

ABSTRACT

While the concept of wisdom, which refers to how people make right use of their knowledge through their practical actions, judgments, and ethical decisions, in general attracts researcher interest in a variety of disciplines, such as philosophy, psychology and management studies. Based on the frameworks for philosophical, group and organizational wisdom, this report identifies software development project team wisdom as a process for how team members' best use the stock and flow of their knowledge through collective judgment, virtue-ethics, emotions/feelings and effective decision-making during their project-related efforts. Adapting the efforts and functional similarities of both group and organizational wisdom practices, this effort determines that wisdom-related mechanisms (e.g., team diversity, networking with other teams and people, and their past experiences), joint epistemic actions (e.g., team reasoning, intuition, and aesthetic capacity), and team virtue and prudence become the different faces of the software development team wisdom process. We then propose how these different faces interrelate and how they also relate to project process effectiveness, such as team learning and speed-to-users, both of which have been rarely addressed empirically in the context of software development project teamwork.

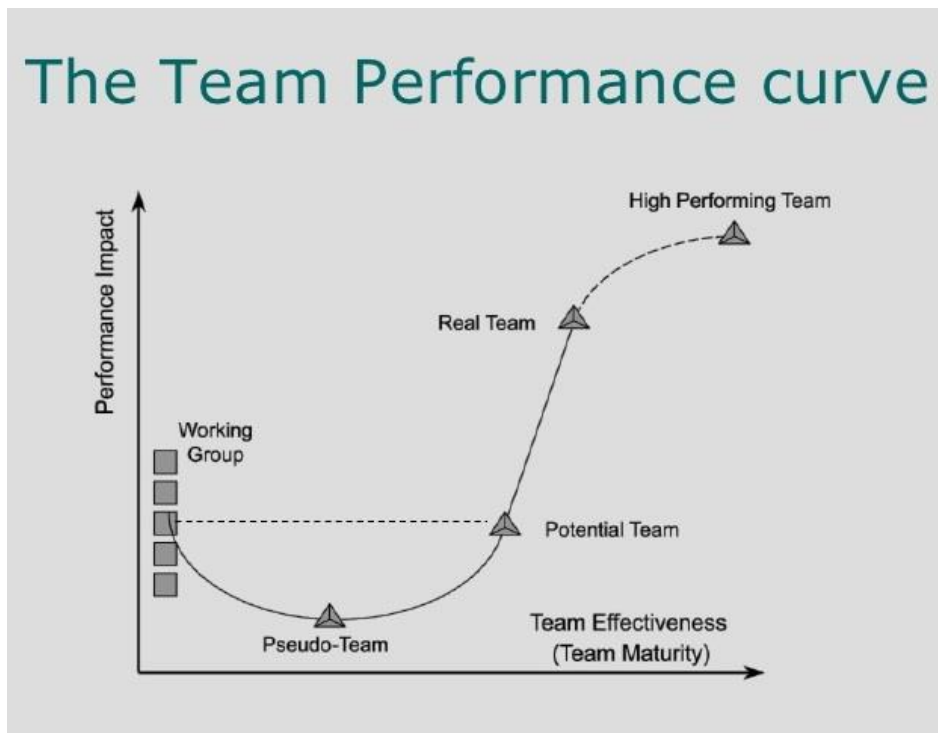
By examining, our results empirically show the following: (a) software development wisdom-related mechanisms positively relate to software development team prudence and virtue and their joint epistemic actions, (b) software development team joint epistemic actions are positively associated with software development project process effectiveness. We conclude by discussing our findings as they relate to the wisdom framework of software development project teams and suggest the key managerial implications for different types of software development projects.

Keywords:

- Team wisdom
- Knowledge management
- Software development
- Speed-to-users
- Team learning

INTRODUCTION

Firstly, talking about Team wisdom and Software Development Project. What is Team Wisdom? A group of people who work together at a particular job or a set of individuals who support the project manager in performing the work of the project to achieve its objectives.



"Teamwork is the ability to work together toward a common vision. The ability to direct individual accomplishments toward organizational objectives. It is the fuel that allows common people to attain uncommon results." --Andrew Carnegie

What is Software Development Project? A software development project is a complex undertaking by two or more persons within the boundaries of time, budget and staff resources that produces new or enhanced computer code that adds significant business value to a new or existing business process.

A software development project team must gather together their collective wisdom to encapsulates all the knowledge and then to include the critical judgment, intuition, aesthetic capacity, and Aristotelian virtue-ethic and prognosis of the team members to become fully successful during the software development

efforts. In this case, software development team wisdom provides an overarching frame-work, indeed a valuable lens, through which elevate the knowledge management view of those software development, and thus accelerate the development process for the software products.

LITERATURE REVIEW

The concept of “wisdom” developed around 5000 years ago, and it has been examined and discussed in a philosophical context ever since in the writings of Socrates, the Platonic dialogues and Plato’s public, and the “Nicomachean Ethics” by Aristotle (Rooney & McKenna, 2008; Izak, 2013). These philosophical arguments later influenced the con-

temporary psychology literature, where researchers moved from abroad definition of wisdom as an excellence of mind and virtue to a specific characterization of wisdom, as an expert knowledge system that deals with the fundamental pragmatics of life. In the psychology literature, the common of the concept of wisdom is that wisdom is manifested as characteristics of reflectiveness and judgment, indeed an emotional and motivational phenomenon and an action-

oriented concept. In addition to the concept of “individual wisdom” in the psychology literature, the term of wisdom was argued in the management literature. Researchers discussed the concept of wisdom in the context of leadership (i.e. Managerial wisdom), which is perceived as the ability of leaders to act virtuously, capture the meanings of new knowledge, and interpret them in a holistic and integrative manner and also as a collective and interactive process (i.e., group team and organizational wisdom). These researchers argued that group/team and organizational wisdom involves the sophisticated and sensitive use of knowledge that is embedded in or exhibited by actions and includes those judgments that accommodate multiple realities and emotional and ethical considerations. In this sense, group, team, and organizational wisdom is considered a more appropriate way to address “knowledge work” and related topics in firm operations and the efforts that require high analytical, judgmental, ethical, and other demands for these processes.

Further still, the software development project team wisdom process clarifies any boundary related confusion between the concepts of knowledge and the wisdom achieved by renewing the current view of the knowledge management hierarchy on the software development project team. Here, unlike past studies that have assumed a data-information-knowledge-

wisdom hierarchy or role for wisdom to play “to guide all processes relating to identifying and processing data, information, and knowledge. Thus we note here that data, information knowledge and wisdom are the four key concepts determined by using a continuum, subject to the extent to which these concepts do reflect human involvement with and the processing of the reality at hand in the actual context of the specific softwa

re development project team. For example, program code is merely data and information is a context based arrangement of such program codes wherein the relationship between them is shown. Knowledge is thus a judgment of the significance of program code items, while wisdom is an understanding of how/why a software development project team uses that knowledge (a judgment of the significance of the designated program code items) in the best way and including their broader social and ethical considerations.

METHODOLOGY

To examine the proposed six hypotheses, we used multi-item scales that we either modified or adopted from the prior literature as demonstrated in Table 1. We applied a 5-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5) to assess team reasoning, intuition, aesthetics capacity, virtue, prudence and learning, and the speed-to-users variables. We further used an itemized rating scale ranging from “extremely low” (1) to “extremely high” (5) to measure team diversity and networking, and past team members’ experience variables. We used a ratio scale to evaluate the control variable and project team size for the number of full-time team members’ participating in a software development project team efforts.

Construct	Dimension	Question items
Mechanisms	Team networking	To what extent did your team members have social networks with other project team members?
		To what extent did your team members establish communication systems across internal and external networks?
		To what extent did your team highlight the critical role of boundary spanners?
		To what extent did your team encourage the development of social networks to increase access to organizational resources and knowledge?
		To what extent did your team members have adequate resources and effective organization?

Construct	Dimension	Question items
		ational communication systems that gave them the ability to share information and coordinate with others?
	Team diversity	To what extent did your team have people from different departments and units? To what extent did your team have people from different educational backgrounds? To what extent did your team have people from different capabilities and capacities?
	Team experience	There was a critical mass of experienced people on the team who had developed and launched similar products before. People in the team brought with them a wealth of information gained from prior assignments within this company. Department managers in this team had previously worked on similar products within the company. Team members had previous experiences in different departments.
		During the project: Team members filter and interpret the noise from within our project team and determine the salient points on which to act. Team members use reason and careful observation about software and project-related issues and activities in our team.
Epistemic actions	Team reasoning	Team members make careful observations to establish facts and logical deductive explanations about software and project-related issues and activities in our team. Team members evaluate the salience and truth-value of logical propositions about software and project-related issues and activities when applying reason to decision making in our team.
		*Team members are able to formulate and understand logical arguments based on sound propositions about business, the environment, and team-related issues and activities in our team. *Team members question the knowledge inherent in propositions about business, environment, and team-related issues and activities in our team. *Team members are occasionally skeptical of the “facts,” orthodoxy, and “common s

Construct	Dimension	Question items
		<p>ense'' related to business, environment, and team-related issues and activities in our team.</p> <p>*Team members focus at the right level or aspect by choosing what "facts" are most salient in a given situation in our team.</p>
	Team intuition	<p>During the project:</p> <p>Team members put more emphasis on feelings than data when making decisions during this project.</p> <p>Team members put a lot of faith in their initial feelings about other people and situations during the project.</p> <p>Team members make decisions based on their gut feeling when they do not have enough information and must make decisions during the project.</p> <p>*team members trust their hunches when confronted by an important decision during the project.</p>
	Team aesthetic capacity	<p>During the project:</p> <p>Team members can articulate their insights to others in our team.</p> <p>Team members have communication skill in our team.</p> <p>Team members have sensitivity and an ability to interact with others all the time and continually pick up clues and meaning from these interactions.</p> <p>Team members are able to relate to other people in some way so that they can better apprehend a person's often unarticulated beliefs, attitudes, values, knowledge, and understanding, as well as their capacities and incapacities.</p>
—	Team virtue	<p>During the project:</p> <p>Team members are concerned about the role of ethics and virtue in our team.</p> <p>Team members have an ethical/virtuous mind-set in our team.</p> <p>Team members have ethical judgment in our team.</p> <p>*Team members see others' actions as noble and worthwhile.</p> <p>*Team members are concerned about others, are thoughtful and fair, admit their mistakes, and learn from them in our team.</p>

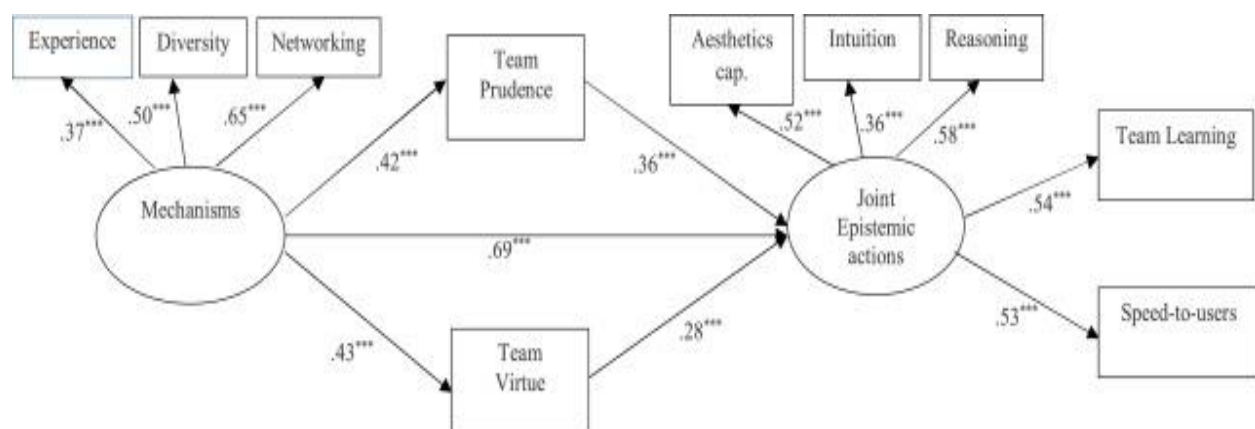
Const ruct	Dimensi on	Question items
—	Team pr udence	<p>*All project related processes are infused with value that goes beyond the technical requirements of the task at hand in our team.</p> <p>*Team members produce virtuous and tolerant decisions in our team.</p> <p>During the project:</p> <p>Team members know how and when to apply absolute principles to a complex and fuzzy reality in our team.</p> <p>Team members have rich factual knowledge about their areas in our team.</p> <p>Team members are able to deliberate well concerning what is good and expedient for themselves in our team.</p> <p>*Team members acknowledge that decision-making is contingent and rarely involves applying absolute principles in our team.</p> <p>*Team members and their actions are practical and oriented toward everyday life while at work.</p>
		<p>Overall, the market/users perceived that this software product had fewer problems than what is considered normal in the industry.</p> <p>Post-launch, this software product had far fewer technical problems than our nearest competitor's product or our own previous products.</p> <p>Overall, the team did an outstanding job uncovering software product problem areas with which users/customers were dissatisfied.</p> <p>Overall, the team did an outstanding job correcting software product problem areas with which users/customers were dissatisfied.</p>
		<p>This project was completed in less time than what is considered normal and customary for our industry.</p> <p>This project was launched on or ahead of the original schedule developed at initial project go-ahead.</p>

Const ruct	Dimensi on	Question items
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Top management was pleased with the time it took us to achieve full commercialization/implementation

We tested for the common method bias problem using the Harman one-factor test. These results indicated that we had many factors with eigenvalues that were greater than 1. Those factors explained 70.19% of the total variance; however, none of the factors explained the higher level of variance (i.e., the highest single variance extracted was 23.67%).

In addition to the Harman one-factor test, we performed a common latent factor (CLF) analysis. We compared the measurement model using CLF and without it. We found that the change in fit indexes were not significant in two of the models, a model including CLF had $\chi^2/df = 1.57$, CFI = .91, and RMSEA = .05 and a model without CLF had $\chi^2/df = 1.67$, CFI = .89, and RMSEA = .06. Also, we found that the path coefficients were not affected when CLF was included in the measurement model, and further still, the differences between the standardized path coefficients were less than .20.



CONCLUSION

This study addressed the relevance of the team wisdom process, which to date has been left underdeveloped and underutilized and thus received little empirical attention in the project management and software development literature. We tested the homological interactions between the team wisdom-related constructs/variables and the combined impacts of those variables on team learning and speed-to-users on software development project teams. The results showed significant associations between team wisdom-related mechanisms, joint epistemic actions, team virtue/prudence, and process effectiveness. However, the current research just scratches the surface of this very important, but still understudied, topic. Future research will reveal even more valuable information on the topic of software development project team wisdom and be both, rich and fruitful and beneficial to the entire software development literature in this field of ongoing interest.

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