The Role of Shared Team Passion, Shared Norms of ICT Use, and Expertise on Knowledge Team Creativity

Kyung Young Lee  
Bishop’s University  
klee@ubishops.ca

Geneviève Bassellier  
McGill University  
genevieve.bassellier@mcgill.ca

Samer Faraj  
McGill University  
samer.faraj@mcgill.ca

Abstract

This study investigates factors influencing knowledge teams to produce creative outcomes. Our model includes three inputs—shared team passion, existence of team expertise, and shared norms of Information Communication Technology (ICT) use—and two processes (external knowledge sourcing, and internal knowledge sharing) that facilitate the creativity of knowledge team outcomes in a context where team members voluntarily join and collaborate via ICT for knowledge creation. The research model is tested with team-level survey data from an educational service company. Results support the role of shared team passion on creativity of team outcome through its influence on external knowledge sourcing and internal knowledge sharing and the moderating role of shared norms of ICT use. We conclude with the possible implications of this study.

1. Introduction

In current business environments, organizational teams often need to combine the distributed knowledge of members from different parts of organizations in order to create a novel outcome. Getting those team members to collaborate is made easier with the help of Information Communication Technologies (ICT) such as virtual workplaces, file sharing systems, and various communication tools, whether or not team members are physically collocated. Although there are several types of teams that are formed for knowledge creation and that rely on ICT for collaboration (e.g. project teams, SW development teams, etc.), this study focuses on knowledge teams [1] that are IT-enabled teams formed by members with diverse expertise in order to create knowledge by working on non-routine, project-based, and complex tasks [1,2]. This type of team becomes more and more important for current organizations as the need to share and transfer knowledge within and outside teams increases with the complexity of the problems faced. [1]. Among various outcome measures (effectiveness, financial performance, or creativity in outcomes), producing a creative team outcome is an important aspect of team performance that organizations expect from knowledge teams [3].

Extant research has identified various cognitive and psychological inputs of knowledge team creativity such as expertise, experience, mood, motivation, and trust [4-7]. However, although passion has been identified as a key driver of team collaboration [8] and thus may also play an important role in team processes for creativity [9], the role of team passion on creativity has not yet been empirically examined. Thus, the motivation of this study is twofold: 1) identify and test the impact of a new team-level input for creative outcome in knowledge teams; and 2) investigate the role of ICT as moderating factor for the impact of the team input.

It is suggested that team creativity is a function of team inputs, processes, and contextual influences [7]. This study follows a similar approach in developing a research model on knowledge team creativity. The model highlights the role of shared team passion as an important team-level psychological input [10, 11]. That is, this study aims to show that shared passion about team activities can enable team creativity through two key knowledge processes: external knowledge sourcing and internal knowledge sharing. Further, this study also investigates the role of team expertise, a well-known cognitive input for team creativity [4] and shared norms of ICT, an important team input for team collaboration [12]. Therefore, this study aims to answer the following research questions: “What are the impacts of passion and expertise on team creativity through team knowledge processes? And “Do shared norms of ICT moderate the relationship between team passion and team knowledge processes?”

2. Theoretical background
2.1. Knowledge team environment

This study focuses on knowledge teams that are characterized by these three elements; these teams: 1) have an objective of knowledge creation, 2) are temporary in nature, and 3) are ICT-enabled forms of collaboration.

First, knowledge teams are formed to combine the knowledge from different areas of expertise, in order to create something new [1]. Such teams are often cross-functional, self-managed, and facing complex and non-routine tasks [13, 14], as this kind of teams are often composed with the members from different parts of organizations and work on topics that are complex and not well circumscribed [14] 1. In addition to working towards meeting the requirements of the organization’s stakeholders, knowledge team members may also be setting their own goals while working on these teams. Thus, the degree of involvement of team members varies according to the team members’ goals. In this paper, we propose that team level passion will make a difference in the involvement by team members.

Second, although it may not always be the case, knowledge teams are usually formed for a certain period of time. When teams are temporarily, members may have social interaction anxiety [15], which may discourage them from freely sharing ideas due to low psychological safety [16]. Also, being involved on a temporary basis often requires team members to engage in both their tasks in the knowledge teams in addition to their day-to-day jobs in their functional teams. In such case, it is possible that some team members show social loafing [3] as knowledge team activities may not be their first priority. If team members develop a shared psychological input such as team passion, it may, over time, mitigate the interaction anxiety and social loafing and thus facilitate a more active sharing of ideas among members.

A third characteristic of knowledge team is that, as any contemporary teams, they can have a certain level of virtuality [17] in that team members rely on different degrees of ICT for team collaboration. This implies that the communication among members happens both face-to-face (f2f) and through ICT. These dual communication modes (f2f and via ICT) should influence the way team members work together. In this type of collaboration environment, members’ shared understanding of how to use ICT for team collaboration is expected to be very important for team processes and outcome.

2.2. Shared team passion

In this study we introduce shared team passion as an important team-level input for team creativity. Passion addresses a number of detrimental factors that can take place in knowledge team such as social interaction anxiety and social loafing [3, 15], by helping members make an extra effort to participate in team activities.

2.2.1. Passion as an important psychological input in non-mandated work environment. Passion has been studied mostly at the individual level. It has been defined in various ways, including as a strong inclination toward an activity [18] and as an intense positive emotional arousal, internal drive and full engagement [19]. Common to those definitions is that passion is formed toward a specific object (i.e. referent target) and that it entails strong liking and full engagement about the target.

Passion has been investigated in various contexts such as sports, gaming and other recreational activities [18], but in the field of management, most studies on passion investigated entrepreneurial passion [11]. Common to those contexts is that passion plays an important role in the success of the active engagement with the reference target, when this engagement is not strictly mandated. According to Cardon et al. (2009), passion has a motivational effect that stimulates entrepreneurs to remain engaged to their target activities, which means that passion is distinct from other constructs such as motivation or engagement [11]. Rather, passion influences ones’ task engagement.

2.2.2. Defining passion at the team level – shared team passion. Passion is not clearly defined at the team level [11]. To the best of our knowledge, there is no empirical study on passion at the collective level. However, theoretical work has described the benefits of looking at passion at the collective level [20]. For example, Faraj et al. (2011) argued that passion in an online community may influence knowledge collaboration [8]. As such, team passion can make a difference in team outcomes through its impact on team processes. In this study, based on the definitions of individual passion in extant studies [10, 11], we define shared team passion about knowledge team activities as the degree with which a team—through its members—experiences strong liking,
enthusiasm, and attachment to the tasks of the team. We also argue that passion is an important team-level input for knowledge processes and team creativity.

2.3. The role of ICT: Shared norms

Earlier studies on the role of ICT in organizations looked at rather a direct impact of ICT on organizations [21], by answering “what is the impact of IT implementation”. However, nowadays, ICT is embedded in every part of organizational activities and even the use of ICT is taken for granted in contemporary organizations. Thus, instead of investigating the direct impact of ICT, we look into the moderating role of ICT, especially the role of shared norms about ICT use as a moderating impact for the relationship between team input (passion) and knowledge team processes, which will provide us with a valuable understanding of how ICT play roles on knowledge team processes for creative outcomes.

In virtual team environments, the concept of the shared norms about ICT use has often been emphasized as an important factor for successful performance [22]. Research suggests that shared norms about ICT use in a team are not formed in a day [23]. Thus, at the initial stages there are few shared norms of ICT use, as knowledge teams are often formed with members who have never worked together before. Norms about ICT are formed over a period of time through interaction among members. Thus, the extent to which teams have developed shared norms about ICT use should vary across teams. This study seeks to investigate how shared norms of ICT use in teams influence the way team inputs affect team knowledge management processes.

Based on previous studies involving shared norms at the team level, we define shared norms of ICT use as team members’ common understanding about how ICT are used for team activity [12, 24]. The dimensions of the shared norms of ICT identified in previous studies can be summarized into two categories: shared norms of 1) managing digital contents; and 2) members’ use of different types of ICT for team activities [25]. These two dimensions of shared norms of ICT use have the potential to help team members collaborate among one another.

2.4. Creativity of knowledge team: the role of knowledge management processes

Creativity is defined as the creation of valuable, useful new product, service, idea, procedure, or process by individuals working together in a social system [7]. Thus, in this study of knowledge teams, their creativity can be measured by novel and useful ideas (that is associated with creativity) embedded in the outcomes of knowledge teams’ work [26, 27].

A number of studies have suggested the roles of team inputs (team composition, members’ status, etc.) and processes (members’ task activities) on team creativity [3]. The team inputs that are said to be related to team creativity include psychological (e.g., commitment), compositional (e.g., diversity), or cognitive (e.g., expertise) factors [7]. In this study, we propose shared team passion as an important psychological input and team expertise as an important cognitive input, reflecting the importance of team members’ task-related expertise and a psychological force that encourages team members’ active participation in team activities. In addition, team processes such as boundary spanning [28], external knowledge sourcing [29], and sharing team members’ ideas [3] are found to be the processes that positively influence team creativity.

Although extant studies have informed the impact of both team inputs and processes on team creativity, we take the perspective of the input-process-output model of creativity [7] and argue that team inputs enable two important team knowledge processes: 1) external knowledge sourcing; and 2) internal knowledge sharing, which improve the creativity of team outcomes in the context of knowledge teams. Internal knowledge sharing is defined as the provision or receipt of task information, know-how, and feedback regarding team activities among team members, and external knowledge sourcing is defined as the receipt of information, know-how, and feedback regarding team activities from external knowledge sources [30, 31].

3. Research Model and Hypothesis

3.1. The impact of shared team passion on team knowledge processes

We argue that shared team passion about team’s activities can address some detrimental factors emerging from active participation in team knowledge processes and thus improve the team’s knowledge management processes, making passion an important factor for hard-working and deliberate practice for success [32].

As described above, in the context of knowledge teams, it is often the case that active engagement in team activities is not strictly mandated. Without prioritizing the activities of knowledge teams, some members do not care about their team’s activities while physically away from one another. Members of
3.2. The impact of the presence of expertise

Although the presence of expertise is found to be an important direct antecedent for team creativity [4], we argue that expertise indirectly influence team creativity through sharing of team knowledge, as it is often the case that team members are from different areas of expertise and sharing knowledge is a key process for expertise to take an effect on team creativity. Previous research has also found that the level of expertise should be related to sharing one’s knowledge at the individual level [34]. In order for each team member to share their knowledge within the team, it is important for them to have a certain level of expertise to do so. At the team level as well, if team members find that the knowledge embedded within the team is related to various aspects of team outcomes, they will spend more time to sharing it within the team. Therefore, we hypothesize that:

H3: Task-related expertise is positively associated with internal knowledge sharing.

3.3. The impact of team knowledge processes on team creativity

Research on knowledge management and learning has paid great attention to two team learning processes; internal knowledge sharing and external knowledge sourcing. A number of studies so far have found that these team knowledge processes enhance team innovativeness and creativity [28, 29]. Thus, as stated in theoretical background, we take the input-process-output model of team creativity and hypothesize the impact of these two team processes on the creativity of team outcomes.

First, research on external knowledge sourcing, external learning and boundary spanning have emphasized the importance of external knowledge sourcing on the various aspects of team outcomes [3, 29-31]. One thing consistently suggested by these studies is that knowledge sourcing from external sources (often used interchangeably with ‘external learning’ and ‘external knowledge acquisition’) should influence team innovativeness or the creative performance of teams [31, 35]. In the context of knowledge teams, as well, members’ efforts to bring external knowledge into the process of creating novel outcomes should influence team creativity because in teams with diversified members’ backgrounds, bringing in external information should stimulate members’ creative thinking. Therefore, we argue that:

H4: External knowledge sourcing positively influences the creativity of team outcomes.
Studies on team learning emphasize the role of knowledge sharing on team performance. It is suggested that sharing members’ knowledge internally or learning from other members internally helps improve creativity [36], and overall performance [29]. For team creativity, knowledge sharing within a team is an important team knowledge process that helps innovative ideas to disseminate within a team and is considered a critical factor for creativity [37]. Team members can have the opportunity to learn about categories of knowledge to which they might not have otherwise been exposed. Those diversified categories of shared knowledge may stimulate team members to think about creative ideas and may also remind them of relevant domain of knowledge for creative team outcomes [38]. Therefore, we hypothesize that:

\[ H_5: \text{Internal knowledge sharing positively influences the creativity of team outcomes.} \]

3.4. The moderating impact of shared norms of ICT use

As stated in theoretical background, a knowledge team is ICT supported team environment and nowadays ICT use becomes routinized by knowledge team members. In this knowledge team environment, we argue that the shared norms about ICT use positively moderate the impact of team members’ passion on team knowledge processes.

External knowledge sourcing involves seeking new knowledge from external sources, such as members from their functional teams, external experts, the Internet, and other materials [39]. When team members achieve shared norms about using ICT for collaboration, they not only understand how to communicate among one another via which ICT, but they also have a common understanding of what knowledge is needed and how to find it from external sources using ICT. For instance, in order to develop new sales plans, knowledge team members will discuss which websites to visit, what keywords to use in Internet search engines, and which ICT to use to find that information. As such, if team members have shared norms about the ways to find useful information from external sources, they will engage in external knowledge sourcing processes more often, as long as they have a strong psychological attachment to their team activities. Therefore, we hypothesize that:

\[ H_6: \text{Shared norms of ICT use positively moderate the relationship between shared team passion and external knowledge sourcing.} \]

Research has found that under a highly virtual knowledge team environment, shared norms of ICT use improve team efficiency [25]. Improved team efficiency in knowledge teams implies that team members can easily engage in team knowledge sharing processes using ICT, as long as they have a good psychological attachment to their tasks. That is, when passionate team members have shared norms about how to communicate together via ICT, they are more likely to spend more time and effort in sharing knowledge and information with other members via ICT. Also, if they have common norms of which ICT should be used in team communication, the codified knowledge contributed by each member of a passionate knowledge team should be better shared, and even applied to the final team outcomes. Therefore we hypothesize that:

\[ H_7: \text{Shared norms of ICT use positively moderate the relationship between shared team passion and internal knowledge sharing.} \]

Figure 1 illustrates our research model.

4. Methodology

4.1. Research Sites and Respondents

Data on knowledge teams were collected at a large firm in South Korea operating in the educational service industry. This company facilitates a form of knowledge teams once every year, to create business ideas or codified knowledge contents (e.g., marketing ideas), temporarily for about six months. Joining a knowledge team is not strictly mandated and means that an employee has to work on this project in addition to working on her/his own regular task. To fulfill tasks, team members meet regularly of (bi-weekly) and communicate virtually via ICT. The topics of each team are voluntarily decided by the team members. Being autonomous in joining in knowledge teams and setting team goal will make a variation in team passion, shared norms of ICT and knowledge processes across teams. The outcomes are
submitted to and rated by a company headquarter manager at the end of the team period.

We surveyed two groups of respondents. First, at the last (if not the second to the last) f2f meeting of each knowledge team, individual team members responded to the questions on independent and moderating variables which were aggregated into team-level measures. Second, one senior manager who supervises all participating knowledge teams rated the creativity of each team outcome, after the final outcomes of all participating teams are collected. It is suggested that subjective assessment of team creativity is common [40] and provides a team-level measure of outcomes [41].

A total of 402 individuals from 82 of the 163 targeted teams participated in the survey. Among those surveys, 18 individual responses and 5 team level samples were dropped by visual examination of collected data, because of many unanswered questions, lack of variance in answers (e.g., marked all 7 in the responses), or teams with less than two of the team members who provided responses. Overall, 375 respondents spread across 77 teams provided usable survey data (team level sample size n = 77), for a response rate of 47.2% at the team level. Within the final sample, 83.2% were female, and 85.0% were between 25 and 44 years old. On average, respondents had approximately 5 years (59 months) of experience in the field of the educational service industry. A total of 89.3% had a university degree or higher. The number of members who completed the survey ranges from 2 to 10 per team, with an average of 4.87 members per team.

4.2. Measures

The measures included in the questionnaires were developed with seven-point Likert scales (1 = “strongly disagree” to 7 = “strongly agree” or from 1 = “not at all” to 7 = “to a great extent”). Details of the items will be available on request.

Creativity of team outcome: We modified an extant measure of new product creativity [27], as this measure is most appropriate for the context of the field of this study.

Shared team passion: We modified Baum and Locke’s (2004) measure of shared team passion [10]. Five items were used, measuring aspects such as the extent to which each member agreed that their team loved their activities in the team and were looking forward to participating in their team activities.

Expertise within a knowledge team: Three items were used to measure the extent of the expertise related to team tasks. Items cover three dimensions of expertise: what is required to achieve team goals; how to make the presentation of outcomes. 

External knowledge sourcing and internal knowledge sharing: We adapted Wong’s (2004) scales of learning behavior [31] covering external knowledge sourcing, and internal knowledge sharing.

Shared norms of ICT use: We adapted extant measure [25] and used six-item measures of shared norms of ICT use in the context of knowledge teams. Items measure shared norms for managing digital documents related to team activities, and shared norms for team communication.

4.3. Measurement model testing

4.3.1 Pre-test result with pilot samples. As we modified several measures, we conducted an exploratory factor analysis (EFA), using the 79 pilot samples (at the individual level) to identify any items that cross-loaded on other constructs in order to refine the items. A principal component analysis was conducted with VARIMAX rotation. The results indicated that a five-factor solution with 22 items was the most likely (eigenvalue>1), and all items correlated most strongly with their intended constructs, and the Cronbach’s alpha [42] of all constructs exceeded the recommended threshold value of 0.7, which assesses adequate internal consistency of each latent variable.

4.3.2. Aggregation of data. The unit of analysis for this study is the team, but data was collected at the individual level. After the actual survey data was collected (375 individual samples), individual team members’ answers for each item within each team are averaged to form team-level data (77 teams). We followed the steps taken by Faraj and Yan (2009) [1] to ensure agreement within each team.

First, most survey items were worded to refer to the teams, rather than individuals, in order to ensure that the level of measurement matches the level of theory. Second, to justify aggregation from individual responses to the team level, we computed an inter-rater agreement statistic using the $R_{wg}$ procedure [43] to assess the convergence of responses among the members of each team. The median $R_{wg}$ values ranged from 0.904 to 0.950, above the generally accepted level of 0.7, thus indicating strong agreement among the team members for all the items. Third, we calculated intra-class correlations (ICC$_1$ and ICC$_2$) to check the reliability of the measures, even after being aggregated at the team level [44]. ICC$_1$ indicates the clustering (team) effect (team membership) against individual variance, while ICC$_2$ indicates whether teams can be reliability
differentiated on the basis of average individual members’ ratings [1]. The ICC for passion, expertise, external knowledge sourcing, internal knowledge sharing, and shared norms of ICT use were 0.444, 0.349, 0.207, 0.283, and 0.232, respectively, while ICC team were 0.795, 0.723, 0.560, 0.658, and 0.596, respectively, which ensures a moderate level of reliability of the measures, after aggregation. Finally, we performed a one-way ANOVA on each variable to assess whether between-team variance was larger than within-team variance. All of our variables were significant at the α = 0.01.

4.3.3 Reliability and validity: In table 1, Cronbach’s alpha for all variables at the team and individual levels are above 0.7, which ensures internal consistency of measurement [42]. For convergent validity, we checked the composite reliabilities and average variances extracted (AVE) of each latent variables, which show the acceptable levels; 0.7 or higher for composite reliability [45] and 0.5 or higher for AVE [46], respectively. Discriminant validity can be assessed by determining if the indicators load more strongly on their own constructs than on other constructs. We checked the cross loadings from a factor analysis that all indicators have higher loadings on their own construct than others. Also, the square root of the AVE of each construct has to be larger than its correlation with other latent variables (Table 2). All constructs meet this requirement.

Table 1. Measurement properties of constructs

<table>
<thead>
<tr>
<th>Variables</th>
<th># items</th>
<th>Mean (STD)</th>
<th>Cronbach’s α team (indi)</th>
<th>Composite Rel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>4</td>
<td>4.786 (.1315)</td>
<td>.931 (.931)</td>
<td>.951</td>
</tr>
<tr>
<td>Passion</td>
<td>5</td>
<td>4.907 (.978)</td>
<td>.979 (.946)</td>
<td>.983</td>
</tr>
<tr>
<td>Expertise</td>
<td>3</td>
<td>.598 (.131)</td>
<td>.856 (.832)</td>
<td>.912</td>
</tr>
<tr>
<td>External K- Sourcing</td>
<td>4</td>
<td>4.580 (.731)</td>
<td>.911 (.888)</td>
<td>.937</td>
</tr>
<tr>
<td>Internal K- Sharing</td>
<td>4</td>
<td>5.700 (.698)</td>
<td>.961 (.951)</td>
<td>.972</td>
</tr>
<tr>
<td>SNIT</td>
<td>6</td>
<td>5.224 (.784)</td>
<td>.973 (.950)</td>
<td>.978</td>
</tr>
</tbody>
</table>

Table 2. Correlations and square root of AVE

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlations</th>
<th>Square Roots of AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  2  3  4  5  6</td>
<td></td>
</tr>
<tr>
<td>1. Creativity</td>
<td>.910</td>
<td></td>
</tr>
<tr>
<td>2. Passion</td>
<td>.187</td>
<td>.960</td>
</tr>
<tr>
<td>3. Expertise</td>
<td>.030</td>
<td>.234</td>
</tr>
<tr>
<td>4. External K- Sourcing</td>
<td>.270</td>
<td>.318</td>
</tr>
<tr>
<td>5. Internal K- Sharing</td>
<td>.374</td>
<td>.618</td>
</tr>
<tr>
<td>6. SNIT</td>
<td>.204</td>
<td>.596</td>
</tr>
</tbody>
</table>

5. Hypothesis testing result

We used Partial Least Squares (PLS) analysis with SmartPLS [47] to test the paths hypothesized in the research model. PLS analysis is appropriate for this study because we have a multi-paths research model and the data for this study contain non-normal data. [45]. To obtain the level of significance, a bootstrapping re-sampling method (200 re-samples) was used. Table 3 shows the structural model results.

Shared team passion is positively associated with external knowledge sourcing (H1, α = 0.01 level, β = 0.318) and also positively associated with internal knowledge sharing (H2, α = 0.01 level, β = 0.585). The results from H1 and H2 imply that shared team passion is another important team-level input that influences team knowledge processes for creative team outcome. As previously suggested in literature [34], team expertise is positively associated with internal knowledge sharing (H3, α = 0.1 level, β = 0.140). Both external knowledge sourcing (H4, α = 0.1 level, β = 0.184) and internal knowledge sharing (H5, α = 0.01 level, β = 0.330) processes are positively associated to creativity of team outcomes, which implies that in the context of knowledge teams, gathering knowledge from external knowledge sources and sharing within team are important team processes for creative outcomes.

Table 3. Hypothesis test result

<table>
<thead>
<tr>
<th>Direct effect</th>
<th>Path (β)</th>
<th>t-stat</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 (Supported at the 0.01)</td>
<td>0.318</td>
<td>2.642</td>
<td>0.101</td>
</tr>
<tr>
<td>H2 (Supported at the 0.01)</td>
<td>0.585</td>
<td>8.735</td>
<td>0.400</td>
</tr>
<tr>
<td>H3 (Supported at the 0.10)</td>
<td>0.140</td>
<td>1.841</td>
<td>0.177</td>
</tr>
<tr>
<td>H4 (Supported at the 0.10)</td>
<td>0.184</td>
<td>1.688</td>
<td>NA</td>
</tr>
<tr>
<td>H5 (Supported at the 0.01)</td>
<td>0.330</td>
<td>3.616</td>
<td>NA</td>
</tr>
<tr>
<td>Moderation effect</td>
<td>Effect size</td>
<td>t-stat</td>
<td>R²</td>
</tr>
<tr>
<td>H6 (Supported at the 0.10)</td>
<td>0.032</td>
<td>1.710</td>
<td>NA</td>
</tr>
<tr>
<td>H7 (Not supported)</td>
<td>0.018</td>
<td>0.826</td>
<td>NA</td>
</tr>
</tbody>
</table>

In order to test H6 and H7, we measured both t-statistics of interaction factors and effect size. The effect size of this moderation impact is calculated using suggested by Chin et al. (2003) [48].

Hypothesis 6 was supported at the α = 0.1 level with an effect size of 3.2 %, which is a small, but not negligible moderation effect [49]. We can interpret this result that under a high level of shared norms of ICT use, the impact of shared team passion on the external knowledge sourcing process will be stronger. Hypothesis 7 is not supported, with a very weak (almost negligible) effect size of 1.8%. We can
interpret this result as follows: shared team passion influences internal knowledge sharing, regardless of having a high level of shared norms of ICT use. Overall, approximately 17.7% of the variance in the team creativity was explained by our research model.

A post-hoc test was conducted to see if there are direct relationships between two input variables (shared team passion and team expertise) and team creativity. A PLS path model with shared team passion and team expertise as independent variables and team creativity as a dependent variable was constructed. Results from the PLS analysis and a bootstrapping re-sampling (200 samples generated) method indicate that neither shared team passion nor team expertise is a direct significant predictor of creativity of team outcomes (β_passion = 0.162 with t_passion = 1.232 and β_expertise = 0.168 with t_expertise = 0.774), which suggests that simply having team passion and expertise may not be enough. The process of sourcing knowledge externally and sharing it internally are important processes that link team passion and expertise to creative outcomes.

6. Discussion

The two primary goals of this study are to explore the role that shared team passion can have in developing creative outcomes in knowledge team, and to investigate the moderating role of shared norms of ICT use. To achieve these goals, this study developed constructs of passion and shared norms of ICT and tested a model to assess their impacts on team knowledge processes and creativity in a context of knowledge teams. The results of this study contribute to the literature in several ways.

First, we brought the concept of passion into the field of knowledge management and examined it at the team level. Passion has been frequently studied in the field of entrepreneurship, but mostly at the individual level [11]. While in practice, passion has often been mentioned at the collective level, it is usually in a context where the collective participation in the target activity is not strictly mandated [8]. By introducing and testing the role of team-level passion on knowledge sourcing and sharing processes, this study contributes to the input-process-output model of team creativity [7]. The significant relationships between shared team passion and two important team knowledge processes (external knowledge sourcing and internal knowledge sharing) suggest that shared team passion is an important team-level psychological input for team knowledge management processes, on top of previously found team-level psychological inputs for knowledge sharing and sourcing (e.g., trust). In addition, significant relationships between team knowledge processes and creativity and the post-hoc test result (no direct relationship between passion and creativity) also suggest that simply having passion may not facilitate creativity, but passion can have an effect on creativity through team knowledge management processes.

Second, this study suggests the importance of shared norms about ICT use in the context of knowledge teams. In contemporary work environments where ICT is a resource for most types of teams -whether or not team members are distributed, teams that are passionate will engage in team knowledge sourcing processes more intensively when members have higher levels of shared norms about how to use ICT for communication and managing documents. This is particularly true in an environment of knowledge-creating tasks with a limited time period for creating team outcomes, diversified members, and a highly virtual environment.

Third, this study highlights the mediating role of the internal knowledge sharing process for the relationship between expertise and creativity at the team level. Research has shown that at the individual level, expertise is one of the most important antecedents of creativity [5], but that at the collective level, members should share their expertise within teams in order to produce creative outcomes [36]. The post-hoc test results – 1) no direct relationship between expertise and creativity, but 2) significant relationships between expertise and knowledge sharing; and between knowledge sharing and team creativity – highlight the importance of exchanging expertise among team members in the context of knowledge teams formed by diverse members. This study confirms the importance of integrating expertise for team creativity in the context of knowledge teams by internal knowledge sharing [50].

Finally, the outcome of creativity was measured by a senior manager, who is not member of any of the teams surveyed. This approach improves the robustness of our findings and contributes to studies on team creativity.

The results of this study may help practitioners who are engaged in knowledge team activities identify the conditions under which they can achieve more creative team outcomes.

First, to achieve more creative outcomes from knowledge team activities, an overall passion within teams should be a proper initial step in improving knowledge team members’ participation in team activities, in general. Thus, it might be a good idea for a company headquarter manager to advertise that “passion about your team activity should improve the
quality and creativity of your team outcome,” when they facilitate the knowledge team activities.

Second, the finding on the moderating role of the shared norms of ICT use suggests that it is important for teams to build up shared norms of how to use ICT in order to improve the team process of external knowledge sourcing with passionate team members. Third, it is suggested that although the members of a knowledge team are passionate about their team activities, and they have expertise on the topic of the team tasks, without the processes of external knowledge sourcing and internal knowledge sharing, it might not be possible to produce the best possible team-level outcomes. Thus, facilitators of knowledge teams should also encourage teams share knowledge and find knowledge from external sources, so that team-level psychological and cognitive input can significantly improve team creativity.

There are several limitations of this study. First of all, this study took place in a company with a homogenous group of respondents with a high proportion of women. Thus, the results may not be generalizable beyond the context of the field of this study. Future research should be done with more heterogeneous groups to test the impacts of passion, expertise, shared norms of ICT use, and knowledge processes on the creativity of team outcomes.

Second, although we have mentioned team level passion is an important step to improve team knowledge processes and creative outcome, this study did not look into what causes team passion. Also, there might be a discrepancy between individual team members’ passion and overall team passion. That is, it is not known that individual team members’ passion are additive linearly to the team level. For example, too much passion of only a few members may cause negative reactions from the rest of team members (especially when team members do not have common understanding of team goals and activities) and this will negatively affect overall passion. This potential challenge caused by individual passion and team level passion should be further investigated in the future research.

Third, we investigated the moderating role of the shared norms of ICT on the relationship between passion and team knowledge processes but did not look into the impact of ICT on team outcome (creativity), since our focus is to identify new input (passion) and to investigate if the norms of ICT use improve the impact of passion on team knowledge processes. In the future research, we should look into the moderating role of ICT (which can be shared norms or actual usage of various ICT) on the relationship between team processes and outcome measures (effectiveness or creativity.)

Fourth, there could be a bias in measuring the team creativity due to the use of a single rater. However, this concern is mitigated by relying on the most knowledgeable stakeholder, i.e., the manager who oversees all participating teams, and therefore also addressing potential concerns of common bias.

7. Conclusion

Achieving creative outcomes by participating in knowledge teams is not easy. This study shows that in a non-mandated knowledge team setting with diverse membership and a high level of virtuality, shared passion at the collective level and team expertise help improve team knowledge processes, which in turn facilitate the a more creative outcome. On top of a team’s psychological and cognitive inputs and knowledge processes, this study suggests that it is also important to have shared norms of using information communication technologies, which are the key resources that most teams in contemporary organizational environments have.

8. References