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**INNOVATION IN THE WORKPLACE:**

**The Role of Job Characteristics, Motivation and  
Organizational Factors in Promoting Ideas Generation and  
Adoption.**

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# TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>1</b>
<b>CHAPTER 1 .....</b>	<b>7</b>
<b>Individual Innovation in the Workplace: Differences Between Self- and Supervisor Evaluation. ....</b>	<b>7</b>
<b>1.1. INTRODUCTION.....</b>	<b>7</b>
1.1.1. Self - versus Supervisor Evaluation.....	9
1.1.2. Predictors of Individual Innovation.....	11
<b>1.2. METHOD.....</b>	<b>14</b>
1.2.1. The company .....	14
1.2.2. Sample and Procedure .....	15
1.2.3. Measures.....	15
<b>1.3. RESULTS.....</b>	<b>18</b>
1.3.1. Differences among Self- and Supervisor evaluation .....	19
1.3.2. Relation among Individual Characteristics, Perception of Job and Organizational Factors, and Suggestion Making and Implementation .....	23
1.3.3. Considering the Time Dimension: Predictors of Suggestion Making and Suggestion Implementation across Time .....	24
<b>1.4. DISCUSSION .....</b>	<b>28</b>
<b>CHAPTER 2 .....</b>	<b>35</b>
<b>From Ideas Generation to Adoption: The Interplay between Work Characteristics, Leader-Member Exchange and Engagement across Time.....</b>	<b>35</b>
<b>2.1. INTRODUCTION.....</b>	<b>35</b>
2.1.1. Individual Innovation in the Workplace.....	37
2.1.2. Job Resources, Intrinsic Motivation and Innovation.....	39
2.1.3. Relationship with Supervisors .....	41
2.1.4. Engagement as a Motivational Factor .....	42
2.1.5. The Current Study .....	44
<b>2.2. METHOD.....</b>	<b>45</b>
2.2.1. Research Setting and Design .....	45
2.2.2. Sample and Procedure .....	46
2.2.3. Measures.....	47

2.2.4 Plan of Analysis .....	48
<b>2.3. RESULTS.....</b>	<b>51</b>
2.3.1 Descriptive Analysis .....	51
2.3.2 The Factor Structure of IWB .....	55
2.3.3. Supervisor-reports of IWB .....	58
2.3.4. Self-reports of IWB .....	61
<b>2.4. DISCUSSION.....</b>	<b>63</b>
2.4.1. Limitations .....	65
 <b>CHAPTER 3 .....</b>	 <b>67</b>
<b>Innovative Employees: Personal Characteristics and Performance Outcomes. ....</b>	<b>67</b>
<b>3.1. INTRODUCTION.....</b>	<b>67</b>
3.1.1. Development of Hypotheses .....	69
<b>3.2 METHOD.....</b>	<b>71</b>
3.2.1 Sample and Procedure .....	71
3.2.2. Measures .....	72
<b>3.3 RESULTS.....</b>	<b>73</b>
3.3.1. Data Analysis.....	73
3.3.2. Differences between Innovators and Conservatives.....	77
<b>3.4. DISCUSSION.....</b>	<b>78</b>
 <b>4. GENERAL DISCUSSION.....</b>	 <b>81</b>
<b>4.1. SELF- VERSUS SUPERVISOR EVALUATION.....</b>	<b>81</b>
<b>4.2 PREDICTORS AND OUTCOMES OF INDIVIDUAL INNOVATION.....</b>	<b>84</b>
<b>4.3 THE TIME DIMENSION .....</b>	<b>87</b>
<b>4.4 PRACTICAL IMPLICATIONS.....</b>	<b>90</b>
<b>4.5 LIMITATIONS .....</b>	<b>91</b>
 <b>REFERNCES.....</b>	 <b>93</b>
 <b>APPENDIX A. Employees Questionnaire T1 - Employees Questionnaire T2</b>	
<b>APPENDIX B. Supervisors Questionnaire T1 - Supervisors Questionnaire T2</b>	



# INTRODUCTION

Nowadays companies have to face new challenges due to global competition and the rapid development of new technologies. In this context, the introduction of innovation in organizations is often seen as the best way to gain a competitive edge and ultimately survive in a turbulent environment (Damanpour & Schneider, 2006; Scott & Bruce, 1994; Tushman & O'Reilly III, 2002; West, Hirst, Richter & Shipton, 2004a).

The topic of innovation is especially important for country like Italy which in the last annual report of the European Union analyzing the innovative performance across the EU has been rated as a “moderate innovator” (European Innovation Scoreboard, 2009). In particular, Italy’s innovative performance “is below the EU27 average and the rate of improvement is also below that of the EU27. Relative strengths, compared to the country’s average performance, are in Finance and support and Economic effects and relative weaknesses are in Human resources, Firm investments and Linkages & entrepreneurship” (European Innovation Scoreboard, 2009; p. 5). The report states that in the past 5 years strong growth in the countries’ innovative performance has been produced by improvements in human resource management in order to stimulate the employees’ willingness to innovate. Creative ideas are the basis of all innovation and it is the individuals who “develop, carry, react to, and modify ideas” (Van de Ven, 1986, p. 592). This points out the importance of understanding how to stimulate innovation among employees: we therefore focused this dissertation on individual innovation in the workplace.

West & Farr (1990, p. 9) defined innovation as “...the intentional introduction and application within a job, work team or organization of ideas, process, products or procedures which are designed to benefit the job, the work team or the organization”. This definition highlights three main aspects: innovation is a consequence of goal-oriented activity, innovation is about creating something new to the social setting of adaptation, and innovation is aimed to produce benefit (West & Anderson, 1996; West, 2002; West et al., 2004a). The criterion of novelty is not defined as absolute but based on the context so that innovations may vary on a continuum from minor adaptations or adjustments to truly significant changes or inventions which alter the premises of a certain area (West, 2002).

In line with these considerations, a company could use two basic strategies to seek a competitive edge (Porter, 1996): differentiation or cost leadership. In the former, the

organization looks for completely new products or services that allow the company to distinguish itself from the competitors in some way. Using the latter strategy, the organization tries to overcome the competitors by creating products at a lower cost comparing to other organizations. Companies that choose this strategy rely primarily on improving efficiency and product quality, looking for minor changes or small improvements that allow to reduce costs. Suggestions about how to improve productivity and efficiency that non-manager or R&D employees are able to provide and apply in their job are fundamental for this kind of strategy (Axtell, Holman, Usworth et al., 2000; Frese, Teng & Wijnen, 1999; Naveh & Erez, 2004). As proposed by Frese, Teng & Wijnen (1999) this is a very important issue because companies who are able to facilitate employees in making suggestions (i.e. through a structured suggestion system) can achieve important improvements in quality and quantity of production, saving a considerable amount of money. However, the companies that should achieve the best results are those who are able to use and manage both strategies, depending on the specific requirements of the environment (Bledow, Frese, Anderson, Erez & Farr, 2009).

Traditionally, researches on creativity and innovation have been focused more on “big” invention, studying the innovative activities of employees involved in R&D departments (Scott & Bruce, 1994; Tierney, Farmer, & Graen, 1999), rather than on minor improvements. This is in line with the evolution of the studies on creativity and innovation. The scientific study of creativity started with the attempt to explain the exceptional innovative potential of famous artists and scientists (King & Anderson, 1995). These first studies aimed to identify the personality traits that characterize highly creative individuals. More recently, under the influence of the cognitivism, creativity has been considered primarily a mental cognitive process. This leads to considering the association between creativity/innovation and different styles of thinking or problem solving. The early works that studied innovation from this perspective tend to emphasize the differences between the less and the more innovative individuals. Kirton (1976) for instance theorized that some individuals (adaptors) expressed creativity through making modifications within the existing paradigm while others (innovators) express creativity by breaking out of the existing paradigm.

Some authors consider creativity as a special form of problem solving while others assume that creativity arises from an ordinary problem solving process. One of the most used concept by the former authors to describe non-ordinary problem solving process is “insight”. According to the cognitive psychologists of the Gestalt school that developed the

concept of insight, creative problem solving occur when the individual suddenly see how the elements of a problem can be managed in an unusual way to solve the problem.

Recently Amabile (1988) proposed a new approach to creativity within the domain of social psychology. The attention shifts from the cognitive processes that lead to creativity or innovation to the outcome of these processes. According to Amabile (1996), the outcome approach is a more feasible form of creativity evaluation. Her argument is that even an assessment of a given thought process as creative must depend on the end-result of such a process; either a product or a response of some kind. In her consensual definition of creativity, “a product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product” (Amabile, 1996; p. 33).

Using this approach, creativity and innovation can be considered a sort of performance. Based on the formula proposed by Campbell & Pritchard (1976)  $performance = f(ability \times motivation)$  and feasibility (Ford, 1992). So far, there are three key aspects that lead to innovative or creative performance. First of all, one should have the ability to perform their work. This first condition is necessary but not sufficient because one can have the ability to perform an activity but can choose not to do it. So far, the second fundamental factor is the motivation to perform the activity. The third factor is related to the context in which the action is performed. In fact, there could be social conditions that (i.e. don't have tools to perform an activity) facilitate or inhibit creativity and innovation.

In 1996 Oldham and Cummings stated that “little is known about the conditions that promote the creative performance of individual employees in organizations” (p. 607). Nowadays our knowledge in the field is considerably advanced, and thanks to some recent reviews (Anderson, De Dreu & Nijstad; 2004; Hülshager, Anderson & Salgado, 2009; Harrison, Neff, Schwall & Zhao, 2009) facilitators of innovation at the individual, group, and organizational levels have been reliably identified. Despite this consideration, authors still complain that the majority of researches on innovation have been devoted to finding out predictors of innovation using cross-sectional design and used aggregate measure of innovation or considered only one stage (i.e. implementation) of the complex innovation process.

This dissertation has two main goals. The first theoretical and methodological goal is related to some of the aforementioned issues that are still controversial in the field of innovation. A



first issue is related to the possibility of differentiating between different innovative work behaviours (IWBs), related to different phases of the innovation process.

A second issue is related to shifting the attention from looking for new predictors to considering the time dimension, largely neglected in past research. We will investigate how changes in the work context may influence the employees' willingness to perform IWB.

A third issue is related to the role of intrinsic motivation in directly and indirectly promoting IWB as a mediator between resources (organizational, individual, etc.) and the employees' innovation. In fact, despite the big relevance that has been assigned to the concept of intrinsic motivation, especially in Amabile's theory of creativity (1988), the few studies that have examined the role of intrinsic motivation as a mediator provide results that are ambiguous (Shalley et al., 2004).

The second goal is related to the practical application and implication of the methodological and theoretical issues above discussed. The major point is related to the differences between two widely used methods to assess individual innovation in the work place: self- and supervisor evaluation. In this dissertation we clarify some differences between the two measures, highlighting strengths and weaknesses of both. As we stated above, today's employees and organizations are required to manage both innovative and ordinary activities. Using self- and supervisor evaluation we confront the most and the less innovative employees in order to investigate the dark-side of innovation. In fact, some authors assume that the most innovative employees are not so efficient in "ordinary performance" as the less innovative employees. So far, we check if the most innovative employees are also able to conform to rules and standards, and combine innovation, efficiently meeting time and schedule constraints.

In order to achieve these goals we conducted three empirical studies. They can be read independently from each other because every study contains separate theoretical introductions and discussion sections.

In the first study, using a longitudinal research design, we investigate the differences between two methods commonly used to assess the employees' innovation: self- and supervisor evaluation. We expect that supervisor evaluations are more stable across time compared to the employees' self-evaluation and that only using the employees' self-evaluation it is possible to detect how changes in the work environment influence the change in the frequency with which employees make and implement suggestions. We analyze how job (job autonomy and job demands) and organizational factors (organizational support for innovation and suggestions facilitators or obstacles) as well as the employees'

intrinsic motivation, and changes in these factors, influence the employees' willingness to make and implement suggestions.

West et al. (2004a) called for a more precise demarcation in the operationalization of the construct of innovation. In the second study, in order to address the suggestion advanced by West et al. (2004a) and in line with Frese et al. (1999) and Rank et al. (2004), we conceptualize IWB as composed by three dimensions called idea generation, idea suggestion and idea implementation, and test the factorial structure of the measure used to assess the employees' IWB. Using a longitudinal research design and the approach proposed by Salanova & Schaufeli (2008), in which resources are related to different outcome via work engagement, we try to shed light on the motivational process that leads from two resources – job control and the quality of the interaction between an employee and his or her supervisor – to IWB.

In the third study, using a person-centered approach, we analyze which characteristics differentiate the most innovative employees from the less innovative ones. We demonstrate that the first ones are able to take care of details and respect the norms as well as the second one. Moreover, there are no differences in the performance of the two groups for what concerns quality and efficiency.

In the last chapter, the main results and implications of the three empirical studies are summarized, integrated, and discussed in terms of the overarching goals of this dissertation.



# CHAPTER 1

## **Individual Innovation in the Workplace: Differences Between Self- and Supervisor Evaluation.**

### *Summary*

In the modern economy innovation is seen as one of the most important factors that allows organizations to face the global competitions. Many HRM systems highlight the importance of “minor” innovations or improvements as suggestions that employees provide to improve productivity and quality.

In this study, using a longitudinal research design, we investigate the differences between two methods commonly used to assess employee innovation: self- and supervisor evaluation. We demonstrate that supervisor evaluation is more stable across time compared to employee self-evaluation and that only using self-evaluation it's possible to detect how changes in the work environment influence the frequency with which employees make and implement suggestions.

We analyze how job and organizational factors, and changes in these factors, influence the employees' willingness to make and implement suggestions. Results show that employees' intrinsic motivation and job demands were the most important predictors of self-evaluation of suggestion making while suggestion facilitators and organizational support for innovation were the most important predictors of suggestion implementation.

### **1.1. INTRODUCTION**

The urge to introduce innovations in organizations in order to gain a competitive edge and ultimately survive in today's market is frequent (Scott & Bruce, 1994; Tushman & O'Reilly III, 2002; West, Hirst, Richter & Shipton, 2004a). According to West (2002), innovations within an organizational setting include such different manifestations as new products, production processes, manufacturing technologies, or computer support services; also administrative changes like new human resource management strategies or the introduction of teamwork are considered innovations.

In this study we focus on individual innovation in the workplace. Although evidence shows that innovation is a complex phenomenon, West (2002) suggests that the innovation process consists of two main stages: idea generation and implementation or application stage. Based on this perspective, in this paper we distinguish between the generation or suggestion stage and the implementation stage. Innovations may vary on a continuum from rather minor adaptations or adjustments, to truly significant ones which alter the premises of a certain area (West, 2002). Such minor changes seem to be more and more important to gain important advantages and this perspective is a key element in many modern HRM systems like total quality management, and continuous improvement. Based on this perspective, many authors (Axtell, Holman, Unsworth et al., 2000; Frese, Teng & Wijnen, 1999; Naveh & Erez, 2004) stressed the importance of the minor changes or suggestions that non-manager or R&D employees are able to provide and apply in their job to improve productivity and quality. In this study we use the term individual innovation to refer to: making suggestions to improve different aspects of the job; suggestion implementation.

One of the most important issues in innovation research is how to select a measurement method to investigate different aspects related to the complex process of innovation. In fact, “literature is characterized by a diversity of approaches, prescriptions and practices that can be confusing and contradictory” (Adams, Bessant & Phelps, 2006; p. 21). For instance, individual innovation is usually assessed by self-, supervisor or peer ratings (Axtell, Holman & Wall, 2006; Janssen, 2000, 2004; Miron, Erez & Naveh, 2004). The use of objective data is less frequent, in spite of some exception in companies that use a structured suggestion system (Frese et al., 1999; Oldham & Cummings, 1996). In a recent meta-analysis on team innovation, Hülshager, Anderson & Salgado (2009) show that different measurement methods and sources “display only moderate correlation” and, moreover, “the relationships between antecedent variables and innovation differ substantially depending on the measurement method” (p. 23).

While many authors conceptualized innovation as a multi stage phenomenon (Rogers, 1995; West, 2002; West & Farr, 1990), in empirical research current measures only address one component (e.g. “idea implementation”; West, Shackleton, Hardy & Dawson, 2004b) or, when they considered more components, due to the high inter-correlations between the components, authors decided that the different aspects should be combined and treated as a global measure of innovative work behaviour (e.g. Janssen, 2000, 2004; Scott & Bruce, 1994).

Research on performance and 360° feedback show that different kind of raters (i.e., peers, self, supervisor) are able to detect different and useful perspectives in measuring performance (Arvey & Murphy, 1998). Moreover, these studies show that the more similar the different aspects that have to be evaluated (as in the case of idea suggestion and implementation) by others, the higher the correlation among these aspects (Murphy, Jako & Anhalt, 1993). This effect increases when behaviour is not directly observable as in the case of the first stage of the innovation process. In this stage employees are engaged in finding and defining problems, searching for solutions, developing ideas, which are mostly internal cognitive processes that may remain unobservable and so unknowable to supervisors. Moreover, employees may develop and submit suggestions not necessarily to the supervisor. A first question arises from these considerations: do self- and supervisor evaluation allow to detect and distinguish both the idea suggestion stage and the implementation one?

Employees directly experiment small changes in their work context or in their job; the supervisor, on the contrary, may perceive such changes after some time or perceive only major ones. Axtell et al. (2006) have pointed out that employee innovation is also often influenced by salient aspects of the work situation changing over time. A second question arises from these considerations: how is it possible to detect the influence of these changes on innovation?

Using a longitudinal research design, the overall purpose of this study is to provide data relevant to these questions and to deal with some of the neglected issues related to the most used method (self- versus supervisor rating) employed to evaluate individual innovation.

### **1.1.1. Self - versus Supervisor Evaluation**

Authors use supervisor rating as a more reliable measure compared to self-rating for different reasons. First of all, from a psychological point of view, one can assume that when people are called to self-evaluate their performance or positively characterized work behaviours, they tend to overrate their performance due to social desirability; moreover self-raters tend to be lenient (Nilsen & Campbell, 1993). Second, using two different sources to get data related to independent and dependent variables it is possible to avoid the problem of common method variance.

Despite this consideration, authors stressed the importance of using different sources of information to assess work behaviour because each one of them is useful to detect some specific aspect (Arvey & Murphy, 1998). In evaluating innovation, this consideration is especially important because of the nature of the concept. A lot of studies on innovation support convergent validity of self- and supervisor ratings of innovation even if the correlation between the measures is quite low (Axtell et al., 2000; Janssen, 2000). In the first stage of innovation, people deal with activities connected with the generation and promotion of new ideas. In this phase, people can suggest their ideas to colleagues and not to the supervisor, or test small changes to improve their work autonomously. The supervisor evaluation may miss these innovative activities and only acknowledge those activities connected with successful changes or improvements that employees show to impress the supervisor (Janssen, 2000).

Several studies on performance evaluation show that often raters tend to evaluate the person and not the behaviour; this phenomenon has been called “halo error” (Murphy et al., 1993). As Murphy et al. (1993) suggest, “halo errors magnify differences in the mean ratings received by different individuals and flatten the overlap profile of ratings, compressing differences between rating of different areas of performance” (p. 223). We can assume that the supervisor gets a general impression of employee innovation without considering single aspects that characterized the innovation process. This would lead to a very high correlation between different aspects of performance (especially when evaluating aspects similar in the nature as ideas suggestion and implementation).

Therefore, the first two hypotheses are:

*H1: The correlation between the frequency with which employees make suggestions and the frequency with which such suggestions are implemented is significantly higher when using supervisor evaluation rather than self-evaluation.*

*H2: Supervisor evaluation of employee innovation (idea suggestion and implementation) is more stable across time compared to employee self-evaluation.*

In addition, as literature suggests, supervisors tend to evaluate the person and not the behaviour of the ratee. So far, it could be difficult to observe changes in such evaluation in a short time span because they are quite stable over time. This means that using supervisor evaluation as dependent variable it will be difficult to observe any effect of predictors on a specific stage of the innovation process controlling for the other one.

So far, we hypothesize that:

*H3.: Using supervisor evaluation the majority of the variance in idea suggestion will be explained by suggestion implementation because the two will be strongly correlated. So far, no effect of predictors on idea suggestion, controlling for idea implementation, will be observed.*

*H3a.: Using supervisor evaluation, the majority of the variance in suggestion implementation will be explained by idea suggestion because the two will be strongly correlated. So far, no effect of predictors on idea implementation, controlling for idea suggestion, will be observed.*

### **1.1.2. Predictors of Individual Innovation**

Bledow, Frese, Erez, Anderson & Farr (2009) suggest that while some of the factors considered in the research (i.e., shared vision, innovative organizational culture) have been reliably found to be related with innovation, for other factors findings remain contradictory. Despite this consideration, in general authors agree in stating that individual and job characteristics are mostly important in the first stages of innovation while social and contextual factors are especially related to the last stages of innovation, when the new ideas are implemented (Axtell et al., 2000; West, 2002; West et al., 2004b). One of the few studies on individual innovation that empirically supports this consideration is the one by Axtell et al. (2000). In this research, shopfloor innovation was investigated. Authors show that suggestion making is especially related to individual (role breadth self-efficacy, production ownership) and job factors (problem-solving demands, machine maintenance) while implementation is especially related to group and organizational factors (team leader support, team method control, team role breadth, support for innovation, participation, management support).

For what concerns individual characteristics, factors like the ability to think creatively, experience within the domain, and also motivational factors have been found to play a significant role in the first stages of the innovation process, where creativity is especially important (Amabile, 1990). In particular, intrinsic motivation can be described as the core concept within the creativity theory of Amabile (1990; 1996). Intrinsic motivation is defined



as “the motivation to engage in work primarily for its own sake, because the work itself is interesting, engaging, or in some way satisfying” (Amabile, Hill, Hennessey & Tighe, 1994; p. 950). Despite the attention that has been devoted to this concept in literature, few studies have directly tested its importance (Shalley & Gilson, 2004), especially in the area of individual innovation. Tierney, Farmer & Graen (1999), in a field study examining creative performance in the work setting, prove that when employees enjoy creative related tasks (intrinsic motivation) their level of creative output (creative performance evaluated by the supervisor; invention disclosure forms; research reports) is higher than for the employees that have low intrinsic motivation. Making suggestions implies thinking new ways to improve different aspects of the job. This is a discretionary activity that requires creativity and is not explicitly requested by the job, so the employees’ intrinsic motivation in dealing with tasks that require creativity should be very important.

Job characteristics have also been identified as influential factors for both creativity (Oldham & Cummings, 1996; Tierney & Farmer, 2002) and innovation (Axtell, 2000; West et al., 2004b). Drawing from the work of Hackman & Oldham (1980), three aspects of the job can be considered central for facilitating creative performances: autonomy, challenge and complexity (Shalley & Gilson, 2004). Axtell et al. (2000) prove that job complexity is an important factor in influencing making suggestions. Individuals must have some autonomy and discretion to have the opportunity of making and implementing suggestions. It is reasonable to think that employees who deal with complex jobs that are challenging and allow to use different skills should be encouraged in making suggestions. As West (2002) hypothesized, another important job factor that can foster innovation is (an adequate level of) job demands. Job demands should be important for both suggestion making and suggestion implementation because people can be encouraged to reduce or keep an adequate level of job demands.

Making ideas and making an effort to apply them are risky activities because employees that promote changes to improve work have to modify the “status quo” and expose themselves to promote the improvements. Supervisors and colleagues could resist to change and be an obstacle for idea suggestion and implementation. Theories of innovation (West, 1990) and various field research (Scott & Bruce, 1994; Frese et al., 1999; Axtell et al., 2000) show that a supportive environment is one of the most important factors in promoting innovation. An important organizational factor that can contribute to creating a supportive environment is the perception that the organization gives value and supports innovation (West & Anderson, 1996).

Frese et al. (1999) show that hindrances (i.e., negative organizational barriers that could generate among employees the belief that suggestions are not welcomed by the company) can make it harder to submit suggestions to a formal organization suggestion program. We assume that different kinds of obstacles (i.e., not to have resources to implement ideas) or facilitators (as the employees' perception that they can easily find help to develop ideas) are even more important to propose and apply suggestions in those organizational contexts that don't have any formal system for collecting and assessing ideas.

On the basis of the aforementioned arguments about differences among individual and job characteristics, and organizational factors, we hypothesize that:

*H4: Individual and job characteristics will be stronger related to idea suggestion (using employee self-evaluation) than employees' perception of organizational factors.*

*H5: Employees' perception of organizational factors will be stronger related to suggestion implementation (evaluated by employees) than individual and job characteristics.*

In a recent review on innovation, Anderson, De Dreu & Nijstad (2004) stated that facilitators of innovation at the individual, group, and organizational levels have been reliably identified. The authors still complain that the majority of research on innovation has been devoted to finding out predictors of innovation using cross-sectional design. Based on this consideration, in the present study we want to shift the attention (from looking for new predictors) and consider the time dimension, largely neglected in past research. On the one hand, we assume that supervisor ratings of employee innovation tend to be stable over time, even if actual changes in the environment or job may have an influence on employees' workload (i.e., extra efforts connected to organizational changes) and/or employees' perceptions of organizational factors. On the other hand, we argue that employees directly experience changes in the work context so that employee self-evaluation of making and implementing suggestions will be more sensible to changes in job and organizational factors than supervisor evaluation. In fact, changes introduced in the work environment may modify the employees' work behaviours and often these modifications are related to "micro-behaviours" directly connected to work activities that could be not visible for the supervisors.

Based on these considerations we hypothesize that:

*H6: Changes in supervisor evaluation of idea suggestion will be predicted by individual and job characteristics, and employees' perception of organizational factors (and not by the changes in these factors).*

*H6a: Changes in supervisor evaluation of suggestion implementation will be predicted by individual and job characteristics, and employees' perception of organizational factors (and not by the changes in these factors).*

*H7: Changes in employee self-evaluation of idea suggestion will be predicted by changes in individual and job characteristics, and by changes in employees' perceptions of organizational factors.*

*H7a: Changes in employee self-evaluation of suggestion implementation will be predicted by changes in individual and job characteristics, and by changes in employees' perceptions of organizational factors.*

## **1.2. METHOD**

### **1.2.1. The company**

We tested our hypotheses on a medium-sized Italian steel company which employs about 400 people and has three main divisions located in three different areas in a city in central Italy: one division (88 employees) is a specialised manufacturer of spur and bevel gears; a second division (86 employees) is a worldwide supplier of comprehensive gear manufacturing solutions; the third division (134 employees) is a producer of wire and cable manufacturing equipment and machinery. By May 2009, the various divisions were relocated to a new shared location to save supply and coordination costs and improve productivity. Ninety-two employees of the staff work in another city; they have not been involved in the research because their plant remains at its current location. The relocation of the company was assisted by a skilled team of engineers assuring the most efficient transition time as well as continuous production outputs.

### **1.2.2. Sample and Procedure**

The study was part of a broader research project on employee innovation within the organization. The managers of this company were interested in investigating how to facilitate and encourage employees in suggesting ways to boost productivity and quality. We collected data at two points in time: in April 2009, before the relocation, and three months after the change had been completed. We chose this time span on the basis of four interviews (one with the human resources director of the whole company and one with each director of the three divisions). Managers or employees in high rank positions were not involved in the research because – according to the human resources director – making suggestions to improve organizational efficiency is part of their job. We thus focused the analysis on blue and white collar workers. We drew the sample from the organization chart of the three divisions and selected 260 employees that met the aforementioned criteria. Participation in the survey was voluntary and confidentiality was assured; a questionnaire was administered during normal working hours in different sessions facilitated by the researchers and involving groups of 7 to 15 employees for each session. We collected 230 usable questionnaires at T1 (we ruled out 9 incomplete questionnaires) and 218 at T2 (we ruled out 13 incomplete questionnaires); matching T1 and T2 respondents we therefore obtained a total of  $N = 207$  employees that filled out the questionnaires.

A second questionnaire was filled out by 28 supervisors. They rated the frequency with which employees make suggestions and the frequency with which those suggestions have been implemented. Three supervisors did not rate 9 employees because they had recently changed job or working area, leading to a total of  $N = 198$  with a response rate of 76.15%. Participants were mainly men (81.8%), the average age of the sample was 44.15 (s.d. 8.37) years with a medium tenure of 15.1 (s.d. 10.76) years.

### **1.2.3. Measures**

All variables were assessed using previously developed scales with the exception of two specific variables related to “suggestion obstacles” and “suggestion facilitators” that will be described below. The majority of the scales were originally developed and published in English and had already been used in an Italian context. At T1, the instructions asked the

subjects to answer thinking about their work experience “in general” while at T2, to be sure that people responded thinking about their actual situation after the relocation, instructions specifically asked employees to answer thinking about their working situation in the previous 3 months. The scales that were used are described below.

Innovation. We measured two components of individual innovation: *suggestion making* and *suggestion implementation*. We used the scales developed by Axtell et al. (2000) including 6 items for suggestion making, that investigated the frequency with which the respondent had proposed changes or improvements to various aspects of the work (1. new targets or objectives; 2. new working methods or techniques; 3. new methods to achieve work targets; 4. new information or recording systems; 5. new product or product improvements; 6. other aspects of their work) and 6 items for suggestion implementation, that include the same aspects but investigated the frequency with which suggestions have been implemented.

To evaluate the appropriateness in the specific context of the items that measure innovation, we checked them during the interviews with the 4 directors. On the base of these interviews we chose to rule out from each scale the item “new targets or objectives” because the directors said that the employees that had been involved in the research did not have the possibility to choose targets or objectives for their work. Moreover, we modified two items to make them more adherent to the specific organizational context and easily understandable for the employees and supervisors (changes were related to item 3. “new ways or methods to achieve work targets”; and 4. “new methods or procedure to collect, manage and spread information”). The respond format was a 7-point Likert-scale ranging from never (0) to always (6), the same scales were completed by both the employees and the supervisors. We provided the supervisors with a questionnaire with the name of each employee that had to be rated.

Work characteristics. We assessed two work characteristics using the scales proposed by Karasek (1985) in the job content instrument and already used in an Italian context (Magnavita, 2008; Massei & Zappalà, 2009). Three items proposed by Karasek for the dimension “decision authority” have been used to measure *job autonomy* (i.e., “My job allows me to make a lot of my own decisions”; the Alpha of .67 at T1 and .71 at T2 is adequate for a 3 item scale. We measured *job demands* using 7 items proposed by Karasek (i.e., “My job requires I work fast”), this measure has good reliability at T1 and T2. For both

measures items were rated on a seven point Likert-scale that ranged from “0 = completely disagree” to “6 = completely agree”.

Intrinsic motivation. We used 4 of the 5 items proposed by Tierney et al. (1999) to measure *intrinsic motivation* and already used in an Italian context (Zappalà & Massei, 2009). We ruled out an item, “I enjoy engaging in analytical thinking”, because it was not easily understandable for blue collar workers. The scale ranges from “0 = completely disagree” to “6 = completely agree”.

Suggestion obstacles and facilitators. On the basis of the 9 interviews with white and blue collar workers that had not been selected to fill out the questionnaire we created 8 items related to factors that employees consider impediments or facilitators to suggestion making and implementation. We ran an exploratory factor analysis in SPSS using maximum likelihood extraction method and a direct oblimin rotation; we obtained a two-factor solution confirmed by the analysis of the eigenvalues scree plot. We labelled the first factor, composed by 5 items, “*suggestion facilitators*” (“I have access to sufficient technical competences to develop my ideas”; “I can easily find help to develop new ideas”; “I know exactly at whom I can present new ideas or proposals”; “I have enough time to elaborate and develop new ideas or improvement to submit to the company”; “Ideas are welcomed no matter who submits them”); this factor explained 34.16% of variance. The second factor, including 3 items, has been labelled “*suggestion obstacles*” (“I don’t have enough organizational resources to develop my ideas”; “the ideas that I present are not taken into account”; “there isn’t any advantage in submitting ideas and suggestions to the company”) and accounted for an 18.82% of explained variance. All items loadings on its own factor were higher than .60 and lower than |.11| on the other factor. The respond format was a 7-point Likert-scale ranging from “completely disagree” (0) to “completely agree” (6).

Organizational support for innovation. This variable has been measured using 8 items related to the dimension of group support for innovation of the Team Climate Inventory developed by West & Anderson (1996) and validated in an Italian context (Ragazzoni, Baiardi, Zotti, Anderson & West, 2002). We tailored this scale to be used at organizational level as has been already done in other research conducted in an Italian context (Zappalà &

Massei, 2008). The response format ranged from “0 = completely disagree” to “6 = completely agree”.

Demographics. Participants indicated gender, age and job tenure. We used these data as control variables.

### 1.3. RESULTS

Before testing the hypotheses, data screening analyses were conducted to identify differences among respondents and non-respondents, and to check deviations from normality. Data proved to be fairly normal and tests for non-respondent bias didn’t indicate any differences among employees who filled in the questionnaire and who did not for what concerns demographics characteristics. We compared employees in the panel group (N = 198) with the drop-outs (N = 32) considering all the variables measured at T1. The results from T-test (Table 1) showed that the panel group differed from the drop-outs in terms of perceptions of suggestion facilitators, suggestion making and implementation (supervisor evaluation). In particular, employees who did not fill out the questionnaire at T2 perceived less suggestion facilitators and have been evaluated as less ready to propose and implement suggestions compared to employees who filled out the questionnaire on both waves.

Table 1. Differences among respondents and non-respondents on the variables measured at T1.

	Mean resp. T1-T2	Mean non-resp. T2	t	d.f.	p
Sugg. facilitators T1	3.39	2.47	3.34	228	.001
Suggestion making – supervisor evaluation T1	2.42	1.85	2.38	228	.02
Suggestion imp. – supervisor evaluation T1	2.28	1.74	2.23	228	.03

### 1.3.1. Differences among Self- and Supervisor evaluation

The means, standard deviations and correlations for all considered variables are presented in Table 2. We can note that the correlation among organizational support for innovation and organizational facilitators was quite high in both waves and equal to .64. However, the correlation value is lower than .75, the limit that Ashford & Tsui (1992) consider problematic for the multicollinearity.

The first hypothesis stated that the correlation between the frequency with which employees make suggestions and the frequency with which such suggestions are applied is significantly higher using supervisor evaluation rather than self-evaluation. To test this hypothesis we used the method proposed by Cohen & Cohen (1983). First, each correlation coefficient is converted into a  $z$ -score using Fisher's  $r$ -to- $z$  transformation. Then, making use of the sample size employed to obtain each coefficient, these  $z$ -scores are compared using the formula 2.8.5 (Cohen & Cohen, 1983, p. 54). Correlations suggestion making and suggestion implementation, evaluated by supervisors, were equal to .91 ( $r_1$ ) at T1 and T2; correlations between ideas suggestion and implementation, evaluated by employees, were equal to .77 ( $r_2$ ) at T1 and T2. The difference among  $r_1$  and  $r_2$  (.14) was statistically significant ( $Z = 5.01$  confidence interval for the differences  $.24 < .14 < .65$  with  $p < .01$ ) confirming H1.

In the second hypothesis we assumed that supervisor evaluation of employee innovation is more stable across time compared to employee self-evaluation. Correlation between suggestion making at T1 and suggestion making at T2, evaluated by supervisors, was equal to .76 ( $r_1$ ); correlation between suggestion implementation at T1 and suggestion implementation at T2, evaluated by supervisors, was equal to .67 ( $r_2$ ); correlation among suggestion making at T1 and suggestion making at T2, evaluated by employees, was equal to .55 ( $r_3$ ); correlation among suggestion implementation at T1 and suggestion implementation at T2, evaluated by employees, was equal to .54 ( $r_4$ ).

For what concerns suggestion making, in line with our hypothesis, the difference among  $r_1$  and  $r_3$  (.21) was statistically significant ( $Z = 3.73$  confidence interval for the differences  $.12 < .21 < .56$  with  $p < .01$ ); also the difference among  $r_2$  and  $r_4$  (.13), related to suggestion implementation, was statistically significant ( $Z = 2.04$  confidence interval for the differences  $.01 < .13 < .44$  with  $p < .05$ ), therefore hypothesis H2 was confirmed.



Table 2. Means, standard deviation and correlations. Reliability estimates ( $\alpha$ ) are shown in parenthesis on the diagonal.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	1.18	.39													
2. Age	44.15	8.37	-.02												
3. Job tenure	15.11	10.76	.04	.55**											
4. Intrinsic motivation T1	4.98	.95	-.01	.01	-.01	(.86)									
5. Job demands T1	4.31	1.05	.18*	.05	.07	.30**	(.80)								
6. Job autonomy T1	4.00	1.26	-.01	.01	.01	.19**	.36**	(.67)							
7. Suggestion obstacles T1	2.86	1.52	-.01	-.09	.00	-.10	-.03	-.32**	(.74)						
8. Suggestion facilitators T1	3.39	1.46	-.11	.14*	.07	.25**	.20**	.49**	-.29**	(.85)					
9. Org. support for inn. T1	3.39	1.44	.01	.12	.03	.26**	.36**	.33**	-.29**	.64**	(.95)				
10. Suggestion making - employee evaluation T1	3.22	1.61	-.11	.12	.18*	.46**	.41**	.27**	-.03	.35**	.30**	(.94)			
11. Sugg. implementation - employee evaluation T1	2.67	1.65	-.05	.17*	.21**	.42**	.30**	.40**	-.22**	.53**	.47**	.77**	(.95)		
12. Suggestion making – supervisor evaluation T1	2.42	1.22	.04	.00	.09	.19**	.21**	.32**	-.09	.17*	.06	.22**	.23**	(.93)	
13. Sugg. implementation – supervisor evaluation T1	2.28	1.27	.01	.02	.06	.16*	.22**	.32**	-.08	.20**	.08	.22**	.23**	.91**	(.95)
14. Intrinsic motivation T2	4.25	1.51	-.02	.01	.05	.45**	.28**	.33**	-.10	.38**	.34**	.45**	.49**	.19**	.17*
15. Job demands T2	4.05	1.22	.18*	-.08	.05	.21**	.61**	.32**	-.12	.21**	.35**	.36**	.24**	.26**	.21**
16. Job autonomy T2	3.57	1.43	.03	.00	.10	.16*	.30**	.59**	-.16*	.40**	.32**	.27**	.31**	.25**	.27**
17. Suggestion obstacles T2	2.99	1.61	-.08	-.08	.01	.03	.00	-.11	.25**	-.13	-.18*	-.03	-.06	.22	-.01
18. Suggestion facilitators T2	2.79	1.59	-.12	.04	.10	.17*	.22**	.27**	-.34**	.54**	.49**	.31**	.37**	.17*	.19**
19. Org. support for inn. T2	3.01	1.48	-.09	.04	.06	.13	.33**	.28**	-.25**	.50**	.59**	.25**	.31**	.12	.14*
20. Suggestion making - employee evaluation T2	2.39	1.70	.00	.00	.12	.37**	.34**	.26**	-.09	.34**	.32**	.55**	.50**	.27**	.25**
21. Sugg. implementation - employee evaluation T2	1.94	1.62	-.02	.01	.18**	.34**	.34**	.39**	-.20**	.40**	.41**	.47**	.54**	.36**	.32**
22. Suggestion making – supervisor evaluation T2	2.46	1.45	.06	-.16*	.01	.26**	.28**	.24**	-.03	.12	.08	.28**	.22**	.76**	.64**
23. Sugg. implementation – supervisor evaluation T2	2.21	1.40	.04	-.17*	.00	.27**	.26**	.22**	.03	.09	.03	.26**	.19**	.74**	.67**

	14	15	16	17	18	19	20	21	22	23
1. Gender										
2. Age										
3. Job tenure										
4. Intrinsic motivation T1										
5. Job demands T1										
6. Job autonomy T1										
7. Suggestion obstacles T1										
8. Suggestion facilitators T1										
9. Org. support for inn. T1										
10. Suggestion making – employee evaluation T1										
11. Suggestion imp. – employee evaluation T1										
12. Suggestion making – supervisor evaluation T1										
13. Suggestion imp. – supervisor evaluation T1										
14. Intrinsic motivation T2	(.93)									
15. Job demands T2	.40**	(.87)								
16. Job autonomy T2	.45**	.44**	(.71)							
17. Suggestion obstacles T2	-.16*	.03	-.14*	(.76)						
18. Suggestion facilitators T2	.39**	.29**	.42**	-.23**	(.90)					
19. Org. support for inn. T2	.35**	.34**	.42**	-.18*	.64**	(.96)				
20. Suggestion making – employee evaluation T2	.54**	.46**	.37**	-.03	.50**	.34**	(.95)			
21. Sugg. implementation. – employee evaluation T2	.49**	.44**	.51**	-.08	.60**	.54**	.77**	(.95)		
22. Suggestion making – supervisor evaluation T2	.26**	.29**	.25**	.07	.10	.11	.34**	.37**	(.95)	
23. Sugg. implementation – supervisor evaluation T2	.24**	.30**	.26**	.07	.09	.07	.37**	.37**	.91**	(.95)

\*  $p < .05$ . \*\* $p < .01$ .

We hypothesized that it will not be possible to detect the effect of the predictors on a single aspect of employee innovation controlling for the other one, using supervisor evaluation. The findings presented in Table 3 and Table 4 confirm hypotheses 3 and 3a, in fact all the partial correlations among predictors and suggestion making (holding suggestion implementation constant), and predictors and suggestion implementation (holding suggestion making constant), were not significant.

Table 3. Partial correlation of predictors variables with suggestion making and implementation (evaluated by supervisors) at T1.

	Partial correlation suggestion making T1 (controlling for imp. T1)	Partial correlation suggestion implementation T1 (controlling for sugg. making T1)
1. Gender	.06	-.05
2. Age	-.06	.06
3. Job tenure	.07	-.04
4. Intrinsic motivation T1	.11	-.03
5. Job demands T1	.02	.08
6. Job autonomy T1	.05	.09
7. Suggestion obstacles T1	-.04	.00
8. Sugg. facilitators T1	-.04	.12
9. Org. support for inn. T1	-.03	.06

\* $p < .05$ ; \*\* $p < .01$

Table 4. Partial correlation of predictors variables with suggestion making and implementation (evaluated by supervisors) at T2.

	Partial correlation suggestion making T2 (controlling for imp. T2)	Partial correlation suggestion implementation T2 (controlling for sugg. making T2)
1. Gender	.05	-.03
2. Age	-.02	-.05
3. Job tenure	.01	-.01
4. Intrinsic motivation T2	.10	.01
5. Job demands T2	.04	.10
6. Job autonomy T2	.04	.08
7. Suggestion obstacles T2	.05	.02
8. Sugg. facilitators T2	.02	-.01
9. Org. support for inn. T2	.12	-.08

\* $p < .05$ ; \*\* $p < .01$

### 1.3.2. Relation among Individual Characteristics, Perception of Job and Organizational Factors, and Suggestion Making and Implementation

In order to test hypotheses 4 and 5 regarding to the relation of the predictors with suggestion making and suggestion implementation, evaluated by employees, we use the partial correlation with the same rationale used for supervisor evaluation. As we can see in Table 5, at T1 individual and job characteristics were positively related only to suggestion making, except for job autonomy that is positively related only to suggestion implementation, and all but one (suggestion obstacles) individual perception of organizational characteristics were related only to suggestion implementation.

Table 5. Partial correlation of predictors variables with suggestion making and implementation (evaluated by employees) at T1.

	Partial correlation suggestion making T1 (controlling for imp. T1)	Partial correlation suggestion implementation T1 (controlling for sugg. making T1)
1. Gender	-.13	.07
2. Age	-.02	.12
3. Job tenure	.03	.11
4. Intrinsic motivation T1	.23**	.11
5. Job demands T1	.30**	-.04
6. Job autonomy T1	-.08	.32**
7. Suggestion obstacles T1	.22**	-.31**
8. Sugg. facilitators T1	-.11	.44**
9. Org. support for inn. T1	-.12	.40**

\*p < .05; \*\*p < .01

The pattern is less clear at T2 but if we exclude job autonomy, that is related only to suggestion implementation like at T1, and suggestion obstacles, even at T2 (Table 6) individual and job characteristics were related more strongly to suggestion making than individual perception of organizational factors, while – in line with our hypothesis – we found an opposite pattern for suggestion implementation that was stronger related to individual perception of organizational factors. We can therefore consider H4 and H5 only partially confirmed.

It's interesting to highlight three unexpected correlation: a positive correlation (.22) among obstacles and suggestion making at T1 (although not significant, we observe also a negative correlation pattern for suggestion facilitators and organizational support for innovation with suggestion making); a negative correlation (-.14) between organizational support for innovation and suggestion making at T2; job autonomy being positively related to suggestion implementation only and not to suggestion making.

Table 6. Partial correlation of predictors variables with suggestion making and implementation (evaluated by employees) at T2.

	Partial correlation suggestion making T2 (controlling for imp. T2)	Partial correlation suggestion implementation T2 (controlling for sugg. making T2)
1. Gender	.03	-.02
2. Age	-.01	.02
3. Job tenure	-.03	.14*
4. Intrinsic motivation T2	.29**	.14*
5. Job demands T2	.22**	.16*
6. Job autonomy T2	-.04	.39**
7. Suggestion obstacles T2	.04	-.09
8. Sugg. facilitators T2	.07	.39**
9. Org. support for inn. T2	-.14*	.47**

\*p < .05; \*\*p < .01

### 1.3.3. Considering the Time Dimension: Predictors of Suggestion Making and Suggestion Implementation across Time

We assumed that supervisor evaluations of employee innovation were less sensible to changes in predictors because they are quite stable over time, even if there could have been a change that influenced the employees' workload (i.e., as in our case, extra efforts connected to company relocation) or perceptions of organizational factors. In order to test our last hypotheses and gain a longitudinal perspective of our data we run 4 hierarchical regression models based on the same rationale, both for self- and supervisor evaluation. We used as dependent variables suggestion making at T2 (evaluated by employees and supervisors), and suggestion implementation at T2 (evaluated by employees and

supervisors). In the first step of the regression we entered control variables. In the second step we introduced the dependent variable measured at T1 to detect changes in the dependent variable. In the third step we entered predictors variables measured at T1 to test cross-lagged effect. In the final step we added the predictors variables measured at T2 to detect effects related to changes in these variable from T1 to T2.

Table 7 reports the results related to supervisor evaluation that confirm H6 and H6a: changes in supervisor evaluation of employee innovation (suggestion making and implementation) were predicted by individual and job characteristics, and the employees' perception of organizational factors measured at T1, and not by changes in these variables. Control variables explained 4% of the variance in the dependent variables and, in particular, age was negatively related to suggestion making and implementation. The most important predictors of suggestion making and implementation were the past behaviours, in fact the earlier level of suggestion making, measured at T1, explained 56% of unique variance in the variable measured at T2 and suggestion implementation explained 45% of the variance in suggestion implementation at T2. For what concerns the lagged effects, the most important predictor of change in suggestion making were age, intrinsic motivation and job demands so that younger and intrinsic motivated employees who perceived more job demands proposed more suggestions compared to older and less intrinsic motivated people that were engaged in less demanding jobs. As expected, due to the high correlation among suggestion making and implementation, we found a similar pattern for change in suggestion implementation. In this case the most important predictors were age and intrinsic motivation.

As assumed in H7 and H7a, changes in employee self-evaluation of suggestion making were predicted by changes in individual and job characteristics, and changes in the employees' perception of organizational factors. The results in Table 8 show that, even in this case, the most important predictors were suggestion making and implementation measured at T1, that explained respectively 30% and 28% of unique variance in the same variables measured at T2.

Table 7. Hierarchical regression of employees' innovation (suggestion making and implementation) evaluated by supervisors, on predictors variables measured at T1 and T2.

	Supervisor-rated suggestion making T2					Supervisor-rated suggestion implementation T2				
	F	Entry $\beta$	Final $\beta$	R <sup>2</sup>	$\Delta R^2$	F	Entry $\beta$	Final $\beta$	R <sup>2</sup>	$\Delta R^2$
<b>Step 1:</b> control variables	2.87*			.04	.04*	2.93*			.04	.04*
Gender		.05	.00				.03	-.01		
Age		-.23**	-.19**				-.24**	-.20**		
Job tenure		.13	.04				.13	.07		
<b>Step 2</b>	73.23**			.60	.56**	47.12**			.49	.45**
Sugg. making T1		.75**	.72**				---	---		
Sugg. impl. T1		---	---				.67**	.63**		
<b>Step 3:</b> predictors at T1	31.76**			.63	.03*	21.65**			.53	.04**
Intrinsic mot. T1		.10*	.06				.16**	.13*		
Job demands T1		.11*	.12*				.10	.06		
Job autonomy T1		-.04	-.10				-.01	-.08		
S. obstacles T1		.03	-.01				.06	.03		
S. facilitators T1		.00	.01				-.03	-.02		
Org. sup. inn. T1		.01	.02				-.03	-.02		
<b>Step 4:</b> predictors T2	20.35**			.64	.01	14.21**			.56	.03
Intrinsic mot. T2		.09	.09				.07	.07		
Job demands T2		-.02	-.02				.09	.09		
Job autonomy T2		.08	.08				.09	.09		
S. obstacles T2		.04	.04				.04	.04		
S. facilitators T2		-.10	-.10				-.06	-.06		
Org. sup.inn. T2		-.01	-.01				-.05	-.05		

\*p < .05; \*\*p < .01

We can considered H7 as fully confirmed because changes in suggestion making (evaluated by employees) were predicted by changes in the employees' intrinsic motivation, job demands and perception of suggestion facilitators. In particular the fourth step, where the

predictors measured at T2 were entered in the regression models, explained 14% of unique variance in suggestion making and 20% in suggestion implementation.

Table 8. Hierarchical regression of employee innovation (suggestion making and implementation) self-evaluated, on predictors variables measured at T1 and T2.

	Self-rated suggestion making T2					Self-rated suggestion implementation T2				
	F	Entry $\beta$	Final $\beta$	$R^2$	$\Delta R^2$	F	Entry $\beta$	Final $\beta$	$R^2$	$\Delta R^2$
<b>Step 1:</b> control variables	1.34			.02	.02	3.00*			.04	.04*
Gender		.01	.05				-.02	.02		
Age		-.08	-.03				-.12	-.07		
Job tenure		.17	.04*				.25**	.11*		
<b>Step 2</b>	22.60**			.32	.30**	23.03**			.32	.28**
Sugg. making T1		.56**	.28**				---	---		
Sugg. impl. T1		---	---				.54**	.30**		
<b>Step 3:</b> predictors at T1	11.50**			.38	.06**	13.20**			.41	.09**
Intrinsic mot. T1		.12	.08				.11	.12*		
Job demands T1		.08	-.02				.10	-.07		
Job autonomy T1		.04	.02				.14*	.09		
S. obstacles T1		-.01	.05				-.03	.04		
S. facilitators T1		.09	-.03				.02	-.16*		
Org. sup. inn. T1		.09	.02				.15	-.02		
<b>Step 4:</b> predictors at T2	12.26**			.14**		17.76**			.61	.20**
Intrinsic mot. T2		.21**	.21**				.03	.03		
Job demands T2		.19**	.19**				.15*	.15*		
Job autonomy T2		.02	.02				.15*	.15*		
S. obstacles T2		.05	.05				.03	.03		
S. facilitators T2		.33**	.33**				.32**	.32**		
Org. sup. inn. T2		-.07	-.07				.21**	.21**		

\* $p < .05$ ; \*\* $p < .01$



H7a was only partially confirmed because employee self-evaluation of suggestion implementation at T2 were related not only to the changes in the predictors but also to the employees' intrinsic motivation and perception of (low) suggestion facilitators measured at T1; in particular, changes in suggestion implementation were predicted by changes in job demands and autonomy as well as changes in perceptions of organizational support for innovation and suggestion facilitators.

It is interesting to note that for what concerns the relevance of intrinsic motivation and, in part, job demands, the results of employee and supervisor evaluation are partially coherent.

In fact, as regards supervisor evaluation, general intrinsic motivation and job demands measured at T1 predicted suggestion making at T2, and only general intrinsic motivation (measured at T1) predicted suggestion implementation at T2.

For what concerns employee evaluation, specific intrinsic motivation measured at T2 and job demands measured at T2 predicted suggestion making at T2, and job demands measured at T2 and general intrinsic motivation measured at T1 predicted implementation at T2.

So far, if we do not consider the time dimension related to the moment in which predictors were measured, results related to job demands and intrinsic motivation were quite coherent both for self- and supervisor evaluation of suggestion making and implementation.

As expected, employees were more sensible to the changes in the work context, related to job characteristics and organizational factors, changes that can influence variation in suggestion making and implementation. So far, the  $R^2$  change in the fourth step, where the specific predictors related to the length of time from T1 to T2 were entered in the regression model, were significant in predicting suggestion making and implementation at T2 as evaluated by employees. On the contrary, when considering supervisor evaluation, the  $R^2$  change at the fourth step was not significant, and only the general level of the predictors measured at T1 explained variance in suggestion making and implementation.

## **1.4. DISCUSSION**

The first question of this study was related to the possibility of distinguishing among two phases of innovation, suggestion making and implementation, using self- or supervisor evaluation. Our result proved that, when using supervisor evaluation, it is difficult to differentiate among different behaviours that characterized employee innovation. Often, in

other research (i.e., Janssen, 2000, 2004), due to the high correlation among the different innovative behaviours, authors decided to use an unique composite index of innovation. In some cases this choice could be considered adequate: in fact, from a logical point of view, probably the staff who feel able to implement their own innovative ideas feel able to generate and promote those ideas too.

This argument is also supported by the findings of Frese et al. (1999), showing that the number of employee suggestions adopted and rewarded by the company was primarily related to the number of suggestions written and proposed ( $r = .76$ ) to the company, showing that different dimensions of innovation are strongly correlated. Moreover, especially if we are interested in differentiating among more or less innovative employees and in evaluating employee innovative potential “in general”, or the factors (i.e., individual characteristics, job and organizational factors, etc.) that affect this potential, it could make sense to aggregate different innovative behaviours in an unique measure and use supervisor evaluation. In fact, as we pointed out in the theoretical part of this article, “other-raters” tend to evaluate the person and not the behaviours, boosting differences in the mean ratings of different subjects.

On the other hand, if the aim is – as in our case – to understand how individual, job and organizational factors influence the adoption and exploitation of suggestions proposed by employees, we should try to find measures or methods that allow to distinguish among different behaviours, and it could make sense to use employee self-evaluation. Moreover, our results show that the method used to evaluate the employees’ innovative behaviour is central, for instance, to detect the influence of contextual changes on the employees’ willingness to propose and implement suggestions.

The relevance of the measure used is evident if we look at the zero-order correlation. We obtained a similar pattern (even with differences in magnitude) in the direction of the relation among predictors and self- and supervisor evaluation of suggestion making and implementation. Apparently, simply analyzing zero-order correlation, we could say that the hypotheses H4 and H5 were confirmed. In fact, excluding job autonomy and suggestion obstacles (at T2), we found that individual and job characteristics were more strongly related to suggestion making (evaluated by employees) than the employees’ perception of organizational and team factors, while employees’ perception of organizational factors were more strongly related to suggestion implementation (evaluated by employees) than individual and job characteristics. In this way, we could get a distorted picture of the results

and assume for instance that job autonomy was important both for suggestion making (T1  $r = .27$ ; T2  $r = .37$ ) and suggestion implementation (T1  $r = .40$ ; T2  $r = .51$ ) or that all the correlations were in the expected direction. In fact, when we analyzed partial correlation we found that job autonomy was only related to suggestion implementation, and not to suggestion making, in both waves. Frese et al. (1999), studying the employees' willingness to provide suggestions through a structured systems, found that autonomy (job control) was negatively correlated to having ideas. A possible explanation for this result advanced by the authors was that "people with a higher degree of control and complexity do not need to participate in the suggestion system because they can immediately change things themselves" (p. 1150). Our result seems in line with the argument proposed by Frese et al. (1999) because, even if in the company that we considered in this study a formal system to collect employee proposals was not in place, it seems reasonable that employees who have autonomy in their job do not need to suggest changes, they can simply implement them.

It is interesting to highlight two other unexpected results: 1) the positive correlation among suggestion obstacles and suggestion making at T1, and 2) the negative correlation among organizational support for innovation and suggestion making at T2. These results did not emerge from zero order correlation but were detected using partial correlation of employee self-evaluation of innovative behaviours. A possible explanation of these results is offered by Janssen (2000) who, investigating job demands, effort-reward fairness and innovative work behaviour, found out that the employees' innovative work behaviour can serve as a problem-focused coping strategy to deal with heavy workload. We may assume that, even in our case, employees who perceived obstacles tried to offer ideas to change the situation as well as employees who perceive an adequate organization support for innovation are not encouraged to propose changes because they do not feel the urgency of changing the situation.

In line with our hypothesis we found that intrinsic motivation and job demands were the most important predictors of self-evaluation of suggestion making while, among organizational factors, suggestion facilitators and organizational support for innovation were the most important predictors of self-evaluated suggestion implementation.

In the second question posed at the beginning of this article we wondered in which way it is possible to detect the influence of contextual change on innovation. We answered to this question proving that changes in employee self-evaluation of the frequency with which they proposed and implemented suggestions were related to changes in individual characteristics, job and organizational factors while supervisor evaluation were stable across time. In line

with theory (Fishbein & Ajzen, 1975), even in our study past behaviour was the most important predictor of the future behaviour. In fact, suggestion making measured at T1 was the most important predictor of suggestion making at T2, explaining an adjunctive (after control variable have been entered in the model) 30% of variance in self-evaluation and 56% in supervisor evaluation; suggestion implementation at T1 explained an adjunctive 28% of variance in self-evaluation and 45% in supervisor evaluation of suggestion implementation at T2.

In Amabile's theory of creativity (Amabile, 1990; 1996), intrinsic motivation is considered one of the most important factor influencing creativity performance. In line with Amabile's theory, in this research intrinsic motivation seems to be one of the most important factors in influencing employees' innovation. If we exclude age and past behaviour, the employees' general intrinsic motivation, measured at T1, is the only factor that predicted change in supervisor-rated suggestion implementation and, together with job demands, change in supervisor evaluation of suggestion making T2. Change in the employees' intrinsic motivation is one of the most important predictor of change in self-rated suggestion making too. As expected, only employee self-evaluation of suggestion making and implementation were sensible to the changes in the predictors.

We found that employee self-evaluation of suggestion implementation at T2 were related not only to the changes in the predictors but also to employees' intrinsic motivation and perception of (low) suggestion facilitators measured at T1. This result could be due to a suppressor effect (Paulhus, Robins, Trzesniewski & Tracy, 2004) because the beta of intrinsic motivation and suggestion facilitators were not significant when entered in the regression, and became significant after the variables at T2 were entered, variables that in the same case were strongly correlated with them (i.e., suggestion facilitator at T1 had a correlation of .50 with organizational support for innovation at T2).

This study has strengths and weaknesses. A first weakness was related to the absence of objective measures of the targeted innovative behaviours. One strength is that we used different sources to assess independent and dependent variables, avoiding some problems connected with the common method variance. Moreover, assessing employee innovative behaviours using different sources, lead us to shed light on some differences among the two measures.

Another strength is the longitudinal research design used for the study, that allows to consider the time dimension and the changes that could influence predictors and dependent

variables. Furthermore, the time span from T1 to T2 chosen for the study could be seen as a strength or a weakness. On one hand, one could argue that a 3-month span is too short to detect real changes but, on the other hand, this time span was chosen because of a real change undertaken by the organization and results show that employees experienced changes in the 3 months; these variations in individual, job and organizational factors influenced changes in the employees' readiness to propose and implement suggestions.

We conducted the research in only one company, which restricts the possibility to generalize the results. This could be seen as another weakness. Nevertheless, choosing only one company allowed us to reduce problems connected with possible third variables not considered (i.e., differences related to the sector in which companies work) that could perturb the results.

Finally, the panel-group differed from the drop-outs on supervisor evaluation of suggestion making and implementation, and perception of suggestion facilitators. These differences could be seen as another limitation of the study because we could assume that employees who were judged to be less willing to propose and implement suggestions, or who experienced less suggestion facilitators in the work context, did not fill out the questionnaire at T2.

We already presented some practical implications of the study, for instance the importance to use employee self-evaluation when it is desirable to check rapidly the effect of organizational or work changes that could affect employees performance (in our case the innovative performance). Organizations should put an effort in improving organizational facilitators that help employees in applying suggestions. At the same time, it is important that companies elaborate strategies to make employees aware of the necessity of innovation because, surprisingly, employees who perceive less problems in the work context (i.e., organizational support for innovation) seem less prone to offer suggestions to improve the work compared to employees that experience some difficulties (suggestion obstacles at T1 were positively related to suggestion making at T1).

Another important result is that job autonomy can lead employees to implement their own ideas without offering them to the company. In a logic of continuous improvement this could have a negative effect on organizational efficiency because the improvements are not shared with colleagues and supervisors. It is important for the company to find ways (as for instance developing a structured system for gathering employee suggestions) to collect employee suggestions so that tacit or implicit knowledge used by each employee for

developing work improvements can be translated in explicit knowledge and concrete improvements available to the whole organization.



## CHAPTER 2

### **From Ideas Generation to Adoption: The Interplay between Work Characteristics, Leader-Member Exchange and Engagement across Time.**

#### *Summary*

The main aim of this study is to investigate the motivational process that leads employees to show innovative work behavior (IWB). We hypothesized that the quality of the interaction between an employees and his/her supervisor and the control asserted by the employees on their job foster employees' work engagement that, in turn, is positively related with the frequency with which employees show IWB.

By utilizing a 2-waves longitudinal design and structural equation modeling we proved that engagement (at least partially) mediate the effect of job resources (LMX and control) on IWB. In particular, if an employees experimented more (or less) control and an higher (or lower) LMX quality from T1 to T2 this has an impact on engagement that increase (or decrease) and, in turn, this predicts the increase (or decrease) in the frequency with which employees generate, propose and implement ideas.

### **2.1. INTRODUCTION**

In the modern economy innovation is seen as one of the most important factors that allow organizations to face global competition (Damanpour & Schneider, 2006; Tushman & O'Reilly III, 2002). In the past, based on the paradigm of scientific management and of the "one best way" introduced by Taylor (1856–1915), organizations tried to improve their efficiency by enforcing standardization of methods and providing employees with detailed instructions of how to perform the assigned task. Companies expected that employees adhered strictly to the rules and accomplished their duties, performing the simple task assigned. Employees asserted no control over their job and often they did not understand the meaning of what they were doing. The scientific management paradigm conceptualized workers' motivation as essentially extrinsic, arising from monetary reward. In this



framework, the role of the management and supervisors was to plan production and control workers. This kind of labour organization was for mass production, when the main issues were related to the reduction of costs and an increase in productivity.

Globalization along with the constant introduction of new and improved technologies leads to important changes in the organization of labour. Nowadays, the problem is not “how to produce more” but how to meet customer needs, improve quality and develop new products. Companies and managers look for new ways to achieve organizational goals and, therefore, look for specific employee behaviour and performance that allow adaptation to the modern global market. The attention shifts from the adherence to formal rules and assigned tasks to a more proactive way of dealing with work. The introduction in the scientific literature of such new “active” performance concepts such as “taking charge” (Morrison & Phelps, 1999), “personal initiative” (Frese & Fay, 2001), and “voice behaviour” (van Dyne & LePine, 1998) emphasized this shift. Modern organizations need to promote their human capital and, using the words of Schaufeli & Salanova (2008, p 388), retain employees who are expected “to go the extra mile” as engaged employees seems to do.

In this respect, employees’ innovative work behaviour (IWB), that in the past could be seen as inappropriate or detrimental, is now pursued by organizations and managers (Anderson, De Dreu & Neijstad, 2004; Salavou, 2004). The modern job organization presented above leads to various changes in human resource management. Managers and supervisors should not only control the workers but they should be able to motivate them and construct a positive relation with the subordinate, characterized by trust and collaboration (Avolio, Walumbwa & Weber, 2009). In order to show extra-role behaviours, tasks assigned to the worker should be challenging and allow the employee to exert a certain degree of control over their job (Frese, Garst & Fay, 2007). In recent research job and organizational characteristics are often seen as demands or resources that could influence employees’ well-being and job performance. Demerouti, Bakker, Nachreiner & Schaufeli (2001) show for instance that job demands predict employee exhaustion, and a lack of job resources lead to employees’ disengagement. Moreover, Salanova & Schaufeli (2008) proved that job resources foster proactive behaviours through work engagement. This means that the more resources are available for employees the more they feel engaged and, in turn, the more they display proactive behaviours.

In this paper we want to focus our attention on individual innovation in the workplace, seeking to examine the role that motivational factors may have in promoting IWB. Research on innovation assumes that, under certain conditions (i.e., job control and complexity,

organizational support for innovation, etc.), it is possible to obtain an innovative performance. Even in the field of creativity, where intrinsic motivation is the core concept of Amabile's theory (Amabile, 1988), researchers often assumed that intrinsic motivation arises directly from the characteristics of the job without measuring it (Oldham & Cummings, 1996). Using a longitudinal research design and the approach proposed by Schaufeli and colleagues, in which resources are related to different outcome via work engagement, we want to investigate the motivational process that arises from various "resources" and leads employees to perform IWB. This study will focus particularly on two resources: job control and the positive interaction between supervisor and employee (leader-member-exchange or LMX).

### **2.1.1. Individual Innovation in the Workplace**

Following the definition proposed by West & Farr (1989), we conceive IWB that employees can perform in the workplace by means of the intentional creation, introduction and application of new and useful ideas within a role, group or organization, in order to benefit the individual, the group or the organization significantly.

Ford (1996) states that creativity and innovation have been studied largely within different disciplines: predominantly, innovation within economics, engineering and sociology; while psychology is by far the most important field for creativity research. There seems to be a broad understanding within the scientific literature that creativity involves the generation of new ideas, while innovation is the implementation of new ideas or original solutions (Mumford & Gustafson, 1988; Woodman, Sawyer & Griffin, 1993; Scott & Bruce, 1994; Amabile, 1996; West, 2002; Mumford, Scott, Gaddis & Strange, 2002; West, Hirst, Richter & Shipton, 2004a). Ford (1996) asserts that there is a tendency to use the terms "creativity" and "innovation" interchangeably because they are closely linked in people's minds. Moreover, it's not yet clear if innovation and creativity should be thought of as uni-dimensional or multi-dimensional constructs (Patterson, 2002). This is a very important issue because even if the majority of the authors (Rank, Pace & Frese, 2004; West et al., 2004a) agree that different behaviours (i.e., idea generation, idea suggestion and idea implementation), related to creativity and innovation, probably have different predictors, the mix of measures, which assess idea generation or implementation, results in a confusion of

what specific factors may predict and facilitate the generation of ideas, on one hand, and the implementation and adaptation of those ideas on the other hand. Therefore, West and colleagues call for a more precise demarcation in the operationalization of constructs. In line with this statement, in a recent meta-analysis on the predictors and moderators of individual creativity and innovation, Harrison, Neff, Schwall & Zhao (2006) found that the majority of the studies in the field of innovation use an aggregate measure of innovation, or consider only one stage (i.e., implementation). Then, the authors stressed the importance for future research to distinguish the different stages of the innovation process.

Individual innovation is generally regarded as a process composed of different and sequentially related behaviours. Janssen (2000; 2004), following Scott and Bruce (1994), considered innovation as comprising three tasks and labeled them as idea generation, idea promotion and idea realization. Rank et al. (2004) and Frese, Teng & Wijnen (1999) also emphasized three tasks: “creativity” refers to the generation of new and useful ideas; “voice behaviour” comprises the suggestion of new ideas; “innovation” is characterized by the implementation of new ideas. Axtell, Holman, Unsworth, Wall, Waterson & Harrington (2000), as well as Axtell, Holman & Wall (2006), when studying shop-floor innovation, considered only two dimensions — suggestion and implementation of ideas — without considering the phase of creativity. As we can note, the aforementioned definitions of innovation are quite similar, although sometimes authors consider idea suggestion and promotion as two distinct phases (Holman, Totterdell, Axtell, Stride & Port, 2005). In order to consider both the generation and the implementation phases of the innovation process as suggested by West et al., (2004a), and following Frese et al. (1999) and Rank et al. (2004), we conceptualize IWB as composed by: idea generation, idea suggestion and idea implementation.

Idea generation encompasses the creation and ideation of new and useful solutions to improve products, processes or working condition. Creativity is a valuable ingredient in this phase (West et al., 2004a). After an employee has generated ideas, they usually propose them to colleagues or supervisors. These social activities are useful to improve ideas or find support for the new solution. If the idea is considered valuable or useful it will be implemented in the last phases of the innovation process. It’s important to note that individuals can be engaged in more than one of these activities at the same time (Scott & Bruce, 1994). A first objective of the study is to investigate if it’s possible to distinguish empirically between different behaviours, related to individual innovation in the workplace.

So far, we hypothesize that:

H1: *The three components (idea generation, suggestion and implementation) of the individual innovation in the workplace are empirically distinguishable.*

H1a: *The three-factor structure of the scale measuring individual innovation will be stable across time.*

### **2.1.2. Job Resources, Intrinsic Motivation and Innovation**

It makes sense to think that the characteristics of the tasks assigned to an employee influence their willingness to engage in innovative activities in the workplace. Empirical research confirms this consideration. In fact, job content factors have been identified as predictors of creativity (Oldham & Cummings, 1996; Tierney & Farmer, 2002) and innovation (Axtell et al., 2000; West, Shackleton, Hardy & Dawson, 2004b). These findings have also been confirmed by the meta-analysis of Harrison et al. (2006) that shows that the “job characteristic held the most consistent and strongest positive relationship with creativity and innovation” (p. 29).

In particular, control is one of the most important job characteristics that has usually been considered in European research (Frese et al., 1999). Karasek (1979) defined control as “the extent to which employees have the potential to control their tasks and conduct throughout the working day” (p. 290). Karasek conceptualized control as composed by two main dimensions: decision authority and skill discretion.

Skill discretion refers to the level of competencies and skills required to accomplish the job requirement and the discretion permitted to the employees in deciding what skills to employ and when to employ them (Karasek, Brisson, Kawakami, Houtman, Bongers & Amick, 1998). The second dimension, decision authority, is conceptually similar to job autonomy and is related to the opportunity given to employees about decision-making during their work (i.e., the freedom given to the employees in choosing how to organize their job; Karasek et al., 1998).

Shalley, Zhou & Oldham (2004) affirm that job complexity (i.e., jobs that allow a high level of autonomy, task variety and significance) should foster creativity, enhancing individual interest for the task that has to be accomplished. Oldham & Cummings (1996), studying the

influence of personal and contextual factors on employees' creativity, measured by three indicators (patents, contributions to a suggestion program, and supervisor ratings of employees creativity), proved empirically that job complexity was related to patent disclosure and rated creativity, but not to the number of suggestions offered by employees. Olhy & Fritz (2009), using diary methodology, analysed the influence of two work characteristics (job control and time pressure) on proactive and creative employees' behaviour. Results show that chronic time pressure and chronic job control, as well as daily time pressure and daily job control, are related positively to daily creativity and proactive behaviour.

The relationship between job control and idea suggestion seems to be less clear. Frese et al. (1999), studying employees' willingness to provide suggestions through a structured system, found that autonomy (job control) was related negatively to having ideas. A possible explanation for this result, that has been advanced by the authors, was that "people with a higher degree of control and complexity do not need to participate in the suggestion system because they can immediately change things themselves" (Frese et al., 1999, p.1150). The studies of Massei (study 1 of this dissertation) and Axtell et al. (2000) seem to confirm this statement. The results of both studies show that similar forms of job control (job autonomy in the first study and individual method control in the second) were related to suggestion implementation but not to suggestion proposing. In accord with the argument proposed by Frese et al. (1999), we believe that employees who have a high level of control over their job, don't need to propose changes, they can simply apply them.

Based on these considerations we expected that:

*H2: Job control is more (positively) related to idea generation and idea implementation than to idea suggestion.*

The design of jobs has a big impact on "employees' intrinsic motivation and creative output at work" (Shalley & Gilson, 2004, p.37). In particular, complex and challenging jobs are more likely to be perceived as interesting and exciting and, therefore, result in higher levels of intrinsic motivation (Oldham & Cummings, 1996; Shalley et al., 2004) as shown by the empirical research of Janssen, De Jonge & Bakker (1999).

In line with Salanova & Schaufeli (2008) we consider job control as a work-related resource. Job resources are, "those aspects of the job that have the capacity to reduce job

demands, are functional in achieving work goals, and may stimulate personal growth, learning, and development” (Schaufeli & Salanova, 2008, p.385). Employees who perceive more job resources (i.e., autonomy, skill discretion) are more likely to feel engaged (Schaufeli & Salanova, 2008).

We hypothesize that:

H3: *Job control is positively related to employees’ work engagement.*

### **2.1.3. Relationship with Supervisors**

The importance of support has been identified as a core factor in the context that influences creative work (Mumford et al., 2002; Amabile, Schatzel, Moneta, & Kramer, 2004). Shalley & Gilson (2004), reviewing the social and contextual factors that can foster or hinder creativity, affirm that “the link between supervisor support and creativity has been relatively well established in the literature” (p. 40).

In this study, we’ll especially focus on the quality of the exchange between the leader and the employee, that has also been tested in relation to creative and innovative work in organizations. Vertical dyad linkage research has shown that leaders don’t use the same leadership style with all their subordinates but develop specific and differential relationships with each employee who reports directly to them (Graen & Uhl-Bien, 1995). Much research documented how differentiated LMX is related to organizational variables and employees’ in-role performance (for a complete review, see Graen & Uhl-Bien, 1995). The basic assumption in LMX is that the interaction between supervisor and employees can range from a “low quality exchange relationship, in which interpersonal interaction is largely restricted to fulfilling contractual obligations,” to a “high quality LMX relationship that comprises social exchange patterns that transcend contractual obligation” (Henderson, Liden, Glibkowski & Chaudhry, 2009, p.517). So far, a high quality LMX relationship seems to be particularly relevant to promote employees’ extra-role behaviours. A study by Scott & Bruce (1994), conducted within an R&D department, hypothesized that LMX influences the level of innovation. The results revealed that the quality of the exchange was related both to the level of supervisor-rated “innovative behaviour” of employees (a composite measure of general activities, related to various innovation process stages: idea

generation, idea promotion and implementation), and to the perceived support of innovation. Also Tierney, Farmer & Graen (1999) found evidence that confirms the positive influence of high-quality LMX on two measure of creative performance (rated creativity and invention disclosure) within the R&D section of a large chemical company.

In line with these arguments and empirical evidence we expected that:

H4. *The quality of interaction between supervisor and each subordinate (LMX) is positively related to idea generation, suggestion and implementation.*

When an employee and their supervisor are engaged in a high-quality relationship subordinates are allowed greater autonomy and influence in decision-making about different aspects of their work (Basu & Green, 1997; Scott & Bruce, 1994; Tierney et al., 1999) and perceive the assigned task to be more challenging and relevant compared to low LMX employees (Liden & Graen, 1980).

So we hypothesize that:

H5. *LMX is positively related to job control.*

A supervisor who is engaged in positive interaction with the subordinate is more willing to offer assistance to the employee, providing physical and emotional support (Basu & Green, 1997; Graen & Uhl-Bien, 1995) that, in turn, will boost the employee's engagement (Schaufeli & Salanova, 2008). Empirical results also confirm the importance of the social support provided by co-workers and supervisors as a resource that is able to increase engagement (Schaufeli, Bakker & Van Rehenen, 2009; Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009) and, when lacking, increases burnout (Halbesleben, 2006).

This leads to the hypothesis that:

H5a. *LMX is positively related to work engagement.*

#### **2.1.4. Engagement as a Motivational Factor**

The main objective of this study is to discover the role of intrinsic motivation as a mediator between job resources and innovation. As we highlighted in the introduction, despite the

relevance that has been devoted to the concept of intrinsic motivation in the literature, few studies have tested its role as a mediator directly (Shalley et al., 2004). In addition, the few studies that have examined the mediating role of intrinsic motivation provide results that are ambiguous. For example, Shin & Zhou (2003) found that a measure of intrinsic motivation only partially mediated the relationship between transformational leadership and creativity, while Shalley & Perry-Smith (2001) found no significant mediation for intrinsic motivation in the relationship between expected evaluation and creativity. Shalley et al. (2004), commenting on this empirical evidence, suggest that these weak results could be related to the measure of intrinsic motivation used in the studies. In fact, researchers have often measured a specific intrinsic motivation related, for example, to the intrinsic motivation to be creative on the job (Tierney et al., 1999; Shin & Zhou, 2003).

In order to overcome the problem related to the measurement of intrinsic motivation we propose to use engagement as an indicator of intrinsic motivation. Using engagement as an indicator of intrinsic motivation could be a useful choice because engagement is a well-established construct, and the scale usually used to operationalize this concept has already shown very good psychometric properties and has been validated in many different languages (Schaufeli & Bakker, 2003; Schaufeli & Salanova, 2007). This choice is in line with the conceptualization of engagement that has been advanced by Schaufeli & Bakker (2004), who define engagement as an affective-motivational state related to the work, characterized by vigour, dedication and absorption. It consists of three dimensions: vigour, characterized by high levels of energy and mental resilience while working, willingness to invest effort in work and persistence in dealing with difficulties; dedication, characterized by a sense of significance of being involved in one's work, inspiration, pride and challenge; absorption, characterized by being involved happily in one's work, whereby time passes quickly and one has difficulty detaching oneself from work (Schaufeli & Salanova, 2007).

Vigour and dedication are the core dimensions of engagement and are also considered to be the direct positive opposites of exhaustion and depersonalization, two of the three burnout dimensions (Salanova and Schaufeli, 2008; Schaufeli & Bakker, 2004). Absorption is instead considered as a consequence of work engagement (Schaufeli & Salanova, 2007) and appears similar to flow, that is, a state of optimal experience (Csikszentmihalyi, 1990). Therefore, in this study, only the dimensions of vigour and dedication are used as indicators of engagement. In particular, vigour represents the energetic component of engagement, while dedication is related to the identification component of engagement (Schaufeli &



Bakker, 2004). Conceptually speaking, energy and identification represent the two underlying dimensions of engagement and burnout. Vigour and exhaustion represent the opposite poles of energy, while dedication and depersonalization (a burnout dimension) are the two extremes of identification (González-Romá, Schaufeli, Bakker & Lloret, 2006).

The Job Demands-Resources (JD-R) assumes that availability of job resources triggers a motivational process that leads employees to: fulfil human basic needs, promoting employees' growth, learning and development; and meet successful organizational and work goals, because job resources could be considered facilitators that help employees deal with assigned tasks (Schaufeli et al., 2009). This motivational process leads employees to feel engaged with their work. Two different theories, Job Characteristics Theory (Hackman & Oldham 1980) and Self-Determination Theory (Deci & Ryan 1985), support this assumption. The first theory proposes that five job characteristics (variety, identity, significance, autonomy, feedback) are able to intrinsically motivate employees. According to the Self-Determination Theory, the basis for intrinsic motivation arises from three innate psychological needs: need for competence, relatedness, autonomy (Ryan & Deci, 2000). These needs, and the possibility to fulfil them through social and environmental factors that could foster or hinder intrinsic motivation, influence people's well-being and their natural propensities for growth, learning and creativity (Ryan & Deci, 2000). Salonova & Schaufeli (2008) proved empirically that engagement, as an indicator of intrinsic motivation, mediates the influence of job resources on proactive behaviour. As we explained in the introduction, individual innovation in the workplace can be considered as an extra-role behaviour.

In turn, we hypothesize that:

*H6: Work engagement is associated positively with idea generation, suggestion and implementation and, thus has a mediating role between resources and individual innovation.*

### **2.1.5. The Current Study**

Despite many authors emphasizing the advantages and the utility of longitudinal research, they are still the exception. Even in the field of innovation, most of the studies are characterized by a “cross-sectional research design and only 20% of the studies carried out between 1997 and 2002 used multiple time-point measures” (Anderson et al., 2004, p.157).

Examining the recent review of Harrison et al. (2006), on the topic of individual creativity and innovation, it is possible to note that longitudinal research is still uncommon.

We used a longitudinal research design to investigate how changes in IWB (idea generation, suggestion and implementation) are predicted by changes in resources and engagement (Figure 1). This choice allows the strengthening of the causal direction between dependent and independent variables and the testing of the reverse relationship. To our knowledge, in the field of innovation research, this is the first study that tries to investigate the mediating role of intrinsic motivation using engagement. Owing to the incoherent results related to the role of intrinsic motivation as mediator among resources, creativity and innovation presented above, we expect that engagement will, at least partially, mediate the relationship between job resources and individual innovation in the workplace. In this study, we use supervisor evaluation of employees' innovation (idea generation, suggestion and implementation) as a dependent variable to avoid the problem of *common method variance*. Axtell, Holman and Wall (2006) have pointed out that employees' innovation is also often influenced by salient aspects of the work situation that change over time. The method chosen to evaluate employees' innovative behaviour is central, for instance, to be able to detect quickly the influence of contextual changes on employees' willingness to propose and implement suggestions (Massei, study 1 of this dissertation). Moreover, research on performance and 360° feedback shows that different kind of rater (i.e., peers, self, supervisor) are able to detect different and worth perspective in measuring performance (Hedge and Borman, 1995, cited in Arvey & Murphy, 1998). Based on these considerations, in order to strengthen and broaden our results, we also use employees' self-evaluation of idea generation, suggestion and implementation as dependent variables.

## **2.2. METHOD**

### **2.2.1. Research Setting and Design**

The study was a part of a broader research project carried out in a medium-size Italian steel company. The organization agreed to collaborate in the study because it wants to improve organizational efficiency and foster employees' innovation and suggestion-making. The

company, which employs about 400 people, is organized into three main, narrowly connected, divisions: the first is a specialist manufacturer of spur and bevel gears; the second is a worldwide supplier of comprehensive gear manufacturing solutions; the third is a producer of wire and cable manufacturing equipment and machinery.

The company ended 2008 with a turnover surpassing 175 million Euros. All three divisions experienced a year of considerable growth, producing an overall 22% increase in turnover. In order to deal with the general crisis of the automotive sector that started at the end of 2008, the management of this company pushed for the launch of an important improvement and cost-saving programme. In particular, managers were interested in investigating how to facilitate and encourage low rank employees' innovation, in order to boost efficiency and quality. Moreover, by May 2009, the company had relocated in new premises and the management would control how changes in job organization, connected with the move, affected employees' willingness to generate, propose and implement new ideas.

We collected data at two points in time: in April 2009, before the relocation, and three months after the change had taken place. We chose this time lag on the basis of four interviews, with the human resources director of the whole company and with a director of each division. In the sample we did not include managers or employees in high-ranking positions (the human resource director stated that making suggestions to improve organizational efficiency is part of their job), as well as 92 employees that work in a different area not involved in the relocation.

### **2.2.2. Sample and Procedure**

We drew the sample from the organization chart of the company and selected 260 employees with the above-mentioned criteria. Participation in the survey was voluntary and confidentiality was assured; a questionnaire was administrated during normal working hours in sessions facilitated by the researchers. We collected 241 usable questionnaires at T1 (we discounted 9 incomplete questionnaires) and 218, at T2 (we discounted 13 incomplete questionnaires). Therefore, matching T1 and T2 respondents led to N = 209 employees that filled out the questionnaires in both waves with a response rate of 80.38%.

The 209 employees provided self-reports for job control, leader-member-exchange, engagement and IWB. In addition, employees were rated by their direct supervisors (28) on the dependent variable of IWB. Three supervisors didn't feel able to rate 9 employees that

had recently changed job or working area. Participants were mainly men (81.3%), the average age of the sample was 44.27 (s.d. 8.34) years, with a medium tenure of 15.10 (s.d. 10.71) years.

### **2.2.3. Measures**

All variables were assessed with previously developed scales, originally published in English and already used in an Italian context. At T1, the instructions asked the subjects to answer thinking about their work experience “in general” while at T2, to be sure that people responded thinking about their actual situation after the relocation, instructions specifically asked employees to answer thinking about their working situation in the previous 3 months.

Job control. We measured *job control* using an adaptation of the scale proposed by Karasek (1985) in the Job Content Questionnaire, which had already been used in an Italian context (Magnavita, 2008; Massei & Zappalà, 2009). Three items proposed by Karasek for the dimension “decision authority” (i.e., “my job allows me to make a lot of my own decisions”) and 4 items for the dimension of “skill discretion” (i.e., “my job requires me to learn new things”) were used to create an overall score for job control by averaging the respective items. Items were rated on a seven point Likert-scale that ranged from “0 = completely disagree” to “6 = completely agree”.

Leader-member-exchange. The quality of the supervisor-employee relationship was assessed by a slightly modified version of the 7-item *LMX* instrument proposed by Graen and Uhl-Bien (1995). We used the same items proposed by the authors but worded affirmatively (i.e., “I usually know how satisfied my leader is with what I do in my job”). The scale ranges from “0 = completely disagree” to “6 = completely agree” and has a very good internal reliability in both waves.

Engagement. Work *engagement* was assessed by using the vigour (i.e., “At my job, I feel strong and vigorous”) and dedication (i.e., “I’m enthusiastic about my job”) subscales of the Italian adaptation of the Utrecht Work Engagement Scale (UWES; Schaufeli, Salanova, González-Romà & Bakker, 2002). The robust psychometric properties of the UWES have

been confirmed in the Italian context in two distinct studies comprising a sample of 963 school teachers (Simbula, Guglielmi, Schaufeli & Depolo, 2008) and a sample of 948 healthcare workers (Pisanti, Paplomatas & Bertini, 2008). All items were scored on a 7-point frequency rating scale ranging from 0 (“never”) to 6 (“always”) and added to form an overall engagement factor score.

Innovative work behaviour. Following Frese et al. (1999) and Rank et al. (2004), we conceptualized IWB to be composed of: idea generation, idea suggestion and idea implementation. So we assessed the 3 dimensions using items proposed by Holman et al. (2005). Employees provided self-assessments and were rated by their direct supervisor on: 3 items for *idea generation* (i.e., “Having ideas about how things might be improved”); 3 items for *idea suggestion* (i.e., “Suggesting how things might be improved”); and 3 items for *idea implementation* (i.e., “Having your proposals for doing things differently carried out”). The scale, already used in the Italian context (Massei & Zappalà, 2009), ranges from “0 = never” to “6 = always”, and the 3 dimensions have a very good internal reliability in both waves.

Demographic variables. We used *gender* (1 = male, 2 = female), *age* (in years), and *seniority* (in years) as control variables to check for differences in the IWB related to socio-demographic variables.

#### **2.2.4 Plan of Analysis**

All the analysis was carried out using AMOS 5 (Arbuckle, 2003) with maximum likelihood estimation methods. We used confirmatory factor analysis to check the hypothesized 3-factor structure of the scale measuring individual innovation, and the measurement equivalence across time. To evaluate fit, the following indexes were used: the  $\chi^2$  goodness-of-fit statistic; the Comparative Fit Index (CFI; Bentler, 1989 & 1990); and the Non-Normed Fit Index (NNFI; Tucker & Lewis, 1973; Bentler & Bonnet, 1980). Non-significant values of  $\chi^2$  indicate that the hypothesized model fits the data well. Because it is known the  $\chi^2$  index is greatly affected by sample size, so that the probability of rejecting a model increases when sample size increases, it is suggested to compute relative goodness-of-fit indices (Bentler, 1990). The fit can be considered acceptable when CFI and NNFI, are

greater than .90 and RMSEA is equal to or smaller than 0.08 (Bentler, 1990). In order to compare non-nested models, we used AIC (Akaike's Information Criterion) index which is designed specifically to test competing models where one model cannot be derived from the other through suitable parameter restrictions. Lower information index values indicate better fit so that one should choose the model that has the smallest AIC value.

We used the approach proposed by Frese, Garst & Fay (2007) in order to consider different models that can be tested in a longitudinal perspective. First we tested the stability model (SM1 in Figure 1), assuming that there are no relationships among variables except stability and synchronous correlations among the variables measured at T1. Then, we used the stability model as the starting point to test other structural causal models. The next model that we tested was a *synchronous model* (SM2 in Figure 1) in which it is assumed that all the causal paths work concurrently at T2. In this model previous values of the dependent and independent variables are controlled so that we predict how changes in predictors influence changes in dependent variables.

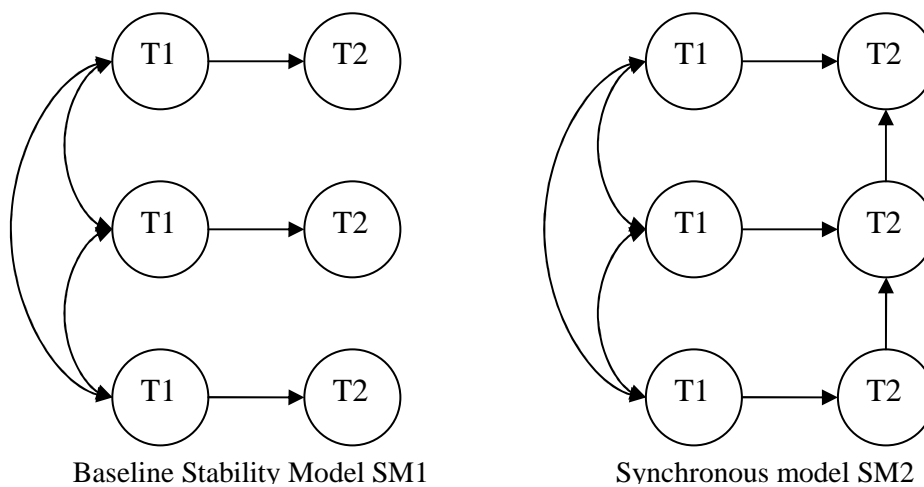


Figure 1. Different structural models.

We tested our hypothesis confronting two competing models to examine whether engagement is a full mediator: in the first one engagement fully mediates the effect of job resources on idea generation, suggestion and implementation (PM3 without dashed arrows

in figure 2); in the second one (PM3 with dashed arrows in figure 2), we added direct paths from job resources (job control and LMX) to idea generation, promotion and implementation. If the second model fits significantly better than the previous one, engagement is only a partial mediator.

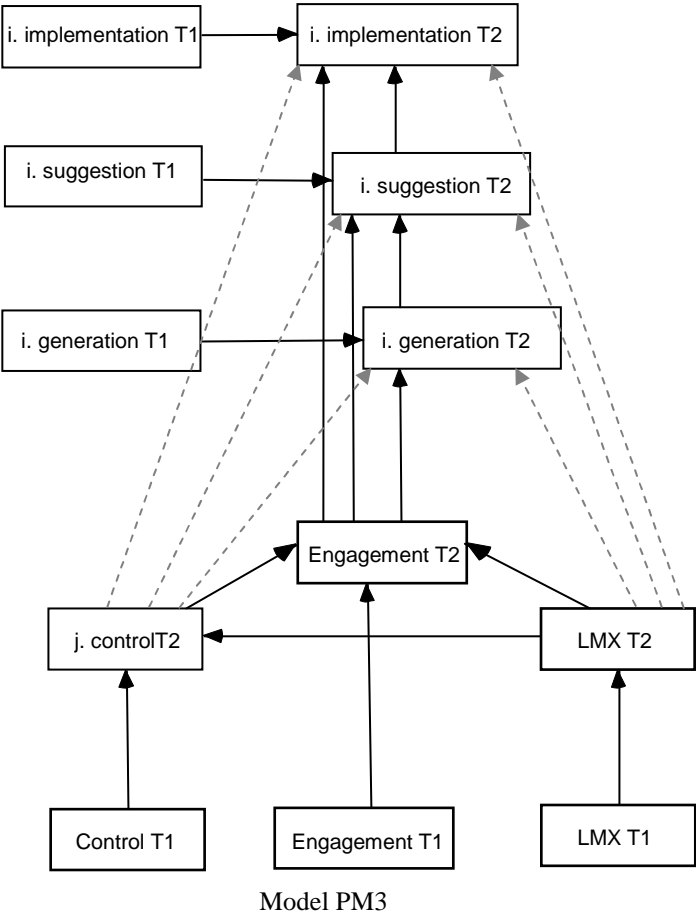


Figure 2. Research models: complete mediation and partial mediation (dashed arrows in the figure).

## 2.3. RESULTS

### 2.3.1 Descriptive Analysis

Before testing hypotheses, data screening analyses were conducted to check deviations from normality, and to identify differences between respondents and non-respondents. Data was revealed to be fairly normal. Test for non-respondents' bias shows no differences in demographic characteristics (age, gender and seniority) between employees who filled in the questionnaire at T2 and those who did not. We compared employees in the panel group (N = 209 for self-reported measure and N = 200 for supervisor-rated IWB) with the drop-outs (N = 32) with regard to all the variables measured at T1. The results from T-test (Table 1) showed that the panel group differed from the drop-outs in terms of idea generation (supervisor evaluation), suggestion (supervisor evaluation) and implementation (supervisor evaluation and self-evaluation). This means that employees who didn't fill out the questionnaire at T2 were those who, on average, have been evaluated by the supervisors as less innovative and who report implementing ideas less frequently compared to the panel group.

Table 1. Differences between the panel group and the drop-outs.

	Mean resp. T1-T2	Mean non-resp. T2	t	d.f.	p
Idea generation (supervisor evaluation)	2.79	2.23	2.24	228	.03
Idea suggestion (supervisor evaluation)	2.84	2.26	2.27	228	.03
Idea implementation (supervisor evaluation)	2.80	2.23	2.23	228	.03
Idea implementation (self-evaluation)	3.41	2.69	2.31	239	.02

Table 2 presents means, standard deviation and correlations between the study variables. Correlations were all in the expected direction and the three predictors, LMX, engagement and job control, were related with the dependent variables measured at the same point in time, both for supervisors and self-evaluation. The only exception is related to LMX



because even if the correlations with the dependent variables were all in the expected direction, at T1 they don't reach the significance level when considering idea generation and suggestion (employees' self-evaluation), as well as T2, when considering idea generation (self- and supervisor evaluation) and suggestion (supervisor evaluation).

In line with other research findings (Janssen, 2000), self- and supervisor evaluation of the three dimensions of IWB only correlated moderately, ranging from .11 to .23 at T1 and from .28 to .37 at T2, and sometimes they don't reach the significant level.

It is possible to note that the correlations between three dimensions of IWB evaluated by the same rater (employee or supervisor) were very high, both at T1 and T2, ranging from .71 to .94. This suggests that the structure of the scale that measure IWB needs to be investigated further.

Table 2. Means, standard deviation and correlation. Reliability estimates ( $\alpha$ ) are shown in parenthesis on the diagonal.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender	1.19	0.39												
2. Age	44.27	8.34	.00											
3. Job tenure	15.10	10.72	.06	.53**										
4. Engagement T1	4.53	1.11	.08	.13	-.02	(.94)								
5. LMX T1	4.55	1.30	.01	.06	-.01	.31**	(.94)							
6. Job control T1	4.38	1.05	-.03	-.01	-.04	.53**	.31**	(.83)						
7. Idea generation T1 emp. self-evaluation	3.97	1.20	-.06	.03	.14*	.55**	.10	.38**	(.90)					
8. Idea suggestion T1 emp. self-evaluation	4.10	1.36	-.07	.10	.11	.58**	.12	.46**	.85**	(.92)				
9. Idea implementation T1 emp. self-evaluation	3.41	1.62	-.06	.14*	.15*	.47**	.21**	.50**	.66**	.71**	(.91)			
10. Idea generation T1 supervisor evaluation	2.79	1.29	-.02	-.05	.03	.16*	.17*	.31**	.23**	.18*	.11	(.95)		
11. Idea suggestion T1 supervisor evaluation	2.84	1.32	.01	-.05	-.03	.17*	.20**	.34**	.21**	.18**	.12	.93**	(.95)	
12. Idea implementation T1 supervisor evaluation	2.80	1.28	-.02	.06	.07	.18*	.15*	.34**	.20**	.13	.12	.84**	.85**	(.91)
13. Engagement T2	4.14	1.32	.04	.15*	.08	.77**	.22**	.46**	.47**	.48**	.44**	.16*	.18*	.18**
14. LMX T2	3.88	1.60	.12	-.01	-.06	.32**	.56**	.30**	.12	.09	.26**	.17*	.21**	.18**
15. Job control T2	3.75	1.24	.05	-.03	.07	.45**	.22**	.67**	.36**	.38**	.45**	.31**	.32**	.29**
16. Idea generation T2 emp. self-evaluation	3.09	1.55	-.07	-.01	.09	.51**	-.01	.42**	.61**	.58**	.48**	.22**	.18*	.18**
17. Idea suggestion T2 emp. self-evaluation	3.37	1.67	-.06	.05	.11	.52**	.04	.47**	.61**	.63**	.53**	.19**	.15*	.15*
18. Idea implementation T2 emp. self-evaluation	2.91	1.63	-.01	.04	.12	.48**	.13	.44**	.52**	.54**	.56**	.21**	.18*	.21**
19. Idea generation T2 supervisor evaluation	2.93	1.46	-.03	-.14*	.02	.24**	.10	.29**	.33**	.30**	.18*	.79**	.75**	.61**
20. Idea suggestion T2 supervisor evaluation	2.96	1.49	.02	-.13	.00	.27**	.10	.29**	.31**	.28**	.17*	.77**	.75**	.59**
21. Idea implementation T2 supervisor evaluation	2.81	1.51	.01	-.13	-.01	.35**	.16*	.33**	.36**	.31**	.19**	.73**	.72**	.67**

	13	14	15	16	17	18	19	20	21
1. Gender									
2. Age									
3. Job tenure									
4. Engagement T1									
5. LMX T1									
6. Job control T1									
7. Idea generation T1 emp. self-evaluation									
8. Idea suggestion T1 emp. self-evaluation									
9. Idea implementation T1 emp. self-evaluation									
10. Idea generation T1 supervisor evaluation									
11. Idea suggestion T1 supervisor evaluation									
12. Idea implementation T1 supervisor evaluation									
13. Engagement T2	(.95)								
14. LMX T2	.40**	(.94)							
15. Job control T2	.53**	.46**	(.94)						
16. Idea generation T2 emp. self-evaluation	.58**	.11	.48**	(.91)					
17. Idea suggestion T2 emp. self-evaluation	.57**	.14*	.52**	.87**	(.94)				
18. Idea implementation T2 emp. self-evaluation	.57**	.29**	.60**	.74**	.77**	(.88)			
19. Idea generation T2 supervisor evaluation	.24**	.13	.37**	.33**	.32**	.29**	(.95)		
20. Idea suggestion T2 supervisor evaluation	.27**	.13	.36**	.31**	.32**	.28**	.94**	(.96)	
21. Idea implementation T2 supervisor evaluation	.31**	.16*	.40**	.37**	.35**	.36**	.84**	.86**	(.96)

N = 209, except for supervisor evaluation of employees' IWB (N = 200). \* p < .05. \*\*p < .01.

Test-retest correlations between IWB dimensions were quite high, ranging from .56 to .63 for self-evaluation and from .67 to .79 for supervisor evaluation. Correlations between predictors measured at T1 and T2 (ranging from .56 to .77) indicate that the study variables were quite stable over time.

Despite these considerations, there were significant decreases in the means of all the variables from T1 to T2 (Table 3), except for supervisor evaluation of idea suggestion and implementation that did not change over time and the mean of supervisor evaluation's of idea implementation that slightly increased from T1 to T2.

Table 3. Differences between the variables means measured at T1 and at T2.

	Mean T1	Mean T2	t	d.f.	p
Engagement	4.53	4.14	6.65	208	.00
LMX	4.55	3.88	6.87	208	.00
Job control	4.38	3.75	9.65	208	.00
Idea generation (emp. self-evaluation)	3.97	3.09	10.17	208	.00
Idea suggestion (emp. self-evaluation)	4.10	3.37	7.88	208	.00
Idea imp. (emp. self-evaluation)	3.41	2.91	4.72	208	.00
Idea generation (supervisor evaluation)	2.79	2.93	-2.07	199	.04
Idea suggestion (supervisor evaluation)	2.84	2.96	-1.69	199	.09
Idea imp. (supervisor evaluation)	2.80	2.81	-.14	199	.89

### 2.3.2 The Factor Structure of IWB

In order to test H1, we compared the fit of three models by means of Chi-squares difference tests (Jöreskog & Sörbom, 1993), both for supervisor evaluation (N = 200) and self-evaluation (N = 209): a 1-factor model (M1) with all the items loading on a single factor; a 2-factor model (M2), with items related to idea generation and idea suggestion loading on one factor and items related to idea implementation on another factor, allowing the two factors to covary; a 3-factor model (M3), with the three items related to idea generation loading on one factor, the three items related to idea suggestion loading on a second factor,

and the three items of idea implementation loading on a third factor, allowing the three factors to covary.

Table 4 shows the fit indices for all models. In accordance with H1, M3 is superior to M2 and M1 both for supervisor and self-evaluation. In particular, for what concerns the supervisor evaluation, the two-factor solution is superior to the one-factor solution ( $\Delta \chi^2 = 113.358$ ,  $df = 1$ ,  $p < .01$ ), and the three-factor solution is superior to the two-factors solution ( $\Delta \chi^2 = 11.063$   $df = 2$ ,  $p < .01$ ). In addition, AIC is lowest for M3 and this model had better fit indexes than the other models. All the standardized factor loadings were statistically significant with  $p < .001$  and range from 0.88 to 0.95.

We can observe a similar pattern for what concerns self-evaluation, with M2 superior to M1 ( $\Delta \chi^2 = 183.411$ ,  $df = 1$ ,  $p < .01$ ); and M3 superior to M2 ( $\Delta \chi^2 = 40.387$ ,  $df = 2$ ,  $p < .01$ ). Even in this case, M3 has the lowest AIC value and better fit indexes compared to the other models. All the standardized factor loadings were statistically significant with  $p < .001$  and range from .82 to .94.

We can consider H1 confirmed because the 3-factor model of IWB fitted the data significantly better than the alternative models. However, M3 fits did not reach the recommended criterion of good fitted models for all indices (notably RMSEA), although, the aim of this study was not to validate the scale but to look for the best structure of the scale.

Table 4. Model fit of IWB with different factorial structures.

Model	$\chi^2$	df	RMSEA	NNFI	CFI	AIC
M1 Supervisor ev.	197.608	27	.178	.906	.929	233.608
M2 Supervisor ev.	84.25	26	.106	.967	.976	122.253
M3 Supervisor ev.	73.187	24	.101	.969	.980	115.187
M1 Self-ev.	296.996	27	.219	.792	.844	332.996
M2 Self-ev.	113.555	26	.127	.930	.949	151.555
M3 Self-ev.	73.213	24	.099	.957	.972	115.213

In Table 5, we present the result related to IWB scale measurement equivalence across time. We compared the three-factor model with free items loading (M3F) to a model with

loadings restricted to equal factor loadings at T1 and T2 (M3R) by means of Chi-squares difference tests (Jöreskog & Sörbom, 1993).

Table 5. Measurement equivalence across time of the three-factor structure of IWB scale.

Model	$\chi^2$	df	RMSEA	NNFI	CFI	AIC
M3F Supervisor ev.	265.928	126	.075	.969	.974	355.928
M3R Supervisor ev.	270.775	132	.073	.970	.974	348.795
M3RI Supervisor ev.	240.680	129	.066	.976	.979	324.680
M3F Self-ev.	302.674	126	.082	.943	.953	392.674
M3R Self-ev.	306.958	132	.080	.946	.954	384.958
M3RI Self-ev.	280.285	129	.075	.952	.960	364.285

There were no significant differences on the chi-square test between free and equal factor loadings, both for supervisor evaluation ( $\Delta \chi^2 = 4.847$ ,  $df = 6$ ) and self-evaluation ( $\Delta \chi^2 = 4.284$ ,  $df = 6$ ). This means that the factor structure can be considered equal across time. In addition, all of the fit indexes were better for the models with equal factor loadings than for the models with free factor loadings. So far, it is possible to assume measurement invariance across time, confirming hypothesis H1a.

In order to improve the fit of the model, the so called “modification indices” were inspected assuming that longitudinal research could allow the correlations between the error covariance of the corresponding observed variables across the measurement times (Arbuckle, 2003; Xanthopoulou et al., 2009). In fact, the fit was improved (models M3RI in Table 5) by correlating the errors of the same three items for supervisor and employee self-evaluation. The improved model (M3RI) fitted to the data significantly better than the model with the equal factor loadings, both for supervisor evaluation ( $\Delta \chi^2 = 30.095$   $df = 3$ ,  $p < .01$ ) and employee self-evaluation ( $\Delta \chi^2 = 26.673$   $df = 3$ ,  $p < .01$ ), with the values of all the indexes improved.

Due to the small sample size, we reduced the complexity of our hypothesized SEM models using manifest variables in the next analysis; this allows us to reduce the number of

parameters that have to be estimated without paying the price of losing information (Jöreskog & Sörbom, 1993).

To control for differences related to socio-demographic variables we carried out 12 regressions before testing our hypothesized models. We regressed each of the 3 IWB dimensions (self- and supervisor-evaluated) at T1 and T2 on gender, age and seniority. None of the socio-demographic characteristics were significant predictors of dependent variables. So we excluded the socio-demographic variables in the subsequent analysis.

### 2.3.3. Supervisor-reports of IWB

The main objective of this study is to investigate the role of intrinsic motivation as a mediator between job resources and innovation, using work engagement as an indicator of intrinsic motivation. Table 6 displays the fit indexes for different structural models: 1) a stability model (SM1), assuming that there are no relationships among variables except stability; 2) a *synchronous model* (SM2), in which it is assumed that all the causal paths work concurrently at T2 and that engagement fully mediates the effect of job resources on ideas generation, suggestion and implementation; 3) a partially mediated model (PM3) in which direct paths from job resources (control and LMX) have been added to idea generation, promotion and implementation; 4) a final model (SM2I), improved by looking at the “modification indexes”.

Table 6. Goodness-of-fit measures for different structural models predicting supervisor-evaluation of the three dimensions of employees’ IWB.

<i>Model</i>	$\chi^2$	<i>df</i>	<i>RMSEA</i>	<i>NNFI</i>	<i>CFI</i>	<i>AIC</i>	Comparison	$\Delta \chi^2$	$\Delta$ <i>df</i>
SM1Sup.	609.805	45	.251	.620	.741	675.805	---	---	---
SM2 Sup.	87.919	37	.083	.957	.977	169.919	SM1-SM2	521.886*	8
PM3 Sup.	75.432	31	.085	.957	.980	169.432	SM2-PM3	12.487	6
SM2I Sup.	80.425	36	.079	.980	.980	164.425	SM2-SM2I	7.494*	1

\* $p < .01$ .  $N = 200$ .

As shown in Table 6, the stability model (SM1) didn't fit very well with the data and clearly improved when the hypothesized paths among the variables measured at T2 were specified (SM2). These paths are the same as those depicted in Figure 3 and results suggest that, after controlling for the level of the dependent and independent variables measured at T1, engagement completely mediates the effect of job resources on idea generation, suggestion and implementation. There were no significant differences on the chi-square test between the fully mediated model (SM2) and the competing partially mediated model (PM3) that comprised direct paths from LMX and job control to idea generation, suggestion and implementation. So we can conclude that SM2 is superior to PM3. As hypothesized (H3 and H5a), changes in LMX and job control positively predict changes in employees' work engagement from T1 to T2, and engagement mediates the effect of resources on IWB, confirming H6. In line with hypothesis 5, LMX is positively related to job control and, in particular, changes in the quality of interaction across T1 and T2 influenced the change in employees' perceptions of job control.

All the paths depicted in Figure 3 were significant. However, modification indices suggested to include one additional non-hypothesized cross-lagged path, from the general level of engagement measured at T1 to the quality of interaction between supervisor and employee (model SM2I in Table 6). This means that the quality of the relationship between an employee and his/her supervisor during the three months passed from T1 to T2 is predicted not only, as expected, by the general quality of the relationship as measured at T1, but also from the general level of employees' work engagement. This seems to suggest that there were reciprocal relationships between work engagement and LMX. Adding this additional pattern, the fit of the model reached the recommended criterion of good fitted models for all indices.



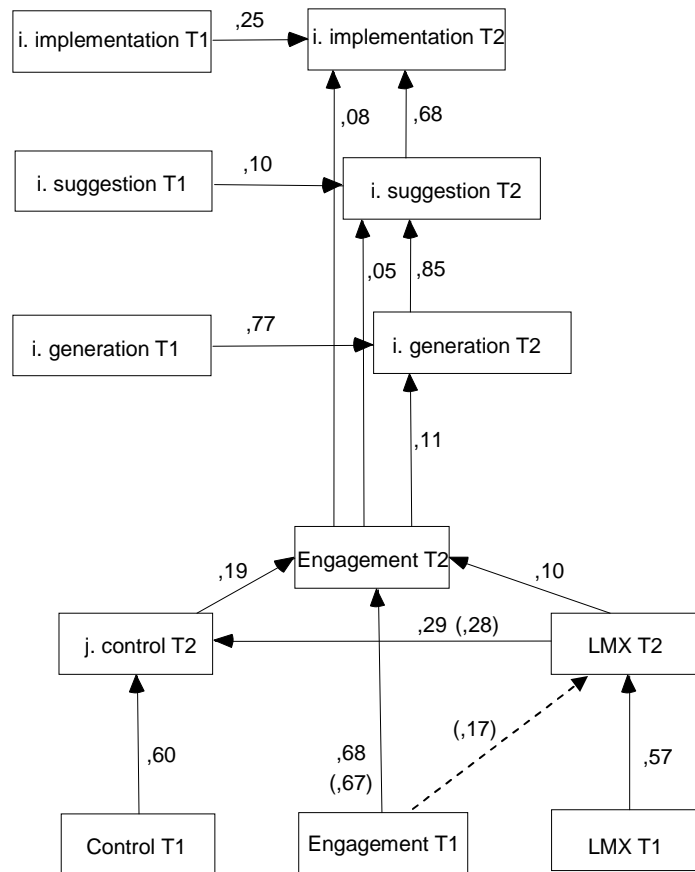


Figure 3. Path coefficients of models SM2 and SM2I (model SM2I parameters are given in parentheses when different from paramters of SM2), N = 200.

SM2I model explained 63.2% of variance in idea generation at T2, 89.2% in idea suggestion at T2, 78.7% in idea implementation at T2 and 64.8% in engagement at T2. In line with theory and other research findings (Frese et al., 1999; Janssen, 2000, 2004) the 3 dimensions of IWB, idea generation, suggestion and implementation were srtrongly related to each other. Thus, a change in the frequency with which employees’ implemented ideas were predicted primarily by the change in the frequency with which they suggested ideas that, in turn, was predicted by the change in the frequency with which employees generated new ideas. The change in engagement from T1 to T2 is a significant predictor of the small residual variance of the three components of IWB (.11 for idea generation, .05 for idea suggestion and 0.08 for idea implementation).

### 2.3.4. Self-reports of IWB

In order to strengthen our results, we tested the same models considering employees' self-evaluation for idea generation, suggestion and implementation. We used the same models compared above: a stability model (SM1); a *synchronous model* (SM2); and a partially mediated model (PM3). The only difference is that in this case models SM2 and PM3 contain the improvement suggested by the previous analysis, the path from engagement measured at T1 to LMX measured at T2.

Table 7. Goodness-of-fit measures for different structural models predicting self-evaluation of the three dimensions of employees' IWB.

<i>Model</i>	$\chi^2$	<i>df</i>	<i>RMSEA</i>	<i>NNFI</i>	<i>CFI</i>	<i>AIC</i>	Comparison	$\Delta \chi^2$	$\Delta$ df
SM1 employees	556.321	45	.234	.583	.716	622.321			
SM2 employees	108.001	36	.098	.927	.960	192.001	SM1-SM2	448.32**	9
PM3 employees	61.425	30	.071	.962	.983	157.425	SM2-PM3	46.576**	6
PM3I employees	70.277	36	.068	.927	.981	154.277	PM3I-PM3	8.852	6
PM4 employees	66.125	35	.065	.967	.983	157.125	PM3I-PM4	4.152*	1

\* $p < .05$ , \*\* $p < .01$ ,  $N = 209$ .

As shown in Table 7, the stability model (SM1) didn't fit very well with the data and clearly improved when the hypothesized paths among the variables measured at T2 were specified (SM2). In this case, the partially mediated model (PM3) is superior to the fully mediated model (SM2). When the non-significant paths were constrained to be equal to 0, the fit of the model improved considerably (model PM3I in Table 7, depicted in Figure 4). There were no significant differences in the chi-square test between the partially mediated model (PM3) and the competing improved model (PM3I), so that we choose to retain PM3I, the more parsimonious model.

We inspected modification indices to look for unhypothesized relationships; it was suggested to include a cross-lagged path, from the general level of idea implementation measured at T1 to the specific job control measured at T2 (model PM4 in Table 7). The new

model PM4 was superior to PM3I ( $\Delta \chi^2 = 4.152, df = 1, p < .05$ ). This means that the more employees implement ideas to improve their work the more they perceive control over their job. This seems to suggest that there were reciprocal relationships between idea implementation and job control.

All the paths depicted in Figure 4 were significant and the model explained 50.3% of variance in idea generation at T2, 77.2% in idea suggestion at T2, 64.6% in idea implementation at T2 and 63.6% in engagement at T2. With regard to the three IWB dimensions, even for self-evaluation, the change in the frequency with which employees implement ideas is predicted primarily by the change in the frequency with which they suggest ideas that, in turn, is predicted by the change in the frequency with which employees generate new ideas. In other words, if, for example, an employee generates less (or more) ideas from T1 to T2 this has an impact on the number of suggested ideas (at T2) that decrease (or increase) and, in turn, this predicts the decrease (or increase) of the ideas implemented (at T2).

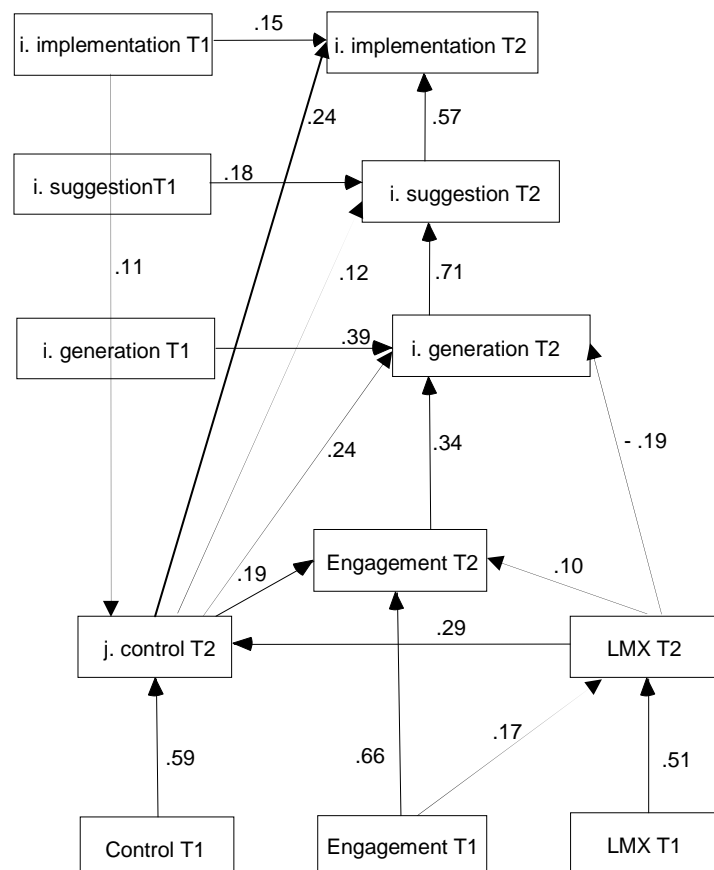


Figure 4. Path coefficients of models PM3I, N = 209.

The results suggest that H6 is only partially confirmed because engagement is a partial mediator of resources on idea generation and had no effect on idea suggestion and implementation. In line with H2, job control was more related to idea generation (.24) and implementation (.24) than to idea suggestion (.12).

Contrary to our expectation (H4), LMX is not related to idea suggestion and implementation and the change in the quality of interaction between an employee and their supervisor negatively predicted the change in the frequency with which employees generated new ideas in the three months after relocation. The high correlation between the predictors measured at T2 (LMX and engagement .40; LMX and job control .46) and the absence of correlation between LMX at T2 and idea generation at T2 (supervisor-evaluation) lead us to hypothesize that the unexpected negative pattern was due to a suppressor effect. So we can assume that LMX at T2 was not related significantly to idea generation.

## **2.4. DISCUSSION**

The main objective of this study was to shed light on the motivational processes that lead from different job resources to IWB through employees' work engagement. The appropriateness of choosing engagement as an indicator of intrinsic motivation seems to be well supported by our results. In fact, in accordance with previous findings and our hypotheses (Schaufeli et al., 2009; Simbula, 2009; Xanthopoulou et al., 2009): a) work engagement resulted quite stable over time (the path from engagement at T1 to engagement at T2 was equal to .66); b) the increase of employees feeling of work engagement, after controlling for the general level of work engagement, was predicted by (an increase in) job control (H3) and the quality of interaction with the supervisor (H5a). In addition to this last result, the unexpected positive effect of the general level of engagement (measured at T1) on LMX at T2, controlling for LMX at T1, highlight the presence of what Schaufeli and colleagues (2009) defined as a "gain cycle". This means that employees who initially feel engaged are likely to perceive an improvement in their relationship with the supervisor in the 3 months after the first data collection which, in turn, makes them feel more engaged at T2.

Contrary to our expectation (H4), the quality of the interaction between a supervisor and their subordinate was not directly related to employees' IWB. However, LMX was revealed to be very important, fostering employees' work engagement directly and indirectly, via job control. It seems that employees who are engaged in a positive relationship with their supervisor feel more engaged with their work and are perceived to have a high level of control over their job (H5). This could be due to the fact that probably supervisors give more autonomy and control to those employees with whom they have a better working relationship.

In accordance with H1 and H1a, our study shows that IWB is composed of three main dimensions that are related and stable over time. As hypothesized (H6), work engagement seems to play a mediating role (at least partially) between job resources and employees' IWB. In particular, after controlling for general levels of the variables considered in the study, engagement was the most important predictor of idea generation, both in supervisor reports and in self-evaluation. In line with other findings, supervisor evaluation seems to be more stable across time and less sensitive to the change in the predictors compared to employees' self-evaluation. The change in employees' work engagement explained only a small but significant portion of residual variance in idea generation, suggestion and implementation, after controlling for the general level of these variables. These results confirm the importance that, in creativity and innovation research, has been given to intrinsic motivational factors and show that the more employees experience a feeling of vigour and dedication in their job, the more they generate ideas to improve their work.

Our findings highlight some relevant differences among self- and supervisor evaluation. First of all, even if self-evaluation can be affected by different kinds of bias (i.e., social desirability, leniency of self-assessment; Nilsen & Campbell, 1993), employees directly experience changes in the work context or in their job, while the supervisor could perceive such changes with some delay or perceive only the most relevant ones. So a practical implication of the study is that it could make sense to ask employees directly, using self-evaluation, to check the effect of organizational or work changes that could affect employees' performance (in our case innovative performance).

Secondly, supervisor evaluations of employees' IWB may miss innovative activities that are less observable, for instance, the generation of ideas, which is primarily an intrapersonal cognitive process. In addition, probably supervisors can only perceive the IWB connected with successful major changes, or improvements that employees show to impress the supervisor, missing other employees' innovative activities (Janssen, 2000). These

considerations could be used to explain the differences among the models related to self- and supervisor evaluation of IWB. In fact, when we used supervisor-reports the effect of job resources on supervisor-rated IWB was completely mediated by engagement, while when we used self-report of IWB, (the change in) job control had also a direct effect, particularly on (change in) idea generation and implementation, but also on suggestion.

On one hand, as suggested by Frese et al. (1999), employees with a higher degree of control over their job can probably change things directly themselves. For example, they can apply small improvements to deal with ordinary problems that arise from the job and not present them to the supervisor or share such ideas with other colleagues.

On the other hand, employees experienced the changes in their job directly (for example, the relocation) and probably used IWB as a problem-focused coping strategy (Janssen, 2000) to deal with the increase in workload or the variation in job control as a result of this change. Our results seem to confirm this consideration. In fact, employees who implemented more ideas (self-evaluation) at T1 report higher level of job control at T2.

#### **2.4.1. Limitations**

A first limitation of the study is related to the few job resources considered in the study. In fact, we focused only on job control and LMX, while research demonstrated that there are numerous other resources that can influence engagement and innovation.

A second limitation of the study is that employees in the panel group differed from the drop-out in terms of supervisor evaluation of the idea generation (supervisor evaluation), suggestion (supervisor evaluation) and implementation (supervisor and self-evaluation). This suggests that those employees who are evaluated as less innovative by the supervisors were less willing to participate in the research.

A third factor that could be considered to be a limitation is related to the instructions that we gave to the employees to fill out the questionnaire, that were different at T1 and T2. This allows us to be sure that, at T2, people responded thinking about their work situation after the relocation, but made it more difficult to check for reciprocal relationships or inverse relationships among predictors and outcome variables.

The time length from T1 to T2 chosen for the study could be seen as a strength or a weakness. On one hand, one could argue that a 3-month period is too short to detect real

changes but, on the other hand, this time lag was chosen on the basis of a real change that the organization had undertaken and the results showed that employees did experience changes in the 3-month period.

## **CHAPTER 3**

### **Innovative Employees: Personal Characteristics and Performance Outcomes.**

#### *Summary*

The main aim of this study is to investigate the differences between the most and the less innovative employees in terms of personal characteristics and three dimensions of performance: innovation, quality and efficiency.

Using cluster analysis and a person-centred approach we demonstrate that the group composed by the most innovative employees (innovators) scored higher than the group composed by the less innovative employees (conservatives) on two personal characteristics: originality and personal initiative. No differences have been found in attention to details and conformity.

Results show that there is no difference in the dimensions of quality and efficiency of performance between innovators and conservatives while the former propose and implement more suggestions (innovative performance) than the latter.

### **3.1. INTRODUCTION**

As the majority of previous research on innovation, the first two studies of this dissertation were variable-centred and investigated the relations between predictor variables and outcome through correlational and regression analysis. The main aim of those studies was to investigate which variables predict employees' innovation (i.e. the employees' willingness to propose and implement suggestions). In this chapter we shift the attention from the variables to the individuals in order to identify the differences between the most and the less innovative employees.

Nowadays companies have to deal with different and apparently contradictory market demands to meet customers' needs. On one hand, they should be able to continuously develop innovative products, services, etc., on the other hand they should maintain high quality standard, improve efficiency and reduce costs. The necessity to manage these



different requirements leads to tensions between what we could call “ordinary work activities” and innovative activities, both crucial for organizational success, because the demands of innovative activities differ from the demands of routine performance (Bledow, Frese, Anderson, Erez & Farr, 2009; Naveh & Erez, 2004). Therefore, “today’s employees are required to be creative, yet also to conform to rules and standards, and work efficiently to meet time and budget constraints” (Miron, Erez & Naveh, 2004, p. 175).

Two major questions arise from these considerations. Do highly innovative employees have different personal characteristics compared to less innovative employees? Do different dimension of employees’ performance related to efficiency, quality and innovation compete or complete each other?

As we outlined in the discussion of the first study, when one is interested in differentiating between the more and the less innovative employees while evaluating employee innovative potential “in general”, it could make sense to aggregate different innovative behaviours in a unique measure. We already presented some of the strengths and weaknesses of self- and supervisor evaluation. The different methods used to assess the three components of employees’ IWB show only moderate correlation, ranging from .11 (n.s.) to .37 ( $p < .01$ ) in the second study of this dissertation. We can expect that some employees underestimate or overestimate their innovative potential compared to the supervisor. So far, we could find different degrees of accordance between self- and supervisor evaluation of employees IWB. Cluster analysis enables to identify different employee “profiles” and, in turn, an investigation of their implication. Aldenderfer & Blashfield (1984) reported that there are no established quantitative criteria for choosing the best solution. Anyway, we can assume to find four different configurations using self- and supervisor evaluation of employees’ innovation, leading from 2 to 4 possible clusters. We can imagine to have an high degree of accordance between self- and supervisor evaluation and find only two clusters, one formed by employees who consider themselves and are considered very innovative by their supervisor and another one, composed by employees who consider themselves and are considered not innovative by their supervisor. In the two other possible solutions (3 or 4 clusters), we could expect to find some incongruence between self- and supervisor evaluation. On one hand, we could find a group composed by the employees who consider themselves very innovative but are considered scarcely innovative by their supervisor. On the other hand, we could find a group of employees who consider themselves not very innovative but are considered innovative by their supervisor.

The two major aims of this study are to investigate which factors discriminate the most innovative employees from the less innovative ones in terms of antecedent, relating to personal characteristics, and in term of consequences, relating to job performance. In order to be sure to select only the most and the less innovative employees, we will compare the two less ambiguous groups, for which self- and supervisor evaluation concord. The first one is composed by employees who consider themselves and are considered very innovative by their supervisor and the second one is composed by employees who consider themselves and are considered not innovative by their supervisor.

### **3.1.1. Development of Hypotheses**

Cognitive style has been identified as one of the most important individual characteristics that is related to individual innovation (Kirton, 1976; Scott & Bruce, 1994; Tierney, Farmer & Grae, 1999). Kirton suggests that some persons, called adaptors, tend to prefer the adaptive approach to problem-solving, while others, called innovators, prefer the reverse. Adaptors prefer to solve problems by using well-established rules and accepting problems as defined. Alternatively, innovators look beyond what is given to solve problems, integrating diverse information and redefining the problems. The differences between the two “types” of persons have often been assessed by three personal characteristics: originality, conformity to rules and norms, efficiency and attention to detail.

The work of Miron et al. (2004) proves that the three characteristics are distinct yet interrelated dimensions with positive correlation between them. This means that people who have the ability to be creative could be able at the same time to care about details and to conform to the given organizational norms. In Miron et al. (2004) research originality (called by the authors “creativity”) was the only personal characteristic that was positively correlated with employees’ innovative performance. Based on these considerations we expect to find a difference between the more and the less innovative employees for what concerns the personal characteristic of originality, with the first scoring significantly higher than the second, but not for the other two personal characteristics.

Therefore, we hypothesize that:

*H1. The group composed by the most innovative employees will score higher on originality than the less innovative employees.*

*H1a. There will be no differences between the most innovative employees and the less innovative employees for what concerns attention to detail and conformity.*

A number of studies have shown that creativity does not necessary lead to innovation (Miron et al., 2004; Tierney et al., 1999). Innovation is often a risky activity for employees because they can encounter obstacles in the development of new ideas and they have to be ready to face the status quo in order to implement the new ideas. Moreover, innovation is often not something that is formally required from blue collar employees and can be conceived as an extra-role performance (Ohly & Fritz, 2009; Rank, Pace & Frese, 2004). For these reasons, employees need to have initiative in order to do more than what is formally demanded and to deal with the potential obstacles that they might encounter in the development and application of ideas. “Personal initiative is a behavior syndrome resulting in an individual’s taking an active and self-starting approach to work and going beyond what is formally required in a given job” (Frese, Kring, Soose & Zample, 1996, p. 38). Therefore, probably the most innovative employees will be those with the higher level of personal initiative.

Based on these considerations, we hypothesize that:

*H2. The group composed by the most innovative employees will score higher on personal initiative than the less innovative employees.*

In this work we considered three dimensions of performance that could compete with each other. The first one is related to innovation and, in particular, to the improvements that employees could propose and apply in their job. In the first study of this dissertation we already presented which organizational and personal characteristics are related to suggestion making and implementation. So far, we expected that employees who consider themselves and are considered highly innovative by the supervisor will propose and implement more suggestions compared to less innovative employees.

Originality as well as an innovative or divergent cognitive style can be considered as creative-relevant skills (Amabile, 1990; Shalley, Zhou & Oldham, 2004; Tierney et al.,1999). Numerous studies have proved that the individuals’ innovative cognitive style is

positively related to creative and innovative performance (Oldham & Cummings, 1996; Scott & Bruce, 1994) but it is not yet clear how these characteristics affect other relevant performance dimensions, related to quality and efficiency. While innovation is about breaking rules and searching for new way to perform the task, quality requires adherence to rules and standards. Creativity and innovation require time and experimentation while efficiency and reducing costs imply working at fast pace (Amabile, Hadley & Kramer, 2002).

The most innovative employees could spend their time finding and testing new solutions. Therefore they could be considered by their supervisor as less able to perform the assigned task with a high standard of quality or as fast as the less innovative employees. In our knowledge, there is only one study that tested this hypothesis disconfirming it (Miron et al., 2004). In fact, the study reported a positive correlation among the three dimensions of performance, showing that they do not necessarily compete with each other.

On the basis of the aforementioned arguments about different dimensions of performance, we hypothesize that:

*H3.: The group composed by the most innovative employees makes and implements more suggestions compared to the group composed by the less innovative employees.*

*H3a. There will be no differences between the most innovative employees and the less innovative employees for what concerns the two dimensions of performance related to quality and efficiency.*

## **3.2 METHOD**

### **3.2.1 Sample and Procedure**

We collected data at the same two points in time of the first two studies of this dissertation and the subjects (N = 200) were the same of study 1 and 2. Participants were manly men (81.5%), the average age of the sample was 44.15 (s.d. 8.36) years with a medium tenure of 15.18 (s.d. 10.81) years.

At T1 the instructions asked the employees to provide self-reports about personal characteristics, thinking about how, in general, they consider themselves. We measured originality, attention to detail and conformity only at time 1 because theory about cognitive style and the underlying personal characteristics (Kirton, 1976) shows that these personal characteristics are quite stable over time and should not change in a time span of three months. We assumed that the same rationale could be used for personal initiative. Theory and empirical research (Frese, 1996; Frese, Garst & Fay, 2007) show that personal initiative is quite stable over time but in order to test that the assumption about the stability of personal characteristics is plausible even in this research, we measured personal initiative at both waves (we considered only these personal characteristics and not the other three related to cognitive style in order to reduce the length of the questionnaire). We evaluated the employees' innovative potential using self- and supervisor evaluation of the frequency with which, in general, employees show IWB.

At T2 the supervisors rated employees performance in the three months elapsed from T1 to T2.

### **3.2.2. Measures**

Employees' innovation. We created an overall score of employees *innovative potential* using the 9 items proposed by Holman et al. (2005) and already used in the study 2 to assess the 3 dimensions (idea generation, idea suggestion and idea implementation) of employees IWB. Items were scored on a 7-point Likert scale that ranges from “0 = completely disagree” to “6 = completely agree”.

Personal characteristics. We measured three personal characteristics related to *originality* (i.e., “I’m a person that has original ideas”), *attention to detail* (i.e., “I’m a person who enjoys detailed work”) and *conformity* (i.e., “I’m a person who promptly adapt his/herself to the system”) using 15 items, 5 for each dimension, based on the work of Kirton (1976) and asking to the employees to self-evaluate their self-image. We then used the 6-item scale proposed by Frese et al. (1996) to measure *personal initiative* (i.e., “I actively face the problems”). Items were scored on a 7-point Likert scale that ranges from “0 = completely disagree” to “6 = completely agree”.

Performance. We provided the supervisors with a questionnaire with the name of each employee that had to be rated. We evaluated three performance dimensions: *innovation*, using the scales developed by Axtell et al. (2000) and already used in the study 1 (5 items for ideas suggestion and 5 items for suggestion implementation), *quality* (3 items, i.e., “In his/her works, he/she assured the required standard quality”), *efficiency* (3 items, i.e., “He/She fulfilled the assigned work schedules”). Items were scored on a 7-point Likert scale ranging from “0 = completely disagree” to “6 = completely agree”.

## 3.3 RESULTS

### 3.3.1. Data Analysis

Table 1 provides the descriptive statistics, the reliability estimates of the scales and the correlation among variables. Considering demographic variables we can note that gender is not related to the other variables. The older employees seem to care more about detail than the younger. Supervisors report that the innovative performance of the former is significantly lower than the second. In addition, the employees who have a longer organizational tenure reached higher level of performance in terms of quality compared to the persons with a lower seniority.

According to our hypothesis, originality and personal initiative were the personal characteristics that had the strongest positive correlation with the employees' innovative potential (both for self- and supervisor evaluation). If we exclude the relation between originality and conformity (the correlation is positive but not significant), all personal characteristics considered in the study were positively correlated among them. These results support the assumption that an employee can have at the same time a high level of originality, conformity and attention to detail.

The two dimensions of innovative performance, suggestion making and implementation were very highly and positively related (.91). This is in line with the consideration that we advanced in the study 1 about the tendency of other-raters, like supervisors, to evaluate the person and not the behaviour. This is especially true when behaviours are similar in nature as in the case of suggestion making and implementation that are both related to innovative

activities. It is interesting to note that the three dimensions of performance are positively correlated, supporting our hypothesis that different and apparently contrasting dimensions of performance do not necessarily compete with each other.

Cluster analysis has been used to form different groups on the basis of self- and supervisor evaluation of employees' innovative potential, in order to consider both measures. Deciding the number of clusters involves a trade-off between the desire for detail (many clusters) and the desire for generality and simplicity (fewer clusters). Based on the aforementioned reasoning we tested solutions for 2 to 4 clusters. In order to choose the best solution, in accordance with Barbaranelli (2006) we first ran a hierarchical cluster analysis using Ward's method with squared Euclidean distances to establish the number of clusters in the sample. Then, k-means cluster analysis procedures were used to group individuals. An examination of the agglomeration schedule, dendrogram, and percentages of individuals in each cluster for each solution indicated that a three-cluster solution provided the most interpretable pattern and maximized both the homogeneity of individuals within clusters and the heterogeneity of individuals between clusters. We integrated the two clustering methods using the three cluster solution and initial cluster centres obtained from the hierarchical analysis as the value of the mean of the three groups selected to run the k-means cluster analysis.

Table 1. Descriptive statistics and correlations. Reliability estimates ( $\alpha$ ) are shown in parentheses in the diagonal.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	1.19	.39														
2. Age	44.15	8.36	.00													
3. Job tenure	15.17	10.81	.06	.55**												
4. Originality T1	4.69	.84	.00	.02	-.01	(.75)										
5. Conformity T1	4.86	.75	.05	.13	.10	.13	(.69)									
6. Attention to detail T1	5.07	.69	.04	.19**	.11	.24**	.52**	(.76)								
7. Personal initiative T1	4.84	.77	.02	.09	.03	.67**	.19**	.32**	(.84)							
8. Emp. Innovative potential – self-evaluation T1	3.78	1.27	-.07	.10	.16*	.62**	.11	.17*	.60**	(.94)						
9. Emp. Innovative potential – supervisor evaluation T1	2.81	1.24	-.01	-.01	.03	.18*	-.14*	.04	.20**	.18**	(.97)					
10. Personal initiative T2	4.65	1.07	.09	.04	.07	.49**	.13	.31**	.57**	.50**	.20**	(.90)				
11. Performance innovation suggestion making T2	2.47	1.46	.05	-.17*	.00	.25**	.00	.09	.30**	.29**	.73**	.28**	(.95)			
12. Performance innovation suggestion implementation T2	2.23	1.41	.03	-.18*	-.01	.22**	.02	.13	.29**	.25**	.73**	.28**	.91**	(.95)		
13. Performance quality T2	4.54	1.14	.00	-.04	.15*	.01	-.09	.00	.12	.01	.47**	.04	.44**	.35**	(.94)	
14. Performance efficiency T2	4.16	1.30	.05	-.12	.05	.02	-.12	-.09	.00	-.07	.56**	.06	.50**	.45**	.75**	(.95)

\*  $p < .05$ ; \*\* $p < .01$



The agreement between the partitions obtained by the hierarchical analysis and the k-means has been evaluated by means of the kappa (k) agreement coefficient (Cohen, 1960). Values higher than .60 indicate a high agreement, showing that the cluster solution is replicated in the two subgroups. We obtained a value of .68 ( $p < .01$ ), showing that there is a reasonable degree of agreement between the two solutions.

In Table 2 we present the means and the differences of the three groups related to the employees' innovative potential (self- and supervisor evaluated), the variables used to form the clusters.

Table 2. MANOVA for the three cluster solution: between-groups differences for self- and supervisor evaluation of employees innovative potential.

	Group 1 (innovators) N = 95		Group 2 (conservatives) N = 56		Group 3 (unclear innovators) N = 49		F (2, 197)
	M	SD	M	SD	M	SD	
Emp. innovative potential – supervisor eval.	3.70	.77	2.20	.93	1.36	.69	140.70*
Emp. innovative potential – self-eval.	4.49	.70	2.58	.92	4.23	.80	157.18*

\* $p < .001$

The first group (N = 95) is composed by the employees who consider themselves and are considered very innovative by their supervisor and show IWB “often”; we called this group “innovators”. The second (N = 56) group is composed by employees who consider themselves and are considered not very innovative by their supervisor; we called this group “conservatives”. These employees show IWB “rarely”. The third group (N = 49) is composed by the employees who consider themselves very innovative, reporting to show IWB “often”, but are considered scarcely innovative by their supervisor who stated that these employees show IWB “almost never”; we named this group “unclear innovators”.

### 3.3.2. Differences between Innovators and Conservatives

The main objective of this study is to investigate the differences between the most and the less innovative employees. So far, in the next analysis we will consider only the less and the most innovative employees, confronting the groups of innovators with the group of conservatives.

A first aim of this research was to identify which personal attributes characterize the most and the less innovative employees. The results of the t-test presented in Table 2 show that the employees in the group of innovators differ from the employees in the group of conservatives in terms of originality but not in terms of attention to detail and conformity, confirming H1 and H1a. It's interesting to note that innovators reported high scores on all three dimensions. This means that original or creative persons are also able to conform to group and organizational norms and to care about details in what they do. As we hypothesized, innovators scored higher than conservatives on personal initiative at both waves, confirming H2. This result also supports the assumption that personal characteristics are quite stable over time.

The results show that innovators, compared to conservatives, are more original and creative as well as have higher level of personal initiative.

Table 2. Differences between innovators and conservatives in relation to personal characteristics.

	Mean innovators	Mean conservatives	t	d.f.	p
Originality T1	5.05	3.94	8.83	149	.00
Conformity T1	4.82	4.73	.67	149	.50
Attention to detail T1	5.09	4.88	1.78	149	.08
Personal initiative T1	5.22	4.20	8.43	149	.00
Personal initiative T2	5.09	4.00	5.91	149	.00

A second aim of the study was to analyze how the most innovative employees differ from the less innovative in terms of three core dimensions of job performance. Correlations already showed that conformity, innovation and quality did not necessarily compete with

each other. The t-test (Table 3) supports this consideration showing that the innovators proposed and implemented more suggestions (innovative performance) than the conservatives while there were no differences on performance in relation to quality and efficiency, confirming H3 and H3a.

Table 3. Differences between innovators and conservatives in relation to the three dimensions of performance.

	Mean innovators	Mean conservatives	t	d.f.	p
Performance innovation suggestion making T2	3.39	1.92	7.20	149	.00
Performance innovation suggestion implementation T2	3.09	1.77	6.52	149	.00
Performance quality T2	4.85	4.62	1.32	149	.19
Performance efficiency T2	4.58	4.42	.95	149	.34

### 3.4. DISCUSSION

The main objective of this study was to highlight the differences that characterize the most innovative employees as compared to the less innovative, in terms of personal attributes and job performance. In order to achieve this objective, we chose a person-centred approach using cluster analysis.

A first important result is related to the clusters that we identified. We found that there was a moderate degree of accordance between self- and supervisor evaluation of employees innovative potential. In fact, we indentified three groups, one of which was composed by 49 employees (24.5% of the sample) who consider themselves very innovative but are considered scarcely innovative by their supervisor. This result could be attributed to two different reasons: 1) the low degree of accordance between self- and supervisor evaluation is due to the employees' tendency to overrate their innovative potential; 2) the employees are very innovative but they do not show their innovative activities to the supervisor (as we outlined in the study 1 of this dissertation, people can suggest their ideas to colleagues and not to the supervisor, or test small changes to improve their work autonomously). Unfortunately we do not have any elements that might help attributing the result to the first

or the second reason. Therefore, in order to be sure to select the most and the less innovative employees, we considered in the analysis only the groups of innovators and the group of conservatives. For these groups self- and supervisor evaluation concord so that we could assume with a certain degree of accuracy that these employees are those with the higher and the lower innovative potential.

The first question posed at the beginning of this article wondered which personal characteristics differentiate the most innovative employees from the less innovative. Results show that the most innovative employees have, on average, a higher level of personal initiative and score higher on originality compared to the less innovative employees. This evidence contributes to theory development; in fact, in the original theorization of Kirton (1976), adaptors are seen as those individuals who prefer to “do things better”, improving the usual procedure to perform their job, while innovators prefer to “do things differently”, breaking the rule and looking for new ways of dealing with usual tasks or problems. The author tends to heighten the differences between the two types of persons and assumes that innovators use an intuitive cognitive style while adaptors use a systematic cognitive style.

Among the first authors who questioned this argument were Scott & Bruce (1994). Based on Kirton’s approach, Scott & Bruce (1994) treated the systematic and the intuitive problem-solving styles independently. In their empirical research the authors found no differences in innovation between employees who were highly intuitive problem solvers and those who were not, despite systematic problem-solving style had a negative effect on innovation. This result was true both for rank employees engaged in routine tasks and employees that worked in R&D departments. Commenting these results the authors concluded that probably “true innovators are people who can use a style that is appropriate to the stage of the innovation cycle in which they are involved” (p. 601).

The study of Miron et al. (2004) strengthens this consideration and was the first one which empirically proved that the three personal characteristics on which Kirton’s theory is based are distinct and (positive) related dimensions. The present study, using a person-centred approach, reinforced this consideration because it is the first one (in our knowledge) to show that there are no differences between the most and less innovative employees for what concerns attention to details and conformity. This means that a person who has a high innovative potential can score as high on these two personal characteristics as a person who has a low innovative potential. What makes the difference between the most and the less

innovative employees is that the first enjoy creative activities and dealing with new ideas (what we called originality) more than the second.

Another factor which differentiates innovators from conservatives is personal initiative. Some authors (Amabile, 1988; Oldham e Cummings, 1996) consider suggestion making as an innovative behaviour while for Frese, Teng, & Wijnen, (1999) making suggestion can be considered also as an indicator of personal initiative. The authors stated that, in order to propose suggestions, employees have to be: proactive and self-starting, especially when making suggestion is not explicitly required; persistent, in order to overcome difficulties related to the promotion and experimentation of new ideas. Our result seems to confirm Frese et al.'s considerations, showing that innovators score higher than conservatives on personal initiative.

The first question posed at the beginning of this article is very important from a practical point of view too, for example to structure a selection system in a company. In fact, one can argue that selecting employees who prefer to work on structured activities, that prefer to be guided by standard procedure in their work, they will be able to maintain high standard level in their work but not to be innovative (or the opposite). For example, conscientiousness is one of the most relevant dimensions of the big five used to select employees and one can assume that employees who score high in this factor will be not very innovative. In accordance with the results of Miron et al (2004), which show a positive correlation between conscientiousness, creativity, attention to details and conformity, our findings show that this is not true.

Finally, our study shows that there is no difference in quality and efficiency dimensions of performance between employees with a high innovative potential and those with a low potential. In line with our expectations, innovators propose and implement more suggestions (innovative performance) compared to conservatives. This means that innovative performance does not necessarily compete with quality and efficiency.

## **4. GENERAL DISCUSSION**

This dissertation had two main goals, the first one was to give a significant contribution to advancing knowledge in the field of individual innovation in the workplace while the second concerned the practical application and implications of methodological and theoretical issues.

In particular, there were three main points that had to be addressed: analyzing the predictors and outcome of individual innovation in the workplace, investigating the motivational process that arises from different resources and leads employees to showing innovative work behavior; considering the time dimension, analyzing how changes in the work context may influence the employees' willingness to perform IWB; before addressing these aspects, it was important to examine some important issues regarding two widely used methods for assessing individual innovation in the workplace: self- and supervisor evaluation.

### **4.1. SELF- VERSUS SUPERVISOR EVALUATION**

Innovation is a broad concept that is defined, conceptualized and operationalized in a variety of ways (Adams, Bessant & Phelps, 2006; Salavou, 2004; West, Hirst, Richter & Shipton, 2004a). The question of how to measure innovation is one of the most relevant open issues in literature because the use of different measures could imply a substantial inaccuracy in classifying a person, a team or an organization as more or less innovative compared to others as well as in identifying the factors that predict innovation or a phase of the complex innovation process. In this regard, Subramanian & Nilakanta (1996; cited by Salavou, 2004) stated that the characterization of an organization as more or less innovative depends on the way the researcher defined innovation and measured it. Moreover, West et al. (2004a) supported the abovementioned consideration affirming that “measure used in various publications consist of a mix of idea generation and idea implementation, resulting in substantial confusion about the factors predicting creativity and innovation” (p. 272).

Traditionally, expert ratings have been the most applied method to measure creativity in laboratory studies (Shalley, Zhou, & Oldham, 2004). In field studies supervisors have generally been assigned to judging and rating the creativity and/or innovation of their

employees, but some field studies have also used more objective measures like registering the number of patent disclosers (Oldham & Cummings, 1996; Scott & Bruce, 1994; Tierney, Farmer & Graen, 1999), ideas submitted to suggestion programmes (Frese, Teng & Wijnen, 1999; Oldham & Cummings, 1996), or using indications from technical reports (Tierney et al, 1999). By far, most of the studies have used supervisor ratings as a measure of creativity and innovation.

In this dissertation we confronted the employees' self-evaluation with supervisor evaluation because we assumed that, especially in the first phases of the innovation process, employees are engaged in finding and defining problems, searching for solutions, developing ideas, which are mostly internal cognitive processes that may remain unobservable and so unknowable to supervisors. In addition, it seems reasonable to think that supervisors tend to give a general evaluation of the employees paying less attention to the different aspects of the innovation process. These statements are supported by many authors. For example research on performance and 360° show that the more similar the different aspects that have to be evaluated (as in the case of idea suggestion and implementation) by others, the higher the correlation among these aspects (Murphy, Jako & Anhalt, 1993), an effect that increases when the behaviour is not directly observable as in the first stages of the innovation process. In this dissertation we presented the different reasons why the majority of the authors prefer to use supervisor evaluation (i.e., to avoid the problem of common method variance). Despite this consideration, our dissertation supports the above mentioned arguments showing that in some case using the employees' self-evaluation allows to obtain useful information that could be missed using other types of measures. According to the literature (Murphy, Kako & Anhalt, 1993), it seems that the supervisor tends to evaluate the person "in general" and not relating to different employee work behaviours. Therefore, one can rely exclusively on supervisor evaluation if the goal of the research is not to distinguish between phases of the innovation process but to evaluate the employee's innovative potential "in general" or in relation to other employees.

West et al. (2004a) called for a more precise demarcation in the operationalization of the construct of innovation, using measures that allow to distinguish between creativity and innovation, in order to identify the factors that may promote ideas implementation but may inhibit idea generation (i.e., time pressure). In particular, in the first study we confront self- and supervisor evaluation proving that the correlation between the frequency with which employees make suggestions and the frequency with which such suggestions are implemented is significantly higher using supervisor evaluation rather than self-evaluation.

We show that using supervisor evaluation it is very difficult to analyse the effect of the predictors on a single phase of innovation taking into account the other one because of the high correlation that links these aspects. Moreover, we demonstrated that employees, compared to supervisors, were more sensible to the changes in the work context, related to job characteristics and organizational factors; such changes can influence variation in suggestion making and implementation. This means that if the research goal is a) to identify the predictor of the different phases of the innovation process b) to study the first phases of the process that are less observable to the supervisor c) to check rapidly how changes in the work context can affect employee work behaviours, it could make sense to use the employees' self-evaluation.

The results of the second study are in line with the results of the first study, showing that supervisor evaluation of the three dimensions of IWB (idea generation, suggestion and implementation) are higher related to each other and more stable across time compared to the employees' self-evaluation. Using confirmatory factor analysis we proved that the innovation process is composed of three distinct yet interrelated phases. This strength of this result is confirmed by the fact that we found a similar structure using both measures, self- and supervisor evaluation.

The result of the third study confirmed our arguments showing that the more similar the aspects of performance to be evaluated by the supervisor, the higher the correlation between them. In particular, the two dimensions of innovative performance, suggestion making and implementation had a correlation of .91 and the two dimension of performance related to quality and efficiency had a correlation of .75. Using cluster analysis to classify the most and the less innovative employees based on self- and supervisor evaluation we singled out three groups. For two of them supervisor and self-evaluation concord. On the contrary, employees in the third group consider themselves as highly innovative while they are considered not very innovative by their supervisors. These results could support the consideration that self-evaluating their performance employees tend to overrate the performance or that supervisors may miss some innovative activities. This could be attributed to the fact that employees could suggest ideas to colleagues and not to supervisors or directly implement new ideas without sharing them.

In conclusion, based on this consideration, our dissertation highlights the importance of using different methods or sources to evaluate innovation in order to get different and valuable information.



## 4.2 PREDICTORS AND OUTCOMES OF INDIVIDUAL INNOVATION

Creativity and innovation have become valued across a variety of economic sectors in the last 20 years and research on these topics has consequently flourished. These researches have contributed to advancing knowledge in these fields that have been summarized in recent meta-analysis and reviews. In particular, for what concerns innovation Anderson, De Dreu & Nijstad (2004) summarized empirical research in the field, advancing a series of recommendation and new directions for future research as well as Shalley & Gilson (2004) and Shalley et al. (2004) in the field of creativity.

In this dissertation we chose to address some of the open questions proposed by these authors that are related to three major points: 1) analyzing the effect of predictors on the different phases of innovation; 2) seeking to clarify the role of motivational factors in promoting IWB; 3) considering some consequences of innovation, analyzing for instance the differences between the most and the less innovative employees in terms of performance.

For what concerns the first point, thanks to two recent meta-analyses on individual creativity and innovation (Harrison, Neff, Schwall & Zhao, 2006) and on team innovation (Hülshager, Anderson & Salgado, 2009) it is possible to state that facilitators of innovation at the individual, group, and organizational levels have been reliably identified. Despite this consideration, authors still complain that the majority of researches on innovation have been devoted to finding out predictors using aggregate measures of innovation or considered only one stage (i.e. implementation) of the complex innovation process. The inaccuracy in the operationalization and the differentiation between creativity and innovation results in a confusion of what specific factors may predict and facilitate the generation of ideas, on one hand, and the implementation and adoption of those ideas on the other hand. So that, in this dissertation we did not look for new predictors but we tried to better understand the role of some factors in predicting creativity, or the generation of ideas, and innovation, the implementation of those ideas.

In the first study, in line with theory (West, 2002; West et al., 2004a) and the empirical result of Axtell, Holman, Unsworth, Wall, Waterson & Harrington (2000) we confirmed that individual and job factors (intrinsic motivation and job demands) are especially related to idea suggestion while organizational factors (organizational support for innovation, suggestion obstacle and facilitators) are important for the implementation of those ideas.

Innovation and job characteristics. We were particularly interested in investigating the role of autonomy or job control in promoting the employees' willingness to show IWB. In fact, if in line with the theory we assume that individual and job factors are particularly important in the first phases of the innovation process, job autonomy or control should be more important for ideas generation and suggestion than for ideas implementation. The study of Axtell et al. (2000) that directly tested this assumption showed that individual method control, a concept similar to job autonomy, was related only to suggestion implementation and not to suggestion making. Frese et al. (1999), studying the employees' willingness to provide suggestions through a structured systems, found that autonomy (job control) was negatively correlated to having ideas. Frese et al. (1999) explained this result affirming that "people with a higher degree of control and complexity do not need to participate in the suggestion system because they can immediately change things themselves" (p. 1150). We hypothesized that autonomy should have different effects on the different phases of the innovation process, assuming that this factor should be important in particular for the generation and the application of ideas while it should be less important for idea suggestion. The rationale was that employees should have a certain degree of control on their job in order to think about how to improve their work with original ideas. At the same time, it makes sense to think that employees who generate a lot of ideas and have a high degree of autonomy do not necessarily need to suggest their ideas to supervisors or colleagues, they can simply apply them. This could be especially true when a compensation system that rewards ideas is not present in the company. The result of the first and the second study of this dissertation confirmed this consideration; in fact in the first study, using the employees' self-evaluation, we demonstrated that when we controlled for the effect of suggestion making on suggestion implementation and vice-versa, job autonomy was only related to suggestion implementation. In the second study, using the employees' self-evaluation, we showed that job autonomy holds a stronger relation with idea generation ( $\beta = .24$ ) and implementation ( $\beta = .24$ ) than to idea suggestion ( $\beta = .12$ ).

For what concerns individual characteristics, in the third study we showed that the most innovative employees have a higher level of personal initiative and originality compared to the less innovative employees while there are no differences in relation to attention-to-details and conformity.

Innovation and organizational factors. For what concerns organizational factors, in accordance with theory and other research findings, the results of the first study showed that

suggestion facilitators and organizational support for innovation fostered the implementation of suggestions. Contrary to our expectation we found a positive correlation among suggestion obstacles and suggestion making at T1 and a negative correlation among organizational support for innovation and suggestion making at T2. Despite being contrary to our expectations, these results could be considered in line with the theory. In fact, West and Farr (1990) assume that innovation originates from the necessity to solve a problem or to achieve a new and improved way of doing an activity. It makes sense to think that if one does not experiment problems or feel the urgency of changing the status quo they will be not stimulated in proposing new ideas. So that we can hypothesize that employees who perceive obstacles could be encouraged to offer ideas to change the situation while employees who perceive an adequate organization support for innovation are not encouraged to do it.

Innovation and intrinsic motivation. A second important question that we tried to clarify in this dissertation was related to the role of the employees' intrinsic motivation in fostering IWB. Intrinsic motivation can be described as the core concept within the creativity theory of Amabile (1990; 1996). Despite the attention that has been devoted to this concept in literature, few studies have directly tested its importance (Shalley & Gilson, 2004), especially in the area of individual innovation. In line with the theory, in the first study intrinsic motivation resulted as one of the most important predictors of suggestion making and implementation. In particular, the employees' general intrinsic motivation, measured at T1, was the only factor that predicted change in supervisor-rated suggestion implementation and, together with job demands, change in supervisor evaluation of suggestion making at T2.

Research on innovation often assumes that, under certain conditions (i.e., job control and complexity, organizational support for innovation, etc.), it is possible to obtain an innovative performance. In the second study we investigated the motivational process that arises from various "resources" and leads employees to performing IWB using the approach proposed by Schaufeli and colleagues, in which resources are related to different outcome via work engagement. Theory (Amabile 1990; 1996) hypothesizes that intrinsic motivation mediates the effect of job and organizational factors on creativity but the result of the few empirical studies that tested this hypothesis are still controversial (Shalley et al., 2004). Unfortunately, our result did not completely clarify the role of intrinsic motivation; in fact, we obtained different results using supervisor evaluation and the employees' self-evaluation. In the first case, we found that engagement completely mediates the effect of the

resources (LMX and job control) on the three IWBs while in the second case engagement was only a partial mediator. However, the appropriateness of choosing engagement as an indicator of intrinsic motivation seems to be well supported by our results. It seems that the model proposed by Schaufeli could be useful to explain the process that leads employees to showing IWB.

Innovation and performance. Innovation has been generally viewed as a positive and valued factor that allows organizations to face efficiently the global competition and has been generally studied as dependent variable, failing to investigate the consequences of innovation (Anderson et al., 2004). In this dissertation we tested this “positive” assumption investigating some possible negative outcomes of employee innovation in order to analyze what has been called the “dark side of innovation” (Janssen, van de Vliert & West, 2004). In particular, we compared the most innovative employees and the less innovative employees on three dimensions of performance (innovation, quality and efficiency) and proved that there is no difference on quality and efficiency while, in line with our expectations, the most innovative employees propose and implement more suggestions (innovative performance) compared to the less innovative employees. This means that innovation does not necessarily compete with quality and efficiency. Another interesting and unexpected result of the second study was that employees who implemented more ideas (self-evaluation) at T1 report higher levels of job control at T2. This seems to highlight another positive consequence of innovation that could be used by employees as a problem-focused coping strategy in order to deal with changes in the work context and maintain an adequate level of job control.

### **4.3 THE TIME DIMENSION**

While analyzing researches on innovation carried out between 1997 and 2002, Anderson et al. (2004) reported that the majority of the studies were characterized by cross-sectional design and called for longitudinal research. In this dissertation we chose a longitudinal research design for practical and methodological reasons. For what concerns the first point, we were interested in investigating in what way an organizational change connected with the relocation of the company affected the employees’ willingness to generate, propose and

implement new ideas. From a methodological point of view, we chose a longitudinal research design in order to avoid problems of common method variance and to strengthen causal inferences.

In the first and in the second study we found that supervisor evaluations of employee IWB were more stable across time compared to the employees' self-evaluation, even if actual changes in the environment may have influenced the employees' workload (i.e., extra efforts connected to organizational changes) and/or the employees' perceptions of organizational factors. In particular, in the first study we demonstrated that supervisor ratings measured at T1 and at T2 were significantly higher correlated compared to self-evaluation. We demonstrated that only using the employees' self-evaluation it is possible to rapidly check the effect of contextual changes on employee working behaviours. On one hand we proved that changes in the employees' self-evaluation of the frequency with which they propose and implement suggestions were related to changes in individual characteristics, job and organizational factors. On the other hand we demonstrated that supervisor evaluations were predicted by the "general" level of individual and job characteristics, and the employees' perception of organizational factors measured at T1, and not by changes in these variables.

In the second study we found that there were significant decreases in the means of all variables (LMX, job control, engagement, self-evaluated idea generation, self-evaluated suggestion and self-evaluated implementation) from T1 to T2, except for supervisor evaluation of idea suggestion and implementation that did not change over time. These decreases were probably due to the extra-effort required to manage the relocation. We proved that if an employee generates less (or more) ideas from T1 to T2 this has an impact on the number of suggested ideas (at T2) that decrease (or increase) and, in turn, this predicts the decrease (or increase) of ideas implemented (at T2).

In the second study we hypothesized and found that: (change in) the quality of interaction between an employee and his/her supervisor (LMX) influences (change in) the level of the employee's work engagement; (change in) job control had an impact on (change in) the frequency with which employees generate, propose and implement ideas (self-evaluated). The longitudinal research design allowed to identify two other unexpected cross-lagged effects: the general level of idea implementation measured at T1 influenced the change in job control in the three months elapsed from T1 to T2; the general level of engagement measured at T1 influenced the change in LMX from T1 to T2. These results highlight a sort

of reciprocal relation among the variables considered in the study and allowed some advancement in theoretical knowledge presented below.

It seems that employees who initially feel engaged are likely to perceive an improvement in their relationship with the supervisor in the 3 months after the first data collection which, in turn, makes them feel more engaged at T2. Recently Schaufeli, Bakker and Van Rhenen (2009) have proved the dynamic nature of the job demands-resources investigating the loss and gain cycles that may result from an accumulation of job demands and job resources. Our result seems to support Schaufeli and colleagues (2009) arguments, suggesting a reciprocal causation between engagement and LMX.

Janssen (2000) supposed that IWB may serve as a problem-focused coping strategy used by employees to cope with an increment of workload or to deal with stressors in the work context. This consideration is only partially supported by empirical evidence. In one case the author found that employees performed higher level of IWB in response to higher job demands when employees perceived a fair balance between effort spent and reward received at work, supporting the assumption the IWB may be used by employees as a problem-focused coping strategy (Janssen, 2000). In another study Janssen (2004) advanced two competing hypotheses: 1) IWB could serve as a problem focused coping strategy or 2) may be conceived as a potential stressor that could lead employees to experimenting stress reactions, considering the demanding nature of IWB that required extra-effort from employees (i.e. to experiment new ideas, to persuade supervisor and colleagues about the usefulness of the new idea, ecc.). In this study Janssen found support for the second hypothesis showing that stress was a function of IWB, distributive fairness and procedural fairness. IWB did not serve as a problem-focused coping strategy, in fact it was not predicted by procedural and distributive fairness.

Janssen (2000; 2004) tested these hypotheses using a cross-sectional research design so he could not clearly identify the direction of the relation between job demands and IWB (Janssen, 2000), and stress and IWB (Janssen, 2004). In the first study of this dissertation we found that change in job demands predicted the change in the frequency with which employees make and implement suggestion. This result is in line with Janssen's statement that IWB may be used by employees to reduce job demands or deal with difficulties at work. In our knowledge the first study of this dissertation is the first one that supports Janssen's assumption using a longitudinal research design. In the second study we found that employees who in general implement more ideas are likely to perceive an improvement

in job control in the 3 months after the first data collection which, in turn, leads them to show IWB at T2. We explained this result hypothesizing that probably employees used IWB to deal with the variation in job control due to the relocation.

In conclusion, our results seem to suggest that employees use innovation as a problem-focused coping strategy and highlight the presence of reciprocal relation among job control and IWB.

#### **4.4 PRACTICAL IMPLICATIONS**

The knowledge acquired with our studies could be usefully when applied by an organization in order to achieve different goals. In the first study of this dissertation the importance of using employee self-evaluation when it is desirable to check rapidly the effect of organizational or work changes on employees' performance (in our case the innovative performance) has been demonstrated.

We proved that supervisor evaluations tend to be stable across time regardless to real variation in the employees' working behaviour or performance. This result could be due to the fact that the company in which we conducted the studies did not have a structured system to evaluate employees' performance and supervisors have not be trained to do that. Therefore, this finding suggests the importance of providing training to the supervisors in order to be able to evaluate the behaviour and not only the person.

Our result showed that high levels of autonomy or job control may lead employees to implement their own ideas without offering them to the company. This means that despite autonomy and job control have a positive influence on the employees' work engagement, these factors could have a detrimental effect on organizational efficiency. In fact, in a logic of continuous improvement it is important that employees share their ideas with supervisor and colleagues. This means that for a company it is very important to find a way to collect employees' suggestions (i.e., rewarding the best ideas, structuring a system to collect ideas, etc). This means that tacit or implicit knowledge used by each employee for developing work improvements can be translated in explicit knowledge available to the whole organization.

Organizations should put an effort in improving organizational facilitators that help employees in applying suggestions. At the same time, it is important that companies

elaborate strategies to make employees aware of the necessity of innovate. In fact, the results of the first study show that employees who perceive less problems in the work context seem less prone to offer suggestions to improve the work compared to employees that experience some difficulties.

Our results highlight that there are individual differences that could foster innovation. These are related to personal initiative and originality so that managers can try to hire individuals who show high level of personal initiative and originality. Despite this consideration, results show that motivational factors are the most important predictors of innovation. This means that managers can use social and contextual factors (i.e., improving the quality of the relation with their subordinates) that foster the employees' motivation in order to stimulate their willingness to innovate.

Finally, the results show that employees are able to manage different and apparently contradictory requirements related to maintaining high standard quality and efficiency as well as thinking about how to improve their work.

## **4.5 LIMITATIONS**

The studies carried out for this dissertation have several limitations that should be mentioned. The first limitation is related to the sample used for the studies. We have a small sample size ( $N = 200$ ) and the data for all three studies have been drawn from the same sample in only one organization. This makes it difficult to generalize our results so that future research is needed for instance to investigate the appropriateness of using engagement as an indicator of intrinsic motivation and the applicability of the job demands-resources model in the field of innovation.

Another weakness is related to the absence of an objective measure of dependent variables. In order to avoid problems of common method variance we used supervisor evaluation for the dependent variables and we highlighted some differences between self- and supervisor evaluation. In the third study, for instance, we found that for one of the three groups obtained using the cluster analysis there was a low degree of accordance between self- and supervisor evaluation of employees' innovation. The availability of an objective measure of



innovation or the use of another source of assessment (i.e. peer evaluation) could be useful to explain the differences between the two measures.

We used the same method, a self-reported questionnaire, to assess all independent variables. This choice could lead to inflate the correlation between the variables due to the common method variance. However, the longitudinal research design and the way in which the data have been analyzed, holding constant earlier level of the variables, should allow us to avoid some problems connected with common method variance.

Another weakness is related to the longitudinal research design used for the studies. We collected data only in two points in time and this limits the appropriateness of the longitudinal research design (Edwards, 2008). At T1, the subjects were asked to answer thinking about their work experience “in general” while at T2, to be sure that people responded thinking about their actual situation after the relocation, instructions specifically required the employees to answer thinking about their work situation in the previous 3 months. These factors limit the possibility to draw clear inferences about causal relation because we can only partially test for reciprocal relation or inverse relation among the studied variables. The availability of a third wave in which subjects answer the questionnaire using the same instructions given at T2 should allow us to hold constant the general level of the variables measured at T1 and investigate the relation (inverse, reciprocal, etc.) among the variables measured at T2 and T3.

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## APPENDIX A

### EMPLOYEES QUESTIONNAIRE T1

Il questionario che Le proponiamo indaga gli aspetti collegati all'innovazione nelle aziende e nei dipendenti che vi lavorano.

La Sua collaborazione nel rispondere al questionario è pertanto determinante per consentirci di comprendere meglio i fattori che possono esserLe di supporto o di ostacolo nel proporre le proprie idee all'azienda.

Le ricordiamo che non ci sono risposte giuste o sbagliate, siamo interessati solamente al suo personale punto di vista. Il questionario è **anonimo**, e le sue risposte saranno analizzate a livello aggregato, insieme a quelle di tutti gli altri dipendenti.

E' molto importante che Lei risponda al questionario in tutte le sue parti.

**La ringraziamo per la Sua gentile collaborazione.**

<p>Ai sensi del D.L. 196 del 30/6/2003 e delle successive modificazioni (tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali), la raccolta di questi dati è finalizzata a scopi di ricerca scientifica. L'analisi dei dati avverrà in forma anonima e collettiva. Responsabile dell'analisi statistica dei dati del questionario è il prof. Salvatore Zappalà, Facoltà di Psicologia dell'Università di Bologna. E-mail: <a href="mailto:salvatore.zappala@unibo.it">salvatore.zappala@unibo.it</a></p>
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## DATI SOCIO-ANAGRAFICI

Sesso:

M	F
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Età: \_\_\_\_\_; Da quanti anni lavora nell'organizzazione: \_\_\_\_\_

### SEZIONE I: ASPETTI INDIVIDUALI

Utilizzando la seguente scala:

0=Completamente in disaccordo,      1=Abbastanza in disaccordo,      2=Poco in disaccordo  
 3=Né d'accordo né in disaccordo  
 4= Poco d'accordo,      5=Abbastanza d'accordo,      6=Completamente d'accordo

Le chiediamo di **valutare quanto le affermazioni che Le proponiamo rispecchiano il suo modo di essere**. Per fare ciò, indichi il suo grado di accordo con ciascuna delle seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Sono una persona che segue le regole	0	1	2	3	4	5	6	
2. Sono una persona che si adatta prontamente al "sistema"	0	1	2	3	4	5	6	
3. Sono una persona a cui piace molto il lavoro preciso	0	1	2	3	4	5	6	
4. Sono una persona che è prudente quando ha a che fare con l'autorità ed è attenta all'opinione degli altri	0	1	2	3	4	5	6	
5. Sono una persona costante	0	1	2	3	4	5	6	
6. Sono una persona che non cerca mai di forzare le regole (e ancora meno di infrangerle)	0	1	2	3	4	5	6	
7. Sono una persona che procede passo dopo passo con assiduità e perseveranza	0	1	2	3	4	5	6	
8. Sono una persona che fa fronte a molte nuove idee e problemi contemporaneamente	0	1	2	3	4	5	6	
9. Sono una persona a cui piace sentirsi protetta da istruzioni precise	0	1	2	3	4	5	6	
10. Sono una persona che è stimolante	0	1	2	3	4	5	6	
11. Sono una persona che ha delle idee originali	0	1	2	3	4	5	6	
12. Sono una persona che si occupa con cura delle cose in ogni loro dettaglio	0	1	2	3	4	5	6	
13. Sono una persona che ha punti di vista nuovi su vecchi problemi	0	1	2	3	4	5	6	
14. Sono una persona metodica e sistematica	0	1	2	3	4	5	6	
15. Sono una persona che spesso si assume il rischio di fare le cose in modo diverso	0	1	2	3	4	5	6	

**Indichi il suo grado di accordo con le seguenti affermazioni.**

	Completamente in disaccordo				Completamente d'accordo			
1. Mi piace trovare soluzioni a problemi complessi	0	1	2	3	4	5	6	
2. Mi piace trovare nuove idee per nuovi prodotti o servizi	0	1	2	3	4	5	6	
3. Mi piace trovare nuovi modi di svolgere il lavoro	0	1	2	3	4	5	6	
4. Mi piace migliorare processi o prodotti esistenti	0	1	2	3	4	5	6	

**Le chiediamo ora di valutare quanto Lei si riconosce nei seguenti aspetti, indicando il suo grado di accordo con le affermazioni proposte.**

	Completamente in disaccordo				Completamente d'accordo			
1. Affronto attivamente i problemi	0	1	2	3	4	5	6	
2. Ogni volta che qualcosa va male, cerco subito una soluzione	0	1	2	3	4	5	6	
3. Ogni volta che c'è la possibilità di essere coinvolto attivamente, io la colgo	0	1	2	3	4	5	6	
4. Prendo l'iniziativa rapidamente, anche quando altri non lo fanno	0	1	2	3	4	5	6	
5. Uso rapidamente le opportunità per raggiungere i miei obiettivi	0	1	2	3	4	5	6	
6. Solitamente faccio di più di quello che mi è richiesto di fare	0	1	2	3	4	5	6	
7. Sono particolarmente bravo/a nel realizzare le idee	0	1	2	3	4	5	6	

## SEZIONE II: ASPETTI LEGATI AL LAVORO

Per rispondere alle domande che Le verranno proposte in seguito utilizzi la seguente scala:  
 0 = mai; 1 = quasi mai; 2 = raramente; 3 = qualche volta; 4 = spesso; 5 = molto spesso;  
 6 = sempre.

**Qui di seguito troverà una serie di affermazioni relative al lavoro che svolge**, la preghiamo di leggere attentamente ciascuna affermazione e di indicare quanto spesso ha provato tali sensazioni.

	Mai ..... Sempre						
1. Nel mio lavoro mi sento pieno di energia	0	1	2	3	4	5	6
2. Trovo il lavoro che faccio ricco di significati e scopi	0	1	2	3	4	5	6
3. Nel mio lavoro, mi sento forte e vigoroso/a	0	1	2	3	4	5	6
4. Sono entusiasta del mio lavoro	0	1	2	3	4	5	6
5. Il mio lavoro mi ispira	0	1	2	3	4	5	6
6. La mattina, quando mi alzo, ho voglia di andare a lavoro	0	1	2	3	4	5	6
7. Sono orgoglioso/a del lavoro che faccio	0	1	2	3	4	5	6
8. Sono in grado di lavorare per lunghi periodi senza sosta	0	1	2	3	4	5	6
9. Per me, il mio lavoro è stimolante	0	1	2	3	4	5	6
10. Nel mio lavoro, quando sono sotto pressione, ho notevoli capacità di recupero mentali	0	1	2	3	4	5	6
11. Nel mio lavoro sono sempre perseverante anche quando le cose non vanno bene	0	1	2	3	4	5	6

Le chiediamo ora di valutare con quale frequenza **NEL SUO LAVORO** le capita di:

	Mai ..... Sempre						
1. Generare idee originali	0	1	2	3	4	5	6
2. Avere idee su come migliorare le cose	0	1	2	3	4	5	6
3. Trovare nuovi modi di fare le cose	0	1	2	3	4	5	6
4. Proporre le nuove idee agli altri	0	1	2	3	4	5	6
5. Suggestire come migliorare le cose	0	1	2	3	4	5	6
6. Proporre di fare le cose in modo diverso	0	1	2	3	4	5	6
7. Vedere le sue idee adottate dall'azienda	0	1	2	3	4	5	6
8. Applicare i suggerimenti ideati per migliorare le cose	0	1	2	3	4	5	6
9. Realizzare le sue proposte per fare le cose in modo diverso	0	1	2	3	4	5	6

Le chiediamo ora di valutare **quanto spesso ha fornito suggerimenti utili per cambiare/migliorare i seguenti aspetti del lavoro:**

	Mai.....						Sempre
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Facendo riferimento agli aspetti del lavoro appena elencati, Le chiediamo ora di valutare quanto spesso i **suggerimenti che ha fornito per cambiare/migliorare sono stati adottati/applicati:**

	Mai.....						Sempre
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Indichi il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo			Completamente d'accordo			
1. So esattamente a chi rivolgermi per presentare nuove proposte e idee all'azienda	0	1	2	3	4	5	6
2. Ho la possibilità di accedere alla necessaria competenza tecnica per sviluppare le mie idee	0	1	2	3	4	5	6
3. Ho tempo a sufficienza per formulare e scrivere le nuove idee o miglioramenti da presentare all'azienda	0	1	2	3	4	5	6
4. Le idee sono accolte allo stesso modo indipendentemente da chi le presenta	0	1	2	3	4	5	6
5. Posso facilmente trovare aiuto per sviluppare le nuove idee	0	1	2	3	4	5	6
6. Le idee che presento non vengono prese in considerazione	0	1	2	3	4	5	6
7. Non si hanno vantaggi dal presentare le proprie idee e suggerimenti all'azienda	0	1	2	3	4	5	6
8. Non ho a disposizione le risorse aziendali necessarie per sviluppare le nuove idee	0	1	2	3	4	5	6

**Pensando alla sua situazione lavorativa**, indichi il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Il mio lavoro richiede che impari cose nuove	0	1	2	3	4	5	6	
2. Il mio lavoro mi consente di prendere parecchie decisioni in autonomia	0	1	2	3	4	5	6	
3. Il mio lavoro richiede molta rapidità di esecuzione	0	1	2	3	4	5	6	
4. Il mio lavoro prevede parecchie mansioni ripetitive	0	1	2	3	4	5	6	
5. Il mio lavoro mi impegna molto a livello mentale	0	1	2	3	4	5	6	
6. Nel mio lavoro bisogna anche saper trovare nuove soluzioni ai problemi che si presentano	0	1	2	3	4	5	6	
7. Ho abbastanza voce in capitolo durante lo svolgimento del mio lavoro	0	1	2	3	4	5	6	
8. Mi è richiesto di eseguire una quantità eccessiva di lavoro (rispetto al tempo che ho a disposizione)	0	1	2	3	4	5	6	
9. Le persone con cui lavoro hanno stabilito con me un rapporto anche personale	0	1	2	3	4	5	6	
10. Il mio lavoro richiede un elevato livello di capacità/competenza professionale	0	1	2	3	4	5	6	
11. Le persone con cui lavoro mi sono amiche	0	1	2	3	4	5	6	
12. E' possibile che durante il mio lavoro mi giungano richieste non chiare o contrastanti tra loro	0	1	2	3	4	5	6	
13. Nel mio lavoro ho l'opportunità di sviluppare competenze specifiche	0	1	2	3	4	5	6	
14. Il mio lavoro richiede lunghi periodi d'intensa concentrazione	0	1	2	3	4	5	6	
15. Le persone con cui lavoro mi sono d'aiuto nel portare a termine il lavoro	0	1	2	3	4	5	6	
16. Sul lavoro mi capita spesso di essere interrotto e di doverlo completare in più riprese	0	1	2	3	4	5	6	
17. Il mio lavoro è molto frenetico	0	1	2	3	4	5	6	
18. Sul lavoro ho poca libertà di decidere come svolgere i miei compiti	0	1	2	3	4	5	6	
19. Tra le persone con cui lavoro c'è un clima di reciproca collaborazione	0	1	2	3	4	5	6	

### SEZIONE III: ASPETTI LEGATI ALL'ORGANIZZAZIONE

Facendo riferimento **all'organizzazione in generale**, esprima il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. L'organizzazione è costantemente orientata a sviluppare nuove risposte	0	1	2	3	4	5	6	
2. L'assistenza nello sviluppare nuove idee è facilmente disponibile	0	1	2	3	4	5	6	
3. L'organizzazione è aperta e sensibile al cambiamento	0	1	2	3	4	5	6	
4. Le persone di questa organizzazione sono sempre alla ricerca di modi brillanti e nuovi di vedere i problemi	0	1	2	3	4	5	6	
5. In questa organizzazione prendiamo il tempo necessario per lo sviluppo di nuove idee	0	1	2	3	4	5	6	
6. Le persone nell'organizzazione cooperano per aiutare lo sviluppo e l'applicazione di nuove idee	0	1	2	3	4	5	6	
7. I membri dell'organizzazione ricercano e condividono risorse al fine di applicare nuove idee	0	1	2	3	4	5	6	
8. I membri dell'organizzazione ricercano modalità per l'applicazione pratica di nuove idee	0	1	2	3	4	5	6	

Facendo riferimento al **suo diretto superiore**, esprima il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Solitamente so quando il mio superiore è soddisfatto per il lavoro che ho fatto	0	1	2	3	4	5	6	
2. Il mio superiore conosce quali sono i miei problemi e i miei bisogni sul lavoro	0	1	2	3	4	5	6	
3. Il mio superiore riconosce le mie potenzialità	0	1	2	3	4	5	6	
4. Penso che il mio superiore userebbe la sua posizione per aiutarmi nella soluzione di problemi sul lavoro	0	1	2	3	4	5	6	
5. Penso che il mio superiore mi aiuterebbe ad uscire fuori da una situazione difficile anche a proprie spese	0	1	2	3	4	5	6	
6. Ho abbastanza fiducia nel mio superiore da giustificare e difendere le sue scelte nel caso in cui lui/lei non fosse presente per farlo	0	1	2	3	4	5	6	
7. Ho una buona relazione di lavoro con il mio superiore	0	1	2	3	4	5	6	



**Le chiediamo adesso di leggere attentamente le informazioni seguenti.**

**ATTENZIONE:**

Per monitorare adeguatamente come si sviluppano i processi di innovazione nella Sua impresa si prevede di effettuare altre rilevazioni e delle interviste con alcuni dipendenti. E' per noi molto importante poter continuare ad avere ancora la Sua collaborazione, e speriamo Lei intenda rispondere anche ai questionari futuri.

A tal fine, le proponiamo ora di inserire un codice che utilizzeremo per "accoppiare" le risposte che ci ha appena fornito con quelle dei questionari che compilerà in futuro.

Questo è il codice che Le proponiamo e che le chiediamo di compilare adesso:

- \* Prime tre lettere del nome di battesimo di sua madre      |\_\_| |\_\_| |\_\_|
  - \* Prime tre lettere del cognome da nubile di sua madre      |\_\_| |\_\_| |\_\_|
  - \* Gli ultimi due numeri del suo telefono cellulare      |\_\_| |\_\_|
- (o, se non lo possiede, gli ultimi due numeri del telefono di casa)

Le garantiamo che le informazioni che ci ha fornito sono e saranno coperte dal più assoluto ANONIMATO.

**LE FACCIAMO PRESENTE CHE:**

- l'accoppiamento tra i dati anagrafici e il codice che ha appena compilato saranno in possesso solamente ed esclusivamente del prof. Salvatore Zappalà;
- l'accoppiamento dati anagrafici - codice non sarà reso in alcun modo disponibile alla Direzione dell'organizzazione né ai ricercatori che elaboreranno i questionari;
- i dati statistici saranno sempre elaborati in modo aggregato;

**IL QUESTIONARIO È FINITO.**

**LA RINGRAZIAMO PER LA SUA COLLABORAZIONE.**

## EMPLOYEES QUESTIONNAIRE T2

Prima del trasferimento dell'azienda nella nuova sede aveva risposto ad un questionario che ha permesso di rilevare alcuni aspetti relativi al funzionamento organizzativo e alle modalità attraverso le quali l'azienda valorizza le proprie risorse umane.

Per monitorare adeguatamente gli aspetti rilevati con il primo questionario, le chiediamo di rispondere nuovamente al questionario che le proponiamo, facendo riferimento solamente agli **ULTIMI 3 MESI**. E' per noi molto importante che tutte le persone che hanno partecipato alla prima rilevazione continuino a collaborare alla ricerca, La Sua collaborazione nel rispondere al questionario è pertanto determinante.

E' molto importante che Lei risponda al questionario in tutte le sue parti.

Le ricordiamo che non ci sono risposte giuste o sbagliate, siamo interessati solamente al suo personale punto di vista. Il questionario è **anonimo**, e le sue risposte saranno analizzate a livello aggregato, insieme a quelle di tutti gli altri dipendenti.

**La ringraziamo per la Sua gentile collaborazione.**

Ai sensi del D.L. 196 del 30/6/2003 e delle successive modificazioni (tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali), la raccolta di questi dati è finalizzata a scopi di ricerca scientifica. L'analisi dei dati avverrà in forma anonima e collettiva. Responsabile dell'analisi statistica dei dati del questionario è il prof. Salvatore Zappalà, Facoltà di Psicologia dell'Università di Bologna. E-mail: salvatore.zappala@unibo.it

Come le avevamo annunciato nella prima rilevazione, per poter tener conto delle risposte che lei ci aveva fornito, le chiediamo di **COMPILARE IL CODICE CHE AVEVA TRASCritto NEL PRIMO QUESTIONARIO.**

**E' PER NOI FONDAMENTALE CHE I CODICI DELLE DUE RILEVAZIONI SIANO UGUALI.** Le chiediamo pertanto di prestare particolare attenzione nella redazione.

Scriva il codice rispondendo alle seguenti domande:

- \* Prime tre lettere del nome di battesimo di sua madre      |\_\_| |\_\_| |\_\_|
  - \* Prime tre lettere del cognome da nubile di sua madre      |\_\_| |\_\_| |\_\_|
  - \* Gli ultimi due numeri del suo telefono cellulare            |\_\_| |\_\_|
- (o, se non lo possiede, gli ultimi due numeri del telefono di casa)

### SEZIONE I: DATI SOCIO-ANAGRAFICI E ASPETTI INDIVIDUALI

Negli ultimi tre mesi ha cambiato mansione?  Sì|  No      Sesso:  M|  F

Negli ultimi tre mesi ha cambiato reparto?  Sì|  No      Età\_\_\_\_\_;

Per rispondere alle domande che trova di seguito utilizzi la seguente scala:

0=Completamente in disaccordo, 1=Abbastanza in disaccordo, 2=Poco in disaccordo  
 3=Né d'accordo né in disaccordo,  
 4=Poco d'accordo, 5=Abbastanza d'accordo, 6=Completamente d'accordo

Pensando agli **ultimi 3 mesi**, Le chiediamo ora di valutare **quanto lei si riconosce nelle seguenti affermazioni.**

	Completamente in disaccordo				Completamente d'accordo			
1. Ho affrontato attivamente i problemi	0	1	2	3	4	5	6	
2. Ogni volta che qualcosa è andata male, ho cercato subito una soluzione	0	1	2	3	4	5	6	
3. Ogni volta che c'è stata la possibilità di essere coinvolto attivamente, io l'ho colta	0	1	2	3	4	5	6	
4. Ho preso l'iniziativa rapidamente, anche quando altri non lo hanno fatto	0	1	2	3	4	5	6	
5. Ho usato rapidamente le opportunità per raggiungere i miei obiettivi	0	1	2	3	4	5	6	
6. Solitamente ho fatto di più di quello che mi era stato richiesto di fare	0	1	2	3	4	5	6	
7. Sono stato particolarmente bravo nel realizzare le idee	0	1	2	3	4	5	6	

Pensando agli **ultimi 3 mesi**, indichi il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Mi è piaciuto trovare soluzioni a problemi complessi	0	1	2	3	4	5	6	
2. Mi è piaciuto trovare nuove idee per nuovi prodotti o servizi	0	1	2	3	4	5	6	
3. Mi è piaciuto trovare nuovi modi di svolgere il lavoro	0	1	2	3	4	5	6	
4. Mi è piaciuto migliorare processi o prodotti esistenti	0	1	2	3	4	5	6	

## SEZIONE II: ASPETTI LEGATI AL LAVORO

Qui di seguito troverà una serie di affermazioni relative al lavoro che svolge, la preghiamo di leggere attentamente ciascuna affermazione e di indicare quanto spesso, negli **ultimi 3 mesi** ha provato tali sensazioni.

Per rispondere utilizzi la seguente scala:

0	Quasi mai	Raramente	Qualche volta	Spesso	Molto spesso	Sempre
Mai	1 Qualche volta nei tre mesi	2 Una volta al mese	3 Qualche volta al mese	4 Una volta alla settimana	5 Qualche volta alla settimana	6 Ogni giorno

	Mai	1	2	3	4	5	Sempre
1. Nel mio lavoro mi sono sentito pieno di energia	0	1	2	3	4	5	6
2. Ho trovato il lavoro che faccio ricco di significati e scopi	0	1	2	3	4	5	6
3. Nel mio lavoro, mi sono sentito forte e vigoroso	0	1	2	3	4	5	6
4. Sono stato entusiasta del mio lavoro	0	1	2	3	4	5	6
5. Il mio lavoro mi ha ispirato	0	1	2	3	4	5	6
6. La mattina, quando mi sono alzato, ho avuto voglia di andare a lavoro	0	1	2	3	4	5	6
7. Sono stato orgoglioso del mio lavoro	0	1	2	3	4	5	6
8. Sono stato in grado di lavorare per lunghi periodi senza sosta	0	1	2	3	4	5	6
9. Per me, il mio lavoro è stato stimolante	0	1	2	3	4	5	6
10. Nel mio lavoro, quando sono stato sotto pressione, ho avuto notevoli capacità di recupero mentali	0	1	2	3	4	5	6
11. Nel mio lavoro sono stato sempre perseverante anche quando le cose non sono andate bene	0	1	2	3	4	5	6

Le chiediamo di valutare con quale frequenza, **negli ultimi 3 mesi**, **NEL SUO LAVORO...**

	Mai ..... Sempre						
1. Ha generato idee originali	0	1	2	3	4	5	6
2. Ha avuto idee su come migliorare le cose	0	1	2	3	4	5	6
3. Ha trovato nuovi modi di fare le cose	0	1	2	3	4	5	6
4. Ha proposto le nuove idee agli altri	0	1	2	3	4	5	6
5. Ha suggerito come migliorare le cose	0	1	2	3	4	5	6
6. Ha proposto di fare le cose in modo diverso	0	1	2	3	4	5	6
7. Ha visto le sue idee adottate dall'azienda	0	1	2	3	4	5	6
8. Ha applicato i suggerimenti ideati per migliorare le cose	0	1	2	3	4	5	6
9. Ha realizzato le sue proposte per fare le cose in modo diverso	0	1	2	3	4	5	6

Le chiediamo ora di **indicare con quale frequenza, negli ultimi 3 mesi, ha fornito suggerimenti utili per cambiare o migliorare alcuni aspetti del lavoro.**

	Mai..... Sempre						
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Le chiediamo ora di valutare quanto spesso, **negli ultimi 3 mesi, i suggerimenti che ha fornito** per cambiare o migliorare gli aspetti del lavoro di seguito elencati **sono stati adottati o applicati:**

	Mai..... Sempre						
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Facendo riferimento agli **ultimi 3 mesi**, indichi il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Ho saputo esattamente a chi rivolgermi per presentare nuove proposte e idee all'azienda	0	1	2	3	4	5	6	
2. Ho avuto la possibilità di accedere alla necessaria competenza tecnica per sviluppare le mie idee	0	1	2	3	4	5	6	
3. Ho avuto tempo a sufficienza per formulare e scrivere le nuove idee o miglioramenti da presentare all'azienda	0	1	2	3	4	5	6	
4. Le idee sono state accolte allo stesso modo indipendentemente da chi le ha presentate	0	1	2	3	4	5	6	
5. Ho trovato facilmente aiuto per sviluppare le nuove idee	0	1	2	3	4	5	6	
6. Le idee che ho presentato non sono state prese in considerazione	0	1	2	3	4	5	6	
7. Non ci sono stati vantaggi dal presentare le proprie idee e suggerimenti all'azienda	0	1	2	3	4	5	6	
8. Non ho avuto a disposizione le risorse aziendali necessarie per sviluppare le nuove idee	0	1	2	3	4	5	6	

**Pensando alla sua situazione lavorativa negli ultimi 3 mesi**, indichi il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Il mio lavoro ha richiesto che imparassi cose nuove	0	1	2	3	4	5	6	
2. Il mio lavoro mi ha consentito di prendere parecchie decisioni in autonomia	0	1	2	3	4	5	6	
3. Il mio lavoro ha richiesto molta rapidità di esecuzione	0	1	2	3	4	5	6	
4. Il mio lavoro ha previsto parecchie mansioni ripetitive	0	1	2	3	4	5	6	
5. Il mio lavoro mi ha impegnato molto a livello mentale	0	1	2	3	4	5	6	
6. Nel mio lavoro è stato necessario anche saper trovare nuove soluzioni ai problemi che si sono presentati	0	1	2	3	4	5	6	
7. Ho avuto abbastanza voce in capitolo durante lo svolgimento del mio lavoro	0	1	2	3	4	5	6	
8. Mi è stato richiesto di eseguire una quantità eccessiva di lavoro (rispetto al tempo che avevo a disposizione)	0	1	2	3	4	5	6	
9. Le persone con cui ho lavorato hanno stabilito con me un rapporto anche personale	0	1	2	3	4	5	6	
10. Il mio lavoro ha richiesto un elevato livello di capacità/competenza professionale	0	1	2	3	4	5	6	

11. Le persone con cui lavoro mi sono state amiche	0	1	2	3	4	5	6
12. Durante il mio lavoro mi sono giunte richieste non chiare o contrastanti tra loro	0	1	2	3	4	5	6
13. Nel mio lavoro ho avuto l'opportunità di sviluppare competenze specifiche	0	1	2	3	4	5	6
14. Il mio lavoro ha richiesto lunghi periodi d'intensa concentrazione	0	1	2	3	4	5	6
15. Le persone con cui lavoro mi sono state d'aiuto nel portare a termine il lavoro	0	1	2	3	4	5	6
16. Sul lavoro mi è capitato spesso di essere interrotto e di doverlo completare in più riprese	0	1	2	3	4	5	6
17. Il mio lavoro è stato molto frenetico	0	1	2	3	4	5	6
18. Sul lavoro ho avuto poca libertà di decidere come svolgere i miei compiti	0	1	2	3	4	5	6
19. Tra le persone con cui ho lavorato c'era un clima di reciproca collaborazione	0	1	2	3	4	5	6

### SEZIONE III: ASPETTI LEGATI ALL'ORGANIZZAZIONE

Facendo riferimento **alla divisione di sua appartenenza** e pensando agli **ultimi 3 mesi**, esprima il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. L'organizzazione è stata costantemente orientata a sviluppare nuove risposte	0	1	2	3	4	5	6	
2. L'assistenza nello sviluppare nuove idee è stata facilmente disponibile	0	1	2	3	4	5	6	
3. L'organizzazione è stata aperta e sensibile al cambiamento	0	1	2	3	4	5	6	
4. Le persone di questa organizzazione hanno ricercato modi brillanti e nuovi di vedere i problemi	0	1	2	3	4	5	6	
5. In questa organizzazione ci siamo presi il tempo necessario per lo sviluppo di nuove idee	0	1	2	3	4	5	6	
6. Le persone nell'organizzazione hanno cooperato per aiutare lo sviluppo e l'applicazione di nuove idee	0	1	2	3	4	5	6	
7. I membri dell'organizzazione hanno ricercato e condiviso risorse al fine di applicare nuove idee	0	1	2	3	4	5	6	
8. I membri della divisione hanno ricercato modalità per l'applicazione pratica di nuove idee	0	1	2	3	4	5	6	

Facendo riferimento al rapporto con il **suo diretto superiore negli ultimi 3 mesi**, esprima il suo grado di accordo con le seguenti affermazioni.

	Completamente in disaccordo				Completamente d'accordo			
1. Solitamente ho saputo quando il mio superiore è stato soddisfatto per il lavoro che ho fatto	0	1	2	3	4	5	6	
2. Il mio superiore conosceva quali sono stati i miei problemi e i miei bisogni sul lavoro	0	1	2	3	4	5	6	
3. Il mio superiore ha riconosciuto le mie potenzialità	0	1	2	3	4	5	6	
4. Penso che il mio superiore avrebbe usato la sua posizione per aiutarmi nella soluzione di problemi sul lavoro	0	1	2	3	4	5	6	
5. Penso che il mio superiore mi avrebbe aiutato ad uscire da una situazione difficile anche a proprie spese	0	1	2	3	4	5	6	
6. Ho avuto abbastanza fiducia nel mio superiore da giustificare e difendere le sue scelte nel caso in cui lui/lei non fosse stato presente per farlo	0	1	2	3	4	5	6	
7. Ho avuto una buona relazione di lavoro con il mio superiore	0	1	2	3	4	5	6	

**IL QUESTIONARIO È FINITO.  
LA RINGRAZIAMO PER LA SUA COLLABORAZIONE.**





## **APPENDIX B**

### **SUPERVISORS QUESTIONNAIRE T1**

Il questionario che Le proponiamo è un mezzo per valutare con quale frequenza le persone che lavorano con lei hanno sviluppato, proposto e applicato idee innovative. Non si tratta di valutare la prestazione delle persone o la loro efficienza, ma solamente di esprimere una sua valutazione circa le loro capacità di generare e proporre idee.

Le chiediamo di rispondere alle domande che seguiranno facendo riferimento alle persone che lavorano a stretto contatto con lei, compilando per ciascuna persona un questionario ed indicando di volta in volta il nome e cognome della persona a cui farà riferimento rispondendo alle domande.

Ai sensi del D.L. 196 del 30/6/2003 e delle successive modificazioni (tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali), la raccolta di questi dati è finalizzata a scopi di ricerca scientifica. L'analisi dei dati avverrà in forma anonima e collettiva. Responsabile dell'analisi statistica dei dati del questionario è il prof. Salvatore Zappalà, Facoltà di Psicologia dell'Università di Bologna. E-mail: <a href="mailto:salvatore.zappala@unibo.it">salvatore.zappala@unibo.it</a>
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Prima di cominciare a compilare il questionario le chiediamo di indicare il nome della persona a cui si riferirà rispondendo alle domande: Nome e Cognome \_\_\_\_\_

Una persona, per essere innovativa, deve mettere in atto diversi comportamenti. Le chiediamo di valutare con quale frequenza la persona sopra indicata ha messo in atto i seguenti comportamenti **nel lavoro che svolge**.

Per rispondere alle domande che Le verranno proposte in seguito utilizzi la seguente scala:  
 0 = mai;            1 = quasi mai (qualche volta in un anno);    2 = raramente (qualche volta in un anno);  
 3 = qualche volta (qualche volta al mese);            4 = spesso (una volta alla settimana);  
 5 = molto spesso (qualche volta alla settimana);            6 = sempre (ogni giorno).

	Mai.....Sempre						
	0	1	2	3	4	5	6
1. Genera idee originali	0	1	2	3	4	5	6
2. Ha idee su come migliorare le cose	0	1	2	3	4	5	6
3. Trova nuovi modi di fare le cose	0	1	2	3	4	5	6
4. Propone le nuove idee agli altri	0	1	2	3	4	5	6
5. Suggerisce come migliorare le cose	0	1	2	3	4	5	6
6. Propone di fare le cose in modo diverso	0	1	2	3	4	5	6
7. Vede le sue idee adottate dall'azienda.	0	1	2	3	4	5	6
8. Applica i suggerimenti da lui/lei ideati per migliorare le cose.	0	1	2	3	4	5	6
9. Realizza le sue proposte per fare le cose in modo diverso.	0	1	2	3	4	5	6

Le chiediamo ora di valutare **quanto spesso la persona ha fornito suggerimenti utili per cambiare/migliorare i seguenti aspetti del lavoro**:

	Mai.....Sempre						
	0	1	2	3	4	5	6
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Le chiediamo ora di valutare quanto spesso **i suggerimenti che la persona ha fornito** per cambiare o migliorare gli aspetti del lavoro di seguito elencati, **sono stati adottati o applicati:**

	Mai.....						.....	Sempre
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5		6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5		6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5		6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5		6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5		6

## **SUPERVISORS QUESTIONNAIRE T2**

Il questionario che Le proponiamo è un mezzo per valutare con quale frequenza, **negli ultimi 3 mesi**, le persone che lavorano con lei hanno sviluppato, proposto e applicato idee innovative.

**Legga con attenzione ogni singola domanda al fine di dar conto delle diverse caratteristiche della persona che sta valutando.**

Le chiediamo di rispondere alle domande che seguiranno facendo riferimento alla persona che lavora a stretto contatto con lei, di cui troverà il nome e cognome nella pagina successiva.

Ai sensi del D.L. 196 del 30/6/2003 e delle successive modificazioni (tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali), la raccolta di questi dati è finalizzata a scopi di ricerca scientifica. L'analisi dei dati avverrà in forma anonima e collettiva. Responsabile dell'analisi statistica dei dati del questionario è il prof. Salvatore Zappalà, Facoltà di Psicologia dell'Università di Bologna. E-mail: [salvatore.zappala@unibo.it](mailto:salvatore.zappala@unibo.it)

Nome e Cognome \_\_\_\_\_

Una persona, per essere innovativa, deve mettere in atto diversi comportamenti. Le chiediamo di valutare con quale frequenza, **negli ultimi 3 mesi**, la persona sopra indicata ha messo in atto i seguenti comportamenti **nel lavoro che svolge**.

Per rispondere alle domande che Le verranno proposte in seguito utilizzi la seguente scala:

0 Mai	Quasi mai 1 Qualche volta nei tre mesi	Raramente 2 Una volta al mese	Qualche volta 3 Qualche volta al mese	Spesso 4 Una volta alla settimana	Molto spesso 5 Qualche volta alla settimana	Sempre 6 Ogni giorno
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	Mai	1	2	3	4	5	Sempre
1. Ha generato idee originali	0	1	2	3	4	5	6
2. Ha avuto idee su come migliorare le cose	0	1	2	3	4	5	6
3. Ha trovato nuovi modi di fare le cose	0	1	2	3	4	5	6
4. Ha proposto le nuove idee agli altri	0	1	2	3	4	5	6
5. Ha suggerito come migliorare le cose	0	1	2	3	4	5	6
6. Ha proposto di fare le cose in modo diverso	0	1	2	3	4	5	6
7. Ha visto le sue idee adottate dall'azienda	0	1	2	3	4	5	6
8. Ha applicato i suggerimenti da lui/lei ideati per migliorare le cose	0	1	2	3	4	5	6
9. Ha realizzato le sue proposte per fare le cose in modo diverso	0	1	2	3	4	5	6

Le chiediamo ora di indicare **con quale frequenza, negli ultimi 3 mesi**, la persona ha fornito suggerimenti utili per cambiare o migliorare alcuni aspetti del lavoro.

	Mai	1	2	3	4	5	Sempre
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Le chiediamo ora di valutare quanto spesso, **negli ultimi 3 mesi**, i suggerimenti che la persona ha fornito per cambiare o migliorare gli aspetti del lavoro di seguito elencati, sono stati adottati o applicati:

	Mai.....Sempre						
1. Nuovi metodi o tecniche di lavoro	0	1	2	3	4	5	6
2. Nuovi prodotti/servizi o miglioramenti di prodotti/servizi esistenti	0	1	2	3	4	5	6
3. Nuove modalità per registrare, gestire e trasmettere le informazioni	0	1	2	3	4	5	6
4. Nuovi metodi/procedure per raggiungere gli obiettivi del lavoro	0	1	2	3	4	5	6
5. Altri aspetti del suo lavoro	0	1	2	3	4	5	6

Sempre facendo riferimento agli **ultimi 3 mesi**, le chiediamo infine di valutare alcuni aspetti riguardanti le modalità di svolgimento del lavoro da parte della persona.

	Mai.....Sempre						
1. Nel suo lavoro ha garantito standard di qualità adeguati	0	1	2	3	4	5	6
2. Ha svolto bene lavori che richiedevano elevata precisione e accuratezza	0	1	2	3	4	5	6
3. Ha svolto il lavoro in modo accurato e scrupoloso	0	1	2	3	4	5	6
4. Ha rispettato i piani di lavoro assegnati	0	1	2	3	4	5	6
5. E' riuscito a svolgere il suo lavoro in tempi adeguati	0	1	2	3	4	5	6
6. Ha raggiunto gli obiettivi assegnati nei tempi previsti	0	1	2	3	4	5	6