Empirical Software Engineering (2022) 27:183
https://doi.org/10.1007/s10664-022-10225-3

Motivating members' involvement to effectually conduct collaborative software process tailoring

Jung-Chieh Lee[1] · Chung-Yang Chen[2]

Accepted: 16 August 2022 / Published online: 27 September 2022

Abstract

Contemporary business and software environments are highly competitive and rapidly evolving, resulting in software projects that are highly customized and changeable during development. Therefore, software process tailoring (SPT) is important as software teams conduct SPT to adjust shared development processes and evolve the project to better meet unique and dynamic needs. SPT is a special type of teamwork in which members' active participation and critical input are necessary for understanding and synthesizing various business and technical concerns that may be divergent and conflictual and then jointly identifying an integrated tailoring solution. In this context, this study examines members' decisive and critical involvement in SPT and adopts a motivational perspective to explore how motivation can facilitate SPT performance. Specifically, we use empowerment theory to develop a model to theorize and examine how psychological empowerment (PE) in terms of meaningfulness, autonomy, potency, and impact motivates software teams to efficiently and effectively conduct SPT. The model also considers the power distance (PD) to understand how it functions in team-based critical thinking and decisional processes to energize team members' participative effort. The investigation surveyed 102 software development teams and used partial least squares (PLS) to analyze the data. The results show that PE in terms of the four components has various influences on SPT performance and that PD has nonsignificant moderating effects. This study contributes to the software engineering literature by uncovering the contextual mechanism underlying the relationship between PE and PD in SPT. The limitations and possible extensions of this study are also outlined for future research.

Communicated by: Sebastian Baltes

✉ Chung-Yang Chen
cychen@mgt.ncu.edu.tw

Jung-Chieh Lee
jclee@bnu.edu.cn

[1] International Business and Management Research Center, Beijing Normal University at Zhuhai, Zhuhai City, China

[2] Department of Information Management, National Central University, No. 300, Zhongda Rd., Zhongli District, Taoyuan City 32001, Taiwan

Keywords Software process tailoring (SPT) · Psychological empowerment · Power distance · SPT performance, empowerment theory

1 Introduction

The essence of contemporary information system and software project development is innovative and dynamic; thus, software teams often customize the development process in the planning stage of a project and may need to continually refine the process during the development to align with changed or new needs. The task of adjusting processes to account for differences in project particularities and dynamisms is known as *software process tailoring* (SPT) (Fitzgerald et al. 2003; Xu and Ramesh 2008; Tripp and Armstrong 2018; Campanelli et al. 2018; Lee et al. 2020b). SPT is crucial to contemporary software environments, as it assists a software team in driving the project's innovative and evolutionary development (Clarke et al. 2015; Lee et al. 2021).

In the literature, recent studies on SPT have stressed its importance and investigated how its performance, in terms of efficiency and effectiveness, influences a project's outcome (Xu and Ramesh 2008; Bass 2016; Tripp and Armstrong 2018; Campanelli et al. 2018; Lee and Chen 2020; Lee et al. 2020a, 2020b). In particular, SPT involves many different aspects and various levels of alterations of the shared processes of a project, and a software team's efficient and effective tailoring decisions critically determine a project's performance (Lee et al. 2021). Indeed, a team's collaborative decision making in SPT requires soliciting business and technical opinions and concerns from not only managers or leaders but also team members who own mutually dependent tasks; leveraging and reconciling these opinions and concerns, which may be diverse and conflictual (Sawyer 2001; Liang et al. 2010; Lee et al. 2020a, 2020b); and then consolidating to produce the most generally beneficial integrated process solution. This is especially true as SPT is conducted by software teams that need a variety of functional experts and critical thinkers to innovate the development. However, the underlying issue is how members in theory may effectively contribute critical input and influence to alter a project's development when it is empirically directed and controlled by managers and leaders. Thus, this study explores and investigates the drivers that can promote team members' intrinsic motivation to critically collaborate in SPT.

In empowerment theory (Spreitzer 2008; Kirkman et al. 2004), *psychological empowerment* (PE) is essential to people's internal task motivation and their beliefs about the control they have over their work (Kirkman et al. 2004; Maynard et al. 2012; To et al. 2015; Lee et al. 2019). When a team possesses higher levels of PE, members perceive more authority to make decisions and control how their work is conducted and behave actively and energetically in their work (Seibert et al. 2011; Maynard et al. 2012; Matsuo 2019). As extant studies have shown the criticality of PE to team functioning and outcomes, this study seeks to explore its deeper and undiscovered mechanisms in the SPT context. In this regard and considering team members' psychology, we adopt a motivational perspective and utilize empowerment theory to explore how PE motivates team members in performing SPT work. Moreover, as SPT involves many divergent development ideas as well as an extensive scope of task alteration, it also largely depends on how managers and members reciprocally coordinate and accommodate bilateral inputs to yield more thorough tailoring solutions and decisions. In other words, a software team's power and authority of decision making is presumably shared among managers and members during SPT. With this premise, a software team's *power distance* (PD)

(Daniels and Greguras 2014) is considered useful in understanding how PE operates in a team during SPT. Specifically, when a software team is characterized by high PD, managers/leaders are seen as less accessible and are expected to lead autocratically. Conversely, low PD is indicative of participative decision-making and consultative leadership. Thus, we assume that high/low PD may shape the team-based decision-making environment, and such an environment might affect team members' psychological perception and state (i.e., PE in this study) during collaborative and innovative SPT.

Based on the aforementioned context, the following two research questions are formulated: (1) Does a software team's PE contribute to its SPT performance, and if so, how? (2) Does PD moderate the effect of PE on SPT performance, and if so, how? To answer these questions, this study primarily adopts a quantitative research design and is scoped to the quantitative data through a survey. We develop a research model and then empirically test the model using the partial least squares (PLS) method to analyze a survey sample of 102 software development teams working in Taiwanese and Mainland Chinese firms. To extend research concerning software development and project management, as the existing SPT literature has shown that knowledge and its absorption, especially concerning team members' input, are crucial, this paper further investigates and examines software team members and their critical input. The results show that PE in terms of meaningfulness, autonomy, potency, and impact has various influences on motivating members' effectual involvement in SPT, and low PD is interestingly found to have some nonsignificant moderating effects on SPT performance. These findings do not seem to echo the contemporary software team settings that promote empowerment. These results and findings are discussed to highlight theoretical advancements and provide practical implications. This paper contributes to the literature by theorizing how PE can be encouraged in a software team and how PD should operate when leading the team to perform the critical and collaborative task of SPT to effectively evolve the development. The remainder of this study is organized as follows. Section 2 surveys the relevant research literature and proposes the hypotheses and research model; Section 3 describes the research method; Section 4 examines the hypotheses and model and presents the results; Section 5 discusses the theoretical contributions and practical implications; and Section 6 concludes this paper and outlines future research directions.

2 Literature review and hypothesis development

2.1 Software process tailoring and its performance

Today, SPT is critical to the evolution of software development, and SPT performance determines project outcomes and performance (Xu and Ramesh 2007; Conboy and Fitzgerald 2010; Tripp and Armstrong 2018; Campanelli et al. 2018; Lee and Chen 2020; Lee et al. 2021). SPT performance embodies whether a software team can make effective and efficient tailoring decisions considering the broad scope of process alteration and its influence on project results. In particular, the efficiency of tailoring decisions (i.e., SPT efficiency) refers to how much effort the team spends on process tailoring, and the effectiveness of tailoring decisions (i.e., SPT effectiveness) refers to how well the team can formulate quality process solutions, i.e., the team's tailoring decisions help the project undergoing the changes to achieve its goals and expectations (Xu and Ramesh 2008; Lee and Chen 2020; Lee et al. 2020a, 2020b). To investigate SPT performance, the extant literature has adopted a knowledge perspective to explore and investigate how a software team's knowledge-processing mechanisms influence efficiency and effectiveness in executing tasks (Xu and Ramesh 2008; Kalus and Kuhrmann 2013; Lee and Chen 2020; Lee et al. 2020a, 2020b). For instance, Xu and Ramesh (2008) noted that generalized and contextualized knowledge of a project is essential for software teams to satisfactorily meet tailoring requirements and goals. Lee et al. (2021) also showed how a learning ability, particularly absorptive capacity, helps a software team gather useful relevant knowledge and experiences and then apply this know-how to efficiently and effectively address various tailoring needs. The above research offers insight into the importance of SPT knowledge and how such knowledge is employed by software teams to reduce the teams' efforts in collaboratively tailoring the development and making quality tailoring decisions.

In the SPT context, each tailoring case and scenario is distinct (Lee and Chen 2020), and conducting SPT involves the redesign of various and interdependent professional tasks, practices and procedures. It therefore heavily relies on the active participation and critical contributions of the team members who own the tasks. To enable team members' active and critical participation, this study focuses on motivational factors, as motivation is likely to be translated into higher levels of learning and process improvement (Edmondson 2002; Kirkman et al. 2004; Maynard et al. 2012). This focus is consistent with existing studies showing that team members' motivational factors, particularly PE, are critical to team operation and outcome (Kirkman et al. 2004; Chen et al. 2007; Maynard et al. 2014; Lee et al. 2018, 2019). How team members' PE influences SPT effectiveness and efficiency remains unknown and needs to be further explored and investigated from an intrinsic motivational perspective. Moreover, in the SPT context, managers may have considerable power and authority to determine how an empowered team conducts SPT work that requires collaborative decisions and joint responsibilities to output a highly contextualized process solution. Accordingly, in this study, we explore PE and investigate how team members' PE influences SPT performance. In investigating this influence, we consider PD as a moderator to determine its effects on the relationship between PE and SPT performance. The proposed constructs and their corresponding hypotheses are further explored and theorized in the following section.

2.2 Psychological empowerment

In general, PE is a state or set of conditions that allow employees or teams to believe that they have control over their work (Maynard et al. 2012, p.1235). In an organization, when people have a strong sense of empowerment, they are more likely to undertake their work energetically and perform 'above and beyond' what is expected (Spreitzer 2008; To et al. 2015; Lee et al. 2019). In a team with high levels of PE, team members are endowed with more authority to determine their proximal work environment and are responsible for their team's functioning (Mathieu et al. 2006). As a result, PE helps establish a favorable team atmosphere in which members are more willing to provide or share useful ideas and opinions, regardless of whether they are unfavorable for other members. Existing studies have demonstrated that PE can encourage positive individual attitudes (e.g., job satisfaction) and behaviors (e.g., citizenship behaviors) and enhance team performance (Hempel et al. 2012; Maynard et al. 2012; Singh and Sarkar 2012; Zhang et al. 2014; Matsuo 2019).

Scholars have indicated that the essence of PE is multifaceted and cannot be captured by a single concept (Kirkman et al. 2004; Seibert et al. 2011; Lee et al. 2018; Matsuo 2019). Kirkman et al. (2004), focusing on teams, further theorized PE as comprising four subconstructs: (1) meaningfulness, the extent to which team members feel that their own work is valuable and worthwhile; (2) autonomy, the degree to which team members believe that they are free to make decisions; (3) potency, members' self-evaluated belief that they have sufficient ability to skilfully perform their work activities; and (4) impact, the extent to which team members feel that their work significantly contributes to team outcomes. To further understand the effects of PE on SPT, this study explores and investigates how meaningfulness, autonomy, potency and impact each relate to SPT performance. Examining each of the four subconstructs of PE separately allows us to better understand the distinct mechanisms whereby they affect SPT effectiveness and efficiency.

2.3 The effects of PE on SPT performance

In the analysis of teams, meaningfulness refers to whether the tasks that a team works on are important, valuable, and worthwhile (Kirkman et al. 2004; Maynard et al. 2012). It conveys the fit between the team's work goals and beliefs or values (Spreitzer 1996; Seibert et al. 2011; To et al. 2015). When team members perceive that their work and task content are meaningful and valuable and feel that they are doing the right thing, they tend to have higher levels of motivation, commitment and focused enthusiasm in their work. In the SPT context, meaningfulness can stimulate and inspire a software team to maintain momentum and sustainable capacity to streamline the planning process and make tailoring decisions that better connect current planning to the expected evolution of the entire project. Specifically, meaningfulness fortifies team members' collective cognition of the perceived importance of process tailoring to their project work, which may encourage team members to share and exchange SPT-related experiences and concerns according to their best knowledge and in their best interest at work. This leads to the advancement of team members' mutual understanding of the value of the tailored tasks owned by others and to the active sharing of ideas and critical concerns; such outcomes may reduce the generation of cognitive blind spots and improve the anticipation of possible remedial work, thereby yielding a more holistic solution that benefits the entire development strategy. Hence, we hypothesize the following:

H1a: Meaningfulness has a positive influence on SPT efficiency.
H1b: Meaningfulness has a positive influence on SPT effectiveness.

In team research, autonomy denotes that a team has discretion over its work (Kirkman et al. 2004; Maynard et al. 2012). Autonomy allows team members to make timely decisions instead of waiting for permission or approval from managers. This is particularly important when the team is embedded in a rapidly changing environment (Kirkman et al. 2004; Lee and Xia 2010), such as the environment in software development. In the SPT context, software teams are required to solve problems and challenges that cause deviation from standard development processes and may renovate processes and make breakthroughs to test better and more suitable approaches to development (Lee and Chen 2020). In this sense, an autonomous software team has a more adventurous spirit and takes greater experimental risks (Tushman and O'Reilly 1996; Kirkman et al. 2004). This fosters trial and error learning (Lee and Xia 2010), which benefits innovative development and stimulates solutions to efficiently further the planning process. On the other hand, in an SPT context where tailoring decisions are made by a group composed of experts in various domains, autonomy is expected to extend to the individual level to promote independent and critical thinking when brainstorming development solutions.

In this way, a software team should be able to generate various professional opinions and support coordinative communication among team members, thereby formulating a more integrated process solution that benefits various team members and their tasks. Therefore, we hypothesize the following:

H2a: Autonomy has a positive influence on SPT efficiency.
H2b: Autonomy has a positive influence on SPT effectiveness.

In team management, potency refers to team members' shared beliefs in their ability to perform and complete work (Kirkman et al. 2004; Maynard et al. 2012). Teams with high levels of potency may be better able to channel the work performance of their members to tackle challenges and to persist until they finish their work and missions (Edmondson 2002; Kirkman et al. 2004; Tröster et al. 2014). In the SPT context, potency gives team members ample confidence to actively express their opinions and ideas as well as persistently seek out more challenging solutions that may not only accommodate project dynamics and meet customer needs but also aggressively exceed expectations. In other words, potency enables the team to build shared beliefs that stimulate team members to aim higher and strengthen awareness among members (Tröster et al. 2014), which helps the team reach a consensus concerning a higher level of tailoring performance. This enables the team to be more effective in setting better goals that in turn produce holistic and quality tailoring decisions. In addition, because team members are convinced of their own skills and abilities and perceive the influence of higher-performing team members, they will take the initiative (Seibert et al. 2011; Maynard et al. 2012; To et al. 2015) to do well when formulating their own development tasks and practices. In this way, repetitive effort and procedures for coordinating members' mutual expectations of individual task proposals and solutions with respect to the tailoring goal can be reduced. Thus, less effort and time are needed to make effective and quality tailoring decisions. Thus, we hypothesize the following:

H3a: Potency has a positive influence on SPT efficiency.
H3b: Potency has a positive influence on SPT effectiveness.

In the investigation of teams, impact means that tasks performed by a team have a significant influence on organizational or team objectives (Kirkman et al. 2004; Maynard et al. 2012). When team members perceive that their work markedly affects outcomes, they may show more proactive work attitudes and behaviors, which may have positive consequences for the team (Seibert et al. 2011). Specifically, during SPT, with the support of impact, team members tend to plan their own development work and solutions with an enlarged scope that actively extends to consider potential consequences for the entire project and the organization. This allows team members to better grasp the grand scheme of the tailoring information and potential requirements stemming from a specific tailored task and helps them better see how the expected consequences may benefit the overall result. On the other hand, impact may also increase team members' sense of responsibility for their owned tasks and practices and instil the perception that their activities have a significant impact on others' outcomes and the overall result. This stronger sense of accountability can lead team members to be more cautious when tailoring the development process and to give greater consideration to the possible consequences of the process proposal. Presumably, to more rigorously conduct SPT, the effort and time expended would be increased to ensure the appropriateness of the tailoring decision. Accordingly, we hypothesize the following:

H4a: Impact has a negative influence on SPT efficiency.
H4b: Impact has a positive influence on SPT effectiveness.

2.4 Power distance

Team-level power distance (PD) refers to the extent to which a team accepts an unequal distribution of power among team members (Hofstede 2001; Cole et al. 2013; Daniels and Greguras 2014; Yuan and Zhou 2015; Hu et al. 2018). Scholars have indicated that on low-PD teams, team members believe that power should be shared and not limited to team managers; hence, they cannot tolerate the asymmetrical authority. In a low-PD environment, managers tend to have more interaction and socialization with employees (Cole et al. 2013; Daniels and Greguras 2014). In addition, team members may not directly obediently follow the managers' decisions and may actively express their opinions and ideas and negotiate with managers (Yang et al. 2007; Cole et al. 2013; Hu and Judge 2017). Workers can be motivated when they have rights to jointly participate in decision-making. Conversely, on teams with high PD, team members accept the unbalanced distribution of power and authority, and they tend to strictly abide by team policies and the manager's instructions and believe that managers are the primary source of support for the team (Drach-Zahavy 2004). During the decision-making process on low-PD teams, team members are afraid to express their personal opinions and conceal their thoughts and ideas because they fear the manager's authority and dissatisfaction (Hofstede 2001; Daniels and Greguras 2014).

On the basis of the aforementioned concept, we reasonably assume that low and high PD in the SPT context may affect team operations differently and may therefore affect the team's tailoring-related decision making. Specifically, in software teams, managers often speak for the business and customer side, while team members may be primarily concerned with the work they do for the success of the technical development. In this context, effective and efficient decision making should involve both managers' and team members' thoughts, ideas and opinions to generate more comprehensive tailoring decisions. Decisions that favor one side (e.g., the manager or team members) may have a unilateral or narrower and segmented tailoring scope that fails to consider its potential impact on the entire project. As a result, during SPT, PD may affect team members' inherent motivation and authority to express their opinions and make suggestions, which may influence the outcome of a participative decision-making process (Taras et al. 2010; Cole et al. 2013; Yuan and Zhou 2015; Rao and Pearce 2016). However, the extant software development literature has not investigated the contextual influence of power distance on team members' PE during SPT. Therefore, this study explores and investigates the moderating effect of PD on the relationship between the components of PE and SPT performance (efficiency and effectiveness).

2.5 The moderation of SPT efficiency by power distance

In the SPT context, when a software team exists in a low-PD environment, authority and power are shared among team members, and the informal exchange of task information in manager-member and member-member relationships may be more frequent and symmetric.

Team members can further understand and perceive the value and importance of their work through open communication with peers (Daniels and Greguras 2014). In this context, the team may have a more collective cognition and understanding of the meaningfulness of its practice or task content. This may enhance the team's energy and momentum in efficiently planning to meet evolving development needs. In addition, in a low-PD team environment, managers and leaders tend to be more egalitarian (Goleman 2000) and willing to accept and solicit members' opinions and concerns when proposing process solutions; hence, the operation and effect of autonomy in SPT may be enlarged. In other words, when an autonomous team environment is associated with lower PD, the team as a whole can theoretically synthesize and formulate tailoring schemes locally with greater speed without going through the bureaucratic organizational hierarchy. This ensures that the team conducts SPT to efficiently satisfy the internally established schedule and address emerging issues and changes in a timely manner. Based on the above statements, we hypothesize the following:

H5a: Lower PD strengthens the positive effect of meaningfulness on SPT efficiency.
H5b: Lower PD strengthens the positive effect of autonomy on SPT efficiency.

Additionally, a lower PD team environment implies that members are highly participative in the decision-making regarding process tailoring. Through collective group intelligence, the process plans and decisions made by the team may reflect less effort and time spent conducting SPT. This efficiency seems to be facilitated by high potency among team members, since members are then more capable of figuring things out and getting things done (Kirkman et al. 2004). Thus, the entire team theoretically gains more cohesion and shared beliefs, which increases team members' commitment to efficiently tackle dynamic development challenges and make tailoring decisions in like manner. In terms of impact, the aforementioned inference indicates that software teams with this PE characteristic tend to formulate safer but more thoughtful development solutions. This slower pace of decision-making might be exaggerated when leaders do not exert firmer control over the tailoring process. This is because the process of SPT decision making involves the discussion of potential consequences of the solution plan for the outcome of the project. In this situation, lower PD makes the discussion more diffuse, and a consensus cannot be easily reached (Cole et al. 2013; Daniels and Greguras 2014). In other words, the existence of PD may reduce the negative effect of impact on SPT efficiency. Based on the above statements, we hypothesize the following:

H5c: Lower PD strengthens the positive effect of potency on SPT efficiency.
H5d: Lower PD amplifies the negative effect of impact on SPT efficiency.

2.6 The moderation of SPT effectiveness by power distance

Since SPT drives how a development project may proceed, the results of SPT critically determine the development outcome. When a software team conducts SPT in an environment where power and authority over decision-making are shared and participative (i.e., low PD), team members and task or practice owners have more firsthand and straightforward communication with the manager. In this situation and with perceived meaningfulness, team members may exhibit higher enthusiasm in performing their tasks and may be more participative when tailoring and coordinating the development process in which their tasks are contextually involved. As a result, more comprehensive involvement of team members can be expected during SPT, which contributes to the effective validation of the tailoring proposals and ideas, resulting in a more integrated and quality process solution that benefits a variety of interests. In terms of autonomy, members in an autonomous team environment are given authority and control to plan their own work (Maynard et al. 2012). When such a team also has low PD, members are given more control over their work (Hu and Judge 2017), but more responsibility regarding the outcome of the work is presumably imposed on team members as well. In the SPT context, such a situation seems to lead software team members to not only engage in more thorough consideration when proposing development tasks but also effectively remedy the tasks when they deviate, hence helping the team develop tailoring solutions thoughtfully and execute them carefully. Based on the above statements, we hypothesize the following:

H6a: Lower PD strengthens the positive effect of meaningfulness on SPT effectiveness.
H6b: Lower PD strengthens the positive effect of autonomy on SPT effectiveness.

Moreover, in an environment where PD is low, the manager is more willing to consider and accommodate team members' expert opinions, suggestions and solutions in the decision-making process. A low-PD situation might enhance team performance in SPT when the team has high potency. Specifically, in addressing new challenges that require development adjustments, a highly capable software team with low PD has more freedom to test and adopt new or more advanced solution approaches and adjust the development correspondingly to better meet the project goal. In other words, such a team often aims higher when dealing with issues and is able to effectively formulate a better solution that helps evolve the development to a superior status. Finally, a software team that has a high level of impact orientation tends to closely relate the decisions made in the development process to the ultimate outcome of the project. In this situation, low PD enables such a team to conduct SPT more cautiously and make a considered tailoring decision. Such a process solution comprehensively takes into account the concerns of team members in various dimensions and from a longer-term perspective, thus effectively ensuring the validity of the potential outcome of the team's SPT decisions. Given the above statements, we theorize the following:

H6c: Lower PD strengthens the positive effect of potency on SPT effectiveness.
H6d: Lower PD strengthens the positive effect of impact on SPT effectiveness.

Based on the aforementioned arguments and hypotheses, this study develops a research model (see Fig. 1) to explore and investigate the effects of PE in terms of meaningfulness, autonomy, potency, and impact on SPT performance (i.e., efficiency and effectiveness). In particular, PD is considered a moderator of the relationships between the four PE components and SPT performance.

3 Research methods

3.1 Data collection and sample

A survey research method was adopted to empirically test the model. Since this investigation focused on software development teams in Taiwan and Mainland China, a back-translation

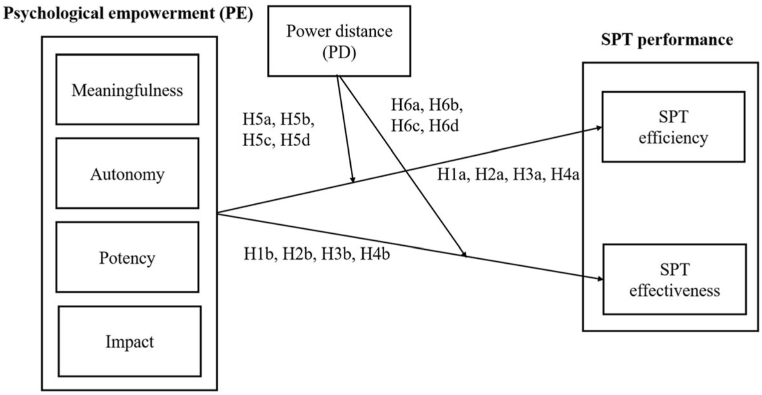

Fig. 1 The research model

approach (Brislin 1970; Lee et al. 2021) was used to translate original English versions of the measurement items into Mandarin. To ensure face and content validity, three experts (including two university professors and one industry practitioner) who specialize in software development and information systems participated in examining the measurement items related to the SPT domain and confirmed that these items were clearly expressed and meaningful. In addition, we recruited 30 graduate students from the Executive Master of Business Administration (EMBA) and Management Information Systems (MIS) programs in a university to join in the pilot-testing process. The participants were selected based on their qualifications as practitioners in the software development domain to help ensure the comprehensibility of the questionnaire items. Through this procedure, the finalized formal questionnaires were developed.

To increase the quality of the samples, this study adopted the multiple sampling frames strategy (Johnston et al. 2011). Specifically, the samples were collected from two regions, Taiwan and Mainland China, because the authors have access to the IT and software associations in these regions. The participating companies were selected based on the business listings of the associations. With the assistance of the associations, we were able to obtain more practical and effective questionnaires. Furthermore, we conducted a quality screening process to establish our candidates and then randomly selected 200 organizations in the two regions as the sampling frames. Moreover, the business listings included not only software companies but also organizations that have the software development function (e.g.,software development unit or department) in various industries. Of the 200 organizations contacted, 105 organizations were willing to delegate a software team to participate in this survey (one software team per organization). The target samples for this investigation were software teams that are directly involved in SPT and experience it.

To effectively target and select the proper participants, at the beginning of the questionnaire, we first introduced the SPT concept and its practices in software development, and then, we designed a dichotomous question (Yes or No) to ask the respondents whether they had SPT-relevant experience. Only those who responded “Yes,” implying they had SPT experience, were qualified to proceed with the questionnaire. To avoid single-source and common method bias (CMB), an ex-ante treatment was used (i.e., each software team was requested to delegate at least two key informants who had experienced and undertaken SPT tasks to complete the questionnaires) to gather the survey data. Notably, the investigation and survey took place during the COVID-19 pandemic. To minimize the influence of the epidemic, the survey was conducted based on the participating teams' preferences for taking either paper-based or online questionnaires. By doing so, we were able to increase the teams' willingness to participate in the survey. Additionally, CMB may occur because of social desirability bias (Nederhof 1985; Ralph 2018). Therefore, we adopted the following treatments to reduce the social desirability bias effect (Nederhof 1985; Srivastava et al. 2015). In the survey, we declared that the data were only used for an academic investigation. We also informed the respondents that the questionnaires were anonymous and that their personal information would be kept confidential to encourage the respondents to truthfully complete the questionnaire.

The survey was conducted from April to October 2020. We received 242 questionnaires from the 105 participating organizations. Among the returned questionnaires, 6 invalid questionnaires (e.g., incomplete responses) from 3 organizations were removed to ensure the quality of the survey. Eventually, in total, 102 software teams from Taiwanese and Mainland Chinese firms (79 teams from Taiwan and 23 teams from Mainland China) with 236 respondents participated in this survey. Thus, 236 samples were included in the data analysis. Additional independent-samples t-tests of education, job position, and work experience showed no significant differences between the paper and online questionnaires; thus, we aggregated the data from these two groups. Furthermore, this study checked whether the responses were representative of the population. Thus, we tested the nonresponse bias using the extrapolation approach proposed by Armstrong and Overton (1977). This approach assumes that participants who respond later are more likely to be nonrespondents. The t-test results showed that there was no significant difference between the early and late questionnaires (after reminders) in terms of education, job position, and work experience. Thus, this study reduced the threat of the nonresponse bias effect, and the responses were sufficiently representative of the population. We also utilized the G*Power software (Faul et al. 2009; Russo 2021) to calculate the minimum sample size (146 samples), and our sample met the requirement. The parameters of the software were based on the suggestions of Campanelli et al. (2018) and Lee et al. (2021) (effect size of 0.15 (average value), power level of 0.95, and maximum allowed error of 0.05). The sample demographics are shown in Table 1. Collecting the samples from multiple sources (i.e., Taiwan and Mainland China) and different industries (See Table 1) helped us increase the sample heterogeneity (Johnston et al. 2011; Baltes and Ralph 2022) and achieve data triangulation (Hussein 2009; Casey and Murphy 2009; Cao and Reimann 2020) to increase the possibility of generalizability.

3.2 Measures

In this study, the measurement items of the research model were previously validated constructs adapted to fit the SPT context and measured using a seven-point Likert scale, as shown in the Appendix Table 8. Notably, the questionnaire items are presented in a generic and concise manner in the Appendix Table 8. We elaborate on these items and provide examples in the formal questionnaire to help the respondents complete the questionnaire. In particular, PE is multifaceted and comprises the following four subcomponents: meaningfulness, autonomy, potency and impact. Each of the four components was measured by three reflective items adapted from Kirkman et al. (2004). PD was assessed using a reflective six-item scale adapted from Clugston et al. (2000) to measure the extent to which team members are willing to accept unbalanced power and authority within the team. SPT performance was operationalized as two constructs: SPT efficiency and SPT effectiveness. Specifically, we

Table 1 Characteristics of the study sample

Item		Number	Percentage
Respondent information			
Respondent position	Team leader/Project manager	40	16.9%
	System analyst	25	10.6%
	System developer	134	56.8%
	System tester	22	9.3%
	Other	15	6.4%
Work experience	1–5 years	95	40.3%
	6–10 years	98	41.5%
	11–15 years	22	9.3%
	More than 15 years	21	8.9%
Education	Bachelor's degree	65	27.5%
	Master's degree	151	64.0%
	Ph.D.	20	8.5%
Software project information			
Team size	Fewer than 5	70	29.7%
	6–10	68	28.8%
	11–15	50	21.2%
	16–20	20	8.5%
	Over 21	28	11.9%
Project duration	Less than 3 months	92	39.0%
	4–6 months	80	33.9%
	7–12 months	40	16.9%
	Over 13 months	24	10.2%
Industry	Software	134	56.8%
	Communication	16	6.8%
	Electronics	32	13.6%
	Manufacturing and machinery	28	11.9%
	Finance and banking	21	8.9%
	Other	5	2.1%

followed the literature in defining SPT efficiency as a software team's effort spent on performing a tailoring task. It was measured by two reflective items from Lee et al. (2021). SPT effectiveness was defined as the quality of the tailoring decisions made by the software team. Five reflective items developed by Lee et al. (2021) were utilized to assess SPT effectiveness.

3.3 Data aggregation

Since we collected the survey data from multiple sources/responses of each team, it was necessary to ensure consistency among the respondents' answers when comparing them (Lee et al. 2021; Hu and Judge 2017; Cole et al. 2013). We therefore examined several statistics: Rwg (James et al. 1984) and intraclass correlation coefficients ICC(1) and ICC(2) (Schneider et al. 2003). The values of Rwg and ICC(2) should be greater than the accepted value of 0.70, and the value of ICC(1) should exceed the threshold of 0.12, which indicates a reasonable level of agreement (Schneider et al. 2003). As shown in Table 2, the team members' perceptions are similar, and their ratings are valid for team-level analysis.

In this study, the partial least squares (PLS) method was selected to examine the model. PLS has been extensively adopted in empirical software engineering studies (e.g., Romero et al. 2015; Akgün et al. 2015; Campanelli et al. 2018; Russo 2021; Russo and Stol 2021)

Table 2 Data aggregation statistics

Constructs	ICC (1)	ICC (2)	Rwg
Meaningfulness	0.578	0.763	0.866
Autonomy	0.551	0.752	0.852
Potency	0.601	0.712	0.806
Impact	0.385	0.708	0.875
SPT efficiency	0.479	0.820	0.920
SPT effectiveness	0.822	0.901	0.759
Power distance	0.451	0.766	0.811

because PLS is a distribution-free technique (i.e., the estimation is not affected by the complexity of the model or nonnormality of the data) (Lee et al. 2020a, 2020b) and can overcome multicollinearity issues (Hair et al. 2012, 2013; Russo and Stol 2021). Additionally, PLS is insensitive to sample size considerations and is suitable for both very small and very large samples compared to covariance-based structural equation modeling (CB-SEM) (Hair et al. 2012; Akgün et al. 2015; Russo and Stol 2021). In terms of other approaches, such as CB-SEM, PLS is employed for the following reasons (Hair et al. (2012, 2017). First, the proposed model of this study is complex, as it has a total of seven constructs and sixteen hypotheses. PLS is more suitable for analyzing a complex model than CB-SEM (Russo and Stol 2021). Second, the model is of a focused type (i.e., the number of exogenous latent variables is at least twice as high as the number of endogenous latent variables) (Hair et al. 2012, p.421), rendering it suitable for PLS (Hair et al. 2012; Koubaa et al. 2014; Lin et al. 2021). In contrast, CB-SEM is proper for analyzing an unfocused model (i.e., the number of endogenous latent variables is at least twice as high as the number of exogenous latent variables) (Hair et al. 2012, p.421). Third, the analysis involves a continuous moderator (i.e., PD) (Hair et al. 2017), and PLS can be used to conduct a moderation analysis (Memon et al. 2019). In the following section, the measurement model is first examined by testing the reliability and validity of the constructs, and then, we verify the structural model by assessing the strength of the hypothesized links among the variables (Lee et al. 2020a). In this study, SmartPLS 3 (Ringle et al. 2015) was adopted for the analysis.

4 Results

4.1 Measurement model

In this study, we validated the measurement model by examining item reliability, convergent validity and discriminant validity. First, item reliability can be determined by examining the item loadings of the constructs. The loading value should exceed the threshold of 0.7 (Hair et al. 2013); here, all the item loadings of the indicators, which were between 0.701 and 0.962, were greater than the suggested acceptable value (see Table 3). Additionally, reliability was assessed using composite reliability (CR) values. According to the results (see Table 3), all the CR values, which ranged from 0.870 to 0.958, exceeded the recommended threshold of 0.7, confirming the reliability of the constructs (Hair et al. 2013). To evaluate convergent validity, we examined the average variance extracted (AVE) of the constructs. Each construct's AVE should exceed the threshold value of 0.50, which indicates that 50% or more of the variance is explained by the indicators of the construct (Hair et al. 2013). Based on the results, all the AVE

Table 3 Descriptive statistics and measurement model results

Constructs	Mean	Standard deviation	Loadings	CR	AVE
Meaningfulness (ME)				0.883	0.716
ME1	5.45	1.02	0.811		
ME2	5.33	1.13	0.857		
ME3	5.55	1.16	0.870		
Autonomy (AU)				0.896	0.811
AU1	5.66	0.98	0.892		
AU2	5.78	1.13	0.909		
Potency (PO)				0.876	0.701
PO1	5.88	1.11	0.822		
PO2	5.92	0.92	0.859		
PO3	5.75	0.82	0.831		
Impact (IM)				0.876	0.78
IM2	5.22	1.20	0.866		
IM3	5.09	1.23	0.900		
SPT Effectiveness (EE)				0.870	0.626
EE1	5.72	1.05	0.828		
EE2	5.58	0.92	0.796		
EE3	5.83	0.86	0.832		
EE4	5.92	0.95	0.702		
SPT Efficiency (EY)				0.958	0.919
EY1	4.71	1.77	0.955		
EY2	4.66	1.82	0.962		
Power distance (PD)				0.870	0.573
PD1	2.75	1.88	0.812		
PD2	3.44	2.08	0.711		
PD4	2.81	2.11	0.801		
PD5	3.02	2.27	0.752		
PD6	3.36	2.39	0.701		

values exceeded the threshold of 0.50, as the values ranged from 0.573 to 0.919 (see Table 3); thus, the convergent validity of the constructs was confirmed. Next, discriminant validity was examined using a heterotrait-monotrait ratio of correlations (HTMT) procedure (Henseler et al. 2016). The results indicated that all the HTMT values were below the accepted value of 0.90 (see Table 4), indicating that discriminant validity was established between the two constructs.

Moreover, although we used an ex ante treatment to reduce the possibility of CMB and its effect on the model, post hoc examinations of the CMB remain necessary. This study adopted two post hoc approaches to detect whether CMB exists. This study performed Harman's one-factor test (Podsakoff et al. 2003), and the results showed that the variance of the first factor accounted for 35.22% of the variance, which is less than 50%, verifying that CMB was not a significant concern. Then, as Kock (2015) and Lee et al. (2021) suggested, we conducted full collinearity tests by testing whether all the variance inflation factors (VIFs) were below the recommended threshold of 3.3. The results showed that none of the VIFs in this study exceeded this threshold (see Table 5), implying that CMB was not a significant issue in this study.

4.2 Structural model

The bootstrap resampling method (5000 resamples) was employed to test the structural model and path coefficients, and the coefficients of determination (R-square value) were calculated

Table 4 The HTMT values of discriminant validity

Constructs	ME	AU	PO	IM	EE	EY	PD
1. ME							
2. AU	0.567						
3. PO	0.335	0.662					
4. IM	0.620	0.610	0.588				
5. EE	0.387	0.450	0.382	0.610			
6. EY	0.228	0.297	0.702	0.575	0.458		
7. PD	0.691	0.557	0.487	0.198	0.402	0.232	

(Hair et al. 2013). Specifically, path coefficients indicate the strength of the relationships between the dependent and independent constructs. R-square values refer to the amount of variance explained by the independent constructs (Lee et al. 2021). Table 6 summarizes the results of the structural path analysis of the PLS estimations. Specifically, in terms of the main effects, we found that most of the proposed hypotheses were supported. Surprisingly, meaningfulness had a negative effect on SPT efficiency (H1a), and impact had a positive influence on SPT efficiency; thus, H4a could not be confirmed. Regarding the moderating effects, only the two hypotheses (H5b and H6b) were supported. These results are further explained and discussed in the next section (i.e., section 5). The coefficient of determination (R^2) of the model was 0.353 for SPT efficiency and 0.715 for SPT effectiveness. We also examined the predictive relevance (Q^2), and the Q^2 values for SPT efficiency and effectiveness were 0.212 and 0.371, respectively. These values were greater than 0, indicating that the model has acceptable predictive relevance (Hair et al. 2013). Moreover, based on the R^2 and Q^2 values, we further assessed the f^2 and q^2 effect sizes. Values of 0.02, 0.15, and 0.35 reflect a small, medium, or large f^2 or q^2 effect size, respectively (Söllner et al. 2017, p. 242). According to Table 7, the results demonstrated the least small f^2 and q^2 effects for all significant relationships. Finally, the model fit was examined using the standardized root mean square residual (SRMR) (Henseler et al. 2016). The model's SRMR value was 0.073, which is less than the threshold value of 0.8, implying that our model is acceptable (Henseler et al. 2016).

Moreover, the samples were gathered from software and non-software industries. We conducted an additional analysis using the non-software industry samples (106 respondents from 46 teams) to examine whether the sample distribution affected the results. This supplementary analysis is possible since the sample size (106) is considered sufficient with the minimum sample size requirement of 60 and the rule of thumb of 10 cases per indicator (Lee and Chen 2022; Chin 1998) concerning the most complex variable, i.e., PD, which has 6 indicators in the model. According to Table 6, the results showed that no difference exists in

Table 5 The VIF values of common method bias

Independent construct	Dependent construct						
	ME	AU	PO	IM	EE	EY	PD
1. ME		1.987	1.622	2.221	2.670	1.220	1.998
2. AU	2.372		2.001	1.856	2.110	1.335	2.338
3. PO	1.988	1.852		2.551	2.987	2.221	2.220
4. IM	1.637	1.962	2.557		1.335	1.888	1.228
5. EE	2.006	2.223	1.667	2.111		1.607	1.118
6. EY	2.587	1.335	1.369	3.001	1.558		2.005
7. PD	1.005	1.857	2.001	2.115	1.327	2.009	

Table 6 Results of the proposed hypothesis tests

Effect types	Hypotheses	Full samples		Non-software industry samples	
		Path coefficients	Result	Path coefficients	Result
Main effects	H1a: Meaningfulness has a positive influence on SPT efficiency.	0.256***	Supported	0.277***	Supported
	H1b: Meaningfulness has a positive influence on SPT effectiveness.	−0.202**	Not supported	−0.195**	Not supported
	H2a: Autonomy has a positive influence on SPT efficiency.	0.159*	Supported	0.147*	Supported
	H2b: Autonomy has a positive influence on SPT effectiveness.	0.412***	Supported	0.408***	Supported
	H3a: Potency has a positive influence on SPT efficiency.	0.165*	Supported	0.177*	Supported
	H3b: Potency has a positive influence on SPT effectiveness.	0.271***	Supported	0.258***	Supported
	H4a: Impact has a negative influence on SPT efficiency.	0.431***	Not supported	0.427***	Not supported
	H4b: Impact has a positive influence on SPT effectiveness.	0.225**	Supported	0.211**	Supported
Moderating effects	H5a: Lower PD strengthens the positive effect of meaningfulness on SPT efficiency.	−0.007	Not supported	−0.011	Not supported
	H5b: Lower PD strengthens the positive effect of autonomy on SPT efficiency.	−0.172*	Supported	−0.190*	Supported
	H5c: Lower PD strengthens the positive effect of potency on SPT efficiency.	−0.016	Not supported	−0.011	Not supported
	H5d: Lower PD amplifies the negative effect of impact on SPT efficiency.	−0.021	Not supported	0.013	Not supported
	H6a: Lower PD strengthens the positive effect of meaningfulness on SPT effectiveness.	0.041	Not supported	0.047	Not supported
	H6b: Lower PD strengthens the positive effect of autonomy on SPT effectiveness.	−0.216**	Supported	−0.199**	Supported
	H6c: Lower PD strengthens the positive effect of potency on SPT effectiveness.	0.082	Not supported	0.075	Not supported
	H6d: Lower PD strengthens the positive effect of impact on SPT effectiveness.	0.032	Not supported	0.029	Not supported

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

Table 7 f^2 and q^2 effect sizes for the model

Effect types	Hypotheses	f^2 value	f^2 effect size	q^2 value	q^2 effect size
Main effects	H1a: Meaningfulness has a positive influence on SPT efficiency.	0.035	Small	0.024	Small
	H1b: Meaningfulness has a positive influence on SPT effectiveness.	0.112	Small	0.025	Small
	H2a: Autonomy has a positive influence on SPT efficiency.	0.132	Small	0.031	Small
	H2b: Autonomy has a positive influence on SPT effectiveness.	0.242	Middle	0.090	Small
	H3a: Potency has a positive influence on SPT efficiency.	0.091	Small	0.012	Small
	H3b: Potency has a positive influence on SPT effectiveness.	0.110	Small	0.022	Small
	H4a: Impact has a negative influence on SPT efficiency.	0.160	Middle	0.141	Small
	H4b: Impact has a positive influence on SPT effectiveness.	0.045	Small	0.013	Small
Moderating effects	H5a: Lower PD strengthens the positive effect of meaningfulness on SPT efficiency.	0.000		−0.005	
	H5b: Lower PD strengthens the positive effect of autonomy on SPT efficiency.	0.025	Small	0.02	Small
	H5c: Lower PD strengthens the positive effect of potency on SPT efficiency.	0.000		0.000	
	H5d: Lower PD amplifies the negative effect of impact on SPT efficiency.	0.002		−0.001	
	H6a: Lower PD strengthens the positive effect of meaningfulness on SPT effectiveness.	0.005		−0.004	
	H6b: Lower PD strengthens the positive effect of autonomy on SPT effectiveness.	0.065	Small	0.02	Small
	H6c: Lower PD strengthens the positive effect of potency on SPT effectiveness.	0.015		−0.005	
	H6d: Lower PD strengthens the positive effect of impact on SPT effectiveness.	0.004		−0.003	

terms of the full sample group and non-software industry group, implying that the non-software industry samples do not skew the results of the full sample.

5 Discussion and implication

5.1 Theoretical contributions

Considering the findings of this study, its theoretical contributions are discussed as follows. Overall, this study sheds light on an important yet unresolved issue regarding the conditions under which team members are psychologically motivated to efficiently and effectively engage in the collaborative decision-making of SPT. Though existing SPT studies have shown that knowledge and its absorption, especially with respect to team members' input, is critical, how to facilitate team members' intrinsic motivation to actively participate in such a unique team-based decisional process and contribute critical thinking to it remains unknown. This paper closes this gap by examining team members and their critical input and contributes to the literature by theorizing the effects of team members' PE on the output of efficient and effective tailoring decisions through SPT. The results advanced our knowledge by revealing that the PE dimensions of meaningfulness, autonomy, potency and impact differentially influence team members' devotion and accountability to collaborating in the tailoring process.

Scholars have noted that a software team's dynamics play a critical role in knowledge-intensive SPT (Kalus and Kuhrmann 2013; Campanelli and Parreiras 2015; Campanelli et al. 2018; Lee et al. 2020a, 2021). These studies mainly focus on the team's interactive behaviors when conducting SPT. We take these studies as a starting point to further trace team members' underlying motivational state in terms of PE, exploring its effects and how it operates in SPT. Specifically, meaningfulness is shown to enable the team to understand the value of process tailoring as well as the value of individual input in the accomplishment of the tailoring work. Meaningfulness strengthens SPT knowledge and idea sharing and exchange, thereby enabling the team to generate effective and quality tailoring decisions. In terms of SPT efficiency, however, meaningfulness is shown to have a significantly negative effect. Such a result reflects that when people perceive that their work and input are valuable and worthwhile (Kirkman et al. 2004; Maynard et al. 2012), the coordination involved in SPT is prolonged. The ideas and input on tailoring the shared process are conflictual or contradictory, and this arouses team members' emotional self-esteem or rational egoism (Lindenberg 2001). Because they feel that they are doing the right thing (Dust et al. 2018), they may continue to defend or debate the ideas and input, and as a result, greater effort is required to reach a consensus on the process solution that is the most generally beneficial.

Autonomy may be typically assumed to worsen conflict and prolong the collaborative decision-making process or to be beneficial only for agile software development teams (Diegmann and Rosenkranz 2017). However, in our opinion, the results may imply that in the SPT context, autonomy not only assists software teams in generating timely process solutions without going through the bureaucratic organizational hierarchy but also fosters team members' independent and critical thinking to help them formulate more integrated tailoring decisions that benefit a variety of interests. Potency is found to equip team members with sufficient confidence and a shared belief in their ability to further challenge their limits in producing synthesized tailoring solutions characterized by higher quality but requiring lower individual effort. This finding implies that team members who perceive higher self-potency can motivate themselves not only to keep pace with rapid and dynamic development processes but also to equip themselves with more knowledge in accepting additional challenges to advance the development project. In addition, as studies show that competent team members tend to help others in highly interdependent work such as software development (Hudson 2007; Chen and Chong 2011; Von Krogh et al. 2012), the presence of potency motivates team members to actively help the team accomplish the desired new development goal, thus increasing the efficiency of collaborative solution planning in SPT.

Regarding impact, the results show that it allows team members to generate process solutions and decisions by deliberating with an enlarged scope that includes the potential consequences on the project execution, which leads to more suitable tailoring decisions. Such a finding implies that a holistic impact orientation may be instilled in team members when considering solutions in planning and responding to changes in the development process. Moreover, an interesting finding shows that impact exerts an antagonistic (i.e., positive) influence on SPT efficiency instead of the negative effect that we hypothesized. A possible reason is that impact-oriented team members are likely to better grasp and comprehend the necessary and peripheral information (Kirkman et al. 2004) of not only their own tasks or practices but also others' and are then able to devote effort to formulating valid process solutions that are beneficial to the ultimate outcome of the project. This in turn helps the team avoid spending additional time and effort on re-executing and remediating tasks, thereby improving SPT efficiency. As a whole, we contribute to the extant software development literature by providing fresh insight into how PE empirically influences how a software team carries out SPT, which can help improve SPT performance. Maynard et al. (2012) and To et al. (2015) argued that the possible differential effects of the four empowerment subfactors should be investigated and examined, and the results of this study clarify and theorize the distinct operational mechanisms whereby they facilitate a team's SPT, which drives the evolution of software development.

Moreover, in a further investigation of how to build a proper and favorable decision-making environment for a team's engagement in SPT, this study looks into the power distribution in the relationship between managers and team members (i.e., power distance). The results of this study demonstrated that lower PD strengthens the positive effect of autonomy on SPT efficiency and effectiveness. It is known that the innovative and dynamic nature of contemporary software development suggests the need for team autonomy. This finding delivers a critical message from software teams that reinforces the claim by showing the utility of SPT, particularly spiced with PD, for them to promptly respond and collaboratively adjust the development through waves of change. Chen et al. (2015) indicated that when new product teams engaged in highly challenging technological development processes face problems that they cannot solve on their own, they may feel distraction, pressure or loss of motivation, thereby hampering team performance. This study furthers the research by reporting a result specific to the context of software development planning. Specifically, the results of this study show that in a low-PD environment, managers can exert more influence on team members' perception of autonomy and their associated work motivation and in turn provide more support that can produce valuable psychological capital, which helps increase team members' self-efficacy when performing tailoring work.

However, the rest of the results showed that the effect of PD on the relationships of meaningfulness, potency, and impact with SPT performance were nonsignificant (i.e., hypotheses H5a, H5c, H5d, H6a, H6c, and H6d were not supported). This seems to contradict the call for promoting lower PD in managing empowered software teams. Specifically with respect to H5a and H6a (meaningfulness × power distance→SPT efficiency and effectiveness), the possible reasons are as follows. According to prior studies (e.g., Guinote (2017) and Hildreth and Anderson (2016)), teams with low PD may have difficulty reaching consensus and may experience increased difficulty in task negotiation when individual team members perceive that their tasks are the most important and valuable. This may create task conflicts among team members and task owners (Lee et al. 2020b). In addition, power may decrease the accuracy of judgment and decision quality when power holders are overconfident or self-righteous (Fiske and Berdahl 2007; Nissan et al. 2015). In this regard, the role of PD in the relation between team members' perception of meaningfulness and SPT performance is shown to be nonsignificant. Furthermore, the failure to confirm H5c and H6c (potency × power distance→SPT efficiency and effectiveness) indicates that lower power distance has little effect on a team's collaborative SPT work. The study of Antonakis and Atwater (2002) may explain why, as it suggests that when team members' perceived ability is high, they prefer to avoid intensive interaction with managers (i.e., a low-PD environment) because they are afraid that managers may meddle in their work and seek to guide it (Chen et al. 2014). As the work of SPT involves various domain-specific tasks that are owned by capable team members, a low-PD team environment is thus shown to not significantly affect the relationship between potency and SPT performance. Such a finding advances our understanding of power distance in the SPT context: managers need not have weaker authority for the team to better perform collaborative SPT. Rather, they can display more trust in team members and help build up team members' belief in their potency (Ozyilmaz et al. 2018) to accomplish the tailoring goals. They can also encourage the more competent team members to be more altruistic. In these ways, the shared and interdependent development processes can be tailored to yield a more integrated process solution.

Regarding the failure to confirm H5d and H6d (impact × power distance→SPT efficiency and effectiveness), the possible reasons are discussed as follows. Because of the diversity of each tailoring case, conducting SPT often involves nonroutine decision-making. Under this uncertain decision-making environment, the team members with more power (i.e., in a low PD team environment) may feel stress and anxiety (Chen et al. 2015) if they perceive that their task has a significant influence on the team objectives and project outcomes. This may lead power holders to dislike the tasks that they are in charge of (DeWall et al. 2011). Therefore, in the SPT work that requires team members to be responsible and accountable for collaborative SPT decisions, decreasing manager-member PD does not influence the relationship between impact and SPT performance. This finding uncovers the underlying operational mechanisms of a contextual factor (i.e., power distance) on the specific effects of PE on SPT performance. The results also extend Guinote's (2017) study by showing that even in an empowered environment, the relationship between power and performance is nuanced and depends on the task and the motivation to complete it.

5.2 Practical implications

Based on the results of this study, several practical implications are provided as follows. First, the results of this study showed that PE indeed fosters SPT performance, except in the case of the negative effect of meaningfulness on SPT efficiency. In terms of meaningfulness and impact, organizations can consider establishing a process asset library (PAL), a knowledge repository used to store and make available all the process assets that are useful and sharable to those who define, implement, and manage processes in the organization (Lee et al. 2016; García et al. 2011). A PAL can help organizations and software teams transfer and exploit software process knowledge, collect similar past tailoring experiences of processes and practices, and archive failed tailoring cases and best practices. With such functionality, team members can survey the PAL to increase their all-around cognition and understanding of planning and tailoring processes, thus helping them view impact more holistically when proposing a tailoring solution.

Moreover, with the establishment of a PAL, we suggest that organizations encourage project teams and their members to share their proven tailored process solutions (i.e., best practices) and publish the solution case in the library to recognize employees' contribution to the organization's software process improvement (SPI) program. This would help increase members' perceived value and meaningfulness and ignite their enthusiasm to contribute more valuable input to subsequent SPT tasks. To reduce the negative effect of meaningfulness on SPT efficiency, projects and practitioners may consider utilizing the Delphi method or nominal group technique (NGT) (Cantrill et al. 2015) to facilitate the collaborative decision-making process in SPT. For example, in the Delphi method, two of the best-known features of which are anonymity and converging evolution, team members record their opinions, and these are then discussed while preserving anonymity to mitigate emotional responses. The project team then votes anonymously again to effectively reach a consensus before moving on to the next process issue. Such a group decision practice would increase the productivity of brainstorming in terms of soliciting ideas and opinions and would streamline discussion of the input to yield a process solution that truly satisfies the most needs.

Concerning teams' perceptions of autonomy and the favorable results reported in this study, we suggest that managers consider loosening control over team members and instead becoming team members' "devil's advocates" to prevent groupthink (Lee and Chen 2019; Lee et al. 2020a). This is particularly necessary in the critical thinking and decisional process of SPT. In addition, managerial practitioners should ponder how much and what type of autonomy they are willing or able to give. Providing a proper scope for decision-making and appropriate discretion over goals, budgeting, resourcing and scheduling (i.e., autonomy for planning) seems to be an effective means of instilling task motivation (Janz et al. 1997). However, when managers grant autonomy and discretion to team members over tailoring decisions, they may need to also consider whether team members are willing to accept the offered authorization, since it is often deemed by individuals that, according to attribution theory (Kassin et al. 2010), such an offer comes with a price, i.e., the corresponding responsibility for the outcome of the tailoring decisions. Therefore, it is suggested that managers not present the offer as a trade and instil the idea in members that SPT decisions are made by the whole team, not individuals. Notably, when a software team is composed of younger or less experienced members, too much authorization might turn into excessive pressures, resulting in less participation or avoidance of participation in the collaborative SPT work. Thus, to better develop team members' task motivation in SPT, autonomy should be associated with an appropriate degree of authorization.

Regarding the moderating effect, interestingly, the results show that even if a low-PD team environment is provided to software teams, it exerts little influence on the effect of the team members' task motivation on process tailoring performance. With this finding, we suggest that managerial practitioners consider adopting the servant style of leadership (Holtzhausen and de Klerk 2018) in guiding the team's SPT activities. According to several studies, servant leaders focus on the personal development of their followers/subordinates and adapt their leadership style to fit each individual's different needs, interests, motivations and idiosyncratic behavior (van Dierendonck 2010; van Dierendonck et al. 2014; Eva et al. 2019). In other words, this leadership type primarily focuses on team members' advancement from a psychological and intrinsic motivational perspective. However, as Eva et al. (2019) noted, building a servant leadership culture requires selecting pro-socially motivated, conscientious people and providing corresponding servant leadership training. It can be inferred that leader selection is particularly important because regardless of how good a training program is, changing self-centered or narcissistic people into other-centered, empathetic, socially sensitive servant leaders is almost impossible. To promote this leadership style, we suggest that software organizations can consider providing incentive programs for team leaders and managers to motivate them and to evaluate how they work to establish this leadership culture. In this way, managers/leaders can be encouraged to become servant leaders that accommodate and support the four distinct traits of psychological task motivation in their team members. This can help catalyze and strengthen the social relationships between managers and team members, thereby enhancing teams' collaborative work performance when conducting SPT.

6 Limitations and future research

This study has several limitations and corresponding suggestions for extending and continually developing SPT research. First, as the study focuses on software teams in Mainland China and Taiwan, the findings may be limited in terms of generalizability. Future research can expand to examine the hypothetical relationships in other geographic contexts, such as different regions or countries, and identify the differences. Second, this study primarily adopted a cross-sectional research design (i.e., survey) to examine how PE influences SPT performance. Scholars e.g., Maynard et al. (2012) have suggested that empowerment research should incorporate a temporal dimension because empowerment may not be a static phenomenon and may differ across phases of the team life cycle. Thus, subsequent research may advance our understanding of SPT by studying empowerment while accounting for the team development lifecycle, e.g., via Tuckman's model, to extend the relevant results.

Third, the sample in this study was drawn from an Eastern social context. The cultures of Eastern and Western societies are different (Hofstede 2001), and these cultural differences might also affect team members' perceptions about PD (Daniels and Greguras 2014; Hauff and Richter 2015). Therefore, we suggest that follow-up studies extend the findings by adopting cross-cultural research designs to further examine how culture influences team processes and function when conducting SPT. Fourth, since SPT is commonly implemented in contemporary software development, the investigation of this paper took a higher view and examined effects that are not limited to any specific development type. Future research can use our findings as a reference in considering different types of software development. In particular, as the distinguishing feature of agile development is self-organizing teams, these teams are theoretically given more freedom and discretion over development. In this sense, future research can seek to identify whether and how the agile development environment affects team members' involvement when performing SPT, as well as how the related effects, e.g., psychological contracts (Robinson 1996; Rousseau et al. 2018), impact agile teams' perceived power when authorization is empirically not ideally autonomic. Finally, this study primarily conducted a quantitative investigation (i.e., survey) and adopted several strategies and treatments in the survey and the analyses. To some extent, this study ensures the quality of the data in such a quantitative study with the purpose to theorize the proposed model and generalize the results. Even so, future research is suggested to include qualitative studies, such as conducting case studies or utilizing qualitative analyses (e.g., interviews), to obtain more additional and specialized details from the findings of this study. In particular, we suggest that future quantitative survey studies consider including a supplementary qualitative analysis when planning and conducting the survey for the purpose of discovering more details about the findings.

7 Conclusion

Software process tailoring is a crucial activity for dynamic and team-based software development; it demands team members' active and critical participation to innovate the development. To understand the members' energetic participation in SPT, this study focuses on the motivational perspective to theorize how psychological empowerment and the power distance motivate team members to foster SPT performance. The results showed that psychological empowerment in terms of meaningfulness, autonomy, potency, and impact has positive impacts on SPT efficiency. Additionally, autonomy, potency, and impact increase SPT effectiveness, whereas meaningfulness decreases SPT effectiveness. Regarding the moderation effect, lower PD is found to enhance the positive effect of autonomy on SPT efficiency and effectiveness. The theoretical model and empirical results of this study contribute to the software engineering literature by conveying the important messages in SPT, i.e., we ascertain that the four components of PE exert different effects on the motivation of members when conducting SPT. In addition, as a contextual factor, the power distance significantly determines the function of members' autonomy on SPT efficiency and effectiveness.

Appendix

Appendix Table 8

Table 8 Questionnaire items

Construct	Items	Strongly disagree Neutral Strongly agree ⟵⟶						
	Please indicate the extent to which you agree with the following statements.	1	2	3	4	5	6	7
Meaningfulness (ME) (Kirkman et al. 2004)	(ME1) My team believes that the task of SPT is significant to its projects.	○	○	○	○	○	○	○
	(ME2) My team feels that it is worthwhile to spend effort and resources on SPT.	○	○	○	○	○	○	○
	(ME3) My team feels that taking part in SPT is meaningful.	○	○	○	○	○	○	○
Autonomy (AU) (Kirkman et al. 2004)	(AU1) My team can propose different ways to accomplish the tailoring goal.	○	○	○	○	○	○	○
	(AU2) My team determines as a team when a tailoring solution has been found.	○	○	○	○	○	○	○
	(AU3) My team makes suitable tailoring decisions without being told by management. (Item dropped)	○	○	○	○	○	○	○
Potency (PO) (Kirkman et al. 2004)	(PO1) My team has confidence in itself when making tailoring decisions that change the development process.	○	○	○	○	○	○	○
	(PO2) My team can get things done when facing substantive and continuous tailoring needs.	○	○	○	○	○	○	○
	(PO3) My team believes that it can be very productive.	○	○	○	○	○	○	○
Impact (IM) (Kirkman et al. 2004)	(IM1) The tailored processes on my team has a positive impact on the project's customer. (Item dropped)	○	○	○	○	○	○	○
	(IM2) The tailored tasks of my team help my company in the establishment of new process standards.	○	○	○	○	○	○	○
	(IM3) The changes to the project made by my team due to SPT make a difference to my organization.	○	○	○	○	○	○	○
SPT effectiveness (EE) (Lee et al. 2021)	(EE1) This tailoring decision is based on the best available information for a software project.	○	○	○	○	○	○	○
	(EE2) This tailoring decision is made based on valid assumptions about a project.	○	○	○	○	○	○	○

Table 8 (continued)

Construct	Items	Strongly disagree Neutral Strongly agree						
	Please indicate the extent to which you agree with the following statements.	1	2	3	4	5	6	7
	(EE3) This tailoring decision helps the project achieve its objectives.	○	○	○	○	○	○	○
	(EE4) This tailoring decision makes sense in light of the project's current resource situation.	○	○	○	○	○	○	○
	(EE5) This tailoring decision is consistent with the strategy and context of integrated process and product development. (Item dropped)	○	○	○	○	○	○	○
SPT efficiency (EY)	(EY1) We have accomplished SPT tasks in less time than expected.	○	○	○	○	○	○	○
(Lee et al. 2021)	(EY2) We have accomplished SPT tasks with less effort than expected.	○	○	○	○	○	○	○
Power distance (PD) (Clugston et al. 2000)	(PD1) Managers should make most SPT decisions without consulting subordinates.	○	○	○	○	○	○	○
	(PD2) It is frequently necessary for a manager to use authority and power when dealing with subordinates during SPT.	○	○	○	○	○	○	○
	(PD3) Managers should seldom ask for members' opinions in proposing and determining tailoring solutions. (Item drop)	○	○	○	○	○	○	○
	(PD4) Managers should avoid off-the-job social contact with employees.	○	○	○	○	○	○	○
	(PD5) Employees should not disagree with management decisions regarding SPT.	○	○	○	○	○	○	○
	(PD6) Managers should not delegate important planning and tailoring tasks to team members.	○	○	○	○	○	○	○

Note: the questionnaire items are presented in a generic and concise manner in the Table 8. We elaborate on these items and provide examples in the formal questionnaire to help the respondents complete the questionnaire

Acknowledgements The authors thank the editor and reviewers for their constructive comments and suggestions, which helped us enhance the quality of this manuscript. We also thank Mr. Ta-Chun Hsu for his assistance in preparing this manuscript.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflicts of interest There are no conflicts of interest to declare.

References

Akgün AE, Keskin H, Cebecioglu AY, Dogan D (2015) Antecedents and consequences of collective empathy in software development project teams. Inf Manag 52(2):247–259

Antonakis J, Atwater L (2002) Leader distance: a review and a proposed theory. Leadersh Q 13(6):673–704

Armstrong JS, Overton TS (1977) Estimating nonresponse bias in mail surveys. J Mark Res 14(3):396–402

Baltes S, Ralph P (2022) Sampling in software engineering research: a critical review and guidelines. Empir Softw Eng 27(4):1–31

Bass JM (2016) Artefacts and agile method tailoring in large-scale offshore software development programmes. Inf Softw Technol 75(75):1–16

Brislin RW (1970) Back-translation for cross-cultural research. J Cross-Cult Psychol 1(3):185–216

Campanelli AS, Parreiras FS (2015) Agile methods tailoring: a systematic literature review. J Syst Softw 110:85–100

Campanelli AS, Camilo RD, Parreiras FS (2018) The impact of tailoring criteria on agile practices adoption: a survey with novice agile practitioners in Brazil. J Syst Softw 137:366–379

Cantrill JA, Sibbald B, Buetow S (2015) The Delphi and nominal group techniques in health services research. Int J Pharm Pract 4(2):67–74

Cao CC, Reimann M (2020) Data triangulation in consumer neuroscience: integrating functional neuroimaging with meta-analyses, psychometrics, and behavioral data. Front Psychol 11:550204

Casey D, Murphy K (2009) Issues in using methodological triangulation in research. Nurs Res 16:40–55

Chen CY, Chong P (2011) Software engineering education: a study on conducting collaborative senior project development. J Syst Softw 84(3):479–491

Chen G, Kirkman BL, Kanfer R, Allen D, Rosen B (2007) A multilevel study of leadership, empowerment, and performance in teams. J Appl Psychol 92(2):331–346

Chen C, Liao J, Wen P (2014) Why does formal mentoring matter? The mediating role of psychological safety and the moderating role of power distance orientation in the Chinese context. Int J Hum Resour Manag 25(8):1112–1130

Chen J, Neubaum DO, Reilly RR, Lynn GS (2015) The relationship between team autonomy and new product development performance under different levels of technological turbulence. J Oper Manag 33:83–96

Chin W (1998) The partial least squares approach to structural equation modeling. In: Marcoulides GA (ed) Modern method for business research. Lawrence Erlbaum Associates, Mahwah, pp 295–336

Clarke P, O'Connor RV, Leavy B, Yilmaz M (2015) Exploring the relationship between software process adaptive capability and organisational performance. IEEE Trans Softw Eng 41(12):1169–1183

Clugston M, Howell JP, Dorfman PW (2000) Does cultural socialization predict multiple bases and foci of commitment? J Manag 26(1):5–30

Cole MS, Carter MZ, Zhang Z (2013) Leader-team congruence in power distance values and team effectiveness: the mediating role of procedural justice climate. J Appl Psychol 98(6):962–973

Conboy K, Fitzgerald B (2010) Method and developer characteristics for effective agile method tailoring: a study of XP expert opinion. ACM Trans Softw Eng Methodol 20(1):1–30

Daniels MA, Greguras GJ (2014) Exploring the nature of power distance: implications for mcro- and macro-level theories, processes, and outcomes. J Manag 40(5):1202–1229

DeWall CN, Baumeister RF, Mead NL, Vohs KD (2011) How leaders self-regulate their task performance: evidence that power promotes diligence, depletion, and disdain. J Pers Soc Psychol 100(1):47–65

Diegmann P, Rosenkranz C (2017) Team performance in agile software development projects: the effects of requirements changes, time pressure, team diversity, and conflict, proceedings of the 2017 international research workshop on IT Project Management, 2017, vol. 2, available at: https://aisel.aisnet.org/irwitpm2017/2/. Accessed 15 May 2021

Drach-Zahavy A (2004) Exploring team support: the role of team's design, values, and leader's support. Group Dyn Theory Res Pract 8(4):235–252

Dust SB, Resick CJ, Margolis JA, Mawritz MB, Greenbaum RL (2018) Ethical leadership and employee success: examining the roles of psychological empowerment and emotional exhaustion. Leadersh Q 29(5):570–583

Edmondson A (2002) The local and variegated nature of learning in organizations: a group-level perspective. Organ Sci 13:128–146

Eva N, Robin M, Sendjaya S, van Dierendonck D, Liden RC (2019) Servant leadership: a systematic review and call for future research. Leadersh Q 30:111–132

Faul F, Erdfelder E, Buchner A, Lang AG (2009) Statistical power analyses using G*power 3.1: tests for correlation and regression analyses. Behav Res Methods 41(4):1149–1160

Fiske ST, Berdahl J (2007) Social power. In: Kruglanski AW, Higgins T (eds) Social psychology: a handbook of basic principles, vol 2. Guilford, New York, pp 678–692

Fitzgerald B, Russo NL, O'Kane T (2003) Software development method tailoring at Motorola. Commun ACM 46(4):64–70
García J, Amescua A, Sanchez MI, Bermon L (2011) Design guidelines for software processes knowledge repository development. Inf Softw Technol 53(8):834–850
Goleman D (2000) Leadership that gets results. Harv Bus Rev 78(2):4–17
Guinote A (2017) How power affects people: activating, wanting, and goal seeking. Annu Rev Psychol 68(1): 353–381
Hair JF, Sarstedt M, Ringle CM, Mena JA (2012) An assessment of the use of partial least squares structural equation modeling in marketing research. J Acad Mark Sci 40(3):414–433
Hair JF, Hult GTM, Ringle C, Sarstedt M (2013) A primer on partial least squares structural equation modeling (PLS-SEM). SAGE Publications
Hair J, Hollingsworth CL, Randolph AB, Chong AYL (2017) An updated and expanded assessment of PLS-SEM in information systems research. Ind Manag Data Syst 117(3):442–458
Hauff S, Richter N (2015) Power distance and its moderating role in the relationship between situational job characteristics and job satisfaction. Cross Cult Manag 22(1):68–89
Hempel PS, Zhang ZX, Han Y (2012) Team empowerment and the organizational context. J Manag 38(2):475–501
Henseler J, Hubona G, Ray PA (2016) Using PLS path modeling in new technology research: updated guidelines. Ind Manag Data Syst 116(1):2–20
Hildreth JAD, Anderson C (2016) Failure at the top: how power undermines collaborative performance. J Pers Soc Psychol 110(2):261–286
Hofstede G (2001) Culture's consequences: comparing values, behaviors, institutions and organizations across nations. Sage, Thousand Oaks
Holtzhausen N, de Klerk JJ (2018) Servant leadership and the scrum team's effectiveness. Leadersh Org Dev J 39(7):873–882
Hu J, Judge TA (2017) Leader-team complementarity: exploring the interactive effects of leader personality traits and team power distance values on team processes and performance. J Appl Psychol 102(6):935–955
Hu J, Erdogan B, Jiang K, Bauer TN, Liu S (2018) Leader humility and team creativity: the role of team information sharing, psychological safety, and power distance. J Appl Psychol 103(3):313–323
Hudson VF (2007) The human touch. Ind Eng 39(9):40–44
Hussein A (2009) The use of triangulation in social sciences research. J Comp Soc Work 4(1):106–117
James LR, Demaree RG, Wolf G (1984) Estimating within-group interrater reliability with and without response bias. J Appl Psychol 69(1):85–98
Janz BD, Colquitt JA, Noe RA (1997) Knowledge worker team effectiveness: the role of autonomy, interdependence, team development, and contextual support variables. Pers Psychol 50:877–904
Johnston SP, Jones MV, Morgan-Thomas A, Vlachos GI (2011) Sampling frames for cross-national survey research in international entrepreneurship. In: Nummela N (ed) International growth of small and medium enterprises. Routledge, New York, pp 191–209
Kalus G, Kuhrmann M (2013) Criteria for software process tailoring: a systematic review. In: Proceedings of the 2013 International Conference on Software and System Process, 2013, 171-180
Kassin S, Fein S, Markus HR (2010) Social psychology, 8th edn. Cengage Learning, Wadsworth
Kirkman BL, Rosen B, Tesluk PE, Gibson CB (2004) The impact of team empowerment on virtual team performance: the moderating role of face-to-face interaction. Acad Manag J 47(2):175–192
Kock N (2015) Common method bias in PLS-SEM: a full collinearity assessment approach. Int J e-Collab 11(4): 1–10
Koubaa Y, Srarfi Tabbane R, Chaabouni Jallouli R (2014) On the use of structural equation modeling in marketing image research. Asia Pac J Mark Logist 26(2):315–338
Lee JC, Chen CY (2019) Exploring the determinants of software process improvement success: a dynamic capability view. Inf Dev 35(1):6–20
Lee JC, Chen CY (2020) Exploring the team dynamic learning process in software process tailoring performance: a theoretical perspective. J Enterp Inf Manag 33(3):502–518
Lee JC, Chen X (2022) Exploring users' adoption intentions in the evolution of artificial intelligence mobile banking applications: the intelligent and anthropomorphic perspectives. Int J Bank Mark 40(4):631–658
Lee G, Xia W (2010) Toward agile: an integrated analysis of quantitative and qualitative field data on software development agility. MIS Q 34(1):87–114
Lee JC, Shiue YC, Chen CY (2016) Examining the impacts of organizational culture and top management support of knowledge sharing on the success of software process improvement. Comput Hum Behav 54: 462–474
Lee A, Willis S, Tian AW (2018) Empowering leadership: a meta- analytic examination of incremental contribution, mediation, and moderation. J Organ Behav 39(2):306–325

Lee A, Thomas G, Martin R, Guillaume Y, Marstand AF (2019) Beyond relationship quality: the role of leader-member exchange importance in leader-follower dyads. J Occup Organ Psychol 92:736–763
Lee JC, Shiue YC, Chen CY (2020a) An integrated model of the knowledge antecedents for exploring software process improvement success. J Enterp Inf Manag 33(6):1537–1556
Lee JC, Wang YT, Chen CY (2020b) The effect of transactive memory systems on process tailoring in software projects: the moderating role of task conflict and shared temporal cognitions. J Syst Softw 164:110545
Lee JC, Chou IC, Chen CY (2021) The effect of process tailoring on software project performance: the role of team absorptive capacity and its knowledge-based enablers. Inf Syst J 31(1):120–147
Liang TP, Jiang J, Klein GS, Liu YC (2010) Software quality as influenced by informational diversity, task conflict, and learning in project teams. IEEE Trans Eng Manag 57(3):477–487
Lin RR, Zheng Y, Lee JC (2021) Artificial intelligence-based preimplementation interventions in users' continuance intention to use Mobile banking. Int J Mob Commun. https://doi.org/10.1504/IJMC.2023.10042841
Lindenberg S (2001) Social rationality versus rational egoism. In handbook of sociological theory. Springer, Boston, pp 635–668
Mathieu JE, Gilson LL, Ruddy TM (2006) Empowerment and team effectiveness: an empirical test of an integrated model. J Appl Psychol 91(1):97–108
Matsuo M (2019) Antecedents of psychological empowerment: the effects of developmental experience, learning goal orientation and authenticity. Asia Pac J Hum Resour. https://doi.org/10.1111/1744-7941.12228
Maynard MT, Gilson LL, Mathieu JE (2012) Empowerment—fad or fab? A multilevel review of the past two decades of research. J Manag 38(4):1231–1281
Maynard MT, Luciano MM, D'Innocenzo L, Mathieu JE, Dean MD (2014) Modeling time-lagged reciprocal psychological empowerment–performance relationships. J Appl Psychol 99(6):1244–1253
Memon MA, Cheah JH, Ramayah T, Ting H, Chuah F, Cham TH (2019) Moderation analysis: issues and guidelines. J Appl Struct Equ Model 3(1):1–11
Nederhof AJ (1985) Methods of coping with social desirability bias: a review. Eur J Soc Psychol 15(3):263–280
Nissan T, Shapira O, Liberman N (2015) Effects of power on mental rotation and emotion recognition in women. Personal Soc Psychol Bull 41(10):1425–1437
Ozyilmaz A, Erdogan B, Karaeminogullari A (2018) Trust in organization as a moderator of the relationship between self-efficacy and workplace outcomes: a social cognitive theory-based examination. J Occup Organ Psychol 91(1):181–204
Podsakoff PM, MacKenzie SB, Lee LY, Podsakoff NP (2003) Common method biases in behavioral research: a critical review of the literature and recommended remedies. J Appl Psychol 88(5):879–903
Ralph P (2018) Toward methodological guidelines for process theories and taxonomies in software engineering. IEEE Trans Softw Eng 45(7):712–735
Rao AN, Pearce JL (2016) Should management practice adapt to cultural values? The evidence against power distance adaptation. Cross Cult Strat Manag 23(2):257–286
Ringle CM, Wende S, Becker JM (2015) SmartPLS 3. SmartPLS GmbH, Boenningstedt http://www.smartpls.com
Robinson SL (1996) Trust and breach of the psychological contract. Adm Sci Q:574–599
Romero HL, Dijkman RM, Grefen PWPJ, van Weele AJ, de Jong A (2015) Measures of process harmonization. Inf Softw Technol 63:31–43
Rousseau DM, Hansen SD, Tomprou M (2018) A dynamic phase model of psychological contract processes. J Organ Behav 39(9):1081–1098
Russo D (2021) The agile success model: a mixed-methods study of a large-scale agile transformation. ACM Trans Softw Eng Methodol (TOSEM) 30(4):1–46
Russo D, Stol KJ (2021) PLS-SEM for software engineering research: an introduction and survey. ACM Comput Surv (CSUR) 54(4):1–38
Sawyer S (2001) Effects of intra-group conflict on packaged software development team performance. Inf Syst J 11(2):155–178
Schneider B, Hanges PJ, Smith DB, Salvaggio AN (2003) Which comes first: employee attitudes or organizational financial and market performance? J Appl Psychol 88(5):836–851
Seibert SE, Wang G, Courtright SH (2011) Antecedents and consequences of psychological and team empowerment in organizations: a meta-analytic review. J Appl Psychol 96(5):981–1003
Singh M, Sarkar A (2012) The relationship between psychological empowerment and innovative behavior. J Pers Psychol 11(3):127–137
Söllner M, Bitzer P, Janson A, Leimeister JM (2017) Process is king: evaluating the performance of technology-mediated learning in vocational software training. J Inf Technol 33(3):233–253
Spreitzer GM (1996) Social structural characteristics of psychological empowerment. Acad Manage J 39(2):483–504

Spreitzer GM (2008) Taking stock: a review of more than twenty years of research on empowerment at work. In: Barling J, Cooper CL (eds) Handbook of organizational behaviour. Sage, Thousand Oaks, pp 54–72
Srivastava SC, Chandra S, Shirish A (2015) Technostress creators and job outcomes: theorising the moderating influence of personality traits. Inf Syst J 25(4):355–401
Taras V, Kirkman BL, Steel P (2010) Examining the impact of Culture's consequences: a three-decade, multilevel, meta-analytic review of Hofstede's cultural value dimensions. J Appl Psychol 95(3):405–439
To ML, Fisher CD, Ashkanasy NM (2015) Unleashing angst: negative mood, learning goal orientation, psychological empowerment and creative behaviour. Hum Relat 68(10):1601–1162
Tripp JF, Armstrong DJ (2018) Agile methodologies: organizational adoption motives, tailoring, and performance. J Comput Inf Syst 58(2):170–179
Tröster C, Mehra A, van Knippenberg D (2014) Structuring for team success: the interactive effects of network structure and cultural diversity on team potency and performance. Organ Behav Hum Decis Process 124(2): 245–255
Tushman ML, O'Reilly CA (1996) Ambidextrous organizations: managing evolutionary and revolutionary change. Calif Manag Rev 38(4):8–30
van Dierendonck D (2010) Servant leadership: a review andsynthesis. J Manag 37(4):1228–1261
van Dierendonck D, Stam D, Boersma P, De Windt N, Alkema J (2014) Same difference? Exploring the differential mechanisms linking servant leadership and transformational leadership to follower outcomes. Leadersh Q 25:544–562
Von Krogh G, Haefliger S, Spaeth S, Wallin MW (2012) Carrots and rainbows: motivation and social practice in open source software development. MIS Q:649–676
Xu P, Ramesh B (2007) Software process tailoring: an empirical investigation. J Manag Inf Syst 24(2):293–328
Xu P, Ramesh B (2008) Impact of knowledge support on the performance of software process tailoring. J Manag Inf Syst 25(3):277–314
Yang J, Mossholder KW, Peng TK (2007) Procedural justice climate and group power distance: an examination of cross-level interaction effects. J Appl Psychol 92(3):681–692
Yuan F, Zhou J (2015) Effects of cultural power distance on group creativity and individual group member creativity. J Organ Behav 36(7):990–1007
Zhang AY, Song LJ, Tsui AS, Fu PP (2014) Employee responses to employment-relationship practices: the role of psychological empowerment and traditionality. J Organ Behav 35(6):809–830