Building a creative work force: What is the current evidence on individual predictors of creative performance?

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In their 2017 survey of CEOs, PWC found that 77% of organisational leaders struggle to build the creative and innovative workforces they need, despite considering creativity to be one of the most essential competencies (PWC, 2017). A recent report by McKinsey (2021) also indicates that creativity will be one of the most in-demand skills over the next decade, and this is only expected to increase as work becomes increasingly automated, a trend hastened by the Covid-19 pandemic (Romei, 2020). Research supports the importance of a creative workforce for driving organisational innovation and, ultimately, organisational success (Anderson, Potocnik & Zhou, 2014). Creative work cannot (yet) be automated (Amabile, 2020), and thus becomes an essential capability for an organization's *human* workforce (Pistrul, 2018). Unfortunately, there is far less certainty in exactly how organisations can build a creative workforce, as the predominant emphasis in Human Resources systems is for selecting and developing a workforce for "standard" forms of job performance (Waples & Friedrich, 2011). In this piece I will summarise the current state of the art in research on individual predictors of creative performance and the characteristics organisations should look for in their employees when seeking to build creative capital.

Background

Creativity is defined as the production of ideas that are both novel and useful, and innovation is the ultimate implementation of those ideas (Anderson et al., 2014). Much of the research on innovation focuses on organisational level indicators of innovation performance (e.g., patents, new products and services, increased profits) (Cordero, 1990; Wang & Zatzick, 2019). Innovation, however, ultimately depends on individuals and teams who can see opportunities for innovation and then generate, test, and implement those ideas (Anderson et al., 2014). At this stage, humans are essential for innovation and the ability to be creative is something that, so far, cannot be automated (Amabile, 2020). Thus, understanding what makes individuals creative is not only essential for

organisations seeking to be competitive, but also for individuals hoping to future-proof their capabilities.

There are many multi-level factors that influence whether innovation will happen in a firm and these factors exist within an interconnected system (Hadjikosta & Friedrich, 2019). For instance, an HR system that can select, train, and manage a creative workforce may fall down if other aspects of the organisation's strategy and culture do not support individuals acting creatively (Malik, Shahzad, Raziq, Khan, Yusaf, & Khan (2019). Thus, while I will review the individual characteristics associated with creative performance, and some considerations for HR systems in building a creative workforce, it is important to keep in mind that this is only one piece of the puzzle necessary for fostering innovation in the workplace (Hunter, Cushenbery, & Friedrich, 2012).

Human Resources Practices and Creativity

There is evidence that organisations can support innovative performance via Human Resources practices (Kianto, Saenz, & Aramburu, 2017; Zhang, Long, Wu and Huang, 2015). For instance, hiring practices are essential for building the knowledge and broader human capital necessary to produce innovation (Wang & Zatzick, 2019). Training and development can be designed to provide not just general skill building that supports creative problem-solving (Sung & Choi, 2014), but also creativity-specific skill building (Scott, Lertiz, & Mumford, 2004). Finally, performance assessment and management systems can influence creativity through goal setting, recognition, and rewards, not just for creative outcomes but, more crucially, attempts at creativity (Mumford, 2000; Waples & Friedrich, 2011). Some recent research does suggest caution in implementing HR practices to support innovation, as a mismatch between the HR practice implemented and the broader context and need for innovation may backfire (Andreeva, Vanhala, Sergeeva, Ritala, & Kianto, 2017).

To understand how HR practices might support building a creative workforce, we must understand which characteristics are most closely tied to creativity, and thus what would need to be selected, trained and developed, or encouraged through performance management. These characteristics are what HR researchers and practitioners would call the KSAOs – knowledge, skills, abilities, and other characteristics that are predictive of a certain type of performance – in this case creative and innovative performance. Knowledge is the facts, principles, or concepts that are necessary for understanding a key domain (e.g., knowledge of driving principles); Skills are proficiencies in key actions taken in a sequence to accomplish something (e.g., the act of driving); Abilities are general capacities or propensities that may translate across domains (e.g., spatial abilities that might improve your driving); Other characteristics are different dispositions outside of KSA's that may include things like personality, values, identity, or needs (e.g., uncertainty avoidance that would prevent you from driving new places) (Brannick, Cadle & Levine, 2012).

While there is a great deal of research on individual predictors of creativity, there is little meta-analytic or review work on a full model of KSAOs and creative performance. Both Hayton and Kelley (2006) and Hunter, et al. (2012) proposed conceptual models of KSAOs and creative and intrapreneurial performance, but as Anderson, et al. (2014) note, there is not enough empirical work on how different KSAOs predict creativity and innovation performance and a meta-analysis in this area is needed. In the absence of this, I have sought to summarise the state of the art in research on individual characteristics that are shown to be related to creativity. To be a "state of the art" review

I have limited it to empirical work published in the last ten years (2010-2020) and focused on work in the leading organisational psychology, organisational behaviour, general management, human resources, and creativity and innovation focused journals.

Summary of Evidence

Knowledge

Knowledge is essential to creativity given that to create something new, there must be something to create from – knowledge is the building material for creative ideas. One of the key areas of focus in the research on knowledge and creativity is on the type of knowledge that an individual has and how it affects their creative performance. The strongest evidence available is related to the importance of domain-based knowledge or expertise, as well as the breadth, or diversity of knowledge that someone has. Becoming "T-Shaped" – meaning that individuals have both knowledge depth and knowledge breadth, has become a popular suggestion for those wanting to be more creative (Sawyer, 2013). The most recent literature supports this recommendation and has shown that each type contributes differently to the creative process. For instance, Mannucci and Yong (2018) found that increasing knowledge depth was more important for the creativity of workers that were newer to a field and needed to build the foundational knowledge architecture. On the other hand, increasing broad-based knowledge was more beneficial for increasing creativity in older workers who may have more rigid knowledge structures and could introduce more flexibility in their thought by using knowledge from outside their core domain.

Another type of knowledge that has proven important is institutional or organisational knowledge (Groza, Locander, & Howlett, 2016), which may be particularly beneficial for the implementation stage of innovation when gathering resources and championing ideas to others is essential (Hayton & Kelley, 2006). Research that has demonstrated the positive impact of tenure on employee creativity (Woods, Mustafa, Anderson, & Sayer, 2018) may add credence to the importance of organisational knowledge to coming up with and implementing ideas – which has implications for decisions to hire from within or externally when you are wanting employees to be creative.

Skills

As might be expected, the sets of skills most likely to impact creative performance are creative problem-solving skills such as opportunity identification, idea generation, and evaluation (Montag-Smit & Maertz, 2017; Puccio & Cabra, 2012). A recent paper by van Wetten, Gerards, and de Grip (2020) found that across both STEM and business occupations, graduates who reported higher levels of creative skills were more likely to be involved in innovation in their organisations. Most of the work on creativity skills focuses on idea generation (Runco, 2010), but recent work in this area has focused on skills related to identifying opportunities for creative problem solving as well as idea evaluation (Zhou, Wang, Bavato, Tasselli & Wu (2019). Baas, Nevicka, and Ten Velden (2014) found that two mindfulness skills – observation and attending to various stimuli, were both related to creativity. In a recent conceptual paper, Zhou and colleagues (2019) made propositions for how individual characteristics may impact the perception and evaluation of creative ideas – a critical part of the creative process. Finally, an interesting study by Grosser and colleagues (2018) found that political skill was associated with involvement in innovation. They suggest that politically skilled individuals are more likely to be well connected within knowledge networks and effectively integrate their diverse

sources of knowledge which will help them generate ideas. They will also be more aware of norms within the organisation which will help them develop ideas more likely to be accepted. Finally, their ability to see and manage the social systems within the organisation will serve them well in championing and implementing their ideas.

Abilities

The abilities studied most often in relation to creative performance are intelligence (Kandler et al., 2016) and ideation or divergent thinking (Runco, 2010). Both show consistent, positive relationships with creativity. Associational (Benedek, Konen, & Neubauer, 2012) and analogical ability (Cubukcu & Cetintahra, 2010) also contribute to creative problem solving in facilitating the connection between disparate concepts and the translation of knowledge or solutions from one domain into another. There has been a growing interest in the socio-emotional predictors of creativity, such as emotional intelligence, which has been found to affect creativity through feedback seeking behaviour and regulation of positive emotions (Parke, Seo & Sherf, 2015; Sung, Rhee, Lee & Choi, 2020). A recent and interesting contribution to the literature on abilities and creativity is that spatial ability may play a role. Kell, Lubinski, Benbow and Steiger (2013) looked at whether spatial ability predicted innovation performance in the form of patents and refereed publications 30 years after the participants were assessed as teenagers (along with their verbal and mathematical abilities). Their spatial abilities, or their capacity for mechanical reasoning and spatial visualisation, predicted their innovative outputs above and beyond their verbal and mathematical ability. The authors make an important note regarding hiring practices – many that use standardised testing scores often rely on mathematical and verbal reasoning abilities and in doing so, would "miss more than half of students within the top 1% of spatial ability (those who are not within the top 1% in mathematical or verbal reasoning ability but are gifted in spatial ability)" (pp 1835) and suggest that this would be particularly detrimental to innovation in STEM fields.

Other Characteristics

The "Other" of KSAOs includes a wide-ranging variety of characteristics – personality, values, needs, dispositions, motivations, and orientations. The strongest evidence for other characteristics related to creativity are Creative Self-Efficacy, or the belief that one has the capacity to be creative (Haase, Hoff, Hanel, & Innes-Ker (2018), the personality characteristic of Openness to Experience (Zare & Flinchbaugh, 2019), Proactive Personality (Kim, 2019; Zhao & Guo, 2019) and Intrinsic Motivation (Gong, Wu, Song, & Zhang, 2017). An overall pattern amongst the forms of motivations related to creativity, is that internal, optimistic, and curiosity-driven motivations (e.g., intrinsic motivation, learning goal orientation, approach motivation, and promotion focus) are more strongly related to creative performance relative to more external or fear-based motivations (e.g., extrinsic motivation, prevention focus, performance goal orientations). For the most part, though, these patterns have been established for quite some time. An interesting recent development is the emergence of prosocial motivation as a driver of creativity (Liu, Jiang, Shalley, Keem, & Zhou, 2016). Prosocial motivation, or the desire to take actions that help others, is related to creative performance because it leads to taking others' perspectives and considering their needs – making it more likely that an idea will be developed that will be useful to potential users (Grant & Berry, 2011).

Beyond the emerging trends and interesting findings noted in the KSAO categories above, there are broader emerging trends that cut across them all as well as some important research gaps that I hope to see creativity scholars address.

Emerging Trends

Contextual Moderators

A key theme that emerged in the last decade of research in this area is the power of the situation – how much the context, such as the team environment, leader style, task characteristics, or organisational factors, can alter the influence these individual characteristics have on creative performance. It has brought to light the conditions under which certain characteristics are more or less advantageous and thus considerations that an HR team would need to make when choosing which KSAOs are most relevant to their team or organisation. Many of the studies cited in the previous sections include situational moderators. The KSAOs' relationships to creativity and innovation may vary with regard to the environment in the team (e.g., Zhu, Gardner, & Chen, 2018), the leadership that the individual is exposed to (e.g., Pan, Liu, Ma, & Qiu, 2018), the task they are engaged in (Sagiv, Arieli, Goldenberg, Goldschmidt, 2010), or even national-level factors (Chiu, Lun, & Bond, 2018). This fits with broader work on understanding person-organisation and person-situation fit in creativity research (Choi, 2004; van Knippenberg & Hirst, 2020) and presents an important consideration for selecting HR practices for promoting creativity and innovation.

KSAO Combinations

In addition to contextual considerations, more attention has been paid in the last 10 years to how the combination and interaction of different individual characteristics may influence creative performance. For instance, in a study of twins, Kandler et al. (2016) looked at both personality and intelligence in relation to creative performance, and Liu et al. (2016) examined the relationship of intrinsic motivation, prosocial motivation and creative self-efficacy to creative performance. While adding complexity and nuance to our understanding of these areas, it reduces our ability to make simple recommendations of which KSAOs are best suited to creative performance in any organisation. This work is critical as individual characteristics do not come packaged on their own – they exist within people that possess an assortment of KSAOs that may be more or less indicative of a propensity for creative performance. Crucially, the research should now turn to which characteristics are likely to occur together, or in combination are most predictive of creative performance, much like the research on the "Dark Triad" of narcissism, psychopathy, and Machiavellianism (Wisse, Barelds, & Rietzschel, 2015). Is there a "creative triad"? In addition to combinations, are there some that are more predictive of creative behaviour than others and should thus be prioritised (Anderson et al., 2014; Hunter et al., 2012)?

Research Gaps

Diversity, Equity, and Inclusion

There is extensive research on diversity and team creativity (Lee, Choi, & Kim, 2018; Pearsall, Ellis & Evans, 2008; Wang, Cheng, Chen, & Leung, 2019), and studies examining how individual demographic categories such as age (Binnewies, Ohly, & Niessen, 2008) or gender (Proudfoot, Kay & Koval, 2015) may be related to creative performance. However, more work is needed not only on describing these factors but

understanding what can be done, and how underlying institutional factors create systemic barriers to creativity. For instance, work by Guillen and Kunze (2019) has examined what conditions might alleviate age-related differences in innovation – in the case of older workers they found collaboration with others was key. What is missing is how institutional and societal barriers that disproportionately affect different groups ultimately affect their ability to be creative and innovative and impede their chances of being hired into innovative organisations. This is a further injustice for them and a missed opportunity for society. For example, given the importance of cognitive resources for creativity (Chae & Choi, 2019), consider the cognitive burden of experiencing racism (Bair & Steele, 2010) and the impact that has on creativity across a lifetime, not to mention the many forms of explicit discrimination that may occur. A study by Cook (2014) showed that periods of ethnic and political violence against African Americans caused a significant decline in patenting activity among African American inventors during that period relative to their White peers.

Our understanding of the impact of neurodiversity in the workplace is accelerating and creativity scholars are keeping pace, but there is ample ground still to be covered. Early work has been done on Obsessive-Compulsive Disorder (Furnham, Hughes, and Marshall, 2013), Autism (Jankowska, Omelanczuk, Czerwonka, & Karwowski, 2019), Attention Deficit Hyperactivity Disorder (Moore, McIntyre, & Lanivich, 2021) and Anxiety (Byron & Khazanchi, 2011), but these are often early examinations looking at direct effects on creative performance or related concepts. More nuanced work is needed on the mechanisms of these relationships, how the creative process might be different for individuals in these groups, how these differences may be advantageous, and what structures or accommodations may be put in place to help them reach their creative potential when they are not.

Bias in Measurement

A related and important issue that the creativity field needs to grapple with is bias in our measures and whether they have accurately captured creative performance for those not in the populations that our measures are often built using (e.g., WEIRD populations – western, educated, industrial, rich and democratic (Muthukrishna, et al., 2020)), or if the structure and content of them introduces bias against particular groups. Park, Chun and Lee (2016) note the benefits of objective over subjective measures of creative performance for minimizing bias, but there is still a need to assess whether our "objective" measures are bias-free. For instance, many consider Guilford's (1967) divergent thinking test as a more objective measure of a creative competency, but Runco & Acar (2010) demonstrated that performance is biased towards those with a wider variety of personal and social experience. You can imagine that those from deprived backgrounds may perform worse than their more advantaged peers on such a measure. In addition, Furnham and Nederstrom (2010) found that men performed better on their measure of creativity (an ideational fluency test). Is there something in men that leads to more creativity or is the measure biased in some way? They call for more exploration of this difference. In addition, there is evidence that men are rated higher than women on subjective forms of creativity, including by their supervisors (Proudfoot, Kay & Koval, 2015). Yet supervisors' assessments of creative and innovative performance are one of the most common outcome measures in studies of creativity and innovation. There may be some creativity assessment techniques that are less subject to bias than others, such as the Consensual Assessment Technique, (Kaufman, Baer, Agars, and Loomis, 2010), which needs to be explored.

KSAOs by Creativity Phase and Type of Creativity or Innovation

Much of the research on KSAOs and creativity focuses on the relationship between the individual characteristics and the outcomes of the creative process, like patents (e.g., Zwick, Frosch, Hoisl, & Harhoff, 2017), an employee's overall creative performance (e,g., Carnabuci & Dioszegi, 2015), or focuses only on idea generation (e.g., Furnham, 2015). There are, however, other steps in the creative process, such as opportunity identification and idea evaluation (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). It is likely that there is variation in skills required by the stage of the creative and innovative process (Anderson et al., 2014). Hunter, et al. (2012) and Hayton and Kelley (2006) both make suggestions for the relative importance of KSAOs across the creative and innovative processes, but more empirical testing of this is required. Studies that include multiple stages of the creative process in a single study with the same individual level predictors, would be particularly beneficial.

In addition to KSAOs potentially varying by stage of the creative process, more work is needed on how KSAOs may vary based on what creative output is being evaluated. For instance, the KSAOs that lead someone to deliver unexpected creative ideas for improving their work may be very different to those that predict performance in a role where creativity is expected as part of the job (e.g., R&D). In their review of issues in measurement of creativity and creative performance, Montag, Maertz, and Baer (2012) highlight this issue of expected versus unexpected creative performance behaviours. Which types of creative performance are desired will have different implications for those making HR decisions.

Additional KSAOs

Finally, there are some KSAOs that are, for the most part, absent from the literature and may be important to focus on. While there is ample research on social networks and creativity (Perry-Smith & Shalley, 2003), there is limited research on the socio-emotional skills that might be relevant in building networks for creativity and innovation. For instance, if we know being a boundary spanner leads to more innovation (Dokko, Kane, & Tortoriello, 2014), what do we know about boundary spanners and what KSAOs might be related to someone being that type of network member? Similarly, we know a great deal about the importance of teamwork to creativity, as well as demographic compositions of teams and creative outcomes (Somech & Drach-Zahavy, 2013), but we know less about what KSAOs are likely to make someone a good team member in the creative environment. If we look at KSAOs for general teamwork (Morgeson, Reider, & Campion, 2005), do they still apply to creative work? In sum, there is a need for more development in the socio-emotional skills necessary for creativity (Sung, et al., 2020).

Conclusion

In this SOTA review, I have briefly summarised some key trends in the last ten years of research on the KSAOs that are likely to influence creative performance at work. There is a vast literature behind this and important papers that were published prior to 2010. However, to give the best sense of where the field is currently, and where it is going, my review of the literature was limited. The references provided should be used as steppingstones for tracing back to more information on any given KSAO.

I expect the importance of creativity to only increase as automation increases. As a recent report by McKinsey (2021) indicates, creativity is a skill most likely to be shielded from automation and is projected to be one of the most in-demand skills in the next ten years. Thus, those in employment, skills and education-based policy positions may also find this SOTA useful in considering the requirements of the work force of the future.

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About the Author

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Dr. Tamara Friedrich is an Associate Professor of Entrepreneurship and Innovation at Warwick Business School. Her primary research interests fall into the broad categories of creativity and leadership, however much of her recent research falls into the intersection of these two areas. For instance, she has studied how organizational leaders may initiate, support, and sustain innovative efforts through hiring, performance management, and creating a climate for creativity. She has also conducted research on leadership in a collective context and how leadership is influenced by the social environment around them. Her work has appeared in several books and journals, including The Leadership Quarterly, Creativity Research Journal, and Human Resource Management Review.

She is a member of the Innovation Caucus which aims to provide evidence-based support to policy makers and practitioners in the UK. She has worked on several research grants with different funding agencies including the NIH, US Army Research Institute and the US Department of Defense. She has given invited talks on creativity and leadership to local schools and business groups such as the City Womens Network and the Leamington Business Forum, and organisations such as Optum UK and the Canadian Imperial Bank of Commerce.