Journal of High Technology Management Research xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of High Technology Management Research

The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power

Zeeshan Ali [a,*], Yuosre F. Badir [b], Mir Dost [c], Bilal Afsar [a]

[a] School of Management, Asian Institute of Technology, Thailand
[b] Innovation and Technology Management, School of Management, Asian Institute of Technology, Thailand
[c] School of Management, Asian Institute of Technology, Thailand

ARTICLE INFO

Available online xxxx

Keywords:
Task uncertainty
Expert intuition
Team likeliness to accept intuition
Expert power
Team intuition
New product development

ABSTRACT

This paper empirically examines the roles that an *expert intuition*, an *expert power*, and a *team intuition* play when applied to a particular task in the NPD team context. The objectives are achieved in two phases. In the first phase, the antecedents of *expert intuition* and *team likeliness to accept expert intuition* were tested. The moderating role that *environmental turbulence* plays was also measured. In the second phase, we measured the impact that an *expert intuition* and *team likeliness to accept expert intuition* had on an NPD *team intuition*. The moderating role that an *expert power* plays was also measured. A comprehensive literature review was conducted to develop the hypothesis and conceptual framework. Data was collected from 325 respondents of 116 software houses in Pakistan. Structured equation modeling (SEM) was used for data analysis. The findings revealed that *task uncertainty* had a positive and significant impact on *expert intuition* and *team likeliness to accept expert intuition*. *Environmental turbulence* also played a significant moderating role except in the case of *task creativity* and the *team likeliness to accept expert intuition*. There was also a positive impact from *expert intuition* and *team likeliness to accept expert intuition* on *team intuition*. The moderating role of *expert power* was also significant. This study adds value to the existing literature on *expert intuition*, *team intuition* and *expert power* especially in the NPD context. The relationship between intuition at the individual and team levels is established and the results revealed the impact of task uncertainty and expert power on the relationship.

1. Introduction

Human beings are social entities who need to interact with other people in their societies (Rook, 1984). This concept can be traced as far back as Aristotle, and was then reinforced by Charles Darwin. Today it is still an accepted phenomenon in modern sociology, psychology and ethnography (Batson, 1990). When this human social entity interacts with a specific society, he or she is influenced by various environmental factors (Kollmuss & Agyeman, 2002). These include various political, social, cultural, technological and economic factors that influence the individual's perceptions, attitudes, and behavior, all of which affect the way that person reacts to a situation (Hansen & Wernerfelt, 1989).

The notion of an environment's influence on an individual's perceptions, attitudes, behavior and decision making is also found in the team setting (Sebanz, Bekkering, & Knoblich, 2006; Zarraga & Bonache, 2003). Like, in new product development (NPD) team context, the team's goals, processes and decision making are influenced by various environmental factors (Ozer, 2005). NPD team members usually operate in a turbulent environment (Dayan & Elbanna, 2011). A turbulent environment is

* Corresponding author. Tel.: +66 91 4240564.
E-mail addresses: st115857@ait.ac.th (Z. Ali), Badir@ait.ac.th (Y.F. Badir), Pandrani_md@yahoo.com (M. Dost), Afsarbilal@yahoo.com (B. Afsar).

http://dx.doi.org/10.1016/j.hitech.2016.04.002
1047-8310/© 2016 Published by Elsevier Inc.

characterized by intense competition, technological and environmental uncertainty and rapid changes in an organization's external environment (Dess & Beard, 1984). Since this kind of turbulent environment requires the NPD team to be more responsive to market needs, the team has to make decisions rapidly (Cooke, Salas, Kiekel, & Bell, 2004).

Most NPD teams are cross-functional in nature to effectively tackle such turbulent environment (Zirger & Hartley, 1996). Each cross-functional team member is an expert in his or her particular domain (Uhl-Bien & Graen, 1998). Eppinger and Ulrich (1995) defined a cross-functional NPD team as a group of experts from various functional areas who are brought together to achieve a common new product development goal. These experts apply individual cognition when working in a team setting, and also collectively share a common team cognition (West, 2007).

One of the key characteristics of experts' cognition is the ability to intuit based on their extensive knowledge and experience in uncertain conditions (Seifert & Hadida, 2009). Intuition is generally characterized as a rapid, unconscious, affective and holistic cognitive phenomenon that is automatic in nature (Dane & Pratt, 2007; Khatri & Ng, 2000; Sadler-Smith & Shefy, 2004). In this study, we are focused on expert intuition that is specific to a particular task or situation in which the expert has considerable experience (Crossan, Lane, & White, 1999).

Neisser (1976) defined expert intuition as a pattern recognition process based on past experiences. An expert can perceive sophisticated and complex patterns that a novice cannot. He or she no longer needs to think consciously about the actions regarding his or her area of expertise. In fact, sometimes it is difficult for experts to explain how they arrived at a decision to take a particular action since it is deeply rooted in their unconscious based on vast experience (Crossan et al., 1999). Prietula and Simon (1989) suggested that it normally takes 10 years of experience and 50,000 chunks of knowledge to be an expert in a particular field. Expert intuition is mostly useful in turbulent conditions where a rapid decision is required for a particular and uncertain task (Dane & Pratt, 2007). Such a scenario is not unique to the NPD context as NPD team experts may need to intuit for a particular and uncertain task that falls in the domain of their expertise (Seifert & Hadida, 2009).

The uncertainty regarding a particular task not only influences expert of that particular task in the team to intuit but also influences rest of the team members to accept that intuition. This is because group psychology experts agree that teams, like individuals, are influenced by many environmental settings (Hansen & Wernerfelt, 1989). In fact Klimoski and Mohammed (1994) argued that teams, being the sum of the individuals combined together to achieve a common goal, actually get the same impact from their environment as an individual does. This congruence between individual and team psychology can be witnessed in new product development (NPD) team settings.

NPD teams have experts from various functional areas, so they need to rely on the intuition of various individual experts. When these individual experts come together in a group, they operate collectively as a team and share a team intuition (Dayan & Di Benedetto, 2011; Dayan & Elbanna, 2011). Açıkgöz, Günsel, Bayyurt, and Kuzey (2014) defined team intuition as a team's capability to assess information automatically without the intrusion of rational thinking. NPD team members use this capability while assessing the rational results derived from available information in the form of charts, graphs and other info graphics (Dayan & Elbanna, 2011).

Another characteristic of experts in a cross-functional team is the possession of expert power (Bunderson, 2003). French, Raven, and Cartwright (1959) defined expert power as a social power that is derived from a person's technical knowledge. Aime, Humphrey, DeRue, and Paul (2014) proposed that expert power in a cross-functional team is heterarchical in nature. An expert team member possesses expert power for a particular task in which he or she has relevant knowledge, skills and experience. This expert power will be transmitted to another team member according to the change in the nature of the task or action.

While these phenomena, i.e. expert intuition and heterarchical expert power, are documented, separately, in the existing NPD literature, it is not clear yet how the co-existence of these two in an NPD project will influence team intuition in a turbulent environment. Moreover, what is the impact of task uncertainty and environmental turbulence on the expert intuition and team likeliness to accept expert intuition also needs to be explained. This study addresses the interplay between task uncertainty, environmental turbulence, expert and team intuition and expert power by addressing four questions. 1) What is the impact of task uncertainty on expert intuition and the likeliness to accept expert intuition? 2) What is the impact of environmental turbulence on the relationship between task uncertainty and expert intuition, task uncertainty and team likeliness to accept expert intuition? 3) What is the impact of expert intuition and team likeliness to accept expert intuition on team intuition? 4) Does expert power moderate the impact that expert intuition and team likeliness to accept expert intuition have on team intuition?

These phenomena are necessary to understand as it will advance the literature by filling the gaps between expert intuition and team intuition. Moreover, as indicated by Aime et al. (2014), team experts are specialists from different domains, and this is what gives each expert member of the team his or her expert power. This study will further clarify the dynamics of individual–team intuition interactions and their relationship with expert power. This research will help managers to make more efficient and effective decisions in a dynamic and turbulent environment. The impact of an individual's opinion on the overall team decision will help to streamline the decision making process. Team leaders/top managers will get a new and holistic view of team dynamics, which will in turn help them to achieve smoother team operations.

2. Theoretical development

2.1. Task uncertainty and expert intuition

The literature related to individual intuition articulates the importance of intuition especially under uncertain situations (Dane & Pratt, 2007; Khatri & Ng, 2000; Miller & Ireland, 2005; Sadler-Smith & Shefy, 2004). Intuition of an expert is helpful because it is

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

a source of efficient, rapid and successful decision making in uncertain situations (Crossan et al., 1999; Dane & Pratt, 2007; Seifert & Hadida, 2009; Simon, 1987). This success is based on the premise that the person who is intuiting must be an expert who has a comprehensive and authoritative knowledge or specific skills in his or her field (Crossan et al., 1999) so that he or she can deal with uncertainty in an effective manner.

Uncertainty is a multidimensional concept (Hite & Hesterly, 2001). It ranges from environmental uncertainty to the uncertainty that can occur at an individual, team or firm level. It also includes technological as well as market uncertainty (Gartner, Bird, & Starr, 1992). Uncertainty is also characterized by task specific factors such as task complexity and creativity (Dess & Beard, 1984; Hite & Hesterly, 2001; Tatikonda & Rosenthal, 2000). Tatikonda and Rosenthal (2000) argue that projects that require novelty and complexity tend to be characterized by greater uncertainty. Task complexity can refer to the inexact or unknown number of means and ends involved in a task and their interconnections (March & Simon, 1958). Creativity on the other hand is defined by Stein (1974) as a novelty that is useful. We apply Stein's definition, and define task creativity as the degree of novelty required for a particular task that will make it useful to different stakeholders.

For this study, task uncertainty is operationalized in terms of a task that is complex and creative in its nature as stated by Dess and Beard (1984), as well as by Hite and Hesterly (2001). We only consider uncertainty in terms of task complexity and creativity because intuition in this research applies specifically to NPD tasks, hence, the task's characteristics are taken into consideration. This is in line with Dane and Pratt (2007), who argued that intuitions experienced by an expert are specific to a particular task.

By combining task uncertainty and expert intuition, we expected to see that an increase in the level of task uncertainty, in turn, induces the expert in that particular task to intuit. For instance, when the NPD task is mentally demanding, challenging, and requires good problem-solving skills, the development of this highly complex task is expected to be highly uncertain (Dayan & Elbanna, 2011). Similarly, when the NPD task requires new ideas or challenges existing ideas, or requires unique solutions and fresh thinking, the development of this highly creative task is expected to be highly uncertain. This uncertainty surrounding the NPD task influences the expert to intuit in order to come up with a rapid and effective solution.

Theorists of team psychology have iterated that environmental factors that influence an individual can also influence a team in a similar way (Campion, Medsker, & Higgs, 1993; Gibson, 1999; Parker, 1994). This is because the cognitive processes that occur at the individual level are similar to the processes that occur at the team level (Klimoski & Mohammed, 1994; Prussia & Kinicki, 1996). Building on this argument, we suggest that task creativity and complexity make both the expert and other team members sense the level of uncertainty in performing the task. While the uncertainty may induce the expert to intuit, the team members, who lack the necessary knowledge and know-how regarding this particular task, will not intuit; however, the team will be ready to accept an intuitive solution from the expert. Hence, it can be deduced that the factors that induce the individual expert in the cross-functional NPD team to intuit, can also induce the rest of the team members to accept that expert intuition.

Hence it is hypothesized that:

1_a. The higher the complexity level of an NPD task, the more likely it will be that expert intuition will be required for that particular task.

1_b. The higher the creativity level of an NPD task, the more likely it will be that expert intuition will be required for that particular task.

1_c. The higher the complexity level of an NPD task, the more likely it will be that team members will accept expert intuition.

1_d. The higher the creativity level of an NPD task, the more likely it will be that team members will accept expert intuition.

2.2. Moderating role of environmental turbulence

Intuition is said to be an effective mode of decision making under uncertain situations (Dane & Pratt, 2007; Sadler-Smith & Shefy, 2004). For example, in strategic decision making studies, intuition is presumed to be a quick and effective decision making mode (Eisenhardt, 1999). Strategic decision making is normally done under situations characterized as turbulent, uncertain, ambiguous and complex (Wally & Baum, 1994). Klein (2002) agreed that in such a situation the expert in a particular field will be able to make a plausible decision based on his or her expertise. Experts who are experienced in making decisions in crisis situations can use their intuition to cope with uncertainty (Crossan et al., 1999; Dane & Pratt, 2007).

Just as in a strategic management situation, team members of a cross-functional NPD team also tend to operate in dynamic and turbulent environment. To address customer needs and both technological and market uncertainties decision making will have to be rapid and accurate (Dayan & Di Benedetto, 2011). In a situation characterized by task uncertainty that influences expert intuition, we would expect that environmental turbulence would further increase the influence of task uncertainty on expert intuition. In such a scenario, the expert of a particular NPD task would use his or her knowledge, experience and expertise to come up with an intuitive solution (Dane & Pratt, 2007).

Since environmental turbulence is expected to increase the influence of task uncertainty on expert intuition, it should also increase the influence of task uncertainty on the likeliness of the team to accept expert intuition. This argument is based on the premise that a team, like an individual, is also influenced by contextual factors (Klimoski & Mohammed, 1994). This influence is expected to result in the acceptance of expert intuition by the rest of the team members. Overall, it can be hypothesized that:

2_a. The higher the environmental turbulence, the higher the impact of task complexity will be on expert intuition.

2_b. The higher the environmental turbulence, the higher the impact of task creativity will be on expert intuition.

2_c. The higher the environmental turbulence, the higher the impact of task complexity will be on the likeliness of the team to accept expert intuition.

2_d. The higher the environmental turbulence, the higher the impact of task creativity will be on the likeliness of the team to accept expert intuition.

2.3. Expert intuition, team intuition

According to the multilevel theory of team decision making, an individual's opinion, skills, and expertise play a key role in team level decision making (Hollenbeck et al., 1995). Sy, Côté, and Saavedra (2005) report that a team member's mood and aspirations also influence the whole team's decision making activities. Similarly, the expertise, knowledge and skills possessed by a team member can also influence the team related decisions. Each individual–team member of a cross-functional team carries specific expertise that other team members cannot access since each member specializes in a different functional area (Sethi, Smith, & Park, 2001). This means that each team member expert will play an influential role in a task related to that person's area of expertise (Cobb, 1980; Schein, 1977). This expert's opinion will be relevant to a particular task so it will have a significant influence on the team to accept and declare the expert's opinion as a team decision.

In the same vein, an intuitive solution suggested by an expert in a cross-functional team is likely to influence the whole team's intuition regarding that task. This is based on the premise that the team is making rapid decisions in a turbulent environment and task uncertainty would also prevail as well. Crossan et al. (1999) reported that the expert may use certain metaphors to describe the intuition and use logical reasoning to explain how he or she come up with that intuition (Sonenshein, 2007). Hence, it can be inferred that the intuition offered by an expert based on his experience, knowledge, skills and exposure will influence the whole team's intuition.

Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) found that team-shared opinions and cognition influence team processes. This is also supported by the fact that shared understanding is a necessary group process (Bettenhausen, 1991). Such shared understanding affects the speed, flexibility and implementation of a decision (Walsh & Fahey, 1986). Based on these arguments, we would expect that team members would be very likely to accept expert intuition and that this acceptance will influence the team intuition. In formal terms, it can be hypothesized that

3_a. The more the expert intuition, the more it will impact team intuition.

3_b. The higher the likeliness to accept expert intuition by the team, the more it will impact team intuition.

According to the heterarchical power theory, power in a cross-functional team is dynamic. It is neither static nor embedded in a particular position (Aime et al., 2014). This power is conceptualized as expert power. Aime et al. (2014) are of the view that in a cross-functional team task, the power lies in the hand of the expert of that particular task. Other team members also rely on the expertise of that team member based on his or her knowledge, skills and exposure. Extending this phenomenon to expert intuition, that is already expected to directly influence the team intuition, it could be argued that expert power will increase the impact of expert intuition on overall team intuition. The expert can use his or her expert power to influence the team to accept his or her intuition and ultimately to consider it as team intuition.

In a similar capacity the concept of team cognition suggests that a team's likeliness to accept expert intuition will lead to team intuition and that decision would be influenced by expert power. As the team is already likely to accept expert intuition and this team likeliness to accept expert intuition influences the team intuition, expert power is further expected to positively increase the influence of team likeliness to accept expert intuition on team intuition.

Hence, it is hypothesized that

4_a. The higher the expert power of a team member, the greater the impact of expert intuition will be on team intuition.

4_b. The higher the expert power of a team member, the greater the impact of team likeliness to accept expert intuition will be on team intuition.

3. Methods

3.1. Measures and sampling

To empirically test the hypotheses, we initially took a sample of 300 software houses in Pakistan. These software houses were involved in new software development and most of them were involved in new software development for clients in developed countries. Web-based and android-based software development was a major part of their business portfolio. The software houses were selected because of their active new software development activities, which were characterized by strict client requirements and time constraints. Moreover, there was intense competition among the developers; hence the environmental uncertainty was quite high.

Of this sample, around 40% (116) of the software houses responded and granted permission to collect data from their software development teams. The average number of team members in a software development was around eight members. For only 2% of the sample, the number of team members exceeded 15, since the development project was quite big. Data collection took around 2 months, from February, 2015 to March, 2015.

There were a total number of 325 respondents among these 116 software houses' NPD teams. We assured respondents of the data's anonymity and confidentiality. The average response rate was three members per team.

3.2. Measures

We used well-established scales to measure the relevant constructs. Some of the measurement scales were adapted according to the operationalized definition of the construct as well as according to the context of the study (see Table 1).

3.2.1. Task complexity

Task complexity was measured by adapting a scale developed by Maynard and Hakel (1997). The four items on the scale (i.e. *I found this to be a complex task. This task required a lot of thought and problem-solving*) measured task complexity. A five-point Likert scale was used in which responses ranged from 1 (totally disagree) to 5 (totally agree). The scale was adapted with a slight modification in sentence construction to align it with the study's scope. A confirmatory factor analysis (CFA) revealed strong loadings of all four items on the said construct. The mean of the responses was taken to further check its relationship with other variables.

3.2.2. Task creativity

Moorman (1995) developed a seven-item scale to measure new product creativity. We adapted this scale to measure task creativity. A modification in the sentence construction (i.e. from "*this product*" to "*the task assigned to me*") was done to measure task creativity. Similar modifications have been done by Dayan and Elbanna (2011) in other adaptations of measurement scale. The reliability of the adapted scale was >0.70 and hence was considered reliable according to a reliability convention in the social and psychological sciences (Nunnally, Bernstein, & Berge, 1967). The CFA confirmed the significant loading of all seven items on the main construct of task creativity. A five-point Likert scale was used in which responses ranged from 1 (strongly disagree) to 5 (strongly agree).

3.2.3. Environmental turbulence

An already well-established and validated scale was used to measure environmental turbulence. Jaworski and Kohli (1993) developed this scale by measuring environmental turbulence in terms of market turbulence, competitive intensity and technological turbulence. The same scale was used to measure environmental turbulence in this study. The CFA revealed that market turbulence and technological turbulence items had factor loadings of more than 0.7 to the main construct, and competitive intensity was removed due to insufficient loadings on the main construct. A five-point Likert scale was used in which responses ranged from 1 = strongly disagree to 5 = strongly agree.

3.2.4. Expert intuition

Pretz et al. (2014) developed and validated a scale to measure intuition. They further categorized different kinds of intuition: holistic-big picture, holistic-abstract, inferential and affective. Among these types, Pretz et al. (2014) claimed the inferential type was a measure of expert intuition. We used the same items to measure expert intuition. One item with an insufficient loading was eliminated from the measurement scale. A five-point Likert scale was used in which responses ranged from 1 (definitely false) to 5 (definitely true).

3.2.5. Team likeliness to accept expert intuition

The questionnaire was adapted from another study by Raven, Schwarzwald, and Koslowsky (1998). The scale items were modified to measure *Likeliness to accept expert intuition* (i.e. *My team member(s)/leader are ready to accept expert intuition, after all he/she is an expert in his/her area.*). The exploratory factor analysis revealed that out of 9 items we used to measure this construct, 8 items had sufficient factor loadings for likeliness to accept intuition. Hence the 9th item was discarded from the list. A five-point Likert scale was used, in which responses ranged from 1 (strongly agree) to 5 (strongly disagree).

3.2.6. Team intuition

Dayan and Elbanna (2011) formulated a scale to measure team intuition. Out of the seven items in the scale, six items had sufficient factor loading (i.e. to what extent participants in this study rely on personal judgment) and were adapted to measure team intuition in this study. A five-point Likert scale was used, in which responses ranged from 1 (very little extent) to 5 (very great extent). The CFA showed factor loadings of 0.7 or more for each item on the team intuition construct.

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

Table 1
Measurement scales and standardized factor loading.

Items	Standardized factor loading
Task complexity	
I found this to be a complex task	0.844
This task was mentally demanding.	0.738
This task required a lot of thought and problem-solving.	0.808
I found this to be a challenging task.	0.803
Task creativity	
The task (assigned to me in the project) challenged existing ideas for this category.	0.873
The task (assigned to me in the project) offered new ideas to the category.	0.822
The task (assigned to me in the project) was creative.	0.853
The task (assigned to me in the project) was interesting.	0.651
The task (assigned to me in the project) was very unique for this category.	0.752
The task (assigned to me in the project) produced ideas for other products.	0.792
The task (assigned to me in the project) encouraged fresh thinking.	0.745
Environmental turbulence	
In our kind of business, customers' product preferences change quite a bit over time.	0.790
Our customers tend to look for new products all the time.	0.698
We are witnessing demand for our products and services from customers who never brought them before.	0.928
New customers tend to have product-related needs that are different from those of our existing customers.	0.710
We cater many of the same customers that we used to in the past.	0.728
The technology in our industry is changing rapidly.	0.790
The technological changes provide big opportunities in our industry.	0.853
A large number of new product ideas have been made possible through technological breakthroughs in our industry.	0.848
Technological developments in our industry are rather minor.	0.811
Expert intuition	
I trust my intuitions, especially in familiar situations.	0.882
Familiar problems can often be solved intuitively.	0.739
There is a logical justification for most of my intuitive judgments.	0.618
My intuitions come to me very quickly.	0.684
My intuitions are based on my experience.	0.880
When I have experience or knowledge about a problem, I trust my intuitions.	0.573
When making a quick decision in my area of expertise, I can justify the decision logically.	0.869
If I have to, I can usually give reasons for my intuitions.	0.838
Likeliness to accept expert intuition	
My team member(s)/leader are ready to accept expert intuition; after all he/she is the expert in his/her area.	0.869
My team member(s)/leader are ready to accept expert intuition; after all he/she knows the best way to do the job.	0.723
My team member(s)/leader are ready to accept expert intuition; after all he/she knows more about the job than I do.	0.900
My team member(s)/leader are ready to accept expert intuition; after all he/she has more technical knowledge than me.	0.797
My team member(s)/leader are ready to accept expert intuition; after all he/she has more skills than me.	0.714
My team member(s)/leader are ready to accept expert intuition; after all he/she has more ability than me.	0.829
My team member(s)/leader are ready to accept expert intuition; after all he/she has more experience than me.	0.814
My team member(s)/leader are ready to accept expert intuition; since his/her previous intuitive decisions lead to favorable results.	0.862
Expert power	
My expert team member(s)/leader probably knew the best way to do the job.	0.706
My expert team member(s)/leader probably knew more about the job than I did.	0.813
My expert team member(s)/leader probably had more technical knowledge about this project than I did.	0.815
Team intuition	
To what extent did participants in this project rely basically on personal judgment?	0.794
On many occasions, the members of the team did not have enough information and had to make some decisions based on a “gut feeling.” To what extent did the team members in this project depend on a “gut feeling”?	0.814
To what extent, team members trust their hunches (feelings) when confronted by an important decision during this project?	0.763
To what extent, team members put a lot of faith in their initial feelings about other people and situations?	0.744
To what extent, team members put more emphasis on feelings than data when making decisions during this project?	0.790
To what extent, team members' intuition turns out to have been right all along?	0.725
Model fit indices	
$\chi^2 = 1609.36$, $df = 915$, $\chi^2/df = 1.759$, $RMSEA = .06$, $CFI = .89$	

3.2.7. Expert power

Expert power was measured through a scale developed by Raven et al. (1998). The measurement scale contains three items. All three items had a sufficient factor loading during the CFA. A five-point Likert scale was used, in which responses ranged from 1 (strongly agree) to 5 (strongly disagree).

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

3.3. Measurement model

Anderson and Gerbing (1988) proposed a series of evaluation tests for a measurement model, such as unidimensionality, discriminant validity, convergent validity and reliability. Initially, an exploratory factor analysis of the selected measurement tools was conducted using the maximum likelihood method. The Kaiser–Meyer–Olkin (KMO) value was greater than 0.7 and Bartlett's test of sphericity was significant. These results supported the use of factor analysis and suggested that the data could be fragmented into sets of latent factors (Kaiser & Rice, 1974). The factor loadings (in pattern matrix) of the majority of the items were sufficient (>0.5) to include in the measurement scale. All items with eigenvalues greater than 1 were included in the measurement model. Items with insufficient loading or cross loadings with a difference of less than 0.3 were excluded from the measurement items list. This process was adopted as per the recommendation of Hair, Black, Babin, Anderson, and Tatham (2006), who advised eliminating items with a loading of less than 0.5 or cross loading with a less than 0.3 level of difference.

After conducting an exploratory factor analysis (EFA), which is considered to be an efficient way to construct a scale, a subsequent confirmatory factor analysis (CFA) was conducted to confirm the loadings. The model fit was evaluated according to certain fitness indicators. These included a χ^2 goodness of fit test, a comparative fit index (CFI) and a root mean square error of approximation (RMSEA). These indices indicate the overall fitness of a model in relation to a null or independent model, which assumes the correlation among the observed variables as zero. The χ^2 value for the current measurement model was 1609.36 with a *df* 915. As a result, the value of CMIN/*df* was 1.759. The value of CFI and RMSEA was 0.89 and 0.06 respectively. According to the threshold levels defined by Hu and Bentler (1999), the above mentioned model fit values are considered sufficient to indicate the overall fitness of the measurement model (see Table 1).

Since these measurement scales were self-reported, a common method bias was also calculated. Harman's single factor test of common method bias was used to test common method variance as prescribed by Podsakoff and Organ (1986). Results indicated that a common method bias did not exist in the data as a single factor did not explain most of the variance. To check the multicollinearity that indicates whether or not two variables are very closely linearly related, multicollinearity diagnostics were used. Two commonly used methods to measure multicollinearity are the variance inflation factor (VIF) and tolerance. Myers (1990) proposed that if the value of VIF is greater than 10 then it is a concern. For a tolerance measure, Menard (2002) proposed that if the value of tolerance is less than 0.2 then multicollinearity is a serious concern. For this measurement model, the VIF value was 1 and the tolerance value was above 0.2, hence the issue of multicollinearity does not exist in this model.

The reliabilities of the constructs' scale are mentioned in Table 2. All reliability values ranged from 0.82 to 0.95. The values were well above the threshold level of 0.7 as suggested by Nunnally and Bernstein (1994). The correlation values between and among the variables indicated a low to moderate level of correlation, an evidence for discriminant validity. The values of correlation coefficient ranged from 0.034 to 0.527, which were well below the problematic level of 0.80 as suggested by Hair et al. (2006). The skewness values of the items ranged from −0.019 to 0.568 and the kurtosis values ranged from −1.22 to −0.243. The values were well below the concerned level of skewness of value 2 and kurtosis of value 5, as suggested by Ghiselli, Campbell, and Zedeck (1981). Hence as per the reliability and validity examination, the values were satisfactory enough for further inferential analysis.

3.4. Descriptive analyses

Table 2 presents the mean, standard deviation and inter-variable correlations. The correlation of task complexity and task creativity was positive and significant with expert intuition and the likeliness to accept expert intuition ($r = 0.286$, $p < 0.05$; $r = 0.5270$, $p < 0.05$; $r = 0.348$, $p < 0.05$; $r = 0.222$, $p < 0.05$). The correlation of expert intuition and the likeliness to accept expert intuition with team intuition was also positive and significant ($r = 0.199$, $p < 0.05$; $r = 0.376$, $p < 0.05$). The moderating variable environmental turbulence had a positive and significant relationship with the relevant dependent and independent variables. Similarly, the moderating variable, expert power, had a positive and significant relationship with its relevant dependent and independent variables.

Table 2
Descriptive statistics.

	Variables	Mean	SD	α	1	2	3	4	5	6	7
1	Task complexity	2.84	1.15	0.906	1						
2	Task creativity	2.78	1.08	0.927	0.250**	1					
3	Environmental turbulence	2.69	0.88	0.885	0.509**	0.359*	1				
4	Expert intuition	2.74	0.920	0.929	0.286**	0.348**	0.274**	1			
5	Likeliness to accept expert intuition	2.87	0.98	0.945	0.527**	0.222**	0.350**	0.184**	1		
6	Expert power	3.15	1.20	0.836	0.316**	0.180**	0.305**	0.034**	0.362**	1	
7	Team intuition	2.77	0.93	0.892	0.315**	0.323**	0.285**	0.199**	0.376**	.169*	1

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

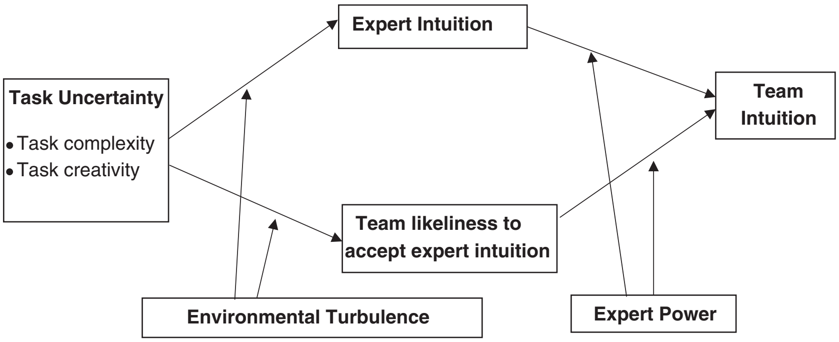

Fig. 1. Theoretical framework.

3.5. The structural model and hypothesis testing

The structural model was tested using the maximum likelihood method in structural equation modeling (SEM). This procedure provided the overall model fit along with the degrees of freedom. The result of the SEM evaluation supported most of the hypotheses (see Fig. 1). The overall conceptual model was an adequate fit with the data ($\chi^2 = 55.586$, $df = 18$, $\chi^2/df = 3.088$, RMSEA = 0.09, CFI = 0.86). The ratio of χ^2/df is 3.088, which is less than 5 suggesting a reasonable model fit. The CFI value between 0.8 and 0.9 indicates a moderate fit (Hu & Bentler, 1999). RMSEA is 0.09 that is closer to the threshold level of 0.05. (See Fig. 2.)

The task related variables (i.e. task creativity, task complexity) had a significant positive impact on expert intuition and the team's likeliness to accept expert intuition. The loadings of the path between task creativity, expert intuition ($\beta = 0.27$, $p < 0.001$); task creativity, likeliness to accept expert intuition ($\beta = 0.17$, $p < 0.05$); task complexity, expert intuition ($\beta = 0.25$, $p < 0.001$) and task complexity, likeliness to accept expert intuition ($\beta = 0.48$, $p < 0.001$) had a positive and significant impact. These results are consistent with the H_{1a}, $H_{1b,}$ H_{1c} and H_{1d}.

The impact of expert intuition on team intuition was also positive and significant. This is evident from the loadings of the path between expert intuition and team intuition ($\beta = 0.15$, $p < 0.01$). Similarly, the impact of the likeliness to accept expert intuition on team intuition was also positive and significant. The standardized regression value of the path between likeliness to accept expert intuition and team intuition was quite high ($\beta = 0.45$, $p < 0.01$). These findings are consistent with H_{3a}, H_{3b}.

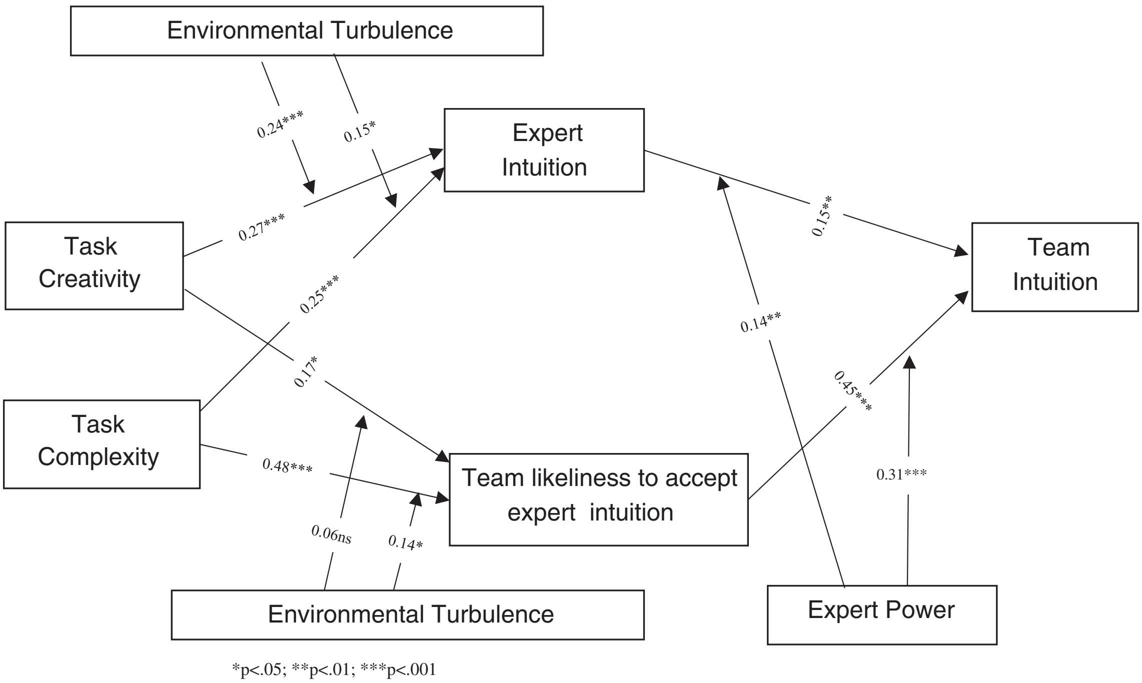

Fig. 2. Path coefficient estimates of the proposed model.

3.5.1. Moderating influences

The interaction method was used to test the moderating influence of environmental turbulence between task creativity, expert intuition; task creativity, likeliness to accept expert intuition; task complexity, expert intuition and task complexity, likeliness to accept expert intuition. Initially standardized values (mean = 0, standard deviation = 1) were computed, then the moderating effect of environmental turbulence was calculated through the interaction method. The findings well supported the hypothesis except for the moderating influence of environmental turbulence on task creativity and the likeliness to accept expert intuition, which was not significant. The moderating impact of environmental turbulence on task creativity, expert intuition ($p < 0.001$); task complexity, expert intuition ($p < 0.001$); and task complexity, likeliness to accept expert intuition ($p < 0.05$) was significant. These results support H_{2a}, H_{2b}, H_{2c}, but did not support H_{2d}.

The moderating influence of expert power on the path between expert intuition, team intuition ($p < 0.01$); and likeliness to accept expert intuition, team intuition ($p < 0.001$) was positive and significant. These results were consistent with hypotheses H_{4a} and H_{4b}. In conclusion, the findings revealed that environmental turbulence and expert power had a significant impact on their hypothesized dependent and independent variables.

3.6. Discussion and implications

The theoretical framework (Fig. 1) hypothesized that task uncertainty (that is operationalized in terms of task creativity and task complexity) acts as an antecedent of expert intuition and the likeliness of the NPD team to accept expert intuition. The framework also proposed the moderated role of environmental turbulence between expert intuition, likeliness to accept expert intuition and its antecedents. Moreover, it was also proposed that the greater the expert intuition and the likeliness to accept expert intuition, the more it will lead to team intuition, and this relationship is moderated by the expert power possessed by the expert who is intuiting. The results of the study support a majority of the hypothesis drawn from intuition antecedents and its flow from individual to team intuition. These results prove the importance of task characteristics and of the individual–team interplay that precedes the final team intuition.

3.6.1. Theoretical contributions

Three major contributions are made by this research in the academic literature. First, even though most of the findings are consistent with the existing literature about intuition, its antecedents and consequences (Dayan & Elbanna, 2011) the moderating impact of environmental turbulence on the relationship between task creativity and likeliness to accept expert intuition is still very low and insignificant. These findings surprised us. Perhaps the most plausible reason for such findings is the constructive conflict among team members. As defined by Danneels and Sethi (2003), constructive conflict refers to a debate of ideas, beliefs and assumptions by its concerned stake holders. This constructive conflict can lead to the unacceptance of certain creative ideas presented by team members under uncertain conditions. This unacceptance can be based on certain prevailing market, technological conditions, the team's culture and the overall strategic objectives of the NPD project. The unacceptance of creative ideas required for the task can explain why a creative task cannot influence the team members to accept expert intuition.

Second, the uncertainty regarding a particular situation is considered as an arousing factor of an intuition (Dane & Pratt, 2007; Khatri & Ng, 2000). This phenomenon is also supported by the overall significant impact of task uncertainty dimensions on expert intuition, yet contrasting evidence in the literature (Dayan & Elbanna, 2011; Elbanna & Child, 2007) found no significant direct or moderating impact of decision uncertainty on intuition. The results of this study are different from the above mentioned studies, particularly in terms of context. One study (Elbanna & Child, 2007) primarily focused on the strategic aspects of decision making whereas another (Dayan & Elbanna, 2011) measured decision uncertainty as a possible antecedent of team intuition. One could argue that first, this study primarily focused on the NPD context in general, and was not specific to its strategic aspect. Second, it measured the impact of contextual factors on individual expert intuition, as opposed to team intuition. Third, both the above mentioned studies focused on decision uncertainty whereas this study focused on task uncertainty, which is a different construct than decision uncertainty. Moreover, this study focused specifically on expert intuition, not intuition in general.

Third, the most important contribution of this paper lies in its examination of the moderating impact of expert power on the relationship between individual expert intuition and team intuition. So far, as per our limited knowledge, no empirical study has been conducted to conceptualize the relationship between expert intuition and expert power especially in NPD context. This study empirically validates the heterarchical phenomenon of power (Aime et al., 2014) in a cross-functional team. It corroborates the findings that power in a cross-functional team is based on expertise and keeps on rotating based on the task ahead. The results reveal an interrelationship between expert intuition and expert power that impact team intuition. Similarly, expert power also influences the likeliness to accept expert intuition to finally consider it as team intuition.

Overall, this study makes a contribution to the field of intuition (both individual as well as team intuition) and to the understanding of the power dynamics in a cross-functional team. Research in the expert power literature has been empirically tested and it validated the impact of expert power on the individual–team intuition interplay.

3.6.2. Managerial implications

Intuition usage and intuitive judgment is a phenomenon that can be inculcated among employees through proper education, training and development (Hogarth, 2001). Based on this premise certain managerial implications can be presented to improve better intuitive decision making and to develop team intuition.

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

First, this study further persuades managers/decision makers to include NPD team members who are experienced in their particular domain and who can work under turbulent conditions. However, team cohesion can be a serious issue if the goals and objectives of the project are not clear and if a reporting structure is not well defined.

Second, managers must promote the use of intuition among the experts. The team culture should be such that it must encourage intuitive opinions so that a new and broad range of solutions can be considered. Moreover, team members must also be trained about the evaluation of the pros and cons of an expert's intuition before considering it as a possibility to be adopted as team intuition.

Third, the whole team, especially the team leader (in terms of authoritative position), must be explicitly told to be more cooperative with experts in certain areas so that the team will come up with more and accurate opinions. The team leader should discourage applying coercive enforcement of opinion on the rest of the experts in the team since each particular task will result into the expert power of a different team member.

Fourth, the experts must be told how to effectively use their expert power to create a team intuition. It can be summarized therefore that the whole team must be briefed about the intuition interactions under uncertain situations.

4. Limitations and recommendations for further research

The current study is not without limitations. Though the framework is carefully defined to provide clear insights to contribute to the existing literature, there are still certain methodological limitations. One major limitation is the self-reporting criteria and cross-sectional research design. Since respondents are referring to previous projects in some questions, they may not be remembering the details accurately, even though reliable and valid measures were used to reduce the potential impact of this limitation as recommended by Miller, Cardinal, and Glick (1997).

The data was collected from team members in the software industry. This narrow focus may limit the ability to generalize to NPD projects in different domains. Another limitation of the study is the limited size of the sample and that the data was collected from only one country.

Further research should be conducted on factors that antecede expert intuition and team intuition. Moreover, the relationship between expert intuition and expert power and the roles they play must be further explored and empirically tested. The impact of team intuition should be further tested on certain project level constructs such as project success and market success. The use of different moderating and mediating factors will further untangle different influencers and the underlying mechanism of this whole team intuition development and its application at intuitive decision making process.

References

Açıkgöz, A., Günsel, A., Bayyurt, N., & Kuzey, C. (2014). Team climate, team cognition, team intuition, and software quality: The moderating role of project complexity. *Group Decision and Negotiation*, *23*(5), 1145–1176.

Aime, F., Humphrey, S., DeRue, D. S., & Paul, J. B. (2014). The riddle of heterarchy: Power transitions in cross-functional teams. *Academy of Management Journal*, *57*(2), 327–352.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411.

Batson, C. D. (1990). How social an animal? The human capacity for caring. *American Psychologist*, *45*(3), 336.

Bettenhausen, K. L. (1991). Five years of groups research: What we have learned and what needs to be addressed. *Journal of Management*, *17*(2), 345–381.

Bunderson, J. S. (2003). Team member functional background and involvement in management teams: Direct effects and the moderating role of power centralization. *Academy of Management Journal*, *46*(4), 458–474.

Campion, M. A., Medsker, G. J., & Higgs, A. C. (1993). Relations between work group characteristics and effectiveness: Implications for designing effective work groups. *Personnel Psychology*, *46*(4), 823–850.

Cobb, A. T. (1980). Informal influence in the formal organization: Perceived sources or power among work unit peers. *Academy of Management Journal*, *23*(1), 155–161.

Cooke, N. J., Salas, E., Kiekel, P. A., & Bell, B. (2004). Advances in measuring team cognition. *Team cognition: Understanding the factors that drive process and performance* (pp. 83–106).

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, *24*(3), 522–537.

Dane, E., & Pratt, M. G. (2007). Exploring intuition and its role in managerial decision making. *Academy of Management Review*, *32*(1), 33–54.

Danneels, E., & Sethi, R. (2003). Antecedents of new product program creativity: The moderating role of environmental turbulence. *Paper presented at the Academy of Management Proceedings*.

Dayan, M., & Di Benedetto, C. A. (2011). Team intuition as a continuum construct and new product creativity: The role of environmental turbulence, team experience, and stress. *Research Policy*, *40*(2), 276–286.

Dayan, M., & Elbanna, S. (2011). Antecedents of team intuition and its impact on the success of new product development projects. *Journal of Product Innovation Management*, *28*(s1), 159–174.

Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly*, 52–73.

Eisenhardt, K. M. (1999). Strategy as strategic decision making. *Sloan Management Review*, *40*(3), 65–72.

Elbanna, S., & Child, J. (2007). Influences on strategic decision effectiveness: Development and test of an integrative model. *Strategic Management Journal*, *28*(4), 431–453.

Eppinger, S. D., & Ulrich, K. T. (1995). *Product design and development, 1995*.

French, J. R., Raven, B., & Cartwright, D. (1959). The bases of social power. *Classics of organization theory* (pp. 311–320).

Gartner, W. B., Bird, B. J., & Starr, J. A. (1992). Acting as if: Differentiating entrepreneurial from organizational behavior. *Entrepreneurship: Theory and Practice*, *16*(3), 13–31.

Gibson, C. B. (1999). Do they do what they believe they can? Group efficacy and group effectiveness across tasks and cultures. *Academy of Management Journal*, *42*(2), 138–152.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis*, *Vol. 6*, Upper Saddle River, NJ: Pearson Prentice Hall.

Hansen, G. S., & Wernerfelt, B. (1989). Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, *10*(5), 399–411.

Hite, J. M., & Hesterly, W. S. (2001). Research notes and commentaries. The evolution of firm networks: From emergence to early growth of the firm. *Strategic Management Journal*, *22*(3), 275–286.

Please cite this article as: Ali, Z., et al., The dynamics of expert and team intuition in NPD projects: The role of environmental turbulence and expert power, *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.04.002

Hogarth, R. M. (2001). *Educating intuition*. University of Chicago Press.
Hollenbeck, J. R., Ilgen, D. R., Sego, D. J., Hedlund, J., Major, D. A., & Phillips, J. (1995). Multilevel theory of team decision making: Decision performance in teams incorporating distributed expertise. *Journal of Applied Psychology*, *80*(2), 292.
Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55.
Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: Antecedents and consequences. *The Journal of Marketing*, 53–70.
Kaiser, H. F., & Rice, J. (1974). Little jiffy, Mark IV. *Educational and psychological measurement*.
Khatri, N., & Ng, H. A. (2000). The role of intuition in strategic decision making. *Human Relations*, *53*(1), 57–86.
Klein, G. A. (2002). *Intuition at work: Why developing your gut instincts will make you better at what you do: Currency/Doubleday*.
Klimoski, R., & Mohammed, S. (1994). Team mental model: Construct or metaphor? *Journal of Management*, *20*(2), 403–437.
Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260.
March, J. G., & Simon, H. A. (1958). *Organizations*.
Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E., & Cannon-Bowers, J. A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, *85*(2), 273.
Menard, S. (2002). *Applied logistic regression analysis, Vol. 106*, Sage.
Miller, C. C., & Ireland, R. D. (2005). Intuition in strategic decision making: Friend or foe in the fast-paced 21st century? *The Academy of Management Executive*, *19*(1), 19–30.
Miller, C. C., Cardinal, L. B., & Glick, W. H. (1997). Retrospective reports in organizational research: A reexamination of recent evidence. *Academy of Management Journal*, *40*(1), 189–204.
Moorman, C. (1995). Organizational market information processes: Cultural antecedents and new product outcomes. *Journal of Marketing Research*, 318–335.
Myers, R. H. (1990). *Classical and modern regression with applications, Vol. 2*, Belmont, CA: Duxbury Press.
Neisser, U. (1976). *Cognition and reality: Principles and implications of cognitive psychology*. WH Freeman/Times Books/Henry Holt & Co.
Nunnally, J. C., Bernstein, I. H., & Berge, J. M. t. (1967). *Psychometric theory, Vol. 226*, New York: McGraw-Hill.
Ozer, M. (2005). Factors which influence decision making in new product evaluation. *European Journal of Operational Research*, *163*(3), 784–801.
Parker, L. E. (1994). Working together: Perceived self-and collective-efficacy at the Workplace1. *Journal of Applied Social Psychology*, *24*(1), 43–59.
Pretz, J. E., Brookings, J. B., Carlson, L. A., Humbert, T. K., Roy, M., Jones, M., & Memmert, D. (2014). Development and validation of a new measure of intuition: The types of intuition scale. *Journal of Behavioral Decision Making*, *27*(5), 454–467.
Prietula, M. J., & Simon, H. A. (1989). The experts in your midst. *Harvard Business Review*, *61*, 120–124.
Prussia, G. E., & Kinicki, A. J. (1996). A motivational investigation of group effectiveness using social-cognitive theory. *Journal of Applied Psychology*, *81*(2), 187.
Raven, B. H., Schwarzwald, J., & Koslowsky, M. (1998). Conceptualizing and measuring a power/interaction model of interpersonal influence1. *Journal of Applied Social Psychology*, *28*(4), 307–332.
Rook, K. S. (1984). The negative side of social interaction: Impact on psychological well-being. *Journal of Personality and Social Psychology*, *46*(5), 1097.
Sadler-Smith, E., & Shefy, E. (2004). Developing intuition: 'Becoming smarter by thinking less'. *Paper presented at the Academy of Management Proceedings*.
Schein, V. E. (1977). Individual power and political behaviors in organizations: An inadequately explored reality. *Academy of Management Review*, *2*(1), 64–72.
Sebanz, N., Bekkering, H., & Knoblich, G. (2006). Joint action: Bodies and minds moving together. *Trends in Cognitive Sciences*, *10*(2), 70–76.
Seifert, M., & Hadida, A. L. (2009). Decision making, expertise and task ambiguity: Predicting success in the music industry. *Paper presented at the Academy of Management Proceedings*.
Sethi, R., Smith, D. C., & Park, C. W. (2001). Cross-functional product development teams, creativity, and the innovativeness of new consumer products. *Journal of Marketing Research*, *38*(1), 73–85.
Simon, H. A. (1987). Making management decisions: The role of intuition and emotion. *The Academy of Management Executive*(1987-1989), 57–64.
Sonenshein, S. (2007). The role of construction, intuition, and justification in responding to ethical issues at work: The sensemaking-intuition model. *Academy of Management Review*, *32*(4), 1022–1040.
Stein, M. (1974). *Stimulating creativity: Volume one, individual procedures*. New York: Academic Press.
Sy, T., Côté, S., & Saavedra, R. (2005). The contagious leader: Impact of the leader's mood on the mood of group members, group affective tone, and group processes. *Journal of Applied Psychology*, *90*(2), 295.
Tatikonda, M. V., & Rosenthal, S. R. (2000). Technology novelty, project complexity, and product development project execution success: A deeper look at task uncertainty in product innovation. *IEEE Transactions on Engineering Management*, *47*(1), 74–87.
Uhl-Bien, M., & Graen, G. B. (1998). Individual self-management: Analysis of professionals' self-managing activities in functional and cross-functional work teams. *Academy of Management Journal*, *41*(3), 340–350.
Wally, S., & Baum, J. R. (1994). Personal and structural determinants of the pace of strategic decision making. *Academy of Management Journal*, *37*(4), 932–956.
Walsh, J. P., & Fahey, L. (1986). The role of negotiated belief structures in strategy making. *Journal of Management*, *12*(3), 325–338.
West, G. P. (2007). Collective cognition: When entrepreneurial teams, not individuals, make decisions. *Entrepreneurship: Theory and Practice*, *31*(1), 77–102.
Zarraga, C., & Bonache, J. (2003). Assessing the team environment for knowledge sharing: An empirical analysis. *International Journal of Human Resource Management*, *14*(7), 1227–1245.
Zirger, B. J., & Hartley, J. L. (1996). The effect of acceleration techniques on product development time. *IEEE Transactions on Engineering Management*, *43*(2), 143–152.