
Premises for innovation: Italian validation and dimensionality of the Inventory of Organizational Innovativeness (IOI)

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✦ **ABSTRACT.** Il lavoro si propone di contribuire alla validazione dell'IOI-Inventory of Organizational Innovativeness (Tang, 1999), uno dei pochi strumenti multidimensionali per la misura dell'orientamento delle organizzazioni verso l'innovazione. I risultati di uno studio su 616 lavoratori italiani non confermano la struttura teorica a 9 fattori ma confermano quella a 6 fattori emersa in altri studi. Le analisi delle proprietà psicometriche della scala e delle sue relazioni con costrutti affini confermano la validità e affidabilità dell'IOI per rilevare i diversi aspetti che contribuiscono a promuovere la capacità di una organizzazione di essere innovativa.

✦ **SUMMARY.** Literature underlines the role of the organizational orientation toward innovation as a precursor of its effective capability to generate and adopt innovations, in this way gaining competitive advantages. However less attention has been devoted to the methodological issues concerning how to measure this construct. Indeed, the few existing measures are often one-dimensional and neglect the multiple facets of this construct. In this paper we examine the multidimensional IOI-Inventory of Organizational Innovativeness (Tang, 1999) with the aim of verifying its psychometrics properties, validating it in the Italian context, and exploring the relationships among its dimensions and other related constructs (servant leadership, climate for support to innovation, climate for participative safety) and outcomes (performance and innovation adoption). Results of the confirmatory factor analysis on a sample of 616 Italian employees did not support the theoretical 9-factor structure. The subsequent exploratory factor analysis attested for a 6-factor model in line with the empirical solution emerged in a previous research. Results of the correlations confirmed the relationship of the IOI's dimensions with both correlated and outcomes measures. Overall, findings of this study attested for the good psychometric properties of the IOI and support that this inventory is a reliable and valid measure of the organizational orientation toward innovation to be used to assess the different facets that contribute to promote the innovation adoption.

Keywords: IOI; Organizational innovativeness; Orientation to innovate; Innovation adoption; Inventory

INTRODUCTION

In the present age of rapid change, innovativeness is the main resource which allows organizations to face the increasing and unstable demands from their environment and to gain competitive advantages. Many scholars have demonstrated, in line with the seminal contribution of Zaltman, Duncan & Holbeck on innovation (1973), that the orientation toward innovation is an important precursor of the concrete innovation implementation stage (Berthon, Hulbert & Pitt, 1999; Hurley & Hult, 1998; Hurley, Hult & Knight, 2005), organisation's performance and economic growth (see Siguaw, Simpson & Enz, 2006). Within this approach, orientation to innovation expresses the degree to which the members of an organization are willing or not to consider the adoption and are committed to their use, as well as the degree to which the management recognizes and takes care of the need for new ideas and actions (Van de Ven, 1986).

From a managerial point of view, orientation toward innovation has been conceived as a strategic competitive orientation (Lynch, Walsh & Harrington, 2010; Manu, 1992) and a key organisational resource (Menguc & Auh, 2002). Indeed, "a firm's long-term success may rely more on an overall firm-level innovation orientation that produces capabilities that spawn innovations, and less on specific innovations" (Siguaw et al., 2006, p. 557). However, research has primarily focused on product and process innovations and on structural factors affecting the innovation outputs (Simpson, Siguaw & Enz, 2006), leaving quite unexplored the role of orientation to innovation in enhancing innovation (Cepeda-Carrion, Cegarra-Navarro & Jimenez-Jimenez, 2011; Hurley & Hult, 1998; Tang, 1999).

In addition, although the different definitions of orientation to innovation highlight the multidimensional nature of this construct (e.g. Amabile, 1997; Lynch et al., 2010), it has been commonly operationalized as one-dimensional, and most empirical evidences are based on the scale developed by Hurley and Hult (1998; e.g. Calantone, Garcia & Droge, 2003; Cepeda-Carrion et al., 2011; Zhou, Gao & Yang, 2005). To the best of our knowledge, only the IOI-Inventory of Organizational Innovativeness developed by Tang (1998) captured the orientation to innovation multi-dimensional nature. In fact, some other scales only pick some of the different facets related to the orientation to innovation, including dimensions referred to both innovative orientation and innovation outcomes (such as the Wang and Ahmed's (2004) questionnaire).

The purpose of this paper is to analyse the dimensionality and reliability of the IOI (Tang, 1998) within the Italian context. Moreover it aims to contribute to the IOI construct validation by examining the relationships of its dimensions with other constructs related to the organisational orientation toward innovation (i.e. servant leadership, climate for support to innovation, climate for participative safety; Hulsheger, Anderson & Salgado, 2009; West & Anderson, 1996) as well as with some organisational outcomes (i.e. organizational performance and innovation adoption; Paleo & Wijnberg, 2008; Parris & Peachey, 2013; Tang, 1999; van Dierendonck, 2011).

THEORETICAL FRAMEWORK

The orientation toward innovation dimensionality

While some authors defined orientation toward innovation as a unitary construct (Hult, Hurley & Knight, 2004), most of them highlighted the different facets of it. For instance, Amabile (1997) asserted that "the most important elements of the innovation orientation are: the value placed on creativity and innovation in general, an orientation toward risk (versus an orientation toward maintaining the status quo), a sense of pride in the organization's members and enthusiasm about what they are capable of doing, and an offensive strategy of taking the lead toward the future (versus a defensive strategy of simply wanting to protect the organization's past position)" (p. 52). Similarly, in their literature review, Lynch and colleagues (2010) conceptualized innovativeness as a multidimensional construct which includes five key components: *creativity*, or the firm's capability to produce new and distinctive ideas, exceeding routine; *openness to new ideas*, or receptiveness to and tolerance of new ideas and experiences; *intention to innovate* (strategic willingness, commitment to innovate); *willingness for risk-taking*, or coping with uncertainty and ambiguity connected to innovation; and *capacity to innovate*, or the necessary skills, knowledge, capabilities and other distinctive resources readily available to adopt or implement new ideas or to take advantage of market opportunities.

Tang (1998), as well, conceptualized orientation toward innovation as a multifaceted construct, assuming a dynamic perspective that simultaneously includes nine dimensions

concerning different organizational levels. Some of them are related to the general organizational commitment toward innovation: *management support*, giving adequate resources and adopting coherent opportunities and rewards to promote innovation; *raising projects*, that is being active in collecting ideas, making suggestions, and exploring through new projects; *doing projects*, expressing the capability to organize, clearly define, implement, and monitor projects; *information and communication* processes that allow dissemination of relevant information, access to documentation and database, and the capturing of ideas and opportunities both from internal and external sources. Other dimensions refer to the interpersonal level: the degree supervisors adopt a consultative and flexible *leadership* style; the degree of teamwork *integration* and mutual trust, being capable to work together harmoniously; the degree colleagues adopt supporting and helpful *behaviour* for work. The last dimensions are related to the job level. One describes the degree colleagues have *knowledge and skills* useful to generate new ideas and create intellectual assets and to turn ideas into action. The other the degree they carry out intellectually stimulating, non-routine and challenging *tasks* that allow creativity and exploration.

The author (Tang, 1999) operationalized the construct in the *IOI-Inventory of Organizational Innovativeness*, a 44-item scale aimed to measure the aforementioned nine facets composing the organizational orientation toward innovation. However, the empirical study he carried out in a professional engineering society did not confirm the nine-factor structure. Specifically, it resulted in a 6-factor empirical solution. Although the authors did not published this last solution, so it is not clear which items loaded in which facets¹, the first factor captures the organisation capability of *doing projects*; the second one mainly captures both the managerial *support* and the *information and communication* theoretical dimensions; the third one captures both the *leadership* and the *raising projects* theoretical dimensions; the fourth factor captures mainly the *tasks* dimension; the fifth factor captures both the *behaviour* and the *integration* theoretical dimensions; and the last factor captures the *knowledge and skills* theoretical dimension. To the best of our knowledge only few authors have used the IOI. For instance, Aliaga (2005) used it taking for granted the nine factors and proposing a revised version of the inventory.

Other authors used part of the IOI, selecting some dimensions or items and showing their relationship with organizational product and process innovation (see for example, Prajogo & Ahmed, 2006; Prajogo, Power & Sohal, 2004).

The first aim of the present study is to examine the IOI psychometric properties, contributing to its cross-cultural validation and generalization. Specifically, according with the conceptualisation of the IOI (Tang, 1998), we will first examine the 9-factor structure, then we will examine the reliability of each of the facets, and finally we will examine the relationships of the IOI facets with relevant correlates and outcomes.

Relationship between orientation toward innovation and related constructs

Literature identifies many “soft” factors enabling the innovation implementation. For instance, leadership has been proved to be a trigger of organizational and individual innovation (de Jong & den Hartog, 2007). Specifically, servant leaders, by focusing on employees’ empowerment, enhance their values and abilities, encourage participation in decision-making and information sharing, and coach them for innovative performance (Konczak, Stelly & Trusty, 2000). In addition, by promoting a safety climate, they lead to interpersonal acceptance, reduce power distance, and so in doing to learning. In this way, servant leaders foster employees’ attachment to the organization, cooperative and extra-role behaviours, and promote a higher engagement in challenging tasks, so that these will results in organizational effectiveness and willingness to change (Parris & Peachey, 2013; van Dierendonck, 2011).

Other dimensions that have been identified as significant antecedents of effective innovation implementation are those related to the climate for innovation, which can be defined as the perception that involvement in innovation is widespread among group members (i.e. Carter & West, 1998; Ekvall, 1996). Specifically, the team climate dimension of *support for innovation* expresses the degree of support (i.e. available resources and time, cooperation, practical support) that teammates feel they receive to enhance the generation

1 For what we know, detailed results of the explorative factor analysis have not been published, so it is not clear which items load in which factors, but only how many items of each dimension load on each factor. Anyhow Tang (1999), for further analyses (e.g. the overall profile, differences in effectiveness and innovativeness performance, comparison between managers and non-managers), doesn’t take into account this empirical solution and refers to the theoretical dimensions.

and the development of organizational innovative processes (Anderson & West, 1998). So, employees feeling this climate perceive the innovation as a collectivistic process, depending on the commitment of the whole group, that cooperate, share responsibilities and help if needed (Anderson & West, 1998). Similarly, the *participation safety* of team climate dimension expresses the perception of non-threatening and not-judging interpersonal relationships, which increases teammates' interaction and motivates their participation in decision-making and information sharing processes. Hence, it encourages to express divergent ideas and to improve ways of working. Overall, both these climate dimensions lead to organizational innovative outcomes (Adams, Bessant & Phelps, 2006; Bain, Mann, Pirola-Merlo, 2001; Curren, Forrester, Dawson & West, 2001; Hulsheger et al., 2009). Specifically, support for innovation proved to be a predictor of overall innovation and of the number of innovation novelty, and participation safety resulted to be the best predictor of the number of innovations (West & Anderson, 1996).

As already mentioned, in order to further investigate the construct validity of the IOI questionnaire, the second aim of this study is to examine the relationship among the IOI dimensions and both servant leadership and the two climate for innovation dimensions (support for innovation and participative safety). Specifically we hypothesize that all of them will be positively related to each of the IOI dimensions.

Many scholars have also highlighted that the orientation to innovation influences the effective generation and adoption of new products/services (Paleo & Wijnberg, 2008; Prajogo & Ahmed, 2006; Prajogo et al., 2004; Zaltman et al., 1973) and so it affects organisation's concrete innovative

capacity (Woodside, 2005). Despite this strong theoretical framework, only few scholars provided empirical evidence of the relationship between organizational innovativeness and performance (Hult et al., 2004) or innovative capacity (Hurley & Hult, 1998). Thus, another aim of this paper is to fill this gap and examine whether and how the IOI dimensions will be positively related to both organisational performance and innovation adoption.

METHOD

Participants and procedure

Participants of this study were 616 Italian employees working in different sectors (see Table 1). Respondents were mainly males (62%), ranged in age from 19 to 62 years ($M = 44$ years, $SD = 2.54$) and had attained a relatively high level of education (41% graduate, 47% high school). Participants held different organizational positions (42% operatives, 39% technical-specialized, 19% management) and ranged in organizational tenure from 1 to 38 years ($M = 14$ years, $SD = 13.6$).

Data collection was conducted by research assistants. Specifically each of them directly contacted the company's managers and after their approval they administered the questionnaire. Participants voluntarily participated in the study and did not receive any kind of reward. Each of the employees received the questionnaire in a blank envelope and a presentation letter, which contained a brief description of the research and its main objectives. Prior to administering

Table 1 – Productive sectors of the sample

| Productive sectors | n | % |
|----------------------------|-----|------|
| Aviation industry | 100 | 16.2 |
| Pharmaceutical industry | 60 | 9.7 |
| Insurance | 202 | 33.1 |
| Marketing | 100 | 16.2 |
| Consulting and development | 100 | 16.2 |
| Railways | 12 | 1.9 |
| Public health | 42 | 6.8 |
| Tot. | 616 | 100% |

the surveys, all participants were informed of the anonymity and confidentiality of the survey and were allowed to decline participation if they so choose. To ensure heterogeneity of the sample, each research assistant approached between 10 and 30 employees from different organisations (see Table 1).

Measures

Orientation toward innovation. The organizational orientation to innovation was measured with the IOI-Inventory of Organizational Innovativeness developed by Tang (1999). This questionnaire, already described in the introduction section, is a 44 item self-report scale and it has been developed for measuring 9 theoretical dimensions. Participants were asked to rate their level of agreement for each of the item on a five-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Two bilingual researchers independently translated the original scale into Italian, then a discussion was followed in order to produce the final Italian version (see Appendix).

Servant Leadership was measured by adapting the 6-item scale by Ashill, Carruthers & Krisjanous (2006). It assesses leader's active engagement in helping and meeting the employees' needs, and his/her role in creating an environment conducive to high quality products-service. Example items are: "Management regularly spends time 'on the floor' (with clients and frontline staff)", "Management provides resources, not just 'lip service', to enhance my ability to provide excellence products-service". Employees expressed their degree of agreement on a 5-point Likert scale, from 1 = *strongly disagree* to 5 = *strongly agree* (Cronbach's alpha = .87).

Team climate for innovation: both *Support for innovation and Participation safety* scales were measured with 16 items from TCI-Team Climate Inventory, developed by Anderson and West (1998). The first dimension (7 items) assesses the perception of support and resources given by teammates to other members of the group for the development of new ideas or to solve problems (e.g. "In this team we take the time needed to develop new ideas"; "Members of the team provide and share resources to help in the application of new ideas"). *Participation safety* (9 items) assesses the perception of trusty, not-threatening interpersonal relationships, so that teammates feel they can safely offer new ideas, share information and participate in decision-making (e.g. "Everyone's view is listened to even if it is in a minority", "We share information generally in the team, rather than keeping

it to ourselves"). Respondents were asked to indicate the extent to which each statement was true for their team on a 5-point Likert scale, from 1 = *strongly disagree* to 5 = *strongly agree* (both Cronbach's alphas = .93).

Perceived organizational outcomes. As indicators of the overall organizational performance, we used the two self-report assessment items included in the IOI (Tang, 1999): "My organization is effective in innovating" and "Overall, my organization is an effective organization". For these two items we asked participants to rate the level of agreement on a 5 point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). In addition, we measured innovation adoption with two items developed for the scope of this research. Specifically, we asked to participants whether, in the last three years, their organization has introduced into the market new products or services ("We placed new products on the market"; "We proposed new services for our customers"). For each of these items participants indicated the frequency of innovations, using a 5-point Likert scale (from 1 = *never* to 5 = *often*).

Data analysis

To validate the *IOI-Inventory of Organizational Innovativeness*, its psychometric properties were investigated. In particular, Confirmatory Factor Analysis (CFA) was used to test the theoretical IOI 9-factor structure. The model fit was analysed by examining along with the chi square, the Comparative fit index (CFI), the Tucker-Lewis Index (TLI); root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR) (Byrne, 2012; Meade, Johnson & Braddy, 2008).

After ascertained the dimensionality of the scale, the reliability of each dimension was analysed. Specifically, Cronbach's Alpha, Composite Reliability (CR) and the Maximal Reliability (MR) (see Fornell & Larcker, 1981; Raykov & Marcoulides, 2011) were examined. For these coefficients, values approaching 1 support the good reliability of the measure assessing the underlying latent construct (Raykov & Marcoulides, 2011). Furthermore, construct validity was examined by correlating the IOI dimensions with different types of correlates. Specifically we examined the association with leadership and team climate for innovation and with some outcomes related to innovation adoption and organizational effectiveness. Data were analysed by using Spss and Mplus softwares.

RESULTS

Before proceeding with the analysis, the normality of all the items of the scale was ascertained. Specifically, skewness and kurtosis indices ranged from .001 to .931. Given that all items were normally distributed, EFA was performed using Maximum Likelihood parameter estimates.

Psychometric properties of the Tang's IOI– Inventory of Organizational Innovativeness

Results of the CFA attested for a not satisfactory fit ($\chi^2_{(866)} = 3481.62$; $p < .001$; RMSEA = .070 (.068–.073); $p < .01$; CFI = .87; TLI = .86; SRMR = .06). In addition, the analysis of the correlations among the IOI facets showed that some dimensions were highly correlated each other (i.e., *Raising projects with management Support* .88; *Doing projects with Information and Communication* .87; *Raising projects with Integration* .82). These high correlations between some facets suggested for a more parsimonious solution, in line with the empirical study by Tang (1999) in which the author extracted 6 factors. Hence, we decided to test an exploratory factor analysis extracting as suggested 6 factors.

Results of the six-factor model showed the following fit indices: $\chi^2_{(697)} = 2637.025$; $p < .001$; RMSEA = .067 (.065–.070); SRMR = .029. Since this solution revealed eight items which loaded lower than $|\ .30 |$ or with higher loadings in more than one factors, they were deleted, and a second analysis was performed. The final six-factor model (Table 2) fits the data – $\chi^2_{(429)} = 1760.81$; $p < .001$; RMSEA = .071 (.068–.075); SRMR = .028 – explaining 62.4% of the total variances.

The first three factors gather, each, two theoretical dimensions, while the other three factor correspond each one to the IOI theoretical dimensions. The first factor accounted for 14.5% of the total variance and gathered items from *Doing projects* and *Information and Communication* dimensions. It was labelled *Alignment* since it is related to the organization's capability to manage a project clearly defining its goals, monitoring and evaluating it, giving adequate resources, and ensuring that all those in need have access to documentation and databases and all relevant information. Thus, it is related to the organization's orientation to enhance the coherence between objectives and resources and among all actors

involved, so that an innovation may be implemented and become effective.

The second factor accounted for 15.5% of the total variance and gathered items from *Raising projects* and management *Support* dimensions. It was labelled *Promotion* since it relates to the organization's openness toward the generation of new ideas, suggestions and project proposed by employees for work improvement and innovation. This implies both a psychological safety climate and processes that enhance and support raising ideas through opportunities and reward systems.

The third factor accounted for 13% of the total variance and gathered items from *Behavior* and *Integration* dimensions. It was labelled *Team support* and refers to the degree of integration and perceived support from colleagues that are considered helpful, trustworthy, willing to cooperate, thereby enhancing teamwork and cohesion.

The fourth factor accounted for 8% of the total variance and included the items of the *Leadership* theoretical dimension. It refers to the perception of top managers as available to listening and communicating, capable of adopting a consultative style, valuing employees' opinions and motivating them towards innovation and work improvement. Thus, it is a factor that expresses the general organization's commitment toward innovation through human resources' motivation and direction.

The fifth factor accounted for 7% of the total variance and was labelled *Task* since it involves items of this theoretical dimension. It expresses the degree to which employees consider their work intellectually stimulating and challenging, based on creativity and on the capability to manage non-routine issues, work that gives them the opportunity to learn and to explore.

And finally, the sixth factor accounted for 5% of the total variance and is composed of the items of the *Knowledge & skills* theoretical dimension. It refers to the perception of teammates as a resource for organizational life and development because of the strength of their knowledge, skills and creativity, and because of their ability to implement new ideas. As shown in Table 3, factors were correlated and ranged from .36 (correlation between Knowledge & skills and Task) to .67 (correlation between Promotion and Alignment).

Table 4 reported the Cronbach's Alpha, maximal and composite reliability, corrected item-scale correlations range, and standard deviation for each factor. As shown, all IOI dimensions were reliable.

Table 2 – Final version of the exploratory factor analysis of IOI– Inventory of Organizational Innovativeness

| Item number | Dimension | Factors | | | | | |
|-------------|-----------|------------|------------|--------------|------------|------------|--------------------|
| | | Alignment | Promotion | Team support | Leadership | Task3 | Knowledge & skills |
| 33 | DOP-3 | .86 | .01 | -.02 | -.08 | .05 | .00 |
| 34 | DOP-4 | .75 | .06 | -.04 | .00 | .03 | .03 |
| 32 | DOP-2 | .74 | .14 | .08 | -.04 | -.03 | -.11 |
| 35 | DOP-5 | .68 | -.07 | .05 | .18 | -.01 | -.04 |
| 42 | IC-2 | .62 | .10 | .01 | .08 | -.10 | .05 |
| 31 | DOP-1 | .56 | .13 | .19 | .14 | -.07 | -.10 |
| 43 | IC-3 | .53 | .20 | -.05 | -.09 | .08 | .07 |
| 41 | IC-1 | .50 | .15 | .21 | .14 | -.12 | -.04 |
| 44 | IC-4 | .48 | .12 | .18 | -.07 | .08 | .06 |
| 27 | RAP-3 | .12 | .73 | .07 | -.05 | .08 | -.06 |
| 8 | SUPP-4 | .07 | .68 | -.10 | .10 | -.03 | .15 |
| 9 | SUPP-5 | .21 | .63 | -.17 | .08 | -.03 | .08 |
| 30 | RAP-6 | .01 | .62 | .05 | -.06 | .11 | -.09 |
| 7 | SUPP-3 | .13 | .61 | -.09 | .16 | .03 | .08 |
| 6 | SUPP-2 | .07 | .60 | -.05 | .15 | .06 | .10 |
| 26 | RAP-2 | .07 | .54 | .27 | -.10 | .09 | .06 |
| 25 | RAP-1 | .17 | .54 | .26 | -.07 | .08 | -.06 |
| 28 | RAP-4 | .13 | .52 | .12 | .03 | .14 | -.10 |
| 19 | BEH-3 | .01 | -.18 | .73 | .07 | .11 | .06 |
| 23 | INT-3 | .00 | .17 | .71 | .08 | -.12 | -.02 |
| 22 | INT-2 | .02 | .26 | .69 | .01 | -.14 | -.03 |
| 17 | BEH-1 | .08 | -.23 | .68 | -.05 | .09 | .18 |
| 18 | BEH-2 | .03 | -.02 | .66 | .01 | .09 | .03 |
| 21 | INT-1 | .05 | .14 | .65 | -.07 | .07 | -.02 |
| 24 | INT-4 | .22 | .15 | .42 | .11 | -.02 | .06 |
| 1 | LEA-1 | .05 | -.02 | .03 | .80 | .01 | .02 |
| 2 | LEA-2 | .10 | .12 | -.03 | .72 | -.01 | .05 |
| 3 | LEA-3 | .24 | -.05 | -.05 | .66 | .15 | .03 |
| 4 | LEA-4 | -.14 | .27 | .21 | .65 | .01 | -.13 |
| 14 | TASK-3 | -.08 | .12 | -.07 | -.01 | .81 | .07 |
| 16 | TASK-5 | .12 | .05 | .01 | .02 | .71 | -.05 |
| 15 | TASK-4 | -.14 | .08 | .15 | .04 | .63 | -.06 |
| 12 | TASK-1 | .16 | .02 | .09 | .10 | .54 | .04 |
| 39 | KNS-4 | -.07 | .07 | .09 | -.00 | .02 | .85 |
| 38 | KNS-3 | .06 | -.04 | .24 | .01 | -.05 | .57 |
| 40 | KNS-5 | .04 | .27 | .19 | .02 | .05 | .43 |

Note: Items refer to the following theoretical dimensions: DOP = doing projects; IC = information and communication; RAP = raising projects; SUPP = support; TASK = task; BEH = behaviour; INT = integration; LEA = leadership; KNS = knowledge and skills;.

Table 3 – Correlations among the IOI's dimensions

| | 1 | 2 | 3 | 4 | 5 |
|-----------------------|-------|-------|-------|-------|-------|
| 1. Alignment | – | | | | |
| 2. Promotion | .67** | – | | | |
| 3. Team support | .60** | .55** | – | | |
| 4. Leadership | .57** | .57** | .47** | – | |
| 5. Task | .38** | .53** | .52** | .37** | – |
| 6. Knowledge & skills | .48** | .37** | .49** | .38** | .36** |

Note. ** $p < .01$

Table 4 – IOI reliability coefficients

| | Cronbach's Alpha | Maximal reliability | Composite reliability | Corrected item-scale correlations |
|-----------------------|------------------|---------------------|-----------------------|-----------------------------------|
| 1. Alignment | .92 | .92 | .93 | .64–.76 (M = .72, SD = .04) |
| 2. Promotion | .93 | .93 | .93 | .60–.77 (M = .74, SD = .06) |
| 3. Team support | .90 | .90 | .90 | .67–.73 (M = .70, SD = .02) |
| 4. Leadership | .81 | .90 | .90 | .73–.79 (M = .77, SD = .02) |
| 5. Task | .88 | .85 | .84 | .63–.74 (M = .71, SD = .04) |
| 6. Knowledge & skills | .81 | .81 | .83 | .60–.76 (M = .66, SD = .08) |

Relations among IOI dimensions and other constructs

Table 5 reported the analysis of the correlations among the six IOI dimensions, servant leadership, climate for innovation dimensions (support for innovation and participative safety), organisational performance and innovation adoption. As hypothesized, all six IOI dimensions showed a significant positive correlation with these dimensions.

DISCUSSION

The main aim of the present study was to investigate the factorial validity of the Italian version of the IOI– Inventory of Organizational Innovativeness by Tang (1999), one of the few instruments adopting a multidimensional perspective to operationalize the construct. Results of the present study support the good psychometric properties of the IOI questionnaire in the Italian context, although partially confirming the theoretical structure proposed by the author. Indeed, the CFA did not provide support for a nine-dimensions scale. A further

EFA suggested for a six-factor structure in which items of different dimensions loaded together in a single factor. Findings showed that eight items had poor relationship with the latent dimensions, thus have been dropped from the analysis.

Specifically, the first IOI factor, *Alignment* (gathering items from the *Doing projects* and *Information and Communication dimensions*), allows to describe organizations in relation to their orientation toward a shared planning, with clear strategies and objectives, where everyone receives adequate resources and access to relevant information. The second factor, *Promotion* (gathering items from the *Raising projects* and management *Support dimensions*), allows to describe organizations capable to raise projects and to give support to innovation: it expresses the willingness to accept new ideas and projects, recognize and reward innovative employees, and concretely give resources and opportunities to enhance innovation. These two dimensions are mainly referred to the organizational level, depicting the organizational strategic orientation toward innovation, that is pursuing innovation as a main goal and providing its members with the necessary support and conditions so that it can be implemented.

Table 5 – Correlations among the IOI's dimensions and other variables

| | Servant leadership | Team climate for innovation | | IOI's organizational performance assessment | | Innovation adoption | |
|-----------------------|--------------------|-----------------------------|----------------------|---|-----------------------|---------------------|--------------------|
| | | Support for innovation | Participative safety | Effectiveness in innovating | General effectiveness | Product innovation | Service innovation |
| 1. Alignment | .64** | .61** | .56** | .70** | .77** | .30** | .41** |
| 2. Promotion | .57** | .66** | .51** | .65** | .64** | .26** | .32** |
| 3. Team support | .51** | .64** | .68** | .55** | .65** | .34** | .40** |
| 4. Leadership | .63** | .52** | .51** | .46** | .61** | .26** | .35** |
| 5. Task | .40** | .55** | .46** | .49** | .47** | .27** | .31** |
| 6. Knowledge & skills | .43** | .58** | .55** | .53** | .57** | .32** | .33** |

Note. ** $p < .01$

The *Team support* dimension (gathered items from the *Behavior* and *Integration* dimensions) allows describing organizations in which colleagues are willing to share knowledge and to take initiatives, are helpful and supportive for work and difficulties and, overall, trustworthy. The *Leadership* dimension is related to the adoption of a consultative and flexible style, aimed at empowering human resources and challenging them to work improvement. These dimensions are related to the interpersonal level, expressing the degree the vertical and peer relationships are perceived as supportive for the knowledge and ideas sharing and the teammates' commitment to innovation.

The *Knowledge & skills* dimension is related to teammates' perception as strong in knowledge and abilities, capable to implement innovative ideas. The last dimension, *Task*, allows to describe organisations promoting a non-routine, creative and challenging work. These latter dimensions are referred to the individuals' level, highlighting the organizational orientation to invest on its members and their professionalism as a resource for innovation.

Currently, to our knowledge, no studies have investigated the factorial structure of the IOI, also in other national contexts, thus this result also provides a more general empirical support to the IOI validation.

In addition, the six dimensions provide a composite picture about how different components of the organization can contribute to promote its innovativeness. Consistently with our hypotheses, the analysis of the correlations showed positive relations among all the IOI dimensions and the other cultural factors for innovation we considered. Specifically, organizations high in IOI dimensions related to the organizational

(Alignment, Promotion) and interpersonal (Leadership, Team support) levels, also perceive their leaders as adopting a servant style, that is supportive for the employees' motivation, participation and direction. Furthermore, their members feel a team climate enhancing the teammates cooperation to implement new ideas and proposals (support for innovation). At last, in organizations high in IOI dimensions –and above all expressing strong Team support (that is having helpful, trustworthy and cooperative colleagues)– teammates also feel a psychologically safe climate, based on non-threatening and not-judging interpersonal relationships.

Furthermore, all the IOI dimensions resulted positively related with the innovation outcome indicators. As expected, organizations highly oriented toward innovation seemed to be also more effective in accomplishing their goals and innovating. They also express a higher capability to adopt innovation, having recently at the time of the research introduced concrete product or service innovation. These results provide some evidence to the innovative orientation conceptualization as a factor that creates premises and conditions for a better performance and the effective innovation implementation.

Practical implications

Evidence from this study suggests that the IOI is a reliable and valid instrument also in its Italian version, and may therefore be adopted in researches and surveys on organizational innovation, in Italian firms as well. The IOI multidimensionality, in addition, enables to simultaneously

detect the role played by the different orientations toward innovation, at different level of analysis (organization, team, task), thus providing a dynamic and analytic perspective to understand the “state of the art” about the firm’s innovativeness. Besides, following the author’s suggestions (Tang, 1999), the IOI allows drawing the profile of an organization, assessing and monitoring strength and weakness areas (also benchmarking against their level in the past or those of other companies), hence raising awareness and consequently suggesting operational guidelines or intervention programs to enhance the organization’s orientation to innovation.

Finally this study, consistent with previous research (Prajogo & Ahmed, 2006; Prajogo et al., 2004; Siguaw et al., 2006; Tang, 1999), confirms the orientation to innovation positive implication for the firms’ performance and capability to innovate, thus offering some insights to enhance innovation. In fact, results suggest that it is useful focusing on these cultural factors, which lead to innovativeness. Accordingly, managers have to bear in mind that all the facets composing the orientation to innovation have to be nurtured, representing a strategic precursor of concrete innovation implementation.

Study limitations

We are aware of a number of limitations of our study. Indeed, caution is recommended before generalizing our findings, due to the specific cultural context where the research was conducted, the unique use of self-report data and the lack of objective outcomes. Future studies should corroborate the above findings with cross-cultural comparisons to ascertain the generalizability of findings across different cultures. Likewise, further evidence may come from multi-informant approaches and objective indicators of innovation outputs and also organizational and contextual parameters.

Although additional work is needed, particularly in the methodological domain, the results reported are promising. Indeed, this study is a first test for the IOI concurrent validation and offers a contribute to the convergent validity of the orientation toward innovation as a multidimensional construct, albeit in the future it would be worthwhile to focus on their discriminant validity, to understand whether and how some of these factors exert a specific contribute. Overall, results suggest evidence that the IOI is a reliable and valid instrument and, combined with the above recommendations, may therefore be adopted in studies on organizational innovation.

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APPENDIX

IOI– Inventory of Organizational Innovativeness theoretical dimensions and Italian version

Di seguito sono elencati alcuni comportamenti che descrivono la vita di un'organizzazione. In che misura li sente corrispondenti a quanto accade nella sua organizzazione?

| Item number | Dimension | English and Italian (in italic) items |
|-------------|----------------|--|
| 1 | LEA-1 | Our top managers are approachable and communicative. <i>Il nostro management è disponibile e aperto alla comunicazione.</i> |
| 2 | LEA-2 | Our supervisors often challenge us to be more innovative and resourceful. <i>I nostri responsabili ci spronano spesso a essere più innovativi e intraprendenti.</i> |
| 3 | LEA-3 | Our top managers show great enthusiasm for innovation and work improvement. <i>Il nostro management mostra entusiasmo per le innovazioni e i miglioramenti sul lavoro.</i> |
| 4 | LEA-4 (R) | Our top managers don't value employees' opinions much. <i>Il nostro management non tiene molto in considerazione le opinioni dei dipendenti.</i> |
| 5 | SUPP-1 (**) | My organization has active programs to upgrade employees' knowledge and skills. <i>La mia organizzazione ha programmi concreti per l'aggiornamento delle conoscenze e delle abilità dei dipendenti.</i> |
| 6 | SUPP-2 | There are many opportunities to exchange and generate ideas in my organization. <i>Nella mia organizzazione ci sono molte opportunità per scambiare e generare nuove idee.</i> |
| 7 | SUPP-3 | My organization recognizes and rewards innovative and enterprising employees. <i>La mia organizzazione apprezza e premia i dipendenti innovativi e intraprendenti.</i> |
| 8 | SUPP-4 | My organization gives adequate resources to exploring and implementing innovative ideas. <i>La mia organizzazione offre risorse adeguate per la ricerca e lo sviluppo di idee innovative.</i> |
| 9 | SUPP-5 | In my organization innovative and enterprising employees are well paid. <i>Nella mia organizzazione i dipendenti innovativi e intraprendenti sono ben remunerati.</i> |
| 10 | SUPP-6 (**) | My work schedule allows me time to think of creative solutions to problems. <i>Il mio orario di lavoro mi consente di pensare a soluzioni creative per i problemi.</i> |
| 11 | SUPP-7 (**) | Innovation is clearly a part of my organization's mission or basic beliefs. <i>L'innovazione è chiaramente parte della mission della mia organizzazione o dei suoi principi di base.</i> |
| 12 | TASK-1 | My work is intellectually stimulating and challenging. <i>Il mio lavoro è intellettualmente stimolante e sfidante.</i> |
| 13 | TASK-2 (**) | There are many opportunities and freedom in my work to explore and try out new ideas. <i>Nel mio lavoro ci sono molte opportunità e margini di libertà per cercare e sperimentare nuove idee.</i> |
| 14 | TASK-3 | I frequently encounter non-routine and challenging work in my organization. <i>Nella mia organizzazione affronto spesso compiti non di routine e sfidanti.</i> |

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| Item number | Dimension | English and Italian (in <i>italic</i>) items |
|-------------|----------------------|--|
| 15 | TASK-4 (R) | The type of work we do requires very little imagination and creativity. <i>Il tipo di lavoro che svolgiamo richiede davvero poca immaginazione e creatività.</i> |
| 16 | TASK-5 | There's much knowledge to gain from the work I do for my organization. <i>Posso incrementare molto il mio bagaglio di conoscenza con il lavoro che faccio per la mia organizzazione.</i> |
| 17 | BEH-1 | I found my colleagues very helpful when I encounter difficulties with my work. <i>Quando incontro difficoltà nel mio lavoro, i colleghi mi sono di grande aiuto.</i> |
| 18 | BEH-2 (R) | In my organization people show little interest in each other's work. <i>Nella mia organizzazione le persone mostrano poco interesse verso il lavoro dei colleghi.</i> |
| 19 | BEH-3 | I find my colleagues very helpful in sharing knowledge and information. <i>Ritengo che i miei colleghi siano di grande aiuto nel condividere conoscenze e informazioni.</i> |
| 20 | BEH-4 (R) (**) | In my organization very few people take the initiatives to raise new projects. <i>Nella mia organizzazione pochissime persone prendono l'iniziativa di sviluppare nuovi progetti.</i> |
| 21 | INT-1 (R) | Teamwork is poor in my organization. <i>Nella mia organizzazione il lavoro di gruppo è scarso.</i> |
| 22 | INT-2 | In my organization different departments work together harmoniously. <i>Nella mia organizzazione le diverse unità lavorano assieme in armonia.</i> |
| 23 | INT-3 | In my organization there is a strong sense of mutual trust. <i>Nella mia organizzazione c'è un forte senso di fiducia reciproca.</i> |
| 24 | INT-4 (R) | My organization is unable to accumulate knowledge or learn and benefit from experience. <i>La mia organizzazione è incapace di accumulare conoscenze o di imparare e trarre beneficio dall'esperienza.</i> |
| 25 | RAP-1 | My organization actively collects ideas for improvements from employees. <i>La mia organizzazione raccoglie attivamente dai dipendenti idee per il proprio sviluppo.</i> |
| 26 | RAP-2 | In my organization employees are active in making suggestions about work improvement. <i>Nella mia organizzazione i dipendenti sono attivi nel proporre suggerimenti per migliorare le attività lavorative.</i> |
| 27 | RAP-3 | In my organization there are ways to support unplanned but worthwhile initiatives. <i>Nella mia organizzazione ci sono dei modi per sostenere le iniziative non pianificate ma meritevoli.</i> |
| 28 | RAP-4 | My organization evaluates project proposals with an open but pragmatic mind. <i>La mia organizzazione valuta le proposte di nuovi progetti con mente aperta, anche se con concretezza.</i> |
| 29 | RAP-5 (**) | In the pursuit of innovation or new business, my organization tolerates mistakes. <i>La mia organizzazione tollera gli errori, se commessi per promuovere l'innovazione o nuovi business.</i> |
| 30 | RAP-6 | If my new idea is not accepted I can try out elsewhere in organization. <i>Se una mia nuova idea non è accettata, posso proporla in altri contesti dell'organizzazione.</i> |

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| Item number | Dimension | English and Italian (in <i>italic</i>) items |
|-------------|------------|--|
| 31 | DOP-1 | Projects and jobs are well organized and executed in my organization. <i>Progetti e attività sono ben organizzati e realizzati nella mia organizzazione.</i> |
| 32 | DOP-2 | In my organization projects start with clear objectives, schedule and resource requirements. <i>Nella mia organizzazione i progetti partono con obiettivi e tempi chiari e con risorse adeguate.</i> |
| 33 | DOP-3 | Projects are monitored and reviewed regularly. <i>I progetti sono monitorati e revisionati con regolarità.</i> |
| 34 | DOP-4 | My organization learns about what was done right or wrong at the end of each project. <i>La mia organizzazione apprende dagli errori o dalle cose ben fatte, alla fine di ogni progetto.</i> |
| 35 | DOP-5 | My organization has clearly defined achievement goals and strategic directions. <i>La mia organizzazione ha obiettivi e direttive strategiche chiaramente definiti.</i> |
| 36 | KNS-1 (**) | My colleagues and I are able to come up with creative ideas when we face tough problems. <i>Io e i miei colleghi siamo capaci di sviluppare idee creative per far fronte ai problemi.</i> |
| 37 | KNS-2 (**) | My organization creates its own intellectual assets, e.g. special techniques, patents. <i>La mia organizzazione sviluppa da sé le proprie risorse intellettuali (es. brevetti, tecniche particolari).</i> |
| 38 | KNS-3 | In my organization there are many employees with strong knowledge and skills. <i>Nella mia organizzazione molti dipendenti hanno consistenti conoscenze e capacità.</i> |
| 39 | KNS-4 | I have colleagues who impress me with their innovative ideas, energy, and resourcefulness. <i>Ho colleghi che mi colpiscono per le loro idee innovative, energia e quantità di risorse.</i> |
| 40 | KNS-5 | I have colleagues who help others to turn ideas into action and reality. <i>Ho colleghi che aiutano gli altri a rendere operative e reali le loro idee.</i> |
| 41 | IC-1 | In my organization the dissemination of information relevant to work is excellent. <i>Nella mia organizzazione le informazioni utili al lavoro sono divulgate in modo eccellente.</i> |
| 42 | IC-2 | Documentation, information and databases are well managed in my organization. <i>Nella mia organizzazione la documentazione, le informazioni e le banche dati sono ben gestite.</i> |
| 43 | IC-3 | My organization's information system is a great aid to finding ideas and opportunities. <i>Il sistema informativo della mia organizzazione è di grande aiuto per trovare nuove idee e opportunità.</i> |
| 44 | IC-4 | My organization captures information diligently from external sources, e.g. customers. <i>La mia organizzazione è attenta a cogliere informazioni dall'esterno (es. dai clienti).</i> |
| 45 | SASS-1 (*) | My organization is effective in innovating. <i>La mia organizzazione è efficace nell'innovare.</i> |
| 46 | SASS-2 (*) | Overall, my organization is an effective organization. <i>Complessivamente, la mia è un'organizzazione efficace.</i> |

Note: Items refer to the following theoretical dimensions: LEA = leadership; SUPP = support; TASK = task; BEH = behaviour; INT = integration; RAP = raising projects; DOP = doing projects; KNS = knowledge and skills; IC = information and communication; SASS = summary assessment items about general perception of organizational innovativeness and effectiveness. (R) Reversed items.

(*) Items excluded from the factorial analysis because not specific to any scales.

(**) Deleted items.