted to the team context. The surveys were tested internally on 23 team members and managers across different sites. They were asked to complete the survey and comment on any lack of clarity regarding the questions. For the appended paper D included in this thesis, the relevant set of variables is reported below.

Team concertive control. To measure concertive control we used three items from Wright and Barker's (2000) scale of concertive control which has been identified as an important conceptualisation of control in self-managing teams (e.g. Barker, 1993; Barker & Tompkins, 1994). The scale represents the first psychological measure to validate the manifest dynamics of concertive control reported by Barker (1993). The selected items are meant to capture the degree of responsibility, control or discretion provided to team

members by the management system established within the team as a consequence of team conventions. Specifically, team members were asked to respond to the following items: (a) “My team makes sure that everyone in the team pulls his/her weight”; (b) “Within my team, we need the agreement of everyone in the team to decide how to use my working time”; and (c) “Within my team, we usually check with other team members before doing something that might affect them”.

Concertive control along with all of the scales on the team member survey, were assessed on a seven- point Likert scale ranging from 1 for “strongly disagree” to 7 for “strongly agree.”

Interactive and diagnostic controls. Given the lack of well-validated, pre-existing measures, constructs for managerial interactive and diagnostic controls were developed for this study. To develop a scale to measure both, we drew primarily on the relevant literature and on data from a focus group made up of members of self-managing teams. We started by determining a theoretical basis for scale items based on Simons's (1991, 1994) original work and the transcription of interviews with team members and other members of the organisation. We subsequently explored other sources of information looking at the organisational documentation reporting the way teams worked and created a tentative list of survey items. Finally, we conducted in-depth interviews with other agile team members to check any ambiguity regarding the formulation of items and for them to suggest improvements to the questions. The higher level managers were asked to answer the following four items using Likert-type scaling (1="strongly disagree" to 7= "strongly agree"): "I ensure that learning about our products is an important agenda to discuss inside my team or teams", "I ensure that product innovation is a regular focus of attention by all the team members within my team(s), "I participate in all the team's ceremonies and events" and "I continually challenge and debate the teams' work progress data or their action plans" (interactive controls); "My team is regularly (several times in a month) asked to provide information about their work progress" , "I regularly see information about the team's progress in the achievement of their competence goals or learning objectives.", "Competence goals are regularly (at least twice a year) provided to my agile team" (diagnostic controls).

Team innovativeness. Higher level managers assessed the team's innovativeness using a scale ranging from "very low" (1) to "very high" (7). Sample items, derived from

exploratory interviews done in the same MNC but involving other R&D departments, included: “Number of created patents or number of generated ideas for new features or new system improvements”, “Number of generated new ideas for improving the team’s way of working or the usage of new tools or new practices”, “Number of generated new ideas for minor improvements to the existing products”, “The team’s ability to use new practices, new tools or to embrace the new way of working”, “The team’s ability to implement radical/major new product ideas” .

Control variables. Previous research shows that team processes and outcomes can be affected strongly by the composition of the group (Williams & O’Reilly, 1998). Central among team composition variables are group size and team tenure which have been shown to influence group process and outcomes (e.g. Ancona & Caldwell, 1992; Bantel & Jackson, 1989). We used these variables as control variables in our regression models. Group size was evaluated as the number of the team’s members and was obtained from the internal team managers. Team tenure was assessed as years of experience in the current team and was obtained from internal team manager via the internal team manager survey.

Data Analysis

The mean inter-rater agreement values for team level constructs of the appended paper D were computed. Complementing these statistics, group-size- corrected intra-class correlation coefficients (ICCs) were estimated. Additionally, a hierarchical linear regression analysis was performed using the statistical analysis tool IBM SPSS statistics.

3.6 Methodological quality assessment

The results of research studies depend greatly on the methodological choice related to the research design, the data collection and analysis. This section reports some important

methodological choices done within the qualitative and quantitative research study and analyses their impacts on the related research outcomes. Criteria originally developed by Yin (1994) are considered: construct validity, internal validity, external validity and reliability.

As should be known, these criteria are not relevant for evaluation of deep-probing qualitative studies.

Despite past research efforts, Hannah and Lautsch (2011) claim that 30 years after Miles (1979) pointed out the lack of agreement concerning how to analyse and present qualitative data, there is still no consensus in this respect. These conditions result in uncertainty about how to conduct ‘good’ case research and how to convince reviewers, editors, and the broader audience of readers of the real value of qualitative research and single case studies.

Therefore, in order to convince the scientific community, qualitative researchers have to fight “an uphill battle to persuade their readers” (Siggelkow, 2007, p. 20).

3.6.1 Construct validity

It is important to make the distinction between internal validity and construct validity. The first one refers to assuring a methodology that enables the research to rule out alternative explanations for the dependent variables, while construct validity is more concerned with the choice of the instrument and its ability to capture the latent variable. Construct validity has three components: convergent, discriminant and nomological validity. Discriminant validity assumes that items should correlate higher among them than they correlate with other items from other constructs that are theoretically supposed not to correlate. On the other side, the convergent validity coefficients are the correlations between measures of the same trait that are obtained with different measurement methods.

The confirmatory factor analysis (CFA) is a powerful method for addressing construct validity for multi-item constructs and makes fewer assumptions while it provides more diagnostic information about validity than Campbell and Fiske's criteria. In the third research study the CFA on the team-level data gives good results for convergent and discriminant validity of our multi-item measures.

3.6.2 Internal validity

Internal validity regards the degree to which a researcher is justified in concluding that an observed relationship is causal (Cook & Campbell, 1979). As in our research studies 1 and 2, the qualitative research resulted in being useful in describing how phenomena operate and in developing preliminary causal hypotheses and theories (Campbell, 1979; Johnson, 1994; LeCompte & Preissle, 1993; Strauss, 1995). The following strategies have been used in both the involved research studies in order to improve the internal validity of our qualitative research. We use the multiple data sources to help understand the focal phenomenon. The interpretation and conclusions related to each research study have been discussed with peers who are familiar with the research, and this provided useful challenges and insights. Especially with the research study 2, a negative case sampling was considered in order to be able to locate and examine cases that disconfirm the author's expectations and tentative explanation. Additionally, for both the research cases, the author was able to collect data in the field over a long period of time. Moreover, we used multiple theories and perspectives to help interpret and explain the data.

3.6.3 External validity

'External validity,' or 'generalisability,' is based on the intuitive belief that theories must be able to describe phenomena not only in the context in which they have been studied, but

also in other settings (e.g., Calder, Phillips & Tybout, 1982; McGrath & Brinberg, 1983). Neither single nor multiple case studies can constitute a valid basis for statistical generalisation appearing to infer conclusions about a population (Yin, 1994: 31; Numagami 1998: 3). This does not imply, however, that case studies are devoid of generalisation. Methodologists distinguish between statistical and analytical generalisation. Analytical generalisation is a process different from statistical generalisation as it regards the generalisation from empirical observations to theory, rather than a population (e.g., Yin, 1994, 1999). In her paper, Eisenhardt (1989) claims that case studies can be a solid starting point for theory development and indicates that a cross-case analysis containing four to 10 case studies may provide a good basis for analytical generalisation. Instead of conducting and analysing multiple case studies of different organisations, researchers may also conduct different case studies within one organisation (a nested approach, e.g., Yin, 1994). Within the research studies 1 and 2, we performed two multiple case studies including from three to four organisations belonging to the same multinational company. Additionally, in line with that recommended by Cook and Campbell (1979), we provided a clear rationale for the case study samples and a great number of details of the case study context in a way to let the readers appreciate the sampling choices. This helps to better understand where findings do and do not apply allowing the assessment of the external validity. Additionally, as most researchers, including Winer (1999); Calder, Phillips & Tybout (1981, 1982); Ferber (1977); and Wells (1993) - and even Cook & Campbell (1979) – suggest, the observation of real people with real setting, as done with our multiple case study, is associated with external validity.

Concerning the external validity for our third study involving quantitative research, the data were collected from a specific type of firm coming from the telecommunications industry

limiting the needed variation in background facets of subject characteristics, setting, context, and relevant history. It is only when these facets vary and we see how they interact that understanding of external validity is enhanced. For this to happen, the observable “background” factors should have been conceptualised in terms of more general constructs and incorporated as moderator variables in the researcher’s (now, more complete) theory.

3.6.4 Reliability

Reliability concerns the replicability of research findings and whether or not they would be repeated if another study, using the same or similar methods, was undertaken.

Some authors are of the view that reliability and replication have direct relevance to qualitative research (LeCompte & Goetz, 1982; Silverman, 2000a). They may also prescribe precise ways in which this can occur. Seale (1999), for example, sees the expectation of complete replication as “a somewhat unrealistic demand” but argues that this is more a consequence of practical problems associated with qualitative research than “insuperable philosophical problems” concerned with conceptions and measurements of “reality”. His view is that good practice in relation to reliability and replication can be achieved through an aspect of reflexivity, that is “showing the audience of research studies as much as is possible of the procedures that have led to a particular set of conclusions” (1999:158). This enables readers to imaginatively 'replicate' studies, and also helps to ensure that claims are supported by adequate evidence.

Some other authors, like for example Kirk and Miller, (1986) and Perakyla, (1997) suggested that there are two levels to ensure that qualitative research is reliable, or has one of the qualities associated with potential replication. First there is the need to ensure that the research is as robust as it can be by carrying out internal checks on the quality of the data and its interpretation. Second, there is the need to assure the reader/enquirer of the research

by providing information about the research process. In this context, questions surrounding the appropriate design and conduct of the research are crucial and need to be asked throughout the research process.

In our research studies 1 and 2, we ensured the reliability of results by leveraging a systematic analysis of data which was performed within a team of researchers, usage of the multi-sources of data allowing for triangulation of results, and the usage of multi-case analysis allowing for cross-case analysis and negative case analysis. Additionally, a huge amount of information related to the research procedures was shown. The reliability within research study 3 is determined by the reliability of survey constructs. Reliability analyses of our multi-item measures yielded very satisfactory Cronbach alpha coefficients ($0.85 \leq \alpha \leq 0.93$).

3.7 Methodological considerations and limitations

Usually the theory-building process is based on prior literature and empirical observation or experience as well as on the insight of the past studies to build incrementally more potent theories. However, there are times, as in the case of our studies, when little is known about a phenomenon. Current perspectives related to our field of research seemed insufficient because they presented little empirical substantiation, or they conflicted with each other. Thus, in our scenario, theory building from case study research was particularly suitable because theory building from case studies does not rely on previous literature or prior empirical evidence.

Several sources have informed the theory presented in this thesis. A long-standing interest in this exploratory field study fueled massive note taking, reflection, and iterative model building over the four years' research. The author's immersion in the setting favoured the collection of detailed data on people's experiences over time, and thus helped develop an

understanding of how teams deal with the interpersonal challenges of self-management. Data collection lasted two years and half, including informal conversations and interviews with team members and other organisational roles; and relevant observation of teams working, meeting, and interacting informally. These first-hand data were completed by company documents and surveys relying on the author's internal position. Throughout the fieldwork, we embraced an iterative process of examining data, writing up early understandings of the situations and events, and formulating new questions to impact subsequent data collection. Moreover, reviewing emergent ideas with colleagues who lacked prior knowledge of the firm or its teams was also an important source of feedback. Additionally, iterating between data collection and analysis provided the flexibility necessary to follow up on promising leads and to leave lines of inquiry that appeared to be fruitless.

By addressing a novel topic of research, we utilised qualitative data opportunistically so that we were free to chase new insights that emerged in an interview or observation. The sample was, by design, path dependent in the sense that subsequent interview questions (or interviewees) were determined iteratively as interesting ideas were raised in the process. Thus, in some cases, data analysis and data collection overlapped in a way that if this approach allowed new insight and theory to develop, it impeded the systematic sampling and consistent use of measures required for meaningful statistical inference.

Blending qualitative and quantitative methods occurred in a way that quantitative work completed qualitative work enabling us to distinguish unexpected relationships, to check their interpretation of qualitative data, and to strengthen their confidence in qualitatively based conclusions as the two types of data converge (e.g., Eisenhardt, 1989b). Thus, careful

analysis of both qualitative and quantitative data increased confidence that the researchers' explanations of the phenomena were more plausible than alternative interpretations.

New scales for diagnostic and interactive controls have been developed. Although we conducted several additional analyses to evaluate the validity of these measurements, it would be useful to measure both types of controls using complementary measurements and relate these to our measurements.

The intensive use of empirical evidence resulted in an overly complex theory, very rich in details till to result unable to raise the level of generality further. As they are, the developed theories seem to describe the specific phenomena. Perhaps, for future studies, we need to accumulate both theory building and theory testing empirical studies.

Our case studies present inevitably limited generalisability. However, the focus on a limited set of cases was necessary in order to explore in depth how teams learn and work with their cognition and emotions in response to societal pressure. Moreover, by including a multiple level approach we were able to identify micro-processes that go beyond just one particular group of actors at a specific point in time. Additionally, our synchronic research design in each analysed organisation limited our ability to draw conclusions about whether the patterns of consistent identifications across the organisational layers, of dual sets of beliefs, between efficiency and learning, among senior managers and the observed team behaviours were merely a temporary phase or more permanent characteristics of self-managing teams applying agile practices. Nevertheless, rather than being interested in analysing the longitudinal process of organisational learning, we were mainly interested in analysing the role of identified variables in the learning behaviours and learning performance of teams.

Another limitation of the study is that the relationships found are associative and may not be causal. Taking this study as a point of departure, future research needs to probe the self-

regulatory processes involved in the organisational generative leaning activities. This may involve a longitudinal research design.

4 Summary of the appended papers

This chapter summarises the five appended papers which serve as basis for this thesis and highlights their main contribution.

Paper A

Annosi M.C., Magnusson M, Martini, A., & Appio F.P. (2016) Social conduct, learning and innovation: an abductive study of the dark side of agile software development
Creativity and Innovation management, early view

Agile methodologies have been adopted by an increasing number of organisations to improve their responsiveness. The adoption of an agile software development framework as a particular instance of contemporary work organisations leads to a fundamental shift in structure, process and decision making (Bartlett & Ghoshal 1993) where the work is organised along horizontal rather than vertical lines (Barley 1996), involving reduced formalisation and specialisation and a looser organisational form (Volberda 1996) through the wide usage of self-managing teams.

Few studies have empirically analysed the effect of agile on long-term organisational goals such as learning and innovation. Using an abductive approach, this study examines the relationships between self-regulated teams' social norms and their resulting effect on learning and innovation. Results indicate that the time pressure (seen as a team's injunctive norms) brought about by the implementation of agile impedes team engagement in learning and innovation activities. We also found that time pressure is affected by a set of different control strategies, more specifically concertive, belief, diagnostic, and boundary controls. These need to be adequately addressed in order to minimise the potential dark side of agile. Team injunctive norms are part of the core themes affecting the self-regulation of team learning. Hence, the paper contributes in identifying the organisational mechanisms, placed

at different organisational levels (micro, meso and macro), influencing the natural process of self-regulation through their impact on norms and to understand how they enact their influence over the team self-regulation process.

A multiple case study was undertaken to conduct this research and four research and development (R&D) organisations belonging to the same multinational telecommunications company were selected for their experience in applying agile Scrum methodologies. An empirically-based model framework using an abductive approach was built allowing for an effective combination between empirical and case study evidence leading to proposition formulation.

A total of 44 semi-structured interviews were carried out and focused on capturing the effects of agile on learning and innovation. All agile roles were represented in the four R&D organisations. Additionally, 121 free-text comments from a survey administered in parallel with the interviews were considered as secondary source data. The data were analysed through a grounded theory-building analysis. The qualitative data analysis started with a within-case analysis followed by a cross-case analysis (Miles & Huberman, 1994). Data analysis included three types of coding: open, axial, and selective coding. A multilevel perspective was chosen to describe processes responsible for the formation of a team's injunctive norms by looking at determinants belonging to a wider organisational context. As further result, this research defined the construct related to time pressure - which is the most critical code - illustrated by comments from agile team members and other relevant organisational roles. Moreover, the mechanisms, managerial practices and work routines giving rise to pressure and its effects on teams, and eventually the whole organisation were revealed through vast empirical evidence. Importantly, these mechanisms were not dealt with in isolation, but their 'concatenation', underlining how the nature of the origin of

pressure encourages distinct forms of theorisation, was shown. For that purpose, the research in paper A clarified the mutually reinforcing effects exercised by their combination.

By revealing these mechanisms, their combined effect, and recursive interactions, a more comprehensive model of an institutional change and the forces that keep employees focused on the project performance at the expense of learning and innovation activities is provided.

Paper B

Annosi, M.C, Magnusson, M. & Brunetta, F. (2015). *Self-organizing coordination and control approaches: the impact of social interaction processes on self-regulated innovation activities in self-managing teams*. In Innovation Management and Computing (Vol I). Eds. Apple Academic Press - Editor Cyrus F. Nourcan.

The development of social norms, as well as how and under which conditions social norms impact individual behaviour, are determined by the social influence process. By leveraging the influence process, we can create and handle change in self-managing teams in order to foster growth and steer team members in a positive direction, away from negative habits. At the same time, if poorly managed the developed social norms can inhibit change, and in the worst case result in conflict and resentment within the team.

If team members feel part of a group and consider that group membership is relevant for them, they will adapt their behaviour to align to the group's norms and standards, which in turn will dictate context-specific attitudes and behaviours that are appropriate for the team. This work focuses on teams' social norms, distinguishing between descriptive (what most others do) and injunctive (what most others approve or disapprove of) norms, investigating important moderators in the relationships between descriptive norms and behaviours, discussing the role of the social environment on the changes to and inculcation of injunctive

social norms, and describing how individual team members' attributes refine the susceptibility of individuals to normative influences.

The work focuses primarily on the emergence of a shared perception of the appropriate way to behave in achievement contexts to delineate important top-down effects between collective and individual intentions, which further addresses the topic of achievement motivation and subsequent types of learning that emerge across levels in the organisation. Specifically, it includes the analysis of both types of norms, descriptive and injunctive; in order to better predict individual behaviour in respect of team learning and innovation. Two types of injunctive norms have been considered: perceived time pressure and concertive control. For each of them this chapter examines the nature of the stimuli likely to lead to the formation and activation of these norms, and determines the conditions under which a unique effect of agile work routines and managerial practices emerge. By describing how teams' motivation for different achievement goals, that is, collective goal orientations in the form of norms, shape the way team members participate in team learning processes, it complements the analysis of self-regulation of learning activities within teams and contributes to identifying psychodynamic factors enacting the self-regulation of generative learning activities.

The paper shows that the team members' attitudes and the team's subjective norms (descriptive and injunctive) significantly influence the behavioural intention to take innovative action. Additionally, it proposes that group identity reinforces the power of group norms (descriptive and injunctive) that influence collective intentions and discusses the relationships clarifying how identity-relevance of the team and different types of norms interact to predict team members' behaviours. Additionally, a qualitative evaluation of the strength of the relationship between descriptive norms and group intentions is performed

and possible relevant moderators of this relationship are highlighted. Moreover, the proximal determinants of injunctive norms are identified by looking at the way the team's work is organised and the social context in which the team operates.

As results, team descriptive and injunctive norms are modelled together to allow for a holistic view of possible managerial interventions. This discussion revealed other social influences. For example, outcome expectations ended up being important resources to better sustain the collective intention to innovate. The perception of managerial expectations induces the belief that enacting a particular behaviour will provide the desired benefits (Bandura, 1986). Furthermore, team members' attitudes were found to have an important impact on the perceived behavioural control of team members which, in turn, influence the team's injunctive norms related to group innovation. Regarding the exchange and inculcation of injunctive norms, the paper proposes that this could be accomplished in multiple and enforcing ways which differ in their level of intentionality. Injunctive norms are created through a system of goals and feedback controls applied to a team's work with the purpose of shaping goal desirability. Also, norms are deliberately transmitted through active instructions and rituals (Allison, 1992; Lumsden, 1988) deriving from the boundary control systems implemented with the adoption of specific agile routines. Additionally, norms can be transmitted more passively through non-verbal behaviours (Allison, 1992; Lumsden, 1988) emanating from the enactment of interpersonal pressure exercised by peers inside the teams. This is enabled by communication the critical role of which is highlighted in Latané's (1996; Latané, Nowak & Liù, 1994).

This work builds on the results of a four-year study of hundreds of teams in several organisational units dealing with product development. The related data collection for this research relied on a pilot study in a small research and development (R&D) organisation,

17 group interviews, an exploratory survey, plus three follow-up meetings in three bigger R&D organisations, 44 individual semi-structured interviews in four large R&D organisations belonging to the same multinational telecommunications company, a global, multilevel and multi-source survey involving participation of 20 different R&D organisations in 11 countries, including the members of 97 teams and their team managers, plus their higher-level managers in the related organisations. The main research methods used were: grounded theory, cross-case analysis, triangulation, linear and hierarchical linear regression models. Organisational documentation from each organisation involved was also collected constituting a valid source of secondary data.

Paper C

Annosi M.C., Foss N.J., Magnusson M., & Brunetta, F. The interaction of control systems and stakeholder networks in shaping the identities of self-managed teams (R&R -minor revision- in *Organization Studies journal*)

Team identity has been given little research attention, even though an increasing number of firms are moving to team-based organisations and there is evidence that teams form identities. We explore the extent to which team identity can be institutionalised as a central organising principle of team-based firms. We argue that managerial and stakeholder interventions shape the self-construction of team identity as well as the team's commitment to specific work objectives. We further suggest that team identity becomes isomorphic to organisational identity because of pressures related to 1) the presence of a dense network of managers and stakeholders, orienting teams towards a focus on certain aspects of the higher-order identity; 2) the use of team routines and regular feedback loops that force the alignment with the organisational identity, and 3) the use of coordinating roles aimed at promoting, ratifying, and reinforcing the convergence of identity within the team.

We build on the idea that “organisational identity is best understood as contested and negotiated through iterative interactions between managers and stakeholders” (Scott & Lane, 2000:44). We expand on these ideas and specifically on the view that organisational identity is an outcome of the complex interactions among managers, organisational members, and other stakeholders. As a central aim of the paper, we address the formation of team identity as a result of the complex interactions among the team’s managers, members, and relevant stakeholders. We argue that team members are not passive targets of managerially designed identities.

We consider several groups of organisational actors or constituencies at multiple organisational levels as we integrate theory on organisational identity with theory on team identification. We apply a multi-level model of controls (Martin, 2003) at three organisational levels: the team level, the meso level, and the macro level.

While most research on organisation-based identities concentrates on a single level of analysis (the individual, the group, or the organisation), we addressed the question on cross-level mechanisms between team and organisational identity construction offering speculative discussion concerning nested identities, advancing our understanding of the processes through which identities are linked across levels, and exploring how identities at one level of analysis can favour and constrain identities at other levels.

Based on an extensive field study, first we propose that agile routines make teams permeable to stakeholder influence at the meso level. At the same time, organisational routines, at the macro level, enable intense relations among stakeholders, leading to the formation of coalitions pressuring teams. This pushes teams towards conformity with stakeholders’ values and beliefs, and leads to alignment between teams’ and stakeholders’ identities. Second, we suggest that the high level of task interdependencies within the team

at the micro level intensifies the strength of relational ties among members. As team connectivity becomes more intense, team members tend to behave in similar ways despite their freedom to be different, creating a set of legitimised working conventions (Scott, 1995) nested in value-based control. The formed team identity becomes the basis on which members operate when developing products/services. Finally, we propose that established managerial controls at the macro level tend to amplify the defined team identity, giving additional legitimacy to team behaviours as the team works towards agile values and principles instilled by stakeholders.

Team identity is a key concept affecting the self-regulation of team learning. Hence, the paper contributes to identifying the organisational mechanisms, placed at different organisational levels (micro, meso and macro), influencing the natural process of self-regulation through their impact on team identity and to understand how they enact their influence over the team self-regulation process.

This research is based on a field investigation of three R&D organisations and relies on the data collected from: 1) extensive archival data, gathered from relevant project and organisation publications, (2) 17 group interviews, (3) attendance at multiple team and firm events, (4) repeated semi-structured interviews with executives of the focal R&D units, (5) informal follow-ups through e-mails, phone calls, and observations, and (6) 65 texts generated by open-ended questions in an exploratory survey used as secondary data sources. The survey was launched in the same period as the interviews.

Paper D

Annosi M.C., Khanagha S., & Magnusson M., A Multi-Level Study of Managerial Control Influence on Self-Managed Team Innovativeness, in proceedings at the *75th Annual Meeting of the Academy of Management*, 7-11Aug. 2015, Vancouver, Canada

In this study we investigate organisational control systems as the underpinnings of large organisations' ability to perform after transition to a flattened and decentralised structure. We consider horizontal social control mechanisms on team level (concertive control induced by high team identification) and vertical bureaucratic managerial control mechanisms on organisation level (interactive and diagnostic management control systems), and examine their combined influence on the innovativeness of self-managing product development teams in a large company. In contrast to some prior research findings, we find a negative effect of the concertive control on team's innovativeness. In addition, managerial interactive control systems fostering a more prestigious team's organisational image seem to strengthen the negative effect of concertive control on the team's innovativeness, while in combination with diagnostic control systems, legitimising the current team image of external organisation, the effect of concertive control becomes positive. Interestingly, our analysis suggests that as concertive control increases, managerial control systems show a converse relationship in such a way that the diagnostic control reduces and the interactive control increases the negative influence of concertive control. This research is sought to provide a multilevel perspective towards the managerial precursors of innovativeness after transition to a flattened organisation by focusing on the interplay between managerial control systems and team level dynamics. By evaluating how external control at one level influences the process of internal regulation and control at another level, this paper sheds light on the tensions that exist in 'post-bureaucratic' organisations between the external forces enacted through pre-existing managerial control systems and the internal ones exerted horizontally by peers within self-managing teams. In so doing, this paper also focuses on a multi-level setting to investigate how social team and

bureaucratic organisation level controls - directly and through the interaction with each other - influence the innovation performance of a large decentralised organisation.

In this context the effect of the related management layer is seen as an active agent operating to actively moderate the effects of the team's social form of control to achieve alignment with the organisation's goals and strategy. For that purpose, we examine the less studied role of managerial control systems (MCS) on the innovativeness of decentralised and flat structures. In particular, this study focuses on the diagnostic use of MCS relying on the traditional feedback role used to implement strategy and on the more active form of MCS, the interactive, based on stimulating communication with and support from local management. Existing research does not consider how macro organisational aspects such as MCS affect the innovativeness of teams when micro contextual features, like team's concertive control and identification, are present.

These results are of great relevance since concertive control is among the core themes which emerged as relevant in shaping the self-regulation of learning activities in teams. Thus, identifying the managerial control systems able to moderate the concertive control's effects on team innovativeness contributes in determining the factors that, in the social environment of self-managing teams, influence the self-regulation of team learning activities and examining how these factors interact with team properties to impact the natural process of self-regulation.

The proposed theoretical framework offers interesting insights into the roles of managerial control in the implementation of organisational strategy at the team level of analysis even when they are nested in concertive control. This study enables a better understanding of the complexity of multiple controls characterising workers in the post-bureaucratic era and supporting firms in the achievement of planned organisational goals. Moreover, this paper

tests empirically the model proposed by Simons (1995) confirming control systems as tools for the implementation of proposed strategies and for giving rise to the emergence of new strategies. On the other hand, the study extends Simons's model applying managerial control to teams as a new unit of analysis. In addition, differently from Simons leaving unclear the need for which organisations should combine diagnostic and interactive controls, it argues that the dynamic tension is used to secure and extend the positive effects of interactive controls on a team's innovation capabilities.

Our theoretical model is tested using data from a multilevel and multi-source survey obtained from a sample of self-managed R&D multidisciplinary teams and their different management layers. We utilise a rich empirical data set including a multilevel multi-source survey of the members of 97 organisational teams, their internal team managers, and their higher-level managers.

Paper E

Annosi M.C., Foss N.J., Martini A., & Magnusson, M. A Multilevel Framework for Organizational Learning in Self-Managed Team Organizations: an abductive micro-foundations study. (R&R in *Journal of Management Studies*)

Drawing on the social cognitive learning perspective, this study advances a multilevel theory of organisational learning for team-based organisations, which integrates principles of cognition and motivation through team level self-regulation mechanisms. We highlight and unpack these mechanisms which have been considered too much as black boxes in the previous organisational learning research. In so doing, we shed light on the processes at the basis of self-regulation of team learning activities and explore the syntactic and semantic complexity of self-regulatory learning activities of teams. Specifically, we identify three sets of self-regulatory systems characterising self-

managing teams in the areas of behaviour, cognition, and environment, and in the identification of their interaction rules. In going beyond normal control theories rooted solely in a negative feedback control system, the interaction rules define feedforward and feedback processes, which regulate self-managing teams' motivation and actions. As such, this paper, then, contributes in determining teams' psychodynamic factors involved in the self-regulation of team learning activities and analyses how these factors enact the self-regulation processes.

In spite of Crossan, Lane & White's (1999) multilevel learning framework, little research has systematically investigated cross-level organisational links (see Edmondson, 2002; Felin & Foss, 2005). Additionally, although the treatment of both constructs, cognition and motivation, is needed to systematically analyse the theory of learning and to guarantee generalisability across contexts, there is an imbalance in the literature concerning the emphasis on cognitive factors at the expense of motivational factors. Thus, the central contribution of this work lies in the identification of the self-regulated learning process of self-managing teams as the underlying phenomenon of interest and as a key part of a theory of organisational learning in modern team or project-based firms.

A comparative case study following an abductive approach was conducted. This study relied on multiple data sources, including interviews, free comments embedded in an organisational survey launched in parallel with our interviews, and organisational documents. A total of 44 semi-structured face-to-face or telephone interviews were conducted. A grounded theory-building analysis was used to address the research question. The qualitative data analysis started with a within-case analysis followed by a cross-case

analysis (Miles & Huberman, 1994). Data analysis included three types of coding, as prescribed by Strauss & Corbin (1990): open, axial, and selective.

5 Analysis and Discussion

This chapter analyses and discusses the results from the appended papers. By focusing on the team and individual factors involved in the system of self-regulation of team learning activities we answer research question 1,2. By identifying the regulative mechanisms, placed at different organisational levels (micro, meso and macro), which influence the natural process of self-regulation of team learning and innovation activities we contribute to answering research questions 3,4. By examining the effect of organisational and team internal factors over the team's learning and innovation performances we answer research question 5. The chapter concludes with concluding discussion and conclusion sections.

5.1 Mapping the system of self-regulation in self-managing teams (Research Questions 1,2)

This thesis explores the main team and individual variables involved in the process of self-regulation of team learning and analyses the relationships enacting the sub-functions defined in the self-regulation process as presented in Bandura (1978a). In so doing, the thesis offers a multilevel perspective to the theory that describes how organizational context influences teams' cognition and motivation for different achievement goals, which in turn shape the way team members participate in team learning processes.

The results we present derive from paper E and paper B. Paper E examines the self-regulated learning process of team members placed in self-managing teams as the underlying phenomenon of interest while paper B discloses the relationships between two types of team norms (descriptive and injunctive) affecting a team's social conduct and highlights their effects on the individual intentions to embrace learning and innovation activities within the team.

5.1.1 Team learning processes

Social learning psychologists represent the structure of self-regulatory processes as three cyclical phases. The forethought phases refer to processes and beliefs that happen before effort to learn; the performance phase refers to processes that happen during behavioural implementation, and self-reaction refers to processes occurring after learning effort (Zimmermann, 2000).

By leveraging the description of a team's collective efficacy, a team's goal objectives and a team's task strategies for learning, as we show in the following, we describe, in sequence, each sub-process related to the self-regulation of learning and identify the self-regulatory mechanisms activating the related sub-functions which justify the emerged team's motivational status.

The processes that have been studied in this thesis are shown in fig 2 and answer the essential question of how a self-managing team becomes a self-regulated learning entity. The function of each process will be described next.

Specifically, in the next section, we examine each of the three sub-processes listed in self-regulatory systems: self-observation, self-judgment, and self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986). Each sub-process related to the self-regulation of learning in the phase of performance and self-reaction activities and identify the self-regulatory mechanisms activating the related sub-functions which justify the emerged team's motivational status which has been represented by the values reported in the forethought phase.

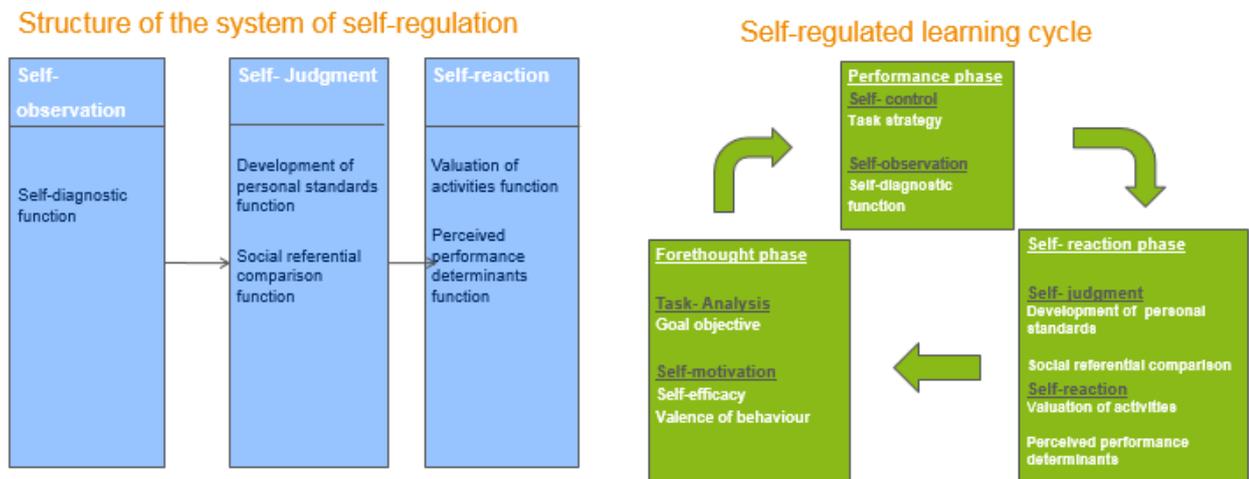


Figure 2: Self-regulation system and self-regulated learning cycle inspired by Bandura (1978a)

Analysis

Each sub-process uses a set of psychological functions, which must be enacted for self-directed change to occur (Bandura, 1986). Through self-observation process, two important functions in the process of self-regulation are realised. It offers the information needed for setting realistic goals and it analyses others' progress toward those goals (Bandura, 1991). Within the self-observation process, people identify the psychologically significant features of their social environments that induce them to behave in certain ways. Therefore, depending on their value orientations, people selectively choose some aspects of their behaviour and neglect variations in other relevant dimensions. We proposed that when team values are conceived around the need to finalise project tasks, concertive control is negatively related to spontaneous team-learning activities beyond project-related needs. Concerning the self-judgment process, it includes several subsidiary processes. Personal standards for evaluating and directing others' actions play a key role in the exercise of self-directedness. They are built up from information received through the three main modes of influence (Bandura, 1986). People create personal standards partly by looking at how

relevant others have reacted to their behaviour. Eventually, they may evaluate themselves using standards that mirror the social sanctions of others. The referential comparison with others can be represented by standards and norms, especially for some regular activities. However, standards can also be gained from coaching, through tutelage by influential persons in the social environment, or through standards prescribed by such influential people. We described the process of standard creation by proposing that the combination of concertive control and perceived time pressure leads teams to develop performance goals which reduce individual motivations to embrace proactively learning activities beyond project-related needs. This proposition represents a rule of interaction between the environment and the cognitive dimension of a self-managing team.

Additionally, we enriched the description of the self-judgment process considering that one's past behaviour is repeatedly used as the benchmark against which current performance is evaluated. In this process, self-comparisons determine the measure of adequacy. Previous results affect self-appraisals mainly through their effects on goal setting. We found that when the value orientation focuses on project performance, time pressure is negatively related to absorptive capacity assimilation with a consequent effect on the level of knowledge absorption from the environment and on the level of collective efficacy. The latter leads to a reduced level of knowledge absorption, which further reduces the level of collective team efficacy over time. Thus, we also suggested that when team members are urged to act in accordance with specific and challenging performance goals, the probability of downward self-efficacy spirals is negatively related to the results of the team's early task experience. This interaction enacts the development of the team's standards through collective team efficacy, which affects the absorptive capacity transformation responsible for the success of the team.

Concerning the description of the self-reaction process, people do not consider how well they perform if an activity has little or no relevance for them. In other words, they devote little effort to devalued activities. Performance appraisals primarily activate self-reactions in areas affecting the individual's well-being and self-esteem. Therefore, the more salient it is that performance relates to one's value preferences and evaluations of personal adequacy, the more that activity is likely to trigger self-evaluative reactions (Simon, 1979). For that purpose, we argue that team beliefs conceived around the need to finalise project tasks reduce individual motivation to embrace spontaneous learning activities beyond project-related needs. This proposition represents a rule of interaction involving the cognitive dimension of the self.

However, self-reaction also changes depending on how people perceive the determinants of their behaviour. They most likely take pride in their achievements when they can accredit their successes to their own abilities and efforts. Therefore, they do not receive much self-satisfaction when they view their performance as highly dependent on external aid or special support. Similarly, self-reactions to faulty and blamable conduct depend on causal judgments. People answer self-critically to faulty performance when they judge themselves responsible, but not when they believe faulty performance is due to unusual events, insufficient capabilities, or unrealistic demands. In the latter situations, external conditions are considered faulty. Starting from these assertions, we found that when time pressure is high, the perceived need for managerial support is negatively related to generative team-learning activities. We define the "team's improvised learning process" as emergent learning behaviours embraced by team members when new product functionalities are to be developed. Additionally, we proposed that a team's knowledge stock is positively related to the team's assimilation and utilisation of new knowledge representing the team's situational

experience. Further, we argued that the perceived need for managerial support, which promotes team members' cognitive development, acts as a moderator in the relationship between a team's assimilation and transformation capabilities with a subsequent effect on the production of new knowledge.

This proposition represents a set of rules of interaction between different dimensions of a self-managing team.

Discussion

Through the developed propositions, displayed in figure 4, the self-regulation profile of self-managing teams is, thus, revealed. Self-regulatory mechanisms enacting psychological sub-functions in each sub-process, belonging to the self-regulation system of learning in self-managing teams, are, in fact, disclosed. They are reported for each relevant sub-function in figure 3 resulting in that self-regulation of team learning activities is very distinctive from that characterising individual learning activities.

What defines them as "self-regulated" here does not rely on personal initiative, perseverance and adoptive skill but on socially constructed intention to embrace learning as a collective effort leading to focus on how to activate, alter and sustain specific learning practices in the social context of teams rather than in a solitary context. Knowing the differences in the structure and function of self-regulatory processes between individuals and self-managing teams enables managers to formulate intervention in the organisation for teams showing a lower level of self-regulatory development for learning.

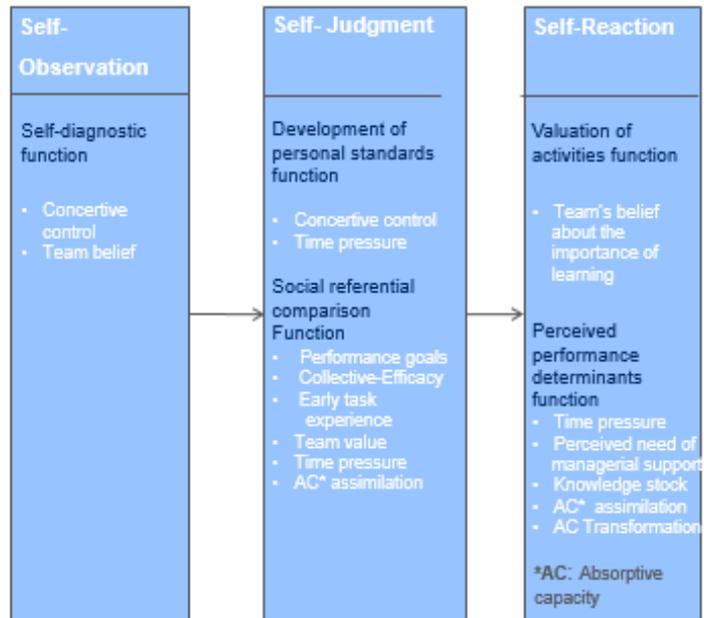


Figure 3: Self-regulation system characterised for self-managing teams

As figure 4 displays, an important emergent means through which team-based organisations’ exercise their influence is their strategic orientation, specifically strategic orientation of their teams (see team beliefs in figure 4). In line with Miles and Snow's (1978) concept of strategic orientations, this thesis considers team beliefs, and values or ideologies regarding what a team should be doing, how it should be doing it, how it should be evaluated, and how these what and how aspects should be reflected in structures and processes.

A team’s strategic orientation is also in line with the term “interpretive schemes” which is close to these concepts including shared meanings or paradigms (Kuhn, 1970; Brown, 1978; Sheldon, 1980; Pfeffer, 1981; Benson, 1983), beliefs (Sproull, 1981), ideologies (Beyer, 1981; Starbuck, 1982), schemata (Weick, 1979) and with some definitions as organisational culture (Jelinek, Smircich & Hirsch, 1983).

This study has shown how the ways organisational teams understand and interpret events have an impact on both their responses and functioning indicating that organisational members' "interpretive schemes" and their expression in "provinces of meaning" are the most influential factors on the design of organisational structure.

Ranson, Hinings & Greenwood (1980) used the concept of interpretive schemes from Giddens (1979) and Schultz (1967) to delineate the cognitive schemata that represent our experience of the world, determining both its crucial dimensions and how we are to comprehend them. Interpretive schemes act as shared, crucial assumptions about why situations occur as they do and how people behave in different situations.

As shown in figure 4, we also propose that organisations' structural characteristics both legitimise and cage actions where, by structure, we mean the following: "Rules and resources, recursively implicated in the reproduction of social systems. Structure exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action". (Giddens, 1984, p. 377). However, when interpretative schemes and their expression in action change, then, structure will also receive change which in turn will legitimise and cage later actions and interpretative schemes. During a period of norms change in interpretative schemes, structural properties become reciprocally connected with interpretive schemes and actions in the same manner as the relationship between the interpretative schemes and actions. In turn, these structural properties, interpretative schemes and actions are all modified in interaction with each other. This explains the consistency of meanings transmitted through team identity and the implemented organisational structure.

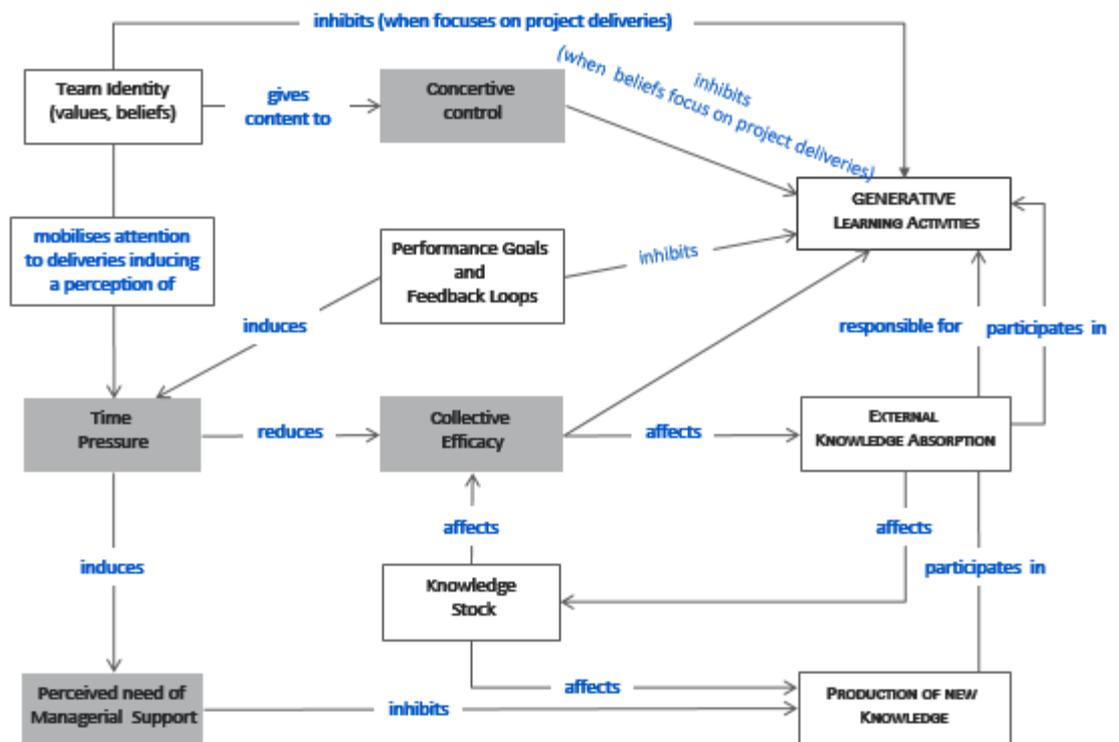


Figure 4: Disclosed dynamics for the self-regulation of learning behaviour

5.1.2 Motivating team members to learn: the role of team norms

Teams' social norms, descriptive (what most others do) and injunctive (what most others approve or disapprove of), are shared among members and are a core part of the group's identity (Turner, 1991). Because they reduce ambiguity in the decisions to take, they allow members to predict each other's behaviour (Kraiger & Wenzel, 1997). Independently of the nature of the norms - descriptive (i.e., how people typically behave in a given situation) or injunctive (i.e., how people ought or ought not behave in a given situation; Forsyth, 2006), both types give standards that guide members toward appropriate behaviours in that context. In fact, group norms are standards for appropriate behaviour that develop through interactions among group members and are informally agreed upon (Cialdini & Trost, 1998; Raven & Rubin, 1976). If team members feel part of a group and consider that group

membership is relevant for them, they will adapt their behaviour to align to the group's norms and standards, which in turn will dictate context-specific attitudes and behaviours that are appropriate for the team.

Paper B reveals the nature of the organisational mechanisms related to the activation of injunctive (see the perceived feeling of time pressure) and of descriptive norms, and determines the conditions under which a unique effect of agile work routines and managerial practices emerge to impact individual intention to learn.

In this study, we offer a multilevel theory that describes how teams' motivation for different achievement goals, that is, collective goal orientations in the form of norms, shape the way individuals and teams collectively participate in organisational learning processes. Collective goal orientation is here interpreted as a shared perception of the appropriate way to behave in group achievement contexts; as such, it is best conceptualised as a behavioural norm at the group level.

Analysis

This research highlights how descriptive and injunctive (mostly performance-oriented) norms emerge in work groups and influence information interpretation and integration at the individual level. Specifically, it describes how groups' norms can become embedded in the organisational culture (see descriptive norms) and affect the ways in which learning processes are institutionalised throughout the organisation. It also provides theoretical grounding for relationships between teams' norms (descriptive and injunctive) and learning processes across levels of analysis, and offers answers to the questions of why some team members and work groups actively participate in taking learning opportunities in their work experiences while others more passively avoid such opportunities. Further, it also describes several contingencies that may alter the ways in which norms emerge.

Thus, the resulting theoretical framework may facilitate future research on the micro-foundations of organisational learning. In fact, our theory highlights the micro-foundations and dynamics of organisational learning, which presents a complementary viewpoint to the macro-organisational approach that is more prevalent within the organisational learning literature (e.g., Felin & Foss, 2005; Selznick, 1996) and to the meso-organisational approach treated in paper E, addressing the self-regulatory process of a team as a new entity to analyse.

We assessed the relationship between descriptive norms and the individual intention to innovate and to devote time to learning, and proposed that a team's descriptive norms for creativity and group innovation are positively related to the individual intention to trigger innovative initiatives inside the team.

However, since behaviour may also be guided by a desire to do the "right" thing, we needed to know more about the influence of injunctive norms on individual intention. For that purpose, we suggested that descriptive norms about group innovation are positively related to individual intentions within the team and the magnitude of this association increases as injunctive norms increase.

Additionally, as Ajzen & Fishbein (1980) suggest that the threat of social sanction is not considered necessary for norms to influence individual behaviour, norms are indicated as enacting influence because individuals use important referents to guide their actions (Ajzen & Fishbein, 1980). Thus, from the perspective of social norms, team members may perform an action because they think that relevant others expect them to do so (subjective norms), or because failure to do so could result in social sanctions (injunctive norms). The common element in these types of influences is that behaviour is driven by expectations about others' beliefs. Individuals often have clear knowledge about what others want them to do,

and consequently they can elaborate their perception about injunctive norms using experience of others' reactions to their behaviours. Specifically, we proposed that within the agile Scrum routines of daily stand-up meetings, descriptive and injunctive norms are enacted, having as important referents the team's manager and stakeholders. Additionally, we suggested that the magnitude of the relationship between descriptive norms related to group innovation and behavioural intention grows as outcome expectations become stronger.

Furthermore, making the team's activities and planning publicly known to managers and stakeholders constitutes an important mechanism to improve individual identification with the organisation. Dutton, Dukerich & Harquail (1994) suggest, in fact, that the visibility of the affiliation with an organisation is a moderating factor in the relationship between attractiveness of a perceived organisational identity and organisational identification, since this visibility underlines individual affiliation within the organisation. On the other hand, the visibility of a team's participation in the realisation of stakeholders' objectives generates an enhanced cognitive elaboration of the organisational social identity of the stakeholders.

Elaboration of a team's social identity favours and becomes the prerequisite for the formation and the enactment of peer control which is a form of normative control (injunctive) enacted by peers. In fact, there is a robust link between the micro-technique of discipline and employees' identification with the organisation. A high level of team identification allows for higher norm consensus which is helpful in clarification of what the context demands. Expectations about team members' behaviours are made more explicit, and their salience increases. The negative consequences of not engaging in productive teamwork acquire more impact for the team members. This process prevents any

autonomous decisions about putting effort into the team task, thereby eliminating any motivational barriers that could lead team members not to participate in productive and collaborative teamwork (Cooper & Withey 2009).

In addition, as Foucault (1977) notes, when team members identify so strongly with organisational values, they do not have the critical distance necessary to judge the fairness of the micro-techniques they have generated collectively or in which they have been involved. Specifically, team members who identify strongly with their teams should feel better about themselves when they accomplish identity-relevant norms compared to when they violate these norms. On the other hand, individuals with no identification with the group will exhibit emotional responses to conformity versus violation (Christensen, Rothgerber, Wood & Matz, 2004).

Hence, injunctive norms, having a moral aspect, define what people should do, acting as self-standards that determine whom the individual would like to be or whom they ought to be (Higgins, 1987; Moretti & Higgins, 1999; Schwartz, 1977; Schwartz & Fleishman, 1978).

Hence we propose that greater group identification increases the use of team injunctive norms as behavioural standards for group members.

Consistent with this discussion, we proposed that injunctive norms about group innovation are positively related to individual intentions inside the team and the magnitude of this association increases as group identification increases.

Furthermore, the theory of planned behaviour indicates three conceptually independent antecedents to individual intention. The first is attitude toward the behaviour which is related to the extent to which the individual has a favourable or unfavourable evaluation of the behaviour in question. The second predictor is the subjective norm which is the

perceived social pressure to enact or not to enact the behaviour. The third determinant is the degree of perceived behavioural control (self-efficacy). According to the theory of planned behaviour, the more positive people's attitudes and subjective norms, and the greater their perceived behavioural control regarding a behaviour, the more likely they will intend to perform that behaviour. Similarly, the stronger people's intentions, the more likely they will perform the behaviour. Thus, in line with the literature, team members' beliefs about the relevance of the innovative behaviour and their individual self-efficacy are positively related to team injunctive group norms and we proposed that perceived behavioural control towards an innovative activity mediates the relationship between the attitude to the innovative activity and the injunctive norms to perform (or not) that innovative activity and the individual intention to embrace it.

As reported in Annosi, Magnusson, Martini & Appio (2015), perceived time pressure (as an injunctive norm) is influenced by: 1) a team's attitude to revealing the importance of project tasks to team members; 2) the characteristics of specific agile routines imposing constraints and rules on people's actions as in the implementation of boundary control systems (Simons, 1991, 1994); 3) concertive control from peers enacting pressure to get the job done; and 4) implementation of diagnostic controls (Simons 1991, 1994) in the form of goals and feedback loops. Specifically, team attitudes mirror the values transmitted through line management together with their social environment and represent the basic values which drive team intentions. In agile, team members consider the priority to be the development of features, not innovation and learning. As a result, they prioritise project deadlines which they feel adds pressure, and do not implement strategies to foster learning. Identification with a social group may increase the importance of an attitude if the team's rights are considered to be at stake (Key, 1961; Modigliani & Gamson, 1979).

Hence we proposed that team members' attitudes about the importance of group innovation are positively related to injunctive norms about group innovation. Additionally, we suggested that team members' attitude to the importance of group innovation mediates the relationship between group identification and injunctive norms about group innovation.

In an agile context, the effects of boundary control systems, defined as the formal systems used by top management to establish obligatory limits and rules (Simons, 1994), impose complex agile routines/ceremonies that apply to team members. Among these, product backlog seems to limit the team's freedom to allocate time to anything not clearly included in the specific time-period (or sprint).

On the other side, diagnostic control systems are defined as formal feedback systems used to monitor team outcomes and correct deviations from pre-set performance standards (Simons, 1994). They are represented by the short feedback loops in the agile framework. Examples of feedback include daily stand-up meetings, continual integration activities, three-weekly demo and retrospective, frequent meetings with product owners to track team progress, and information radiators to constantly monitor team competence. Barker (1993) defines concertive control systems for self-regulating teams as normative controls that become restrictive for individual team members, creating high levels of stress. The effect of concertive control is that people feel they are being watched and their contribution to team goals checked up on.

In order to clarify the impact and the relevance of these constructs on the team's injunctive norms, we need to introduce the concepts of goal desirability and goal feasibility as norms concerned with the desirability of the means and goals. Goal desirability and goal feasibility are two constructs to explain goal-directed behaviour. They have been described as key concepts (e.g. Atkinson, 1964, Liberman & Trope, 1998; Gollwitzer, 1990). They

have been related to the concepts of desire and belief in the philosophy of action (Mele, 1997), and goal desire in turn has been defined as “the valence of an action’s end state, whereas belief regards the ease or difficulty of reaching the end state” (Lieberman & Trope, 1998, p.7).

Specifically, goal desire indicates desire for a behaviour, while goal-perceived feasibility is perceived as behavioural control (Perugini & Bagozzi, 2001). Hence, an increase or decrease in the desire for a goal should lead to an increase or decrease in the desire for the behaviour functionally tied to the goal. At the same time, an increase in perceived goal feasibility should produce an increase in perceived behavioural control and the influence of perceived goal feasibility on perceived behavioural control should very high given the functional link between goals and behaviours (Perugini & Conner, 2000). Thus, as behaviours are selected based on their usefulness for achieving a goal, a certain level of perceived easiness of the goal should bring about a choice of behaviours perceived to be at a corresponding level of feasibility and personal control (Perugini & Conner, 2000).

According to Perugini & Conner (2000) the motivation and the volition to perform a given behaviour is usually a function of both distal (e.g. the desired goal) and proximal variables (e.g. perceived control over a given behaviour). Based on the above, we can assume that collective injunctive norms in teams are determined by the diagnostic controls, contributing to the goal desirability and limited by the boundary control related to the implementation of agile methodologies combined with the interpersonal pressure imposed by the concertive control which simultaneously influences the formation of perceived control. Boundary and concertive controls contribute to the perception of goal feasibility within the team and act to limit team members’ actions. Hence we proposed that injunctive norms about group innovation in self-managing teams are determined by the implementation of diagnostic

controls, which contribute to the desire for innovation action by imposing continual monitoring on the team's work.

Additionally, we suggested that injunctive norms are influenced by the team's perception of feasibility of the innovation activity, which is determined by the related concertive control and boundary controls defining the constraints on a team's actions and impact the constraints on a team's actions and impacting the perceived behavioural control of team members.

Figure 5 shows some important relationships described in the paper.

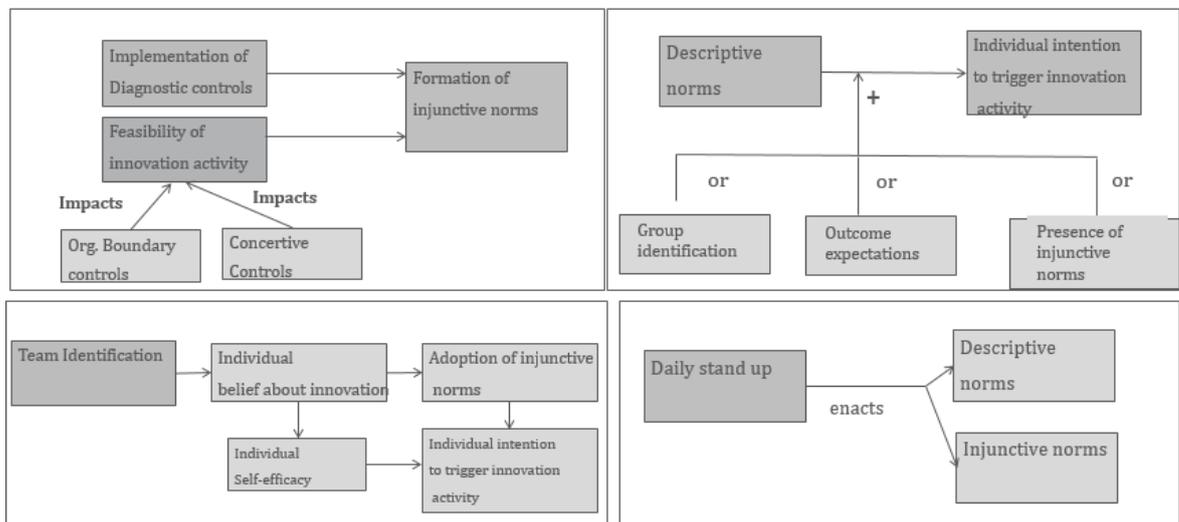


Figure 5: From team level to individual self-regulation

Discussion

The aim of this study was to give a fuller depiction of why and how learning evolves in organisations from organisation down towards team and individual level by using an emergent, motivational perspective inspired by achievement goal theory (Dweck, 1986). Organisations and teams are goal-directed units that often pursue achievement first and foremost, yet they cannot continue to adapt and succeed in competitive environments without a concomitant focus on learning. Our theoretical synthesis of organisational

learning and achievement goal theories answers the question of why learning arises in organisations by depicting how individuals' interpretations of achievement situations leads them to actively pursue or avoid learning opportunities in their daily work settings. Our framework also describes how such learning is revealed by showing how the achievement motivation present across individuals and collectives pushes different behaviours that influence multilevel learning processes. Despite our framework primarily stressing the emergence of a shared perception of the appropriate way to behave in achievement contexts, we also underlined important top-down effects, such as group leadership and organisational reporting structures. This multilevel theoretical framework shed further light on the relevance of the motivational micro-foundations of organisational learning beyond the cognitive, resource-based, and competence-based macro approaches that are more commonly seen in the organisational learning literature.

5.2 Organisational control mechanisms regulating the self-regulation of learning activities (Research Questions 3, 4)

The task of harnessing human efforts for the attainment of organisational objectives such as organisational learning has always been of crucial importance. In their endeavour to increase control over the behaviour of people, organisations use a combination of mechanisms. In the bureaucratic, industrial mode managerial activity is typically concentrated on designing and supervising work processes that reduce the (intellectual) effort and skill necessary for the worker to carry out his or her work (Karreman & Alvesson, 2004). It relies on phenomena such as vertical division of labour, hierarchy, and the formalisation and standardisation of work processes (Mintzberg, 1983; Wright, 1996).

Additionally, management and bureaucracy lay on the idea that work can be shared between those who work and those who plan, organise, coordinate, and control work. However, as traditional industrial work reduces in organisations, and other forms of work increase in frequency and importance, managerial intervention applies other modes of operation (Karreman & Alvesson, 2004). According to Etzioni (1964), among others, management targets behaviour indirectly, through norms and values, in such organisations. This is realised through managerial practices that Etzioni labels, and Kunda (1992) elaborates, as normative control: ‘the attempt to elicit and direct the required efforts of members by controlling the underlying experience, thoughts, and feelings that guide their actions’ (Kunda, 1992: 11).

In the case of self-managing team-based organisations, most work situations include elements of worker autonomy, which management ceaselessly tries to coopt and colonise in the name of the corporate good (Karreman & Alvesson, 2004). According to Bendix (1956): ‘beyond what commands can effect and supervision can control, beyond what incentives can induce and penalties prevent, there exists an exercise of discretion . . . which managers of economic enterprises seek to enlist for the achievement of managerial ends’ (cited in Kunda, 1992: 12). The second part of the thesis has three specific objectives: (1) to examine the nature of cultural-ideological modes of control like team identity and indirectly norms as they result in important self-regulatory mechanisms for team learning activities, by exploring their effect over the main team outcome such as team innovativeness, by analysing the effect of their combination over team innovativeness and identifying their organisational determinants; (2) present a model of control which identifies the major variables and specifies their interrelationships and (3) to provide possible direction for

future research having developed propositions concerning the control of human behaviour in a formal organisation at individual and group level as well as overall in the organisation.

The results we present derive from: paper C which examines the multilevel process of organisation and team identities formation; paper D which answers calls for a more nuanced explanation of how concertive control combinations affect team performance (team innovativeness and effectiveness), by assessing the joint impact of managerial intervention (diagnostic and interactive controls) and concertive control; paper A which directly examines the effect of time pressure on team creativity, and also identifies the organisational mechanisms responsible for perceived time pressure.

5.2.1 Organisational mechanisms affecting the formation of team identity

As highlighted before, we choose to concentrate more on a relevant set of core themes affecting the self-regulation of team learning (see figure 3) to give focus and direction to two important questions, each of which is centrally connected to the broad goal of this thesis. In this chapter, we debate the relationship between management control, social identity, and identification. Since both social identity and identification are socially formed, it is also possible to impact and manage them.

Analysis

Identity is a concept that has many meanings and applications in organisational analysis. Social identity has particular importance for organisational activities as it gives clues for action, interpretation, and conduct. In this capacity, social identity may provide guidelines for organisational action, that is, potentially operate as a device for the exercise of managerial control.

Identity may refer to the organisational level: organisational identity (e.g. Albert & Whetten, 1985; Christensen & Rosenbloom, 1995) or, on the other hand, refer to individuals or groups of individuals (Knights & Willmott, 1985, 1989; Ashforth & Mael, 1989; Deetz, 1992). However, the three levels are connected to each other: organisational identity informs group identity which, in turn, can affect personal identity or vice versa in these cases (Dutton et al., 1994). Here we use identity as a bridging concept between individual, group, and organisational levels. In particular, we will focus on social identity, on the team level, in contrast to organisational and individual identity.

Social identities are assimilated by means of various processes of identification.

Identification relies strongly on people's tendency to classify themselves and others into different social categories (Pratt, 2000). These categories have two main functions: (a) as cognitive tools for ordering the social context, and (b) as an instrument of reflexive identification. Social categories are, thus, means for making sense of both the social environment and the self's location in it—one's identity in relation to the social environment at hand. Processes of identification are a key theme in our analysis as well.

However, the central purpose of this study is to develop a model of team identity construction that more effectively integrates theory on organisational identity and organisational identification and leads to identify cross-level mechanisms between team and organisational identity and to analyse how managers and a team's stakeholders influence the formation of team identity in an agile context. We build on the idea that "organisational identity is best understood as contested and negotiated through iterative interactions between managers and stakeholders" (Scott & Lane, 2000:44). Scott & Lane (2000) suggest a number of relations between stakeholder characteristics, such as the density of their related networks and their ability to influence managers' reconstruction of

organisational identity. We expand on these ideas and specifically on the view that organisational identity is an outcome of the complex interactions among managers, organisational members, and other stakeholders. Nine relevant propositions have been advanced.

First, we found that the dense networks of stakeholders had the capacity to efficiently monitor the team's actions, enacting a form of pressure on the team pushing it towards conformity. In contrast, in the less dense network of innovation coaches driving product innovation, teams had more discretion over their actions, as they were under less unified pressure. While the sparse and fragmented network of the innovation coaches exhibited a limited ability to monitor team behaviours or to create shared behavioural norms, project stakeholders were able to exert a strong influence on teams and the resulting pressure was sometimes conflicting with that of the innovation coaches. Consequently, teams were often unable to conform to innovation coaches' expectations because doing so would require defying the expectations of project stakeholders. As such, teams could resist innovation coaches rather than meet their demands by claiming a lack of time for innovation and by arguing that the quality of their product was the priority. The above reasoning and observations motivate us in arguing that in the presence of agile routine, the combination of shared expectations that agile practice will be followed and the ease of information exchange among an agile team's stakeholders create conditions for applying strong, unified stakeholder pressure to teams. Second, we proposed that the denser a team's stakeholder network, the greater the influence of that team's stakeholders' needs, values and belief on the team's reconstruction of organisational identity, so that the team identity will be isomorphic to organisational identity.

Third, we found also that the coordination role of Scrum Master inside the team puts him/her in a favourable position to isolate the other project stakeholders from one another and to undermine their coordination ability; consequently, his/her imposed norms and beliefs are diffused across the stakeholders' networks. Thus, we suggested that the greater the centrality of a focal actor, such as a Scrum Master, in the team's stakeholder network, the less the influence of other stakeholders' needs, values and beliefs on organisation identity.

Fifth, we argued that greater interaction between stakeholders and teams increases the accessibility and salience of stakeholders' organisational social identity, which is likely to influence how team members evaluate and answer to stakeholder issues. First, by creating a common interpretative frame based on which information about stakeholder attributes and issues are collected, screened, and evaluated; second, by motivating behaviours and practices, that protect, improve or support the organisation's identity. Thus, we proposed that the embeddedness of a Scrum Master inside the team favours the diffusion of the Scrum Master's norms and beliefs inside the team. Therefore, team identity and alignment with the organisation identity are moderated by the presence of a Scrum Master.

Sixth, we also found that teams adopt standards that reflect their current perceptions of the organisational image, test their cognitive understanding against those standards using information taken from their social environment, and take actions to decrease any discrepancy. The team's regulatory aim is to reduce the discrepancy between standards and "enacted" behaviours (Lord & Hanges, 1987). Information and feedback from stakeholders ease the standard setting, enabling the team to find out and reduce discrepancy and adjust behaviours, renewing the interpretation of the organisation's image. When stakeholders' behaviours are supportive of team goals and actions, they reinforce team perceptions of

organisational identity in a direction that is consistent with desired organisational images, and the team becomes more resilient to change (Bem, 1972). Stakeholders' continual validation ensures their pivotal role in the building of team memory. Thus we proposed that team members engage in active processing of an organisation's identity-relevant information to reflect stakeholders' appraisals, managers' self-identities, and perceived organisational goal attainment.

Seven, the public presentation of the team's activities and planning in the presence of managers and stakeholders constitutes an important mechanism for improving individual identification with the organisation. The visibility of the affiliation with an organisation moderates the relationship between the attractiveness of a perceived organisational identity and organisation identification, as visibility supports people's affiliation within the organisation (Dutton et al., 1994). On the other hand, the visibility of the team's participation in the realisation of its stakeholders' objectives generates an enhanced cognitive elaboration of the organisational social identity owned by the stakeholders. Hence, we proposed that the visibility of a team's work processes favours, within the team, the cognitive elaboration of a perceived organisational identity, thereby increasing the accessibility and salience of team-related stakeholders' organisational social identity and the likelihood that team members will eventually become self-disciplined.

Eight, we underlined that, within the team, the high interdependence intensifies the connectivity among people. As connectivity becomes more intense, team members tend to behave in similar ways, despite the freedom to be different. This creates a set of legitimised working conventions (Scott, 1995), nested in the value-based controls, that become the basis on which members operate in the development of products or services. The longer one stays within an organisation, the more prominent self-categorization and organisational

membership become (Kramer, 1991). As identification with a group increases, so does motivation to reach group goals (Ashforth & Mael, 1989; Dutton et al., 1994). This led us to state that team members' task interdependencies and team members' stability inside the team favour individual identification with the team identity.

Nine, we also found that within the team, individuals are exposed to the scrutiny of the entire team so that low performers are motivated to improve their own efforts and high performers push others towards continual improvement. In the daily meetings, team members had the opportunity to indicate their approval or disapproval of behaviour or performance of others, making the daily meeting a forum for rewarding or sanctioning. This leads to a controlling horizontal disciplinary force running across the team, creating the conditions for an extended mode of concertive control (Barker, 1993). Concertive control is based on the ability of the team to use its own sanctions and rewards, associated with the individual basis of evaluation discussed above (Sewell, 1998). In our context, concertive control was enhanced through the Scrum Master's surveillance. Being embedded in the team, he/she had the organisational mandate to reach a high degree of compliance, implementing what Sewell (1998) calls "biopower."³ Thus, we proposed that the team's concertive control and the Scrum Master's allocation to the team jointly cause continual re-establishment of team identity towards higher performance standards and full compliance of the team members with the team's renewed norms. Additionally, we stated that internal team - tension with regard to enhanced performance standards and full compliance with the team's norms creates a feeling of pressure inside the team and focuses the attention of team members on the induced organisational goals.

³ "Biopower normalizes individuals within categories through its ability to identify prodigious subjects, people who don't fit in. These misfits would then receive the attention of the normalising forces of modern society, such as therapy, discipline, or medical treatment "(Sewell, 1998: 421).

Discussion

We have illustrated how organisation identities form, pointing at the conceptual examination of what occurs during the identity formation, as part of a broader discussion on how different levels of identity influence each other. We have advanced on team identity formation utilising multiple levels of analysis, looking at cross-level dynamics and interpreting organisational identity as a nested structure of team identities. Differently from the relatively small body of literature dealing specifically with identity formation per se, which has most often tended to investigate particular aspects of organisational identity formation, we have focused on the overall processes through which it occurs (see Ashforth et al., 2011, for a conceptual exception).

In figure 5, the main identified relationships responsible for the formation of team identity are displayed.

They involve, at the meso level, organisational practices acting as a source of identity inertia. In fact, in accordance with Kogut & Zander, (1996) and Oliver (1997), we revealed that identity is deeply embedded and inextricable from organisational routines and practices. Thus, even when organisations pursue strategic change by announcing and acknowledging a shift in identity, the change may not materialise unless there are attempts to examine and revise routines and organisational practices. At micro-level, we have identified team properties which act as enablers of team identity persistence.

At macro level, we have disclosed the effect of external influence through the interaction between managers and stakeholders on team identity. This suggested that interaction among stakeholders must be coordinated cautiously in a way to secure a greater overlap between

organisational identity and stakeholder identity. Stakeholders may come to identify more with each other than with the organisation and to act collectively to further their own interests. Power would then derive from this ability of stakeholders to act in concert with each other, to marshal joint resources, and to coalesce around a shared reality.

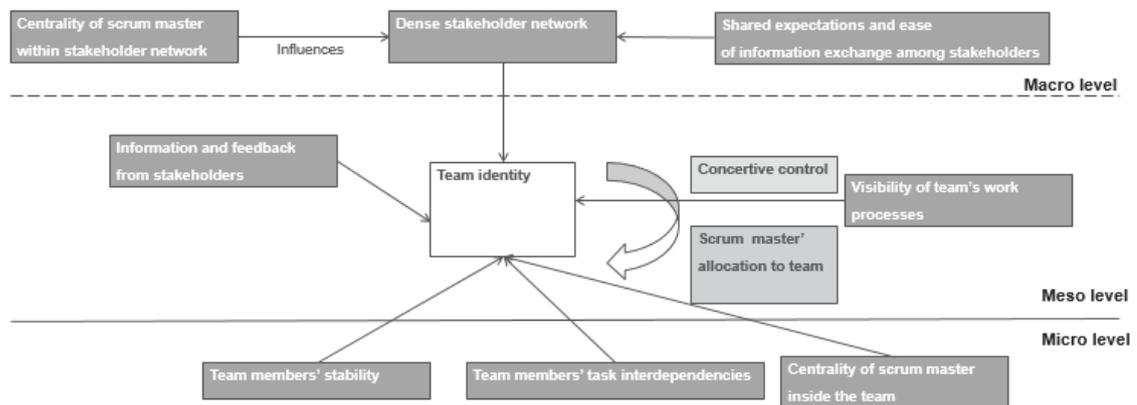


Figure 6: Relationships relevant for team identity formation

5.2.2 Perceived time pressure: organisational control mechanisms responsible for its enactment

From the analysis of the data collected, time pressure was revealed to be the most common experience at work, especially for teams that develop new products. In line with Barczak & Wilemon, (2003) time pressure has, indeed, emerged as a prominent stressor experienced by project teams in this new agile context. Although much has been said about the effects of time pressure, more empirical studies are needed to better understand its impact on teams. Only a few studies have attempted to explore this area empirically (Drach-Zahavy & Freund, 2007; Keller, 2001; Lansisalmi, Peiro, & Kivimaki, 2000; Semmer, Zapf, & Greif, 1996). Prior research on performance effects has shown clearly that time pressure, defined as either perceived time pressure or the imposition of deadlines, increases the rate of individual and group performance (Kelly & Karau, 1993, 1999). However, results have

been not consistent on the quality of performance, with evidence of a positive relationship (Kelly & Karau, 1999), a negative relationship (Kelly & McGrath, 1985), a curvilinear relationship indicating an optimal level of moderate time pressure (Isenberg, 1981) and no relationship at all (Bassett, 1979). Significantly, most of the research studies have focused on the performance of relatively straightforward tasks rather than tasks requiring learning and innovation behaviour. Indeed, there is relatively little research directly analysing the effect of time pressure on creativity, defined as a novel, appropriate response to an open-ended task (Amabile, 1983). Most importantly, to the best of our knowledge, there is no research that has directly examined the process that presumably underlies the production of creative work.

Analysis

This study investigates the antecedents of, and coping resources for, time pressure, and the influence of time pressure on team innovation performances. Specifically, using an abductive approach, this study examines the relationships between time pressure and the resulting learning and innovation performances of the team and analyses the organisational control mechanisms inducing the perception of time pressure in teams in order to adequately minimise the dark side of working in agile.

We investigated micro, meso and macro level of controls acting respectively inside, on the border and externally to the agile team to clarify the reason for the team's behaviours and their influence on both the teams' innovativeness and learning performance. Within an agile context, we identified different types of controls in the team's current routines, values, and related managerial and stakeholder behaviours.

In particular, our research has shown the relevance of the following types of controls: managerial diagnostic, interactive, belief, boundary control systems, placed at macro and

meso level, together with the value-based concertive control placed at micro level. The latter is a normative form of control which may arise from inside the team as a consequence of a shared set of values consensus that becomes constrictive to the individuals within the team, producing high level of stress and demotivation among team members. This type of control is named concertive control.

Diagnostic control systems (see Simons 1991, 1994) allow sensing and recording the signs of anomalous team functioning and monitoring relevant performance variables within predefined and acceptable limits. Managers adopt these systems to track the achievement of organisational goals, to monitor work progress and to measure and adjust deviations from a pre-defined set of performance measures. In the agile context we distinguish between diagnostic controls acting at meso level from the ones at macro level in the organisation. In addition, self-determined diagnostic controls are generated by teams themselves and belong to the micro level. We classify at meso level the performance management actions derived from imposed task routines, expressed requests from team leaders and the team's stakeholders. Examples are: daily meetings among teammates to track the team's work progress and identify needed actions, regular demo meetings with the team's stakeholders to show the results of the work performed after a short iteration, etc. We assigned to macro level the controls originating from the organisation and managerial layer and put in place to shape and monitor the team's behaviours. Under this category fall: team performance and learning goals, information radiators to constantly follow the team's work progress and competence against the established goals. At micro level, we consider self-determined goals and feedback loops that autonomous teams set for themselves to meet the deadlines and to continually improve the performance. Under the condition of self-transcendence, teams set

their own goals and continue in evaluating themselves in such a way that they develop new and better means for fulfilling those goals.

Companies adopt **belief control systems** (see Simons, 1991, 1994) to communicate key business values, directions and goals managers want their organisational members to take and achieve. The main aim of these controls is to raise and stimulate commitment to the organisational core values. The formal belief systems are particularly important in a large and decentralised context such as the one created by the implementation of agile practice, since they contribute in providing employees with a clear and coherent picture of the key organisational values and of their role within the business. In this new organisation context, based on self-managing teams, we found that the belief controls system was distributed across macro, meso and micro layers. At macro level, the high level managers reinforced the transition to a flat organisation of self-managing teams communicating the value of efficiency as enabler of value creation in the organisation, while line managers focused on creating conditions for a successful implementation of self-managing teams transmitting the importance of knowledge sharing among team members and of competence-broadening being crucial in order for teams to work as cross-functional. At meso level, team leaders foster the relevance of the team's routines and the team's attainment of them in order to produce a high performing team. At micro level, managerial beliefs are absorbed by the team and made their own.

Boundary control systems (see Simons, 1991, 1994) put limitations and orders that must be respected within the organisation. In the agile context, we discovered that they were expressed through the complex sets of routines team members have to adhere to, that identify and reinforce acceptable behaviours. An example is represented by the presence of

the product backlog that seems to limit the team's freedom to reserve time for anything that is not clearly stated during a specific iteration.

Interactive control systems (Simons, 1991, 1994) consist of formal mechanisms, adopted by managers, to systematically and personally include themselves in employees' decision making. In the firm environment, we found that the interactive control systems are used at macro and meso levels over the micro, at meso over the macro and vice versa reinforcing each other. An example of interactive managerial controls, we have the continual interactions between the team and the the team's stakeholder's role as the Scrum Master and product owner as the following quote illustrates:

"We sometimes have meetings with the Scrum Master and product owner to discuss some issues that we need to coordinate, we also have other formal meetings every third week of the month in order to discuss impediments with the Scrum Master and product owner".

[Line Manager]

Specifically, the product owners were constantly striving to focus the team's attention on project development activities and the proper allocation of their working time, being involved in all the relevant agile ceremonies for decision making on the team's plan and effort.

"[which kind of information do you exchange with the teams?] Information to make sure that what the team is doing is the highest prioritised and value-giving work and if circumstance change I inform the team and they also do the same so we get the flow going". [Product Owner]

"We have grooming, sprint planning, demo and quite a few technical meetings, in between when needed. At the grooming we walk through what is remaining in their sprint backlog and we can plan new tasks related to the user stories". [Product Owner]

Concertive controls (see Barker, 1993) reveal how team members, “in concert”, develop mechanisms for controlling their own activities. They shift from values to norms to rules that turn out to be binding, limiting, and invisible. These norms and rules provide the workers with a sense of self-control aiming to achieve a good job for the team. Within the agile teams, people feel watched if they contribute to team goals and feel uncomfortable if they are away from what other team members are doing for the project. Hence they feel implicitly forced to finish their task as soon as possible in order to start the next one. We discovered three relevant results related to the combination of controls. First diagnostic and boundary control systems, in combination with team identification and concertive controls, have a negative reinforcing effect on the team’s perceived time pressure. Second, we proposed that a combination of team identification and concertive control negatively influences a team’s learning and innovation, when team value systems are centred on project needs. Third, we suggested that a combination of diagnostic and boundary control systems negatively influences a team’s learning and innovation, unless they are implemented through routinised behaviours.

Discussion

Previous studies have generally supposed that speeding up new product development influences project performance directly, without considering the possibilities of a “black box” between accelerating the development process and its outcomes. An inconsistency that has been highlighted is the relationship between speeding up and product quality. Another inconsistency is the relationship between speeding up and information sharing. Eisenhardt (1989a) found through a case study that teams make use of more information in a fast velocity environment. However, Perlow, Okhuysen, & Repenning (2002) did not find

similar outcomes. Eisenhardt (2004) highlighted this inconsistency in a review and stressed a need for further investigation.

In this study, we show, instead, that speeding up increasingly constrains team members' cognitive resources and causes actors to experience pressure. However, despite speeding up having an intricate effect on people's cognitive resources, human issues, like time pressure, have rarely been considered in product innovation studies (cf. King & Majchrzak, 1996). Our results underline the importance of managerial practices and work routines, derived from the implementation of Scrum, which serve as efficiency carriers, and thereby contribute to the achievement of several aspects of team performance. More in general results stress the role of formal and informal controls as a prerequisite for the team's self-regulating learning strategy and innovation. They confirm also that team innovation and self-regulated learning depend greatly on the team's internal pressure which acts as a mediating factor between organisational controls and self-regulation learning and innovation processes. Thus, a mix of organisational control systems contributes to increased monitoring of team members' behaviours, generation of behavioural alternatives within the team, and multiple interpretations of external input, all of which are vital for innovation and learning.

Our results indicate that, although formal and informal controls are important, the interaction processes leading to time pressure on team members outweigh the managerial controls in predicting innovation.

5.2.3 Contrasting the effects of concertive control through a combination of controls

Past studies have been focused on identifying factors that clarify differences in the effectiveness of self-managing teams (Mathieu, Maynard, Rapp & Gilson, 2008). A

relevant aspect which has not been sufficiently examined is the implication from the delegation of leadership and influence from external supervisors to teams themselves (Manz & Sims, 1987; Stewart, Courtright & Manz, 2011). To be effective, members of self-managing teams must take responsibility for motivating both individual teammates and collective action. Comprehending the motivational states that form in teams to replace hierarchical control is thus of serious concern. In order to understand team motivational states, prior literature studies have mainly applied individual-level motivational states, such as efficacy and empowerment, to the team level of analysis (Chen & Kanfer, 2006; Seibert, Silver & Randolph, 2004). We embrace a different approach. Rather than relying upon individual-level motivation theories up to the team level, we apply an organisation-level motivational concept down to the team level. We precisely leverage theories of organisational control to introduce peer-based control as an emergent motivational state in self-managing teams that replaces hierarchical control to coordinate the direction and persistence of individual behavior inside teams.

After considerable research on formal, hierarchical control exercised by managers, informal control enacted by peers (hereafter referred to as “concertive control”) has more recently been recognised as a widespread organisational phenomenon with a large impact on the functioning of organisational units in general (Loughry 2010) and on teams in particular (Barker 1993). However, acknowledging that teams are usually subjected to multiple control mechanisms simultaneously to get their jobs done (Crisp 2003), scholars have lately focused their attention on the influence of combinations of controls on team performance, resulting in a promising, emerging stream of research (e.g., Loughry & Tosi 2008, Stewart et al. 2012). Despite this increasing interest being promising, we currently do not have a theoretical justification regarding how controls work in combination nor for how and why

they impact organisationally relevant outcomes (Kirsch & Choudhury 2010). Specifically, how concertive control mechanisms may complement (rather than substitute for) each other form of control and through which mediating processes they affect team performance remains unclear (Stewart et al. 2012).

Analysis

In answering calls for a more nuanced explanation of how concertive control in combination with more bureaucratic forms of control affects team performance, we assess the joint impact of diagnostic/interactive managerial control and concertive control on team innovativeness.

Although current research on control combinations and concertive control remains built on traditional theories, such as agency theory (e.g., Loughry & Tosi 2008) and Ouchi's (1979, 1980) contingency theory of control (e.g., Kirsch et al. 2002), scholars have begun to make compelling arguments for why these theories are giving little help in progressing our comprehension of these matters.

Both these theories cannot help in explaining how controls complement each other or define the processes through which they impact performance. Moreover, both theories can be discussed for their reduced applicability to concertive controls in teams (Singh 2008).

Using the self-determination theory (Ryan & Deci, 2000), we could, instead, justify and explain the following relationships: 1) diagnostic control systems are negatively related to team innovativeness; 2) interactive control systems are positively related to team innovativeness; 3) the relationship between the team's concertive control and team innovativeness is moderated by the managerial diagnostic control systems legitimising teams' current team identity, in such a way that concertive control-team innovativeness relationship is stronger for low level managerial diagnostic control systems than for high

level managerial diagnostic control systems; 4) the relationship between concertive control and team innovativeness is moderated by the managerial interactive control systems fostering a more prestigious team's organisational image, in such a way that the team's concertive-team innovativeness relationship is stronger for high levels of managerial interactive control systems than for low levels of managerial interactive control systems.

Extrinsically motivated actions can be transformed into authentic and intrinsically motivated activities as individuals identify with and fully internalise their regulations (Ryan & Deci, 2000) in order to assimilate them to the self and allow them to experience greater autonomy in action. There are three needs identified as the basis for individual self-motivation and personality integration: the needs for competence (e.g. Harter, 1978), relatedness (e.g. Baumeister & Leary, 1995), and autonomy (e.g. Deci, 1975). Many studies suggest that support for relatedness and competence enable the internalisation of regulations while they can be integrated when individuals succeed in understanding and incorporating their meaning into their goals and values (Ryan & Deci, 2000). Thus, along these lines, Deci & Ryan (2000) report that the pursuit and attainment of goals has an important impact on effectiveness and well-being, when different modes of regulations satisfy the previously identified psychological needs. The potential effect of goals on well-being will not be realised if the goals set are not in line with the actual interests and values of people's 'evolving self-system' (Csikszentmihalyi et al., 1993). Hence, both the process and content of goal attainment, goal setting and the related feedback loops, are crucial for performances and well-being. Consequently, the related diagnostic control systems have the potential to lead to a greater basic psychological need satisfaction that will be realised if some conditions are met. The diagnostic variables related to need satisfaction induce the

development of team's competence in a way to make it easier for individuals to comply with team's work requests, and encourage a sense of relatedness favouring a feeling of belonging to the team.

This justifies the results we found regarding the relationship between the team's concertive control and team innovativeness including the moderation of managerial diagnostic control systems. The diagnostic control systems will act in such a way that the team's concertive control is more positively related to team innovativeness if the managerial diagnostic control systems are high rather than when they are low.

The support for relatedness and competence needs fosters the internalisation of a regulation or value but is not sufficient to facilitate their integration. To achieve integration, individuals need to freely assimilate and accept transmitted values and regulation (Deci & Ryan, 2000). The support for autonomy, optimal structure and interpersonal involvement derived from the interactive use of managerial control systems, directly affects the degree to which people value and internalise the regulation. However, people are intrinsically motivated only for activities that satisfy their basic psychological needs such as: competence enabling them to comply with the teams' work standards, related and autonomous (Ryan & Deci, 2000). Failure to support psychological needs results in an inauthentic identity and issues of alienation and ill-being, and the lack of initiatives among employees or rejection of school values among students (Ryan & Deci, 2000). Similarly, Kasser & Ryan (1993, 1996) found, first, that putting strong relative importance on people's intrinsic aspirations is positively related to well-being indicators, while assigning strong relative importance to extrinsic aspirations is negatively related to the same well-being indicators. Hence regular intervention by management into teams' decisions may create the conditions for the team's alienation and ill-being if the team's aspiration and

psychological needs are not supported and are not in line with proposed extrinsic aspirations. The situation will be exacerbated if multiple contemporary identities are introduced leading the team to assume an apparent increased resistance to management's control. This led us to justify that the relationship between concertive control and team innovativeness is moderated by the managerial interactive control systems, in such a way that the concertive control is more positively related to team innovativeness when the managerial interactive control systems are low compared to when they are high.

Discussion

Thus, we theorised and found that managerial diagnostic and interactive controls have a direct relationship with team innovativeness capabilities and that the sign of these relationships is reversed in two sub-group analyses (low and high concertive control values). First, the results of this study suggest strongly that an interactive use of performance management control fosters team innovativeness in the absence of concertive control. By focusing the team's attention on strategic priorities such as learning and innovation, interactive use of managerial control systems (MCS) contributes to improving the team innovativeness. These results support Simons's (1990) model of control systems as a powerful means to foster and manage the emergence of strategy. These results can be extended to team level and complement empirical work conducted by Abernethy & Brownell (1999) and Bisbe & Otley (2004) which supports the role of MCS in an innovative context. Second, the results of this work provide evidence that managerial diagnostic control negatively affects the team's innovativeness capabilities, by generating constraints to secure compliance with deadlines. This is in line with theoretical arguments supporting complementarity and competition between the diagnostic and interactive controls and gives validity to the integration of both types of controls in the theoretical and

empirical analyses. The results indicate that managerial diagnostic and interactive controls contribute specifically and collectively to the team's innovation capabilities. In some circumstances, balanced use generates dynamic tension which ensures the positive effects of interactive controls which are extended by organisational dialogue, and challenge teams to focus attention on innovation and learning. Third, our results suggest that concertive control, focused around the need to deliver and meet deadlines, corresponds to a decreased level of team innovativeness. This finding contributes to the research on the normative mechanisms by illustrating how concertive control does not favour team innovativeness in the case of highly intensive R&D team activities. This study underlines the importance of concertive control as a motivational state in self-managing teams. Fourth, we show also that managerial diagnostic and interactive controls moderate the relationship between concertive control and team innovativeness such that managerial diagnostic and interactive controls are respectively positively and negatively related to team innovativeness only if concertive control is high. Specifically, this work represents a first attempt to study the multilevel performance effects of the managerial diagnostic and interactive controls and their interaction with the more commonly studied normative mechanism of concertive control. Furthermore, our results clarify the nature of the relationships between managerial interventions (through diagnostic and interactive control) and the normative mechanism of concertive control. In the case of team innovativeness diagnostic control mechanisms essentially give legitimacy to team institutions whereas interactive controls act in opposition to team norms and identity, working in the direction to improve the current external team's image which results in a decreased team well-being and consequent performance. Thus, consistent with our expectations, the effect of concertive control on innovativeness attenuates as diagnostic control increases. However, the effect is not strong

enough that a high level of diagnostic control completely substitutes for the effect of increased perception of concertive control. Interestingly, the interaction effect of interactive controls combined with concertive control was slightly different for the team innovativeness up to a point where increased concertive control corresponds to additional reduction in team innovativeness. Thus, adding managerial interactive controls aimed at reinforcing other priorities than the current ones can be detrimental to team innovativeness.

5.3 Effects of regulative actions over team learning and innovation performances (Research Question 5)

The relevance of teams as fundamental units of work in organisations (Hackman 1987, Sproull & Kiesler 1991) has been well-documented (Cohen & Bailey 1997, Harrison et al. 2003, McGrath 1991). Additionally, as innovation comes to be ever more crucial to growth in the face of competition, companies increasingly leverage teams to accomplish their innovation goals, giving such teams a new strategic importance (e.g., Ancona et al. 2002, Wheelwright & Clark 1992). Consequently, “this puts the burden on teams to learn—intensively, effectively, and rapidly” (Bresman, 2010).

With respect to the experienced time pressure, lack of product background knowledge, changing circumstances, and resource scarcity, teams are progressively becoming boundary spanning in search of external sources to learn from rather than being dependent solely on their own experiences and knowledge (Edmondson et al. 2003). As to confirm this, in papers E and A we detected the team’s developed need of managerial support. Specifically, in paper A the team level variable of managerial support resulted in acting as a moderator between the perceived time pressure and a team’s self-regulatory strategy. Recent work has focused attention on the team’s engagement on external learning activities (Argote et al. 2001, Edmondson et al. 2003, Wong 2004). In particular, Ancona and her colleagues

(Ancona & Caldwell 1992, Gladstein 1984) first described the performance effects of external activities in teams while Wong (2004) focused more on boundary-spanning activities associated with learning, and measured the extent to which teams engaged in external learning activities, disclosing a significant link between the external team activities and performance.

The different ways in which teams embrace learning across their boundaries are less well understood. In response to that we have suggested that to understand the effect of learning mechanisms on performance it is important to investigate the existence of different kinds of self-regulatory mechanisms involved in the self-regulative learning activities of teams, because they may have different effects on team performance. The purpose of this thesis is, in fact, to investigate different types of learning mechanisms in teams, to discuss how they differ and why they matter, and to empirically validate a model of how the team's learning mechanisms affect performance. The results derive from a multi-method field study of self-managing teams reported between papers D and E which provide a more fine-grained explanation of how teams engage in learning activities and how this is linked to their learning performance.

Analysis

Specifically, in paper D we demonstrated the negative effect of concertive control over the team's innovation performance and discussed this relationship in the light of auto-determination theory.

A higher level of concertive control implicitly assumes a stronger presence of team norms which become more widely shared and accepted by team members (i.e., higher norm consensus). As a consequence, they reduce ambiguity and induce a clearer and more uniform understanding among team members about the productive work behaviours they

should engage in. In addition, stronger norms convey more effectively to team members the relevance of engaging in such behaviours, by signalling the extent to which these prescribed behaviours are considered important by the majority of teams (i.e., higher norm intensity). As norms become more widely shared and intensely held among team members, they tend to become more morally binding, such that even team members who may not initially embrace these norms are likely to comply by demonstrating effort to adhere to them (O'Reilly & Chatman 1996). In addition to promoting effort, stronger norms also signal more effectively to team members what behaviours they can expect from others. Thus, under a condition of high level of concertive control, team members autonomously accomplish team norms and rules, with violation resulting in various forms of sanctioning by the team. Consequently, a form of introjection occurs for individuals within teams (Deci & Ryan, 1985) being driven by an external regulation which they do not consider as their own (Deci & Ryan, 1985). In accordance with "ought self-regulation" in regulatory focus theory (Higgins, 1997) a feeling of worth is then promoted (e.g. Ryan, 1995). That is individuals are not operating on explicit and communicated expectations and orders but according to what others want them to do. In this context, team members' behaviour is influenced not by external rewards and punishments but by sanctions and rewards exercised by individuals within the team monitoring one another (Deci & Ryan, 1985). This results in a form of dominant but less visible control which is more difficult to resist than that of the bureaucracy (Barker, 1993). Individuals who experience close monitoring behaviours, receive feedback in a controlling manner, and feel the pressure to think and behave in a certain way, have a reduced level of intrinsic motivation which instead is relevant for creativity, which, in turn, needs a higher level of excitement and interest in the activity team members perform to the advantage of the activity itself (Amabile 1983, 1987; Shalley

1991). This justifies the negative correlation we found between the level of concertive control and team innovativeness.

In paper E, through the analysis of quotes gathered during the interview, the emerged motivational status of teams was also collected showing it leverages the description of a team's collective efficacy, a team's goal objectives and a team's task strategies for learning. Specifically, the self-regulation profile of self-managing teams reveals they display low levels of self-efficacy with a missed opportunity to set learning goals for themselves.

Thus, self-managing teams fail to engage in high-quality forethought and instead attempt to self-regulate their learning reactively.

Reinforcing the lack of proper knowledge to deal with any new product change implies a low possibility to acquaint experience over time with the result of exposing team members to the risk of falling into learning inertia. In these conditions, with an evident low level of self-efficacy disclosed, teams do not embrace any other goal especially towards the creation of new product knowledge since they do not seem able to master any product change.

Thus, the new established learning conditions provided the trigger for teams to learn new things and, at the same time, to inhibit the acquisition of their needed skills.

Discussion

Our findings support team concertive control as a motivational state able to undermine team innovativeness. It confirms Barker & Tompkins's (1994) hypotheses that as concertive control becomes stronger, teams can reach a point of diminishing returns. In conditions of high concertive control, team members are required to give too much of themselves, too much of their own identity to the team which degrades their motivation levels. Our focus on informal team institutions, such as concertive control, provides a finer-grained understanding of the effect of Barker's concertive control over different team

capabilities such as innovativeness, and confirms the usefulness of Wright & Barker's (2000) scale in a different setting from that in Hilgermann (1998). Hilgermann applied the construct in the context of a service organisation and manufacturing workers, and found a positive relationship between the extent of concertive control in the team environment and team outcomes such as job satisfaction and effectiveness. This is in line with Henderson & Lee's (1992) results which, although exploratory, show the positive effect of team members' control over team performance in the context of design teams. The contrast with our observations underlines the need to further explore the mechanisms behind concertive control in order to reconcile these different results. In addition, in order to increase the generalisability of these findings, the effect of task on the team's control behaviour should be investigated. For example, our case was of teams employed in highly complex R&D activities which required a certain level of learning. Previous studies have investigated the effect of other peer forces on team performances such as peer rational control (Stewart et al. 2012) which reflects individuals' perceptions regarding the extent to which they believe their economic rewards depend on recommendations from teammates, peer pressure (De Jong et al. 2014), and peer feedback. However, few studies explore the influence of concertive control as pure peer-based control within a team environment. More research is needed to fully understand the joint influence of concertive control and other peer forces, and in particular to investigate the combined effect of peer-based normative (meaning concertive) and rational control mechanisms in the context of self-managing teams.

5.4 Concluding discussion

The analysis of findings derived from paper E led us to depict the semantic relationships among identified concepts as represented within figure 4. It presents the set of propositions advanced in research paper E, there are three fundamental organisational types of controls

upon which a team's knowledge production, a team's knowledge absorption from the external environment and a team's engagement in learning activities depend on: a team's beliefs about the relevance of learning conceived as part of the broader concept of team identity, organisational feedback loops and goals as belonging to the larger term of organisational structure which cages team behaviours and influences selection of team actions, and a team's collective efficacy which in turn depends on the level of the team's knowledge stocks which induce the need to address the team's training properly. Hence until a team's beliefs or team identity, those structures and the educational systems that support people and teams change, organisations will not be able to make some of the fundamental changes that the learning ideologues, have been advocating. However, as we showed in our research paper C, team identity is induced by the network of managers and stakeholders surrounding the team and, indirectly, by the culture endorsed through the managerial layer (see figure 5). Further, the process of team identification leads individuals inside the team to accomplish identity-relevant team norms and to have formed a specific perception of the relevance and feasibility to proactively enact learning and innovation activities as we discussed in paper B.

Analysing team members' tacit shared assumptions, we also discovered and discussed in paper B that the team's developed norms are solutions without people which had been completely shaped by the team's routines, organisational feedback loops and rules which were automatically enacted. The social interactions with the managerial layer, as emerged in paper D, in their intent to change the team's norms resulted in being irrelevant and expensive in terms of team innovativeness.

Thus, managers and the team's stakeholders, with their systemic insights and desires to work in effective teams, are usually frustrated by the lack of support and enthusiasm of

teams who maintain their habit of remaining focused on project deliveries despite line managers' invitations to learn and innovate.

Engineers, on the other hand, tend to see the need for more structured support from managers, the need to build relationships and trust with them, because team members were so hard to manage and control the contemporary objectives to be efficient and adaptive to changes.

The resolution of this tension between managers and engineers results in proposals for new training programmes that have to be pushed up in the organisation for approval, new sets of working routines that should balance efficiency and learning. Those processes reveal the presence of a third critical culture to consider, the executives. Executives have to know that in a tough competitive world, compromises have to be made, chances have to be taken, and financial criteria not always considered as paramount. One consequence is that when the managerial culture tries to improve organisational adaptability by developing learning capacity, which demands time and resources, the executives may cancel the proposed activities on the basis that the financial returns cannot be shown or that too many exceptions are involved that would undermine the control system. Additionally, as we showed in paper E, individual self-efficacy and beliefs about the importance of learning and innovation activities strongly contribute to determine individual self-motivation to learn. Hence, the following variables resulted in being relevant to address learning performance in teams: team identity content determining also team beliefs about the value of team activities, the level of team identification, a team's knowledge background and working experience as they impact team collective efficacy and the managerial layer's culture.

With the indications provided, we have offered an integrative, multilevel understanding of an emerging model of organisational learning regulation in self-managing team-based organisations. Doing so, we have proposed a multilevel explanatory model that

concurrently enlarges and summarises research by specifying the crucial relationships between constructs at the organisational, intrafirm, and team and individual levels of analysis. By specifying these interactive influences among these levels, we demonstrate that a thorough examination of such influences may be critical in gaining a more complete understanding of where organisational learning in self-managing team-based organisations derives from and how it impacts innovation performance. Thus, we answered the call for more integrative and multilevel analyses on organisational learning. In particular, our theory aims to resolve two neglected issues: (a) the interrelationships between different antecedents spread across different organisational levels; (b) the complexity of the learning–innovation performance relationship in a self-managing team context.

Unexpectedly, however, organisational learning in self-managing teams in a context of new organisational form is an under-theorised, under-conceptualised, and, therefore, poorly understood phenomenon. We proved that emotional and cognitive issues should be taken into account to gain added insights into the patterns that can drastically alter affective self-evaluative reactions in self-managing teams. By looking at the interplay between emotion and cognition we addressed ways in which team learning capabilities within organisations may be improved.

This may help organisations to reduce the risk of falling victim to the inertia of success when they move quickly to new technologies and marketplaces. We hope that this developed theoretical framework encourages new directions in research that need to examine organisational learning flows that enable organisational adaptation in self-managing team-based organisations. The foregoing examples emphasise the need to address organisational learning with a dynamic perspective and to visualise how different dimensions of organisational learning impact one another. This framework should

encourage and support in pursuing a more holistic view of organisational learning and act as a map to help scholars and managers expand their horizons.

5.5 Conclusions

It is clear that generative organizational learning is vital to organizational survival in high competitive environments. Organizational learning and organizational control systems are both concerned with the fit between the organization and its environment and play important roles in modifying the organization design to ensure that fit in a turbulent environment.

This thesis reports how people know, act and collaborate to self-regulate their generative learning activities as an ongoing product of their collective activity and explores the effects of relevant organizational control systems on organizational learning behaviours.

In order to support the role of organizational control systems in organizational learning for self-managing team-based organizations, a broad view of these systems has been taken, avoiding to limit them to traditional budgeting and accounting systems.

We have found that organizational control systems play a relevant role in facilitating team learning, and that generative organizational learning is dependent upon both the characteristics and use of the organizational control systems acting on teams.

The relationship between organizational learning and organizational control systems is both recursive and bi-directional. Organizational controls are shaped by institutional arrangements, social and organizational structures, and work routines, and influence the perception of the environment, as well as the formation of team level concepts and norms. As we showed that such systems obscure the arbitrary foundations of learning in teams, in their daily lives people within teams have very limited choice but to behave as the infrastructure of their activities prescribes, and what is possible in human affairs becomes

confused with descriptions of what already exists. Generative learning is, in fact, a response to perceived changes in the environment. Organizational control systems affect the understanding of what those changes mean, and how and what solutions might be generated. In addition, as the organization learns and changes, it may modify its structures and its control systems to accomplish changes.

We have discovered four major organizational controls associated with the regulation of teams' learning and innovation activities as they appeared relevant in the self-regulated learning process of autonomous team members and in its set of identified antecedents: feedback loops and goals combining both learning and performance items; a network of influence made up by managers and other stakeholders interacting with teams through systematic routines; training programmes for team members; and a dialectical perspective on learning and innovation within the managerial layers. We also found that perceived managerial support indirectly impacts organizational innovativeness and capability to learn. Managers may also find that investing in providing teams with a form of a managerial support to encourage team knowledge acquisition can secure greater returns when team tasks involve acquiring knowledge that is less tacit (more explicit). This might be particularly relevant when people deal with a variety of complex or challenging tasks, including the improvements to their product on the field.

The implementation of a consistent set of these organizational control systems are proposed to enhance an organization's ability to learn, to acquire knowledge, distribute and interpret information, and to increase its memory all of which are vital elements of organizational learning.

Self-managing team-based organizations without these characteristics within their management control may suffer from a limited capacity to change and thus reduce their chances of survival in a changing environment.

6 Managerial Implications

In this research we have analysed the self-regulated learning processes in team-based organisations in a way that detects how learning and innovation can be regulated through the detection of relevant organisational and managerial interventions to realise at different levels in the organisation.

As we showed, generative learning demands the design of specific management control systems. The organisational accounting information for generative learning organisations based on self-managing teams must include not only current internal information on costs and revenues, but also information related to teams' proximal external environment.

Performance measurement systems remain the cornerstone upon which effective management control rests. (see Otley, 1994), but they must include efficiency and non-efficiency information. Specifically, they must convey information on the achievement of learning and innovation goals. The latter must be designed in a way to better reflect the operative challenges teams have to face. It is also required that performance measurement should be refocused to horizontal control structures, with less emphasis on hierarchical control structures, transferring the responsibility for control closer to teams themselves by using as forms networks of influences and work routines. They both can consistently act a constant pressure on teams and indirectly force them to both deliver and innovate. Routines and networks of influence, conveying the need to combine project deliveries with innovation outcomes, can be used to obtain horizontal control. Related reward systems, whilst holding team members accountable for outcomes, should foster creativity and risk-taking in defined areas of the organisation and must be closer to the current challenges teams are dealing with, keeping their consistency with the organisational image individuals within teams have built up through designed structures (e.g. routines and networks of

influence). Consistency of managerial message in the form of open communication, participative decision-making processes and designed organisational structures should be in place in order to secure active participation of team members in the achievement of organisational goals. This will also mean refocusing performance measurements on lower levels in the organisation, with team members taking responsibility for their decisions and being held accountable for the outcomes. Training and guided development programmes for team members as part of management control are required to support active participation and empowerment. Strategic planning by a small group of senior managers should explicitly encourage flexibility and creativity in responding to identified external changes which should be the constant focus of central planning. An emphasis on a vision shared among all the managers, which should combine a variety of organisational priorities such as efficiency and learning, is also necessary for the learning organisation.

Executives have to know that in a tough competitive world, compromises have to be made, chances have to be taken, and financial criteria not always considered as paramount. One consequence is that when the managerial culture tries to improve organisational adaptability by developing learning capacity, which demands time and resources, the executives may cancel the proposed activities on the basis that the financial returns cannot be shown or that too many exceptions are involved that would undermine the control system. The development of a proper nesting of organisational identities which included the team identity is also necessary and, as we show, it derives from a proper design of structures and networks of influence made up of managers and stakeholders' interaction over the teams and among them. All of these are to consider the basic characteristics of the organisation's ability to acquire knowledge, distribute and interpret information, and to increase its memory, all essential elements of organisational learning. An organisation with these

management control system characteristics is better able to learn generatively on an organisation-wide basis, and to affect paradigm changes in response to environmental change if this is necessary. Organisations without these characteristics in their management control systems limit their capacity to change: they may attempt to continue in a steady state and limit their chances of survival in a changing environment. Creating a capacity to learn and innovate in self-managing team-based organisations starts with a holistic strategy to implement across all the organisational layers. It should involve processes, structures, skills and behaviours which shape how the organisation learns and searches for new innovation opportunities, raise ideas, elaborate ideas into concepts and select what to do. Senior leaders are consequently called to orchestrate such complex systems taking prime responsibility for each intervention to be realised. Specifically, as said, there are three categories of interventions in creating and implementing a learning strategy:

- to create a proper variety in the cognition of executives and managers as they play a pivotal role in keeping the dissipative equilibrium between efficiency and flexibility;
- a combined set of structures or better semi-structures, which include strategic alliance networks among managers and team stakeholders, driving actions (efficiency) and at the same time leaving room for real-time adjustment of actions in answer to actual events (flexibility);
- significant attention to train team members in a way that improves their knowledge background and their level of self-efficacy.

In the following, relying on our understanding of micro learning dynamics, we clarify further the micro-foundations of how leaders can regulate learning and innovation activities within organisations to achieve higher performance. We extend our ideas along the three areas listed above to elaborate our understanding.

6.1 Creating a dialective perspective on innovation within the managerial layer

Leaders should give relevant attention to managing the cognitive contradiction regarding the tension between efficiency and flexibility inside the organisation. Specifically, executives should secure the coexistence of contradictory cognitive agendas. Keeping both agendas open creates conditions for leaders to distribute resources better so that each agenda may succeed. We propose solitary solutions to achieve this balance which has strong theoretical roots in cognitive psychology, in the empirical analysis of experienced leaders' problems in maintaining the equilibrium between efficiency and flexibility along our four years' research and in our theoretical study on the antecedents to organisational and team identities reported in paper C. The cognitive solution we look for is realised through securing cognitive variety in the managerial groups. In particular, cognitive variety regards the diversity of mental templates for problem solving that are available in an organisation. We propose to realise the cognitive variety through the following list of interventions:

- 1) Adding outsiders to executive and managerial teams to efficiently generate flexible changes to strategic thinking;
- 2) Making the enlarged network of managers and team stakeholders a dense network where each member shares a common set of combined, between efficiency and flexibility, organisational objectives;
- 3) Maintaining the team centrality respect to a dense managerial network in a way that it is the subject of a consistent pressure leading them to comply with stakeholders' views.

Team centrality secures recurrent interactions between individuals in the team and their home organisations which is required for development of the team's reconfiguring capabilities. Without such interactions, home organisations might exercise no control over the interacting

individuals in the team, allowing the individuals to activate their team self-identities to a greater extent than their home organisational self-identities.

6.2 Using a combined set of structures

Structure is at the heart of processes responsible for addressing the tension between efficiency and learning. Despite there being many types of structures such as rules, roles etc., we use the definition of structure as simply constraint on action. Through the analysis of the antecedents of the team's self-regulative learning activities, feedback loops and goals emerged as relevant influencing factors. But they also appeared as important determinants in the formation of team identity's content and of injunctive norms. Thus, structures like them influence both efficiency and learning even if in opposite directions. They cage collective behaviours. before the cognition of teams, as we showed. Hence we can state that the effect of feedback loops and goals goes beyond simply shaping behaviours, and contributes to increasing the reliability of actions, speed, and overall efficiency. In fact, if less structure offers greater possibility to take unanticipated actions in answer to actual situations, the information conveyed in the feedback loops and goals influences team members' perception about the organisational expectations. So less structure contributes to flexibility and thus to learning but at the expense of greater effort and attention to sense and seize the appropriate actions in real time and at the expense of more mistakes. Taken together, these points indicate the need to moderate the level of structuration and to shape the content embedded in the feedback loops and goals by properly combining attention between the competing demands for efficiency and learning. Additionally, teams that are under-structured may be optimised for flexibility but under-perform since they are unable to keep a consistent strategy for capturing a stream of high-value opportunities for the lack of proper capacity to seize and sense the opportunity.

The above considerations lead us to propose multiple ways to realise a proper combination of structures. A way to resolve this is through a simplification cycling. In our case, we rely on the empirical results from the negative case analysis performed in one of our studies and purposefully propose to reduce the rate of Scrum routines with a special reference to the rate of daily stand-up meetings and the rate for reporting the team's delivery progresses. As we discovered during the analysis of the phenomenon, daily stand-up meetings activate team norms and controls, and by doing so they restrict teams' seizing capabilities. They might also constrain the repertoire that individuals can adopt as knowledge segmentation actions. Such restriction might also derive from lack of awareness of different actions or from biases toward some knowledge segmentation actions. Hence, we also recommend adding a flexibility-injective structure such as adding an orthogonal-thinking role striving for forward thinking which should help the team anticipate the change whenever needed. This additional role available for the team should make possible the exposure of team members to a model of the desired learning behaviour. He or she should present the way the learning could happen inside the team in a way that should be credible and thus enhance the team's learning process.

Team members should be given the possibility to practice the desired explained behaviour in a situation similar to their actual real environment and receive feedback to strengthen the desired modelled behaviours as they occur.

More pragmatically, to summarise we propose the following changes:

- A combined (between efficiency and learning) set of team and individual goals having the purpose of improving teams' performances and learning competences in a way that supports their daily operative work should be secured.

- To have included within the reporting system from teams their short-term competence progress as well.
- Reduce the frequency of daily stand-up meetings down to twice a week and reduce the rate used to report progress about the realisation of project tasks to stakeholders.
- Distribute the sprint effort between operative and learning activities and conceive a space, at the end of the sprint, where the experimental learning can become more conceptualised through the support of a selected thought leader who should be responsible for team learning.

6.3 A specific training programme for workers

In spite of the acknowledged relevance of training, fairly little research has been conducted regarding the types of training that are most effective or the process issues related to training for self-managing teams.

The aim here is to give additional insight into the questions of training method effectiveness and learning processes to apply to self-managing teams by leveraging results collected along our four years' research.

As we know from our research results, team collective knowledge stock and collective efficacy have been identified as a basis to improve effectiveness of training. Additionally, vicarious learning principles manifested in teams through the perceived informal pro-social control during team members' socialisation, have been recognised as relevant for enhancing further the effectiveness of training. Thus, four basic ingredients are then suggested: (1) presentation of behaviour models displaying the desired behaviours including learning to teams; (2) imitation or rehearsal by team members of the modelled behaviours; (3) social reinforcement or favourable recognition for adoption of the modelled behaviours by team

members; and, (4) transfer training to encourage use of the learned behaviours back on the job.

Hence the following actions are indicated.

As we showed, team members' experience of tasks strongly affects the team's collective efficacy even more heavily than it occurs for individuals since early failures in teams definitely impact their collective efficacy. Thus, team members must experience sufficient success when using what they have learned in order to believe both in themselves and the value of the new ways. This is best achieved when newly acquired skills are first tried on the job in situations that are likely to produce good results. As individuals gain skill and confidence in handling easier situations, they gradually take on more difficult problems. If they do not gain sufficient success to convince themselves of their new effectiveness, they will apply the new skills weakly and inconsistently, and they will rapidly abandon their newly acquired skills when they either fail to get quick results or experience difficulties. Thus, the learning leader, the new role to appoint to teams, should involve team members in a guided skill mastery on topics of interest for the projects. After teams understand the new skills to acquire, they need guidance and opportunities to perfect them. Initially, they need to test their newly-acquired skills in simulated situations in which they need not fear making mistakes or appearing inadequate, so peering with people in other teams on similar tasks. This is best achieved by role-playing, in which they practice handling the types of situations they must manage in their work environment and they receive instructive feedback. The feedback that is most informative and helps to achieve the greatest improvements is based on corrective modelling.

Modelling and guided performance under simulated conditions are well suited for creating competencies, but it is unlikely that the new skills will be used for long, unless they prove useful when they are put into practice at work.

Additionally, this newly created role should act as another source of efficacy by using the verbal persuasion which is aimed at convincing a person of his or her capability of performing a task and encouraging low self-efficacy subjects to attribute their intermediate performance difficulties to the complexity of the task (external) as opposed to their capabilities (internal) in order to improve performance. Moreover, this learning facilitator should also be responsible for administering proper reinforcement mechanisms since they have social evaluative consequences. Punishment is apt to devalue the model and his/her behaviour, whereas models who are recipients of praise and admiration tend to be attributed high prestige, status, and competence. Model status changes, in turn, can significantly affect observers' subsequent performance of matching responses.

7 Limitations and Future Research

Although our propositions set out the basis for future research, we see the need and opportunity for other inquiries on controls regulating organisational learning and innovation activities in self-managing team-based organizations. We focused on selected constructs to develop our arguments and propositions. Specifically, we embraced a socio-psychological perspective of controls acting on organisational learning, starting to look at team members' shared perceptions about cognitive, emotional or affective states, their ability to deal with conflicting, between learning and efficiency, goals and to manage the co-existence of contrasting mental frames and agendas. Thus, through socio-psychological perspectives on learning we shed new light on how emergent team states contribute in managing trade-offs between exploratory and exploitative learning demands. Building on social identity and social cognitive theory (Bandura, 2001; Tajfel & Turner, 1986), we developed further the impacts coming from three salient team-level socio-psychological states: team identity, team efficacy and team knowledge stocks and feedback loops and goals.

While this strategy helped us to maintain conceptual clarity and parsimony, we may have neglected other variables. Likewise, for instance, it is possible that the team's network centrality in the network of managers and stakeholders will interact to impact organisational learning. Thus, we encourage more research on the organisation, interfirm, and environmental determinants of organisational learning. Additionally, despite the fact that we debated some of our model's variables from each organisational level to more fully analyse their interactive, cross-level influences on organisational learning, more research that examines how variables from each level of analysis reinforce or undermine one another to shape organisational ambidexterity is still needed.

Moreover, future research should address how firms adapt their organisational designs in the different stages of their life. Such a process perspective requires a methodological shift in organisational learning research, calling for empirical studies mainly relying on cross-sectional survey data on managers' perceptions to measure new learning constructs and boundary conditions or to focus on the actual realisation of ambidexterity by deploying archival data on exploitative and explorative moves that have been implemented.

Furthermore, we studied firms, mostly R&D organisations, that excel at exploitative and exploratory innovation and are involved in a telecommunication industry which is acclaimed for its innovative intensity. However, whether and how gained lessons apply elsewhere raises another important question. Further, as deployment of team level variables such as efficacy, identity and knowledge background may be different from individual private understanding of the same variables, the relationships between individual, team, and organisation within the organisational learning process deserve greater attention in future research and could heavily influence an individual's expression and behaviour: are they talking and behaving as representative of their team or "as themselves". And does this difference matter for the organisational learning process?

In order to conduct further empirical research based on our framework, it is necessary to deploy methods that connect macro, meso and micro levels of analysis, while allowing researchers to remain close to people's lived experiences. Grasping the emotional aspects of teamwork requires a better understanding of individual and collective experiences in institutions (Berk & Galvan, 2009; Suddaby, 2010). A number of research methodologies such as rhetorical analysis (e.g., Symon, Buehring, Johnson & Cassell, 2008), ethnography (e.g., Zilber, 2002), and action research (Blackler & Regan, 2006), can result in being compatible with our framework. , More quantitative methods, such as surveys, personality

inventories, and field experiments, might be useful in understanding individuals' tendencies to experience and visualise certain emotions in response to various aspects of the organisational context.

Nevertheless, future research may consider a longitudinal research design to better assess how organisational antecedents affect self-regulated learning activities over time. Future research may also provide a more detailed examination of organisational antecedents as well as outcomes of new-to-unit vs. new-to-market innovations.

Our empirical study included performance data up to one year after the transition to agile software development methods.

Moreover, it would enable the analysis of performance implications at different points in time. Future studies may also examine other dimensions of a unit's performance, such as sales growth, and market share.

8 References

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