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Running Head: INNOVATION AND CREATIVITY IN ORGANIZATION

INNOVATION AND CREATIVITY IN ORGANIZATIONS

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Abstract

This chapter presents a state-of-the-science review of research in the areas of applied psychology into creativity and innovation in organizations. In overviewing the growing body of research findings into innovation and creativity in organizations (ICO), we present a critical summary of present findings and thinking in this topic area. Definitions of these concepts are reviewed initially, and a recent integrative definition noted. We then review extant research findings at three distinct levels-of-analysis: the individual, work group or team, and organizational level. Noting the growth in research at all three levels-of-analysis, we then consider a number of innovative directions that appear fruitful for future research efforts to be concentrated upon. In conclusion, we highlight the importance of ICO research within IWO Psychology and express our hopes that research in this area will continue to flourish and synergistically influence organizational and managerial practices in different countries.

INNOVATION AND CREATIVITY IN ORGANIZATIONS

1. Introduction

Innovation and creativity in organizations (ICO) are vital to success and research has unambiguously shown that these processes are becoming increasingly important drivers of organizational performance, adaptability, and even longer-term survival. As organizations attempt to integrate and exploit the ideas and suggestions of their employees, it is apparent that the process of idea generation and implementation has become a source of distinct competitive advantage (Anderson, Potočnik, & Zhou, 2014). Indeed, as customer and client expectations become ever greater, and markets become more globally competitive, ICO becomes more important. This shift – away from merely routinely performing past duties and ways of working – has gone far from unnoticed in literatures across the management and social sciences, but especially in Industrial, Work and Organizational (IWO) Psychology where researchers and practitioners active in ICO could be argued to be at the forefront of this shift in understanding and responding to environmental performance demands.

It is therefore apt to dedicate an entire chapter to these issues in this Handbook. This shift toward adaptive performance demands and away from traditional ‘command and control’ organizational structures and management styles based upon scientific management and Taylorian principles, has coincided with the changing nature of work over perhaps the last three decades or so (Frese, 2008; West, 2002a). Many employees are now *expected* to be innovative as part of their normal job performance by their employer organizations, especially those at higher managerial levels, those working in research and development (R&D) teams, and those responsible for the development of new products and services aimed

to tap emerging markets and consumer demand. Older, traditional models of job performance and work design have become increasingly antiquated in the face of this shift in demand characteristics, and also so have older, traditional ways of managing staff, it can be argued. Fortunately, IWO Psychologists have been highly active in research and consultancy practice into various aspects of ICO over the concomitant period and there have been notable advances in several areas of our understanding of the antecedents and processes of innovation and creativity in the workplace. In this chapter we summarize these developments, review much of the relevant primary studies and meta-analyses published over recent years, note the highly practical implications stemming from these research findings, and highlight critically important implications for the management of ICO processes in organizations that stem from these advances in the research base.

According to one very recent review, scholars across the broad width of the management sciences have been very active in publishing original research into creativity and innovation in applied settings. Anderson et al. (2014), summarizing the previous decade of developments, identified over 20,000 studies that included either the terms ‘creativity’ and/or ‘innovation’ in their titles, or in their published abstracts. This represented a substantial growth in the sheer numbers of papers published on topics within ICO research compared against earlier decades, but also indicated the huge volume of studies now in print and accessible to anyone attempting to summarize this very substantial area of research and organizational practice. Moreover, it is important to note that scholars from a diverse range of disciplines right across the social and management sciences have contributed to this research base, as we summarize in Table 1.

INSERT TABLE 1 ABOUT HERE

It is clear from this table that contributions to the voluminous and growing body of research in ICO have emanated from several disciplinary backgrounds, only one of which is

IWO Psychology with substantial inputs from applied social psychology especially regarding idea generation and experimental creativity studies conducted in laboratory settings (see also Shalley & Zhou, 2008). Nevertheless, IWO Psychology has made a notable contribution to advances in understanding in this area, and a number of narrative reviews and meta-analyses have been published by applied psychologists over recent years that firmly place our discipline at the core of contributing to these developments. To illustrate this purely in relation to narrative reviews published over the last decade or so, Table 2 summarizes the most influential reviews in IWO Psychology that cover different aspects of creativity and/or innovation in workplace settings.

INSERT TABLE 2 ABOUT HERE

Given the importance of ICO to organizational success, and the growth of published primary research studies and narrative and quantitative reviews, the present chapter sets out to summarize and constructively overview advances in this area. Although we do not limit our coverage to the last decade or so, we focus more heavily upon more recent developments over the last 10 years given the publication of other reviews listed in this Table. The structure of our chapter is as follows. First, we discuss the vexed issue of arriving at a generally accepted definition for innovation and creativity in the workplace. In this section we discuss the change in definitions historically, note several common features spanning the most-cited definitions, and highlight some seemingly inherent problems in producing an all-encompassing definition that is generally acceptable to all researchers active in ICO studies, and in related areas. Nevertheless, we conclude by highlighting a definition recently proposed by Anderson et al. (2014) that combines elements of earlier definitions and offers a generalized and comprehensive definition of the phenomena of workplace innovation and creativity. In the second major section of this chapter, we then go on to review major contributions and advances to research at the level of the individual job role with regards to

ICO. Here, we pay particular attention to research following interactional approach studying the environmental boundary conditions under which creativity is likely to emerge and recent research examining self-regulatory processes underlying ICO. Third, the following section moves our level-of-analysis up one notch to consider workgroup and team-level innovation. In this context we address team climate, communication, team composition and structure, and team leadership as most dominant factors implicated in team-level ICO. In the fourth section, we review advances in organizational-level ICO research. In so doing we highlight ambidexterity literature, dynamic capabilities, organizational culture, different structural factors, and leadership as antecedents of organizational innovation. Fifth, and in conclusion, we review and propose a number of directions for future research and practice stemming from recent advances in this area which encompass all levels-of-analysis covered in the present chapter.

2. Defining Creativity and Innovation in Organizations: Historical Developments

A longstanding and seemingly intractable problem within the ICO literatures has been to define the terms of creativity and innovation with any degree of specificity or general acceptance (Anderson & King, 1993). Over the years a whole range of definitions of either term have been put forwards, some receiving greater acceptance and citation than others, several containing overlapping features, and all purporting to offer an all-encompassing and generalized definition of either or both terms. Table 3 summarizes popularly-cited definitions as they have developed chronologically.

INSERT TABLE 3 ABOUT HERE

Although not a comprehensive account of all definitions proposed over the years, Table 3 illustrates clearly that different authors have rather focused on different aspects of ICO and have proposed definitions according to their perspective. Perhaps the two most-often

cited definitions have been those of Amabile (1983) and West and Farr (1990). Combined they capture a number of the key intrinsic features common to ICO.

First, there are two stages of creativity (idea generation) and innovation (idea implementation), although it can be difficult to identify exactly when one tips over into the other (Amabile, 1996; Bledow, Frese, Anderson, Erez, & Farr, 2009a, 2009b; Oldham & Cummings, 1996). Indeed, more recent literature in the field suggests that the boundaries between both concepts are not that clear. On one hand, some scholars have advocated a stronger conceptual differentiation between creativity and innovation (e.g., Oldham & Cummings, 1996; Rank, Pace, & Frese, 2004), arguing that creativity refers to ideas that are absolutely novel whereas innovation also involves ideas that are being adopted from previous experience or different organizations (so-called 'relative novelty' – see also West, 2002a). In addition, innovation has been suggested as primarily an inter-individual social process requiring collaborative efforts to implement the ideas, whereas creativity represents primarily an intra-individual cognitive process (Rank et al., 2004). However, recent developments in the field have put forward the argument that also creativity can be differentiated in terms of more incremental versus radical (Madjar, Greenberg, & Chen, 2011) and it can take place through social interaction within teams (we touch on levels-of-analysis issue later on). Furthermore, some authors have argued that creativity occurs not only in the early stages of innovation processes but rather they suggest a cyclical, recursive process of idea generation and implementation (e.g., Paulus, 2002). The factors associated with ideation (i.e. idea generation) at the individual, team, and organizational levels have also been argued to be counter to those associated with implementation success at each of these levels (Staw, 1984; West & Farr, 1990), as we describe subsequently in this chapter. Second, workplace innovation inevitably implies a practical output or component that distinguishes it from, for instance, pure creativity studies in the arts or social studies fields (Zaltman, Duncan, & Holbek, 1973). Workplace innovations can

be more radical or incremental in nature, but their distinguishing feature is that there is eventually an evaluation that they add value in one way or another to an organization (depending upon the perception and the timing, of course). Amabile (1983, 1988) has argued, however, that these issues are mostly ones of categorization, and suggests that researchers adopt operational definitions of ICO that make sense to those participating in organizational innovation research studies. Even ideas that begin as complete mistakes may turn out eventually to be converted into valued products or services that can be exploited to add value to an organization (Crossan & Apaydin, 2010). Third, and importantly, ICO can occur at one or more of four levels of analysis: (i) the individual work role, (ii) the work group or team, (iii) the wider organization, and, (iv) across-levels or at multiple-levels (see also Anderson et al. (2014) and Staw (1984) for details of these levels of analysis). Many innovation attempts in organizations involve more than one level of analysis, it has been argued, and so a focus purely upon any single level (e.g., individual job role creativity) will inevitably produce a limited picture of the overall process (Damanpour, 1990). The implication of this is that researchers need to be aware of these cross-level and multi-level effects occurring during innovation attempts, and that study designs need to be operationalized in ways that can encompass such real-life effects as innovations pan-out in organizations. Fourth, there exists a number of related constructs in the change management literatures that have proposed and adopted similar definitions to investigate not dissimilar phenomena to ICO. Potočník and Anderson (2014) identified 8 major constructs whose operationalized definitions have been close in meaning to earlier definitions of creativity and innovation - proactive behaviors, job crafting, voice behavior, taking charge, personal initiative, suggestion schemes, extra-role behaviors, and, organizational citizenship behaviors (OCBs). In addition, the conceptual overlaps and lack of clarity between these concepts has led to a 'crowded construct and nomological network' surrounding ICO definitions. Fifth, definitions vary in their emphasis upon conceiving of creativity and innovation as either

processes or outcomes in the workplace (Anderson & King, 1993; Potočnik & Anderson, 2012). Earlier definitions commonly emphasized one or the other, the most recent integrative definitions suggest that they are both a process and a series of outcomes over time, which in turn can lead to further spin-off innovations and effects (see earlier distinctions by Zaltman et al., 1973). Sixth, and finally, ICO is often experienced within organizations as not an entirely positive phenomena. Rather, the causes, processes and outcomes of creativity and innovation at the work role, team, and organizational level can be negative – the so-called ‘dark side’ of workplace innovation (Anderson & Gasteiger, 2008a; 2008b; Zhou & George, 2001).

Although it is clear that definitions of ICO have focused on rather different elements of the same process, and have certainly become more sophisticated over time, studies have typically adopted different definitions reflecting the particular topic area under research. Typically, creativity researchers, more focused on idea generation, have adopted Amabile’s (1983) definition or later variants of it, whereas workplace innovation researchers have adopted the definition of West and Farr (1990). In order to combine and synergize these alternative definitions, Anderson et al. (2014) most recently proposed their integrative definition, as follows:

“Creativity and innovation at work are the process, outcomes, and products of attempts to develop new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation can occur at the level of the individual, work team, organization, or at more than one of these levels combined, but will invariably result in identifiable benefits at one or more of these levels-of-analysis.”

Having discussed definitional issues, we now move on to consider pertinent research into ICO at differing levels of analysis. In accordance with Staw (1984), we categorize the ICO research at three separate levels: (1) individual work roles, (2) workgroup or team-level innovation, and, (3) organizational and cross-level findings and effects.

3. Individual Work Role Creativity and Innovation

Research on individual creativity in organizations is burgeoning and considerable progress has been made in the last decades in furthering the understanding of when and how people develop new and useful ideas at work. Research has moved away from simplified models that attempt to explain creativity with isolated contextual or personal factors and has instead examined how creativity emerges through the interaction of a person with his or her environment (Anderson, De Dreu, & Nijstad, 2004; Shalley, Zhou, & Oldham, 2004). Recently research has also begun to unpack and directly examine the self-regulatory dynamics underlying creativity in organizational settings (e.g., To, Fisher, Ashkanasy, & Rowe, 2012). Moreover, researchers have questioned the linearity assumption of how antecedent conditions influence creativity and pay increasing attention to non-linear relationships (e.g., Baer & Oldham, 2006). Below, we review these lines of inquiry from a self-regulation perspective. We first highlight the critical role of affect for creativity, then discuss individual differences in self-regulatory processes, and finally shed light on how contextual factors influence the emergence of creativity.

Affect and Creativity

From a self-regulation perspective, creativity can be understood as an adaptive response of a person to the environment through which the person can potentially reach desired future states or overcome environmental threats. Whether or not people engage in creativity as an adaptive response to their environment is strongly influenced by affective processes which

include discrete emotions as well as mood states. Positive and negative affect, as the two basic dimensions along which affective experiences vary, influence creativity through their impact on cognitive functioning (Kuhl, 2001; Watson, Clark, & Tellegen, 1988). A state of positive affect facilitates associative thinking, promotes a heuristic processing style, and broadens thought and action repertoires (Fredrickson & Losada, 2005). Experimental and field studies report a consistent positive relation of positive affect with creativity, in particular if positive feelings are accompanied by high levels of activation (Amabile, Barsade, Mueller, & Staw, 2005; Baas, De Dreu, & Nijstad, 2008; Isen, 1999). The accumulated evidence suggests that creativity can be enhanced by measures that stimulate positive affect, for instance by an inspirational speech of a leader or by providing employees with opportunities to engage in playful and rewarding activities (Amabile, 2000). The consequences of negative affect for creativity are considerably more complex and it has been suggested that negative affect can impede creativity but it can also be the source of particularly high creativity (Baumann & Kuhl, 2002; Kaufmann & Vosburg, 1997).

Negative affect arises if people are confronted with threats. As a consequence, attention focuses on problems and a discrepancy-sensitive mode of cognitive processing is induced. Whether or not people are creative after the experience of negative affect depends on what happens subsequently. Some authors argue that people display higher persistence on a task when they are in a negative state. Persistence can improve creative performance because people stay focused on a task and continue with the generation of ideas (De Dreu, Baas, & Nijstad, 2008; Ohly & Fritz, 2008). Moreover, negative affect can evoke a self-regulatory response that can activate a creative mind-set and result in a change in a person's affective state. Bledow, Schmitt, Frese, and Kühnel (2011) used the term affective shift to refer to the down-regulation of negative affect and the up-regulation of positive affect following negative experiences. Studies have found particular high creativity after this process and self-regulatory mechanisms appear to

play the key causal role (Bledow, Rosing, & Frese, 2012). Complex creative achievements are thus not the result of a single affective state at one point in time. Rather, they are related to a multitude of affective experiences that occur over time and interact with cognitive processes. High positive affectivity and a supportive environment appear to provide the foundation that ensures that negative experiences can also contribute to creativity (George & Zhou, 2007).

Self-Regulation

A self-regulation perspective emphasizes the agentic role of the individual in the creative process. This agentic role encompasses both deliberate processes such as the pursuit of the goal to be creative as well as intuitive processes involved in the formation of new ideas such as implicit affect-regulation and incubation (Madjar & Shalley, 2008; Sio & Ormerod, 2009). In field studies on self-regulation and creativity, variability in people's self-efficacy beliefs have received considerable attention as a consistent predictor of creativity and as a mediator of the effect of contextual factors. For instance, Liao, Liu, and Loi (2010) showed that high quality relationships of employees with their leaders and team members had a positive influence on self-efficacy, which in turn had a positive effect on creativity. Gong, Huang, and Farh (2009) reported a mediating role of self-efficacy for how transformational leadership and learning orientation influence creativity. Other studies showed a positive relationship of creativity-specific self-efficacy beliefs with actual creativity (Tierney & Farmer, 2002).

Self-efficacy beliefs, in particular if they refer explicitly to creativity, can thus be regarded as an indicator that a person is in a state, in which he or she is likely to be capable of succeeding at being creative. It needs to be noted, however, that none of these studies allows for the inference that changing efficacy beliefs directly increases a person's creativity (cf. Vancouver & Kendall, 2006). Rather, self-efficacy beliefs seem to be 'the tip of the ice-berg' that indicates that the motivational, cognitive, and social conditions are conducive of creativity (Bledow, 2013). A challenge for future research on self-regulation and creativity is to move

beyond mere description and to specify and explain the creativity enhancing self-regulatory processes and provide insights in how these processes can be strengthened.

The agentic role of the individual is also emphasized by the literature linking proactive behavior and personal initiative to creativity (Frese & Fay, 2001). Proactive personality has been identified as a main driver of creativity in the domain of personality and its relation to creativity is mediated by self-efficacy beliefs (Chen, Farh, Campbell-Bush, Wu, & Wu, 2013). Gong, Cheung, Wang, and Huang's (2012) study suggests that proactive people interact with their social context in a way that enhances their creativity. They showed that proactive people are more creative because they take initiative to exchange information with others. Thereby they increase the pool of information they can draw from and establish a network of high-trust relationships characterized by high psychological safety to express new ideas. In a similar vein, the proactive strategy to seek for feedback in one's social environment has been linked to creativity as assessed by supervisors (De Stobbeleir, Ashford, & Buyens, 2011). The necessity to take a relational perspective on self-regulation and creativity rather than to examine the individual devoid of his or her social context is emphasized by Grant and Berry's work (2011). They found that prosocial motivation and perspective taking strengthened the link between intrinsic motivation and creativity. People who are not only intrinsically motivated but also driven by the desire to benefit others are most likely to develop new and useful ideas.

Social Context

An increasing number of studies have examined how self-regulatory processes are intertwined with the social context a person is embedded in. For instance, a study on members of research and development teams found that creative self-efficacy beliefs were only related to creativity if there was a shared knowledge of 'who knows what' in a team (Richter, Hirst, Van Knippenberg, & Baer, 2012). This relation was further strengthened by functional background

diversity of the team. The creativity enhancing processes underlying self-efficacy beliefs thus only resulted in creativity if the team context provided the requisite diversity of knowledge. A study on social networks and creativity examined how the number of weak ties through which employees seek advice within their company influenced creativity (Zhou, Shin, Brass, Choi, & Zhang, 2009). The study found the highest level of creativity for employees who were low in conformity and had medium-level of weak ties. According to the authors, this combination was beneficial because employees had an open mindset and were exposed to neither too much nor too little diverse information. The relation of a person to his or her social context seems to also affect what kind of creative results employees are likely to generate. Madjar et al. (2011) reported that resources for creativity, career commitment, and the willingness to take risks were related to radical creativity, whereas the presence of creative co-workers, conformity, and a strong commitment with the organization were related to incremental creativity.

Regarding the influence of job characteristics as a contextual antecedent of creativity, a large number of studies have established an overall positive relationship between job complexity and job autonomy with creativity (Amabile et al., 1996). Intrinsic motivation and positive affect are key mediating processes through which these job characteristics positively influence creativity (Liu, Chen, & Yao, 2011; Saavedra & Kwun, 2000). It needs to be noted, however, that not all people's creativity benefits from the same job characteristics. Only if the ability to self-regulate is sufficiently developed, will autonomy and complexity have positive consequences for creativity (Bledow, 2013). A similar point has been made for how high work demands and time pressure influence creativity. Overall the relationship appears to be curvilinear as work demands and time pressure stimulate and activate only to a certain degree before they have a detrimental effect and lead people to "close their minds" and become less creative (Baer & Oldham, 2006; Binnewies & Wörnlein, 2011; Janssen, 2001). The optimal level of work demands for a person's creativity is contingent on self-regulatory processes which

determine whether they are perceived as a stressor and undermines creative performance or as challenges that stimulates creativity (Bledow, 2010).

The social context plays an even more direct role for the implementation of new ideas than for mere idea generation, as implementation directly affects the social context (Bledow et al., 2009a; West, 2002). In one of the few studies examining idea implementation, Baer (2012) identified factors which improve the otherwise negative odds that employees' ideas are realized. He showed that the relationship between a person and his or her environment was critical. First, ideas were more likely realized if employees were skilled networkers and had established strong "buy-in" relationships. Moreover, perceived instrumentality of implementation was a critical factor for the realization of new ideas. Perceived instrumentality is a relational concept as it is a function of an employee's perception on the one hand and the actual consequences of trying to implement new ideas on the other hand. Finally, as a more practical consideration of these issues, one recent review has suggested how organizations may design their employee selection procedures, based upon this gamut of research findings. Potočnik, Anderson, & Latorre (in press) presented a comprehensive narrative review of the individual-level variables found to be associated with greater propensity to work-role innovation in the context of how these may be assessed within employee selection procedures conducted by organizations. Where organizations are keen to select-in employees with greater propensity to innovation, the authors argue that a range of personality, cognitive ability, skills, and attitudinal qualities can be assessed with validity and reliability via a range of different selection predictor methods.

Overall, our impression is that important advances have been made in the study of individual-level variables associated with ICO. Research has increasingly been using more sophisticated longitudinal designs and collecting the criterion data from sources other than target employees themselves (Anderson et al., 2014). However, we do note that most of the research

effort at the individual level has been around the creativity stage (i.e., idea generation) and relatively few studies have examined the quintessential but later phase of idea implementation. Next, we review historic and recent developments in ICO at the team level – curiously many studies at this level-of-analysis have done exactly the opposite, that is they have mainly addressed the second stage of idea implementation.

4. Workgroup or Team-level Innovation

In addition to investigating innovation at the level of the individual, researchers have studied innovation at the level of small groups or teams within organizations. As teamwork has become more prevalent and central to organizations, team-level innovation has similarly become of greater importance. Strictly speaking, teams differ from groups in that they are characterized by a higher level of interaction and cooperation such that every team is a group but not every group can be called a team (George, 2002). However, most innovation researchers have treated the terms group and team synonymously and so will we for the purpose of the present chapter.

In organizational research as well as in the management and engineering sciences, researchers have studied innovation at the team-level, investigating a host of team characteristics and team processes and the extent to which they help or hinder team innovation. Hülsheger, Anderson, and Salgado (2009) summarized central findings from the last three decades in a comprehensive meta-analysis. They studied the relationship of a number of structural team characteristics (team size, team longevity, job-relevant diversity, background diversity, task interdependence, and goal interdependence) and team process variables (support for innovation, participative safety, vision, task orientation, cohesion, internal communication, external communication, task conflict, and relationship conflict) with innovation. Given space limitations, we will focus on the most prominent variables in the present chapter and elaborate on how and why they affect team innovation.

Team Climate

In developing a theory of group innovation and a subsequent measure of team climate dimensions predictive of innovation, West and colleagues (West & Anderson, 1996; West, 1990; Anderson & West, 1998) drew attention to core aspects of team climate. Referring to definitions of organizational climate, they described team climate as the shared perceptions team members hold of their proximal work environment. West and co-workers identified four major team climate factors, namely vision, participative safety, support for innovation, and climate for excellence. In the last two decades, these four team climate factors have been replicated internationally (e.g. Brodbeck & Maier, 2001; Mathisen, Einarsen, Jorstad, & Bronnick, 2004; Ragazzoni, Baiardi, Zotti, Anderson, & West, 2002) and have been investigated in a multitude of empirical studies on team innovation. Results of the meta-analysis revealed that across these studies, three of these four team climate factors (i.e., support for innovation, vision, and task orientation) were indeed strongly and consistently related to innovation with corrected correlations lying between .42 and .49 (Hülshager et al., 2009). Support for innovation describes a team environment in which team members are not only expected to be innovative but where there is also moral and practical support for such endeavours. This helps motivating employees to take the risk of suggesting and implementing innovative ideas (King, Anderson, & West, 1991; West, 1990). Vision is high when team members are jointly committed to a set of clear team goals that are visionary in nature. Vision facilitates team innovation because such a set of shared team goals facilitates motivation and channels team members' efforts (Hülshager et al., 2009; West & Anderson, 1996). Teams that are high on task orientation strive to achieve high performance standards. To reach this goal, they continuously evaluate their ideas and performance and provide each other with feedback. This concept is closely related to task reflexivity (Tjosvold, Tang, & West, 2004),

the extent to which team members critically reflect upon their objectives, processes and procedures, facilitating the exploration of different perspectives and opposing viewpoints and thereby helping to improve procedures and to develop innovative solutions (West & Anderson, 1996; West, 1990).

Communication

In addition to these team climate factors, the literature has identified communication to be conducive to innovation. Especially external communication, that is, interaction with individuals outside the own team, facilitates innovation by providing individuals and teams with new kinds of knowledge and insights, confronting it with divergent perspectives and ideas that challenge the status quo (Hülsheger et al., 2009; Perry-Smith & Shalley, 2003). Also internal communication, in other words, communication between members of a team, is indispensable for innovation as it fosters the exchange of information and knowledge, sharing of different perspectives and the discussion and development of new ideas.

Team Composition and Structure

In comparison to team climate and process variables, aspects related to team composition and structure tend to be less consistently and less strongly related to innovation (for an overview see Hülsheger et al., 2009). A variable that is worth discussing, however, is diversity, as it has received considerable attention in the team and innovation literature and as arguments and empirical findings have not always been clear and consistent. In the context of innovation, researchers have predominantly focused on job-relevant diversity, referring to team-member diversity regarding characteristics that are related to work tasks, such as education, skills, expertise, knowledge, or function (Milliken & Martins, 1996; Pelled, Eisenhardt, & Xin, 1999; Webber & Donahue, 2001). It has been suggested that job-relevant

diversity is conducive to innovation as it increases the pool of different task-related skills, perspectives and backgrounds within a team and contributes to the cognitive resource diversity of a team (Webber & Donahue, 2001). Team members are stimulated to deal with a broad array of information, divergent perspectives and approaches, and communicate with each other, which fosters innovation-related cognitive processes (Perry-Smith & Shalley, 2003; Perry-Smith, 2006; West, 2002a). On the other hand, there also seems to be a downside to diversity. Too much heterogeneity between group members might be a hurdle to a common understanding of group goals and tasks and may impede constructive cooperation and communication between group members and result in process losses. The idea of job-relevant diversity as a “double-edged” sword is reflected in empirical findings: while some studies found positive relationships between job-relevant diversity and innovation (Drach-Zahavy & Somech, 2001; Keller, 2001), others found no relationship or even negative relationships (Ancona & Caldwell, 1992; Tiwana & McLean, 2005).

Accordingly, the meta-analysis revealed a mean corrected correlation of only .16 between job-relevant diversity and innovation (Hulsheger et al., 2009). Furthermore, the credibility interval around this value was large and included zero, indicating that correlations found in primary studies were diverse including negative as well as positive correlations. These findings suggest that although job-relevant diversity may facilitate innovation in some settings and under certain circumstances, it may also have negative effects for innovation under different circumstances. It is thus crucially important to investigate these circumstances and boundary conditions in order to understand when, why, and how job-relevant diversity helps or hinders innovation. A study by Chi, Huang, and Lin (2009) revealed a curvilinear relationship between organizational tenure diversity and innovation, suggesting that a medium level of diversity helps innovation. They further revealed that team-oriented HR practices moderated the diversity-innovation relationship such that even under conditions of

high diversity, teams that benefit from team-oriented HR practices displayed high innovation. Similarly, Shin and Zhou (2007) identified transformational leadership as a moderator of the diversity-innovation relationship; when teams were led by a transformational leader, diversity was positively related to innovation.

Team Leadership

Leadership has been delineated as a further important impact factor for team – as well as individual and organizational – innovation (Mumford, Scott, Gaddis, & Strange, 2002). Among the various leadership styles that have been studied in relation to creativity and innovation, transformational leadership has emerged as the strongest predictor in a recent meta-analysis (Rosing, Frese, & Bausch, 2011). The theoretical rationale underlying this relationship is that transformational leaders encourage employees and teams to think outside the box and challenge the status quo (Jung, Chow, & Wu, 2003; Keller, 2006; Shin & Zhou, 2003). However, some researchers have suggested that transformational leadership may hinder instead of foster creativity and innovation as leader's strong vision might increase followers' dependency and prevent them from pursuing their own ideas (Basu & Green, 1997; Eisenbeiss & Boerner, 2013; Mumford et al., 2002). Indeed, the variance in primary studies concerning the relationship between transformational leadership and ICO is pretty high, ranging from negative to high positive correlations (Rosing et al., 2011). A few studies investigating boundary conditions shed more light on the specific nature of the relationship between transformational leadership and team innovation. For example, Eisenbeiss, Van Knippenberg, and Boerner (2008) identified a climate of excellence as a moderator of this relationship. The authors argued that a team's high norms for excellence serve as a safeguard that input by the leader is not uncritically realized, but only high quality ideas are generated and implemented. Moreover, Keller (1992, 2006) revealed

that transformational leadership was more highly related to innovation when the team's task was to develop a radical rather than an incremental innovation.

In addition to transformational leadership, several other leadership styles have been investigated in the context of creativity and innovation. Most importantly, initiating structure, leader-member-exchange (LMX), and supervisor support have been positively related to innovation (Rosing et al., 2011). However, of these three leadership styles, only LMX displayed a consistent relationship with innovation; both initiating structure and supervisor support showed considerable variation of relationships. Taken together, a number of very different leadership styles seem to be – albeit inconsistently – related to creativity and innovation. A recent theoretical development of leadership for innovation tries to explain both the variety of pathways to promote followers' innovativeness and the inconsistency of results. The idea of ambidextrous leadership builds upon the distinction between idea generation and idea implementation and proposes that leaders need to be able to promote both processes to support innovation (Rosing et al., 2011). In other words, various leadership behaviors may be linked to innovation if they foster either idea generation or implementation, but this relationship needs to be based on complementary leadership behaviors that foster the other process.

To summarize, team climate aspects such as vision, support for innovation, and task orientation as well as team internal and external communication seem to be the most important drivers of team innovation. Among leadership variables, researchers have identified transformational leadership, initiating structure, supervisor support, and LMX to be positively related to innovation. Future studies on team innovation may benefit from investigating how team-level characteristics differentially relate to the different stages of the innovation process. Researchers now generally concur that ICO at the team level is a non-linear process that involves the development of ideas (creativity) as well as the implementation of ideas. Although

most researchers agree on this definition, little research has, to date, been devoted to differential team-level predictors of ideation vs. implementation. Having considered developments at the team level-of-analysis, in the next section we move on to review the organizational and, briefly, cross-level findings.

5. Organizational Innovation

At the wider organizational level-of-analysis, the literature is rich with research into the myriad of organizational antecedents of innovation predominantly done within the realms of other disciplines, such as management science, strategic management, or sociology. Due to space limitations, we will confine our discussion of organizational innovation to factors that are interesting from an IWO perspective. Thus, in this part of the chapter, we will cover ambidexterity, dynamic capabilities, organizational culture, structural factors, and leadership, as antecedents of organizational innovation.

Ambidexterity

One concept that has gained importance throughout the recent years within the organizational innovation literature is ambidexterity. Ambidexterity literally means the ability to use both hands equally well. In the management literature, ambidexterity can be understood as the ability of organizations to both explore new capabilities and exploit existing competencies (Benner & Tushman, 2003; Gupta, Smith, & Shalley, 2006; He & Wong, 2004). The concepts of exploration and exploitation are closely related to the distinction between creativity and idea implementation at the individual and team level. Empirical evidence supports the assumption that organizational ambidexterity is positively related to organizational innovation (Gibson & Birkinshaw, 2004; He & Wong, 2004). In general, two different strategies on how to achieve a balance of exploration and exploitation have been developed: *structural* ambidexterity and

contextual ambidexterity (Gibson & Birkinshaw, 2004). The structural ambidexterity perspective suggests that ambidexterity can be best attained by assigning exploration and exploitation to different organizational subunits and only integrate the two strategies at the top management level (Benner & Tushman, 2003; O'Reilly & Tushman, 2004; Smith & Tushman, 2005). The second perspective, contextual ambidexterity, however, assumes that every organizational member has to engage to some extent into both explorative and exploitative activities (Gibson & Birkinshaw, 2004). Thus, the organization has to provide structures that allow each individual within the organization to decide when and how to utilize exploration and exploitation respectively. Whether structural or contextual ambidexterity is superior in providing the best support of organizational innovation has yet to be empirically determined. However, from an IWO perspective, it appears reasonable to assume that whether or not organizational exploration and exploitation are structurally separated – for example with exploitation assigned to manufacturing and exploration confined to research and development – all individuals within organizations need to some extent utilize both exploration and exploitation as activities that rely on exclusively one strategy are rather the exception than the rule (Bledow et al., 2009b; Rosing et al., 2010).

Dynamic Capabilities

A related research stream covers the relationship between dynamic capabilities and organizational innovation (Sapienza, Autio, George, & Zahra, 2006). Dynamic capabilities are defined as “the abilities to reconfigure a firm’s resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)” (Zahra, Sapienza, & Davidsson, 2006, p. 918). Dynamic capabilities enable organizations to build new capabilities and rapidly react to environmental changes (Teece, Pisano, & Shuen, 1997). In addition, dynamic capabilities enable organizations to proactively reconfigure their resources to get increased

competitive advantage and move into new markets. Thus, dynamic capabilities provide organizations with a high degree of flexibility and uniqueness that is favorable for innovation.

Organizational Culture

Paralleling the argumentation of West and colleagues at the team-level (West & Anderson, 1996; West, 1990; Anderson & West, 1998), the culture within an organization has been argued to be an important antecedent of its innovative capacities. Organizational culture concerns the values and beliefs that members of an organization share about “how one acts” in that organization (Schein, 1996). A recent meta-analysis summarizes the findings concerning the relationship between organizational culture and organizational innovation (Büschgens, Bausch, & Balkin, 2013). The meta-analysis revealed that organizational cultures that comprise developmental aspects, such as flexibility and learning, are the strongest predictors of organizational innovation. For example, the organizational value of embracing risks seems to be conducive to an organization’s innovativeness (Nystrom, Ramamurthy, & Wilson, 2002). On a slightly different note, organizational climate can also help to translate innovation into organizational success. As an example, Bear and Frese (2003) demonstrated that process innovativeness was positively related to firm performance only in high climates for initiative and psychological safety. In such a climate, employees proactively handle difficulties and hurdles that result from an innovation and are not afraid to speak up about problems. As a consequence, innovation is more likely to be successfully translated into organizational performance.

Structural Factors

Another stream of research at the organizational level has been conducted into the relationship between more formal attributes of organizations (their size, structure, specialization, etc.) and innovation. For example, two meta-analyses showed a low but positive relationship

between organizational size and innovation (Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Damanpour, 2010). However, when disentangling the different conceptualizations of organizational size, the meta-analyses revealed that the relationship of an organizational size measure such as physical capacity (e.g., number of beds in a hospital) or volume of work done by an organization with innovation is much higher than the relationship of other measures such as market share, sales, or number of employees. An earlier meta-analysis by Damanpour (1991) investigated a broader scope of formal organizational attributes in their relationships with organizational innovation. According to this meta-analysis, the most important organizational antecedents of innovation are technical knowledge, specialization, and external communication. In organizations that are characterized with high levels of technical knowledge ideas are more easily understood, processed, and translated into innovative output (Dewar & Dutton, 1986). In addition, when an organization comprises a high variety of specialists, this increases the knowledge base which new ideas may spring from (Kimberly & Evanisko, 1981). Finally, paralleling the findings at the team level, external communication imports new external knowledge into the organization that is critical for innovation (Cohen & Levinthal, 1990). More recent research has also shown that greater intra- and inter-organizational knowledge spillover fosters organizational innovativeness (Van Wijk, Jansen, & Lyles, 2008; Yang, Phelps, & Steensma, 2010).

Organizational-level Leadership

Finally, in common with team level research, the organizational level ICO literature has also provided evidence regarding the role of leadership and other management-related factors in organizational innovation. Many of the findings of applied studies at this level mirror the findings of research into team-level leadership effects reviewed earlier in this chapter. In general, studies have supported the positive relationships between the CEO's or top

management's transformational and transactional leadership style and organizational innovation (Elenkov & Manev, 2005; Jung et al., 2003; Jung, Wu, & Chow, 2008). Other management-related variables found to be facilitative of organizational innovation are top managers' favorable attitude towards innovation (Damanpour & Schneider, 2006), racial and gender heterogeneity in management (Richard, Barnett, Dwyer, & Chadwick, 2004), and CEO's tenure (Damanpour & Schneider, 2006).

To summarize, research on organizational-level antecedents of innovation is diverse. Cultural as well as structural aspects of organizations are important factors in determining the foundation on which innovation can develop. In addition, the concepts of ambidexterity and dynamic capabilities have recently gained importance in the literature and show promise for future research as well as for innovation management practice. What research to date has neglected is a systematic analysis of multiple levels simultaneously. Most of the so-called multi-level studies have explored the role of team leadership (e.g., Liao et al., 2010; Shin, Kim, Lee, & Bian, 2012; Wang & Rode, 2010) and team climate and structure (e.g., Chen et al., 2013; Hirst, Van Knippenberg, Chen, & Sacramento, 2011; Pirola-Merlo & Mann, 2004) on individual creativity and individual innovation. We only identified a few studies that have looked at more than two levels of analyses simultaneously (e.g., Daniels, Tregaskis, & Seaton, 2007; Liu et al., 2011). We would argue that the study of ICO should involve multiple levels-of-analysis to uncover both individual and contextual factors that foster the emergence of creativity and innovation in the organizations. Next we turn to these and other issues in our discussion of future research directions.

6. Future Research Directions

Overviewing this mass of studies and theoretical contributions spanning the different levels-of-analysis, it is clear that substantial progress has been made over recent years in the study of ICO within IWO Psychology. Indeed, the research base is now as vast as it is diverse, and one of the most challenging aspects of this is to pull together all of these findings in an integrative way to attempt to make sense of these and inform organizational practices appropriately. These developments have been particularly rapid over the last decade or so, as one recent review suggests (Anderson et al., 2014). The sheer range of variables at the individual, team, and organizational levels-of-analysis that have been found to correlate with innovativeness is undoubtedly huge, and it would be practically impossible for any organization to attempt to enhance its innovativeness by trying to maximize each and every one of these antecedent variables. Yet, interest in innovation among practicing managers remains high, with senior staff being increasingly required to be innovative and to stimulate their sections to be creative and innovative in their respective fields (Bledow et al., 2009a). As we have overviewed a number of previously-published important reviews of the ICO literature throughout this chapter, it is also enlightening to consider the directions for future research proposed over the years. Table 4 summarizes the key directions for future research suggested by a number of influential narrative and meta-analytical reviews over the last 20 years or so (chronologically, these reviews are: Anderson & King, 1993; West, 2002a; Rank et al., 2004; Anderson et al., 2004; Shalley et al., 2004; Zhou & Shalley, 2008; Hülshager et al., 2009; Bledow et al., 2009a; Crossan & Apaydin, 2010; Rosing et al., 2011; Montag, Maertz, & Baer, 2012; and Anderson et al., 2014).

INSERT TABLE 4 ABOUT HERE

As can be seen from this Table, different reviews have highlighted rather different directions for future research efforts, perhaps largely due to the varying foci of each review. Yet, some common themes and calls emerge over the years (the need for theory development

and meta-analyses, cross-cultural research into ICO differences, measurement issues, etc.). In this chapter we therefore present four meta-directions for future research; that is, four overriding directions we believe constitute the most important general themes and issues for future ICO research to address. Namely, these are (1) moving towards integrative theory development, (2) moving toward cross-level and multi-level research, (3) shifting away from the so-called ‘innovation maximization fallacy’ in ICO research and implied practice, and (4) bridging the Science – Practice divide in ICO research and organizational practices.

Meta-direction One: Integrative Theory Development

Future research can result in an improved and practically more useful understanding of creativity and innovation if researchers shift focus towards integrative theory building. At present, research efforts focus mainly on identifying isolated empirical relationships. Estimates of empirical relationships are useful building blocks for theory development but are insufficient. They do not provide strong guidelines for how the success of creative efforts can be increased as most studies are correlational and do not identify causal mechanisms. Moreover, a narrow focus on isolated variables in a specific domain that have been related to creativity and innovation does not lead to better decisions by individual, team, and organization. When deciding on how to act in a particular situation, actors need to take the particularities of their situation and countless, partly changing boundary conditions into account. Models that integrate the vast amount of empirical findings and specify a set of actionable principles may prove useful for this decision-making process. Below we outline a general strategy and a set of specific tactics for future research which may facilitate integrative theory development.

The strategy we propose can be labeled a functional approach and has proven useful in other domains such as leadership and personality (e.g., Kuhl, 2001; Morgeson, DeRue, &

Karam, 2010). Researchers in IWO psychology traditionally proceed by identifying structural antecedent conditions such as a specific leadership style or individual characteristic and examine how these variables relate to creativity and innovation. By contrast, a functional approach begins with a detailed analysis of the functions that are required for creativity and innovation, that is, with the requisite variety of psychological and behavioral processes. For instance, individual idea generation and collective idea implementation are two basic functions of organizational innovation which can be further decomposed into more specific functions. A functional analyses moves 'backwards' in time from the outcome such as a breakthrough innovation to identify the functions through which the outcome is developed. In a second step, structural antecedent conditions can be examined which may facilitate or impede certain functions. A functional approach moves beyond mere description of relationships toward uncovering the mechanism underlying creativity and innovation.

A functional approach can help to explain why creativity and innovation emerge under very different conditions and may resolve conflicting findings regarding how antecedent conditions relate to creativity and innovation. Any specific antecedent condition, such as a particular leadership style, can facilitate some functions that are necessary for creativity and innovation while it has no effect or even inhibits other functions that are as important. This complexity is masked if researchers focus only on estimating the relationships in a narrow domain without a theoretical explication of the underlying mechanisms and without considering how the influence of antecedent conditions in one domain depends on the influence of factors in other domains. A functional approach is also warranted from an applied perspective: if creative performance needs to be improved in a specific case, the critical question is which of the many potential parameters should be changed to produce the desired effect. An integrative theory can inform this question if it

specifies the basic functions underlying creativity and innovation and outlines how these functions can be influenced.

In the following we present a set of research tactics which we deem useful for the goal of integrative theory development. First, research on creativity and innovation in the applied domain should build systematically on basic psychological research which can help to differentiate the basic functions underlying creativity and innovation. Second, longitudinal research designs with multiple measurements that can quantitatively examine how innovation unfolds in real time will add value to the current literature. Creativity and innovation require cognitive, affective, and behavioral processes that rarely occur at any point in time and the temporal pattern and transition between different states is a critical factor to be considered. Third, in the absence of theoretical models that can make precise predictions, an inductive research strategy that aims at uncovering patterns of reliable relationships can provide important insights (Locke, 2007). Fourth, the adoption of paradoxical frames or a dialectic method is a useful heuristic for theory development as they can synthesize knowledge (Bledow et al., 2009a; Lewis, 2000). Such approaches turn attention to contradictory research findings, the paradoxes of innovation, and on how opposites such as positive and negative affect can both contribute to creativity. Adopting paradoxical frames or a dialectic method can result in new ideas that resolve inconsistencies and lead to a better understanding of creativity and innovation in organizations (Miron-Spektor, Gino, & Argote, 2011).

Meta-direction Two: Greater Cross-level and Multi-level Research

Curiously, the vast majority of ICO studies remain single-level efforts (Anderson et al., 2014; Potočnik et al., in press). That is, studies typically examine predictor-innovation criteria relationships either at the individual, team, or organizational level alone. Yet, it has long been recognized that ICO processes in organizations commonly span at least two levels-

of-analysis. An individual will propose an initial idea that is then taken forwards by his or her proximal work group; senior management will initiate wider organization changes that require innovative responses by numerous teams and individuals to cope; an R&D team will make design changes to a product that necessitate the marketing and sales teams to respond, and so forth. All are examples of cross-level and multi-level ICO phenomena that occur on a daily basis in organizations. Conversely, and somewhat ironically, innovation research has lagged behind in this regard – arguably it has lacked creativity in extending its predominant methodological stance to incorporate such cross-level and multi-level research questions. Although there have been a handful of recent studies (e.g., Chen et al., 2013; Daniels et al., 2007; Liu et al., 2011; Liu, Liao, & Loi, 2012; Mueller & Kamdar, 2011; Richter et al., 2012), these studies are relatively few especially in comparison to the numbers of single-level studies reviewed earlier in the present chapter.

Offering a framework upon which such cross-level effects in ICO can be conceived and operationalized, Anderson et al. (2014) identified four key interfaces:

- (i) *The individual-team (I->T) interface* - where individual employee ideas or proposals are taken up by a team and pursued toward implementation.
- (ii) *The team-individual (T->I) interface* - where work group processes and phenomena impinge upon individual team members.
- (iii) *The team-organization (T->O) interface* – where team innovations involve wider aspects of the organization or its senior management.
- (iv) *The organization-team (O->T) interface* – where organizational-level processes and phenomena impinge upon teams.

All four interfaces (*I->T*, *T->I*, *T->O*, and *O->T*) have lacked sufficient research to be able to draw definitive conclusions over the key determinants, process dynamics, and

outcomes of cross-level ICO phenomena within organizations (Bledow et al., 2009a; 2009b). Especially bottom-up processes (I->T, T->O) have received little to no attention although researchers have convincingly argued that studying how higher level phenomena emerge in teams is vital for our understanding of team processes in general (Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013). Future studies that adopt upward, cross-level, and multi-level designs would therefore appear to offer real prospects of overcoming these current shortcomings in our understanding of these important aspects of creativity and innovation processes within organizations. First, such designs offer the possibility of tracking the journey of ideas throughout organizations. Second, these more complex designs enable researchers to examine how top-down and bottom-up processes interact to create innovative outcomes. Importantly, in order to fully and adequately capture the multiple-level processes involved in innovation, researchers need to be clear about the level of analysis they focus on and use appropriate empirical designs and statistical techniques in their data analyses. Yet, this has not always been the case and a number of studies cannot unequivocally be attributed to one of these levels. This is especially apparent with studies focusing on team level constructs.

The literature has, to date, witnessed two types of designs that have addressed team-level variables in relation to innovation (cf. Hülsheger et al., 2009). The first and purest team-level design is one that studies both predictor variables and innovation at the team-level of analysis. Two types of variables can be studied at the predictor side, integral variables and contextual variables. Integral variables are, for instance, group properties such as team size or team diversity, thus variables that can only vary between but not within groups (Bliese & Jex, 2002). Contextual variables are variables that are derived from individual-level variables, mostly through composition processes, for instance by averaging team members' responses (see also Bliese & Jex, 2002; Kozlowski & Klein, 2000). In the case of support for

innovation, the contextual variable would be a team climate variable, i.e. the teams shared perception of the extent to which innovation is supported in their team. This variable would be derived from team members' individual perceptions of support for innovation in their team. Furthermore, this aggregation would need to be statistically justified. As contextual variables have been derived from individual-level variables, they are conceptually related. Notably, although the team level variable is statistically derived from the individual level variable, they represent distinct constructs that can have different meanings and that can relate differently to innovation. The underlying idea of studying a variable at the team level is one of emergence. "A phenomenon is emergent when it originates in the cognition, affect, behaviors, or other characteristics of individuals, is amplified by their interactions, and manifests as a higher-level, collective phenomenon" (Kozlowski & Klein, 2000, p. 55). Thus, such a collective phenomenon that is the result of an emergent process can but does not necessarily need to be more than the sum of its parts. Whether or not a team level variable is isomorphic with its counterpart at the individual level needs to be explored both theoretically and empirically and this can best be done with multi-level rather than single-level studies (see Chen, Bliese, & Mathieu, 2005). At the criterion side, this design involves collecting a measure of team innovation (as opposed to individual team member innovation). Team innovation measures can be objective indicators such as the number of suggestions made to a suggestion system by a team or supervisor ratings of overall team innovation. With this type of design, analyses are run at the team level with the sample size being the number of teams involved rather than number of individual employees which makes data collection more complex and challenging.

A considerable number of studies in the team innovation literature have, however, used a different design, studying team-level variables at the individual level of analysis. Doing so, they investigated individual perceptions of team-level constructs (e.g. team climate

support for innovation) in relation to individual-level innovation. With this study design, analyses are run at the individual level of analysis with the number of participants as the sample size. Although addressing team constructs, these studies have not investigated team phenomena but rather individual perceptions of these team phenomena and how they relate to individual innovation. For instance, finding a positive relation between individual perceptions of support for innovation and individual innovation one may not, strictly speaking, conclude that support for innovation and innovation are related at the team level. Such a study design addresses relations purely at the individual level. As outlined above, a contextual variable at the team level can be more than the sum of its parts and therefore differ in meaning and functioning from its lower level counterpart. A first indication that relationships between team constructs and innovation do indeed differ between the team and individual-level of analysis is provided by the meta-analysis from Hülshager and colleagues (2009). Their moderator analysis revealed that relationships with innovation were stronger at the team level than at the individual level for support for innovation, vision, and task orientation. These findings exemplify that innovation researchers need to clearly delineate which level/s of analysis they are focusing on, align theory accordingly, and use appropriate study designs and analytical strategies.

Meta-direction Three: Redress Innovation Maximization Fallacy

Our third meta-direction for future research is perhaps the most challenging. It indeed raises fundamental questions over the implicit orientation of much ICO research to date and begets active researchers to critically re-examine some rather sacrosanct but questionable assumptions underlying the epistemological orientation of many study designs. The term '*innovation maximization fallacy*' was proposed by Anderson et al. (2014) in their recent review to suggest that ICO research has suffered crucially from the untested assumption that

“all creativity and innovation is good; and the more, the better”. Studies have typically endeavored to identify which variables or factors correlate with greater innovation, on the untried preposition that if it is possible to increase these factors then innovation will necessarily increase as a result. This untested assumption (part of which Kimberly earlier termed *‘pro-innovation bias’*) is compounded by the notable lack of controlled intervention studies that examine whether in fact increases in such antecedent variables do produce increased innovativeness. Innovation maximization fallacy is compounded by the sheer volume of studies over the years that have been apparently guided by this implicit assumption, yet this does indeed remain an untested and rather under-examined assumption. Is all innovation good, and the more the better? There are compelling reasons to doubt both of these taken for granted and seemingly sacrosanct presumptions. As Anderson et al. (2014) state: *“... creativity and innovation are often experienced as disruptive events, do not always benefit all parties affected, may be initiated in response to distress-related stimuli, and excessive innovation may be counter-productive to other aspects of individual, team, or organizational performance.”* (p. 24).

Future research is needed to critically examine these assumptions and to counter any tendencies toward innovation maximization fallacy, we would argue. For instance, it is important to highlight that no matter how much innovativeness is required by the employees, they will inevitably be asked to fulfill more routine tasks at the same time. That is, no job role comprises of purely innovative tasks – it is the mix between innovative job performance and routine job performance that is crucial. Research has showed that innovative and routine job performance are predicted by different characteristics and skills and therefore maximizing only innovative performance by selecting in employees with high scores on predictors of innovative performance may be counterproductive for the routine job performance (Potočník et al., in press). Future research should determine what the most balanced employee profile

would be like in order not to maximize innovative performance at the expense of more routine job performance. Another avenue for future research to address the innovation maximization fallacy could focus on exploring innovation as an independent variable to uncover potential negative outcomes of innovation (Anderson et al., 2004). Engaging in excessive innovative behaviors could lead to higher employee distress, poorer health or lower job satisfaction, increased conflicts within the team, poorer organizational communication and so on. Future research should develop theory-driven arguments and provide empirical data for these suggestions in order to counterbalance the innovation maximization fallacy.

Meta-direction Four: Bridge The Science – Practice Divide

A notable gap still appears to exist between the mass of research findings into innovation and creativity in organizations on the one hand, and actual organizational practices on the other. As our preceding review suggests, there is certainly no shortage of applied findings that unambiguously delineate a large number of variables at the individual, team, and organizational level found to be conducive to ICO in the workplace. Indeed, this list now runs to arguably several hundred variables at these differing levels-of-analysis, each and all having been found to be correlated with idea generation, idea implementation, or both. Furthermore, recent efforts have seen the publication of a number of quantitative meta-analyses that summarize and integrate the findings of the hundreds of primary studies conducted over several decades (chronologically, the principal meta-analyses are Damanpour, 1991; Camison-Zornoza et al., 2004; Baas, De Dreu, & Nijstad, 2008; Hülshager et al., 2009; Damanpour, 2010; Rosing et al., 2011).

Despite these substantial and wide-ranging advances in research, there appears to remain only limited transfer of these important findings into organizational practices in their ICO management methods and techniques (see also Bledow et al., 2009a; 2009b). Rather,

many practitioners appear to be largely unaware of these findings but be prone to be influenced by populist, over-simplistic management texts on ‘how to manage innovation’ or ‘how to maximize innovation in your organization’. Most of these populist texts are not based upon the extant research findings, we would argue, and indeed some are downright misleading in their claims and directive advice. Yet, other areas of IWO Psychology have witnessed the growth of quite strong, albeit not perfect, links between research and practice (arguably, including selection psychology and health psychology, for instance: Anderson, Herriot & Hodgkinson, 2001), so our impression is that ICO psychology lags behind and suffers from a science – practice gap. Any such gap certainly needs to be addressed if our impact upon practice in organizations is to comply with the scientist-practitioner model often advocated.

Future research could usefully delineate a number of issues underlying this science – practice gap in creativity and innovation in organizations. First, studies are needed to examine initially the levels of knowledge of the principal research findings amongst practitioners in different countries. Our impression, which may or may not be correct, is that many practitioners are simply not aware of even the core research findings in ICO (see also Shalley & Zhou, 2008; West, 2002b). Second, and in parallel with the first issue, if this is the case then researchers need to find ways to disseminate their findings to practitioners more effectively. The question here then is how best to achieve this, and what ‘strategic bridges’ exist for ICO researchers to influence innovation management practices (Anderson et al., 2001). Third, studies that address the scale problem of how to integrate the mass of individual study findings would appear to hold out considerable promise. As we argued earlier in this chapter, one of the key problems facing both researchers but especially practitioners is the sheer volume of study findings and how to make sense of these in an integrative way (Baer, 2012). As discussed under the meta-direction one, there is a need for integrative theories

which identify the core causal processes that drive creativity and successful innovation rather than to merely extend the list of predictors through correlational studies. On the basis of integrative theoretical models and meta-analytical evidence, practical decision-aids can be developed that help practitioners to identify effective courses of action. Field experiments are needed to examine whether and how the body of scientific knowledge can effectively be translated to practice. Finally, a fruitful avenue for future studies is to examine the question of how findings can best be integrated across different levels of innovation phenomena within organizations. As our earlier section calling for greater cross-level research suggests, ICO attempts typically span more than one level-of-analysis within organizations, so future research could valuably establish ways in which such cross-level and multi-level knowledge can best be translated into effective ICO management techniques in real-life workplace scenarios.

7. Conclusion

The field of ICO has grown substantially over recent years with major advances to our understanding of what factors are associated with creativity and innovation at the level of the individual work-role, the work team, and the wider organization. This research base now constitutes a huge volume of primary and meta-analytic studies that, combined, enhance our general understanding of what factors impact either positively or negatively upon workplace innovation. The sheer volume of studies now attesting to the myriad of variables that correlate with ICO at different levels-of-analysis, however, stands in stark contrast to the apparent gap between science and practice in this area of IWO Psychology. As we identify in our meta-directions for future research, this gap together with other pressing and overarching issues seem best to warrant the attention of researchers and practitioners active in ICO for the foreseeable future. It is our hope that this chapter provokes both additional research and

improvements in practice based upon robust scientific findings, and that the issues we review and discuss here stimulate further reflection, enquiry, and changes to predominant practices in innovation management within different workplace settings. As organizations become ever more dependent upon new ideas and their effective implementation for their success, the field of ICO research and its quintessential transfer into practice stands central to these challenges and imperatives to harness the undoubted benefits arising from employee creativity and innovation.

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Table 1

Major Disciplinary Approaches to ICO Research and Practice

Area	Primary academic discipline	Research examples
Creativity/ Idea Generation	Social Psychology / Psychology and individual differences/ IWO Psychology	Baas, De Dreu & Nijstad (2008); Baer (2012)
Innovation/ Idea Implementation	IWO Psychology/ Operations management	Elenkov & Manev (2005); Miron-Spektor, Erez, & Naveh (2011)
Diffusion of innovation	Management science	Gibbons (2004); O'Mahoney (2007)
Technological innovation	Management science	Hill & Rothaermel (2003); Puranam, Singh, & Zollo (2006)
User-driven innovation	Operations management/ Marketing	Bogers, Afuah, & Bastian (2010); Henke & Von Hippel (2005)
Social innovation	Anthropology/ Sociology	Dima, Mary, & Hanin (2011); Tapsell & Woods (2008)

Table 2

Recent Narrative Review Articles on Innovation and Creativity in Industrial, Work and Organizational Psychology: 2002 – to date

Review	Focus	Individual-level predictors	Team-level predictors	Organizational-level predictors
West (2002a)	Innovation/ creativity	Not included	Group task characteristics, group knowledge diversity and skills, integrating group processes, external demands	Not included
Zhou & Shalley (2003)	Creativity	Productivity and creativity goals, performance evaluation and developmental feedback, feedback style and valence, expected developmental assessment strategies, social influence (presence of co- actors, creative role models, and competitive others, leadership and supervisory behaviors, autonomy, rewards, creative personality, big- five personality traits, creative self-efficacy and role identity	Not included	Not included
Anderson, De Dreu, & Nijstad (2004)	Innovation/ creativity	Personality, motivation, cognitive ability, job characteristics, mood states	Team structure, team climate, team member characteristics, team processes, leadership style	Structure, strategy, size, resources, culture

Table 2 (cont.)

Review	Focus	Individual-level predictors	Team-level predictors	Organizational-level predictors
Rank, Pace, & Frese (2004)	Innovation/creativity	Personality, motivation	Environment, leadership, culture	
Shalley, Zhou, & Oldham (2004)	Creativity	Personality, cognitive style, job complexity, relationship with supervisors, relationship with coworkers, rewards, evaluation, time deadlines and goals, spatial configuration of work settings	Not included	Not included
Anderson, Potočník, & Zhou (2014)	Innovation/creativity	Personality, values, thinking styles, self-concepts, goal-orientation, knowledge, abilities, job complexity, goal and job requirements, leadership and supervision, coworker influences, customer influences, social networks, affect, motivation, other psychological factors and social influences (e.g., trust, strain, job involvement, justice)	Team structure (e.g., size, team composition (e.g., diversity), team climate (e.g., reflective), team processes (e.g., reflexivity, problem solving), team leadership	Management-related factors (e.g., HR practices), knowledge utilization and networks (e.g., absorptive capacity), structure and strategy (e.g., decentralization), size, resources, culture and climate, external environment (e.g., market competition), innovation diffusion, and corporate entrepreneurship as innovation

Table 3

Definitions of Creativity and Innovation at Work: Chronological Developments over Time

Authors	Definition Type	Definition
Zaltman, Duncan, & Holbek (1973)	General	“.....any idea, practice, or material artefact perceived to be new by the relevant unit of adoption”
Amabile (1983)	Individual – level creativity	“A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand and (b) the task is heuristic rather than algorithmic.”
West & Farr (1990)	Workplace Innovation	“.....the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organization, or wider society”
Woodman, Sawyer, & Griffin (1993)	Organizational Creativity	“...the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system”

Table 3 (cont.)

Authors	Definition Type	Definition
Scott & Bruce (1994)	Individual Innovative Behavior	“... individual innovation begins with problem recognition and the generation of ideas or solutions, either novel or adopted. During the next stage of the process, an innovative individual seeks sponsorship for an idea and attempts to build a coalition of supporters for it. Finally, during the third stage of the innovation process, the innovative individual completes the idea by producing a prototype or model of the innovation ” (see also Kanter, 1988; Van de Ven, 1986)
Ford (1996)	Creativity	“...domain-specific, subjective judgment of the novelty and value of an outcome of a particular action”
Crossan & Apaydin (2010)	Organizational – economic innovation	“.....production or adoption, assimilation, and exploitation of a value – added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both process and an outcome.”

Table 3 (cont.)

Authors	Definition Type	Definition
Montag, Maertz, & Baer (2012)	Individual-level Workplace Creativity	“ the production of novel and useful ideas for organizational products, services, or processes”, (see also Amabile, 1983; Oldham & Cummings, 1996)
Anderson, Potočnik, & Zhou (2014)	Integrative : Workplace Creativity and Innovation	“Creativity and innovation at work are the process, outcomes, and products of attempts to develop new and improved ways of doing things. The creativity stage of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation can occur at the level of the individual, work team, organization, or at more than one of these levels combined, but will invariably result in identifiable benefits at one or more of these levels-of-analysis”

Table 4
Summary of Innovation Research Narrative Reviews: Authors, Foci and Future Directions

Authors	Focus/Level of Analysis	Review Perspective	Future Research Directions Proposed
Anderson & King (1993)	Work groups, integrative review	Critical review of innovation research, process studies and perspectives at the work group level	<ol style="list-style-type: none"> 1. Meta-analyze findings at the organizational and individual levels of analysis 2. Meso-analytical studies – intra- and inter-group innovation 3. Empirically test process models 4. Shift from naive managerialist toward pluralist and humanist perspectives 5. Elucidate different types of innovation 6. Examine the outcomes of innovation processes
West (2002a)	Work groups and teams exclusively	Integrative review of workgroup innovation studies. Proposes a general model of the antecedents for effective team-level innovation	<ol style="list-style-type: none"> 1. Group task characteristics 2. Group knowledge, diversity and skills 3. External demands 4. Integrating group processes
Rank, Pace & Frese (2004)	Individual creativity, innovation, and personal initiative	Critical review of individual-level processes structured around three challenges for future research	<ol style="list-style-type: none"> 1. Differential predictors of distinct creativity and innovation phases 2. Conceptual integration of research on personal initiative and voice behavior 3. Cross-cultural differences in creativity and innovation
Anderson, De Dreu & Nijstad (2004)	Individual, workgroup and organizational	Multi-level review summarizing past findings and proposes a multi-level ‘distress-related’ model of innovation at three levels of analysis. Identifies five ‘innovative pathways’ for future research.	<ol style="list-style-type: none"> 1. Innovation as an independent variable 2. Cross-national generalizability and cultural differences 3. Multi-level theory and multi-level designs 4. Use of meta-analysis 5. Triangulation of research methods

Table 4 (cont.)

Authors	Focus/Level of Analysis	Review Perspective	Future Research Directions Proposed
Shalley, Zhou & Oldham (2004)	Individual-level integrative review	Identifies personal and contextual characteristics found to associate with workplace creativity. Proposes an organizing framework for individual characteristics	<ol style="list-style-type: none"> 1. Intrinsic motivation as a mediator 2. Mood states 3. Self-efficacy and creative role identity 4. Creative role models 5. Creative process 6. Creativity in international contexts 7. Social networks 8. Different types of creativity 9. Measurement of creativity 10. Team creativity
Zhou & Shalley (2008)	Handbook of workplace creativity future conditional concluding chapter. Individual creativity predominant focus	Offers several important directions to expand individual workplace creativity research. Antecedents to creativity are a major consideration.	<ol style="list-style-type: none"> 1. Expanding research on antecedents of creativity to multilevel analysis 2. Expanding the scope of creativity research – affect, reward, temporal dimension 3. Bridging creativity research with other fields 4. Expanding the context of creativity research 5. Consequences of creativity – positive, negative
Hülshager, Anderson & Salgado (2009)	Workgroups	Quantitative meta-analysis summarizing 104 primary studies categorized under team composition, structure, and process variables. Moderator analyses for measurement level and method included.	<ol style="list-style-type: none"> 1. Team composition and structure 2. Team processes 3. Measurement level and measurement method as moderators 4. Type 1: indiv IVs- indiv DVs designs 5. Type 2: team IVs – team DVs designs 6. Type 3: indiv IVs – team DVs designs

Table 4 (cont.)

Authors	Focus/Level of Analysis	Review Perspective	Future Research Directions Proposed
Bledow, Frese, Anderson, Erez & Farr (2009a)	Multi-level prospective review on the dialectic perspective on innovation	Dialectic perspective, conflicting demands, multiple pathways, and most importantly, ambidexterity posited as key construct for innovation research and practice	<ul style="list-style-type: none"> • Dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity - Review proposes • 15 propositions • 8 principles • Rejoinder paper (same issue) proposes 7 implications for practice.
Crossan & Apaydin (2010)	Organizational and inter-organizational level	Multi-perspectives review including theories/studies on institutional theory, economics, networking, the resource-based view, and organizational learning.	<ol style="list-style-type: none"> 1. Innovation and firm performance 2. Innovation and entrepreneurship 3. Towards a multi-level approach 4. Other avenues – construct measurement, sector differences, leadership style, managerial discretion, etc.
Rosing, Frese & Bausch (2011)	Individual and work group levels	Meta-analysis quantifying relationships between leadership style and individual/team innovation. Proposes an ambidexterity theory of leadership for innovation in addition	<ol style="list-style-type: none"> 1. Systematically consider the complexity of innovation processes 2. Leadership and innovation in contingency circumstances 3. Multilevel research into leadership and innovation 4. Research national cultures and organizational innovation

Table 4 (cont.)

Authors	Focus/Level of Analysis	Review Perspective	Future Research Directions Proposed
Montag, Maertz, & Baer (2012)	Individual-level workplace creativity	Propounds the concepts of creative performance behaviors (CPBs) and creative outcome effectiveness (COE) to organize individual-level studies	<ol style="list-style-type: none"> 1. Examine multiple categories of creative performance behaviors (CPBs) 2. Examine whether additional dimensions of creative outcome effectiveness (COE) exist 3. Relative impact of CPBs upon COE 4. Other CPBs and their impact upon COE
Anderson, Potočnik & Zhou (2014)	Individual, team, organizational, and cross – and multi-level review	Proposes an organizing framework for studies at each level of analysis, and attempts to integrate workplace creativity and innovation research via a comprehensive definition. Also presents a critical review of methodological trends in published studies at each level of analysis	<ol style="list-style-type: none"> 1. Integrate the idea generation and idea implementation sub-fields 2. Need for theorizing and theory-driven studies 3. Organization culture and facet-specific climates for innovation 4. Innovation process research 5. Redress innovation maximization fallacy 6. SMT and intervention studies 7. Leadership style and innovation 8. Dark side approaches and studies 9. Role of customers in employee creativity and innovation 10. Role of the internet and social media in creativity and innovation 11. Future research imperatives <ol style="list-style-type: none"> (a) Meta-analyses of primary studies (b) Cross-level and multi-level approaches and studies