FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

SERVANT LEADERSHIP IN TEMPORARY ORGANIZATIONS:

WHAT IS THE MEDIATING ROLE OF TEAM CULTURE IN HIGH PERFORMING LIMITED TIME TEAMS?

A dissertation submitted in partial fulfillment of

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by

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To: Dean William G. Hardin
College of Business

This dissertation, written by Patrick W. Colbert, and entitled Servant Leadership in Temporary Organizations: What is the Mediating Role of Team Culture in High Performing Limited Time Teams?, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Florida International University, 2024

DEDICATION

To my father, William L. Colbert, who leads by serving his community, faith, and family.

ACKNOWLEDGMENTS

I wish to extend deep appreciation for my supportive family and professional colleagues, committee advisors, DBA program faculty, administrative team, and fellow students.

ABSTRACT OF THE DISSERTATION

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What role does team culture serve in team performance for limited-time, high performing teams? Limited-time project teams are unique in that members agree to deliver a set of outcomes within the bounds of time. Even when the activities aimed at delivering the required outcomes are well-defined by managers in the organization, the leaders charged with execution must first guide the formation of norms and tempo for rapid, productive assembly. Team membership and temporary organizations are becoming central to working life, and this temporary organizing often occurs outside a single firm's boundaries.

We pursue this research with a deep interest in understanding servant leadership in a variety of contexts and providing practical advice for leaders toward building high-performance teams. Central to our analysis are the contextual factors that contribute to effectiveness in driving high team performance, including servant leadership, team

cohesion, trust in team and trust in leader, team serving culture, the significance of the team's mission, the amount of time spent onboarding new team members, and team size.

We created and distributed a survey instrument to individuals involved in projects within the Amazon Mechanical Turk (Mturk) community. The survey measured perceived levels of team performance as a consequence of team serving culture among the independent contextual factors.

Our findings indicate that servant leadership behaviors have a direct positive effect on team serving culture in limted-time teams. More importantly, the results reveal how team serving culture mediates the relationship between servant leadership behaviors and performance. We also confirm and explore a direct positive relationship between the significance of the team's mission and project performance outcomes.

We expect this research contribution to benefit practitioners in organizations and scholars in the organizational behavior field as we: 1) provide additional empirical evidence for the link between servant leadership and team performance, 2) explore servant leadership in the context of limited-time and temporary organizations, and 3) identify contextual variables that act as moderators on team performance in time-bound teams.

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Problem Statement

What role does team culture serve in team performance for limited-time, high performing teams? Limited-time project teams are unique in that members agree to deliver a set of outcomes within the bounds of time. Even when the activities aimed at delivering the required outcomes are well-defined by managers in the organization, the leaders charged with execution must first guide the formation of norms and tempo for rapid, productive assembly. Ericksen and Dyer (2004) examine project team mobilization in high-performing teams, finding high impact and therefore high variability in results from leader activities in the initial phase of project team development. In a parallel vein, other scholars find "coaching intervention that helps a group have a good launch…can significantly enhance members' commitment to the team and the task, and thereby enhance their motivation to perform the work of the team as well as they can." (Hackman & Wageman, 2005).

Low performing teams ***introduce risk and heighten the opportunity costs*** that result from limited capital deployed away from other higher-value projects. Low performing teams are associated with project failures at a higher rate than nominally-performing teams (Scott & Einstein, 2001). Existential risk to a firm is a potential outcome of a low performing project, especially a project in which the successful result addresses a mission-critical innovation that has long-term implications for one or more strategic opportunities or threats to the firm. Aguinis (2009) describes the uncertainty of team performance succinctly, asserting "team-based organizations do not necessarily

outperform organizations that are not structured around teams. In other words, team performance does not always fulfill its promise". In competitive sports, "environments in which players do not trust each other, the coach, or top management will likely have poorer results." (Mach et al., 2010).

The ***short lifespan*** of project teams makes outcome-based assessment difficult. Instead, metrics that track progress at different stages of the project can help teams perform adaptations and adjustments before things go wrong. For example, Hewlett-Packard's product development teams continuously monitor time, cost, and return-on-investment. These interim metrics are developed with input from team members to account for factors outside of their control (Scott & Einstein, 2001).

Significance of the Problem

From a theoretical perspective, performance outcomes are central to the team's reason for formation. Teams are composed of individuals gathered together to achieve an organizationally desirable outcome or set of outcomes pursued with a high degree of coordination and in concert with one another. A leader of a team is accountable for how well that pursuit maps to the organization's expected outcomes from the team.

Empirical examinations into low performance reveal the myriad ways by which poor leadership behaviors lead to low team performance. Zhang et al. (2015) conclude that when leaders focus on the "team as a whole", it positively affects team effectiveness. However, when leaders give special attention to only a few members, it can unintentionally reduce the team's overall strength and effectiveness. Furthermore, team

leaders can enhance team performance by bringing all the parts together and focusing on behaviors that benefit the entire team rather than singling out individual members.

Scholars and managers have developed frameworks for measuring progress against goals using terms including key performance indicators, objectives and key results, business value realization, and a multitude of formulas employed to ensure quality delivery from project teams. As an example, Forrester and Drexler (1999) propose a practitioner-oriented model for team-based organizational performance, one which incorporates measures of effective formation, dependability, focus, degree of buy-in, coordination, impact, and vitality.

Expectations form one important aspect of the context and culture in which the team is operating, but we argue that the context in which performance or non-performance transpires is contingent upon variables that include leader behaviors over the course of the team's pursuit of the collective mission. We therefore investigate how an individual leader's behavior influences the team through building a context of team culture or "team-ness". That is, there is a phenomenon of team culture and team life that uniquely emerges in the context of the leader's behaviors. Hackman (2012) explains that to achieve a full understanding of group behavior and performance, it is critical to consider both individual attributes and the context in which the group operates. The challenge is to account for "cross-level influences" as part of the group's dynamics, rather than simply as potential moderators.

Team membership and temporary organizations are becoming central to working life, and this temporary organizing often occurs outside a single firm's boundaries. The

prevalence of project and gig work in nearly every industry drives a need for new types of formal and informal contracts. A few examples help to clarify the critical distinctions between how high performance in program and project delivery differs from high performance in a permanent organization:

1. A new steering committee member joins a governance team on an organizational transformation program and is unprepared for the speed at which the team is progressing.
2. A complex project requires assistance from a technical architect unfamiliar with a client's business context during the middle of a software product delivery sprint.
3. A business analyst takes on additional responsibility as a product owner due to the departure of a key business subject matter expert.

We propose our research question with a deep interest in understanding servant leadership in a variety of contexts and providing practical advice for leaders toward building high-performance teams. Central to our analysis are the contextual factors that contribute to effectiveness in driving high team performance, including servant leadership, team cohesion, trust, team serving culture, the overall purpose for coming together and nature of the objectives, the amount of time spent onboarding new team members, team size, degree to which the leader and team members are culturally close or culturally distant, and geographical spread of the team.

Research Gap

An essential element of servant leadership is the high prioritization and deep emphasis on team member success. Several important studies theorize and investigate

situational influences, individual characteristics, ethical leadership behaviors, and follower outcomes in the organizational behavior literature (Brown, 2006, 2005), but temporary organizations—formed to execute projects and programs over a limited period and usually involving a collection of individuals who have never worked together before—are unique due to the presence of time boundaries around the planned work. The important distinction between limited-time organizations and perpetual organizations justifies focused theoretical analysis and empirical measurement.

Research Questions

What is the effect of team leadership on team performance? One critical measurement of a leader's effectiveness is how quickly that leader engages new team members in active sensemaking to bring them up to speed on a project and establish common objectives, ways of working, and governance. The servant leader approaches sensemaking and onboarding responsibilities for every team member individually and invests time in understanding what motivations and skills each person brings to the project.

What is the mediating role of team culture in high performing limited time teams? On an ***organizational*** level, the pressing need for soft skills and emotional intelligence in leadership will continue to accelerate as team members express a desire for a balanced, inclusive approach to getting things done. One notable advantage to the servant leader model is a built-in orientation toward coaching and feedback. Some of the most-commonly-cited elements of coaching and feedback are (a) establishing a trust relationship, (b) contracting for success, (c) assessing & benchmarking, (d) clarifying the

possible & setting goals, (e) taking action, (f) taking stock & staying on track, and (g) planning the future & ending the coaching cycle (Sargeant, 2015). By establishing a trust relationship and investing time in every team member early in the engagement, servant leaders are uniquely prepared for the kick-off steps (a & b), midstream monitoring (d & f), and closure (g) critical to running effective coaching and feedback cycles.

Research Contributions

We expect this research contribution to benefit ***scholars in the organizational behavior field*** as we: 1) provide additional empirical evidence for the link between servant leadership and team performance, 2) explore servant leadership in the context of limited-time and temporary organizations, 3) identify contextual variables that act as moderators on team performance in time-bound teams, and 4) validate measurements for knowing how well a particular leadership model works.

Results from a recent study on servant leadership in projects yield evidence indicating less project work withdrawal from members led by a servant leader, and that ***work engagement is higher*** from members led by a servant leader (Nauman, 2022). In the future, we intend to replicate that study and other studies of leadership behaviors impacting team performance. Investigating leadership in a variety of limited-time organizational contexts will serve to validate and extend what we understand given the increasing prevalence of project work and temporary teams.

BACKGROUND LITERATURE REVIEW AND THEORY

Theory and empirical research into team formation and team performance has produced a broad and rich body of knowledge from which to draw in assessing new contextual factors that contribute to high performance in limited-time teams. Tuckman and Jensen (1977) developed theory on the role of a leader in helping teams move through a predictable stepwise progression through ***forming, storming, norming, performing, and adjourning*** inspired investigators to explore alternative leadership models. Rickards and Moger (2000) describe creative leadership processes as essential to breaking the observed ***barriers to high performance***, first a weak barrier between storming and norming, and a much larger one between performing and outperforming other teams.

More recently, Sreih et al. (2019) explore management behaviors and financial performance among a selection of family businesses, taking the field into new accounts of the effect of ***deep familial bonds*** that extend well beyond a sense of widely held and universally accessible cultural understanding to an assessment of multi-generational impacts across time.

The modern prevalence of temporary placements, contract-to-hire, short-term consulting engagements, side hustles, and gig work in teams of globally distributed individuals with large variation in background and perspective offers an opportunity to explore how servant leadership behaviors drive high team cohesion and performance in these limited-term contexts. The essence of servant leadership is an insistence that a leader's behaviors must prioritize each team member's growth and success—that the

highest objective and most valuable leadership contribution must be to develop the individuals on whom that leader will rely to deliver results in a collective team environment.

Christensen-Salem (2021) finds team social resources are antecedent to team serving culture, which is an antecedent to team serving performance further up the correlation path. We envision team social resources as a set of trust and team cohesion constructs hypothesized at the group level of analysis. Furthermore, team leader servant leadership behaviors develop and build trust (in leader and in team) and team cohesion. In short, a servant leader prioritizes the needs of their subordinates over their own and focuses on helping them develop to reach their "maximum potential" and achieve best possible success in their organization and career.

Servant leadership behaviors and team cohesion

Avolio (2009) describes servant leadership behaviors as exhibiting vision, being honest, trustworthy, demonstrating a serving-orientation, offering their behaviors as a model for others to follow, appreciating team member contributions, and empowering team members. Empirical research illustrates that servant leadership has a positive impact on follower satisfaction, job satisfaction, enjoyment of work, concern for the safety of others, and commitment to the organization. More specifically, Christensen-Salem (2021) finds that servant leadership at the department level influences servant leadership in team leaders. This, in turn, affects the team's trust in their leader, trust in the team, and team cohesion. Trust in the leader has an impact on both team cohesion and trust in the team. Additionally, trust in the team and team cohesion are related to a team serving culture,

which improves the team's service performance. The authors also describe a behavior modeling effect, where trust and cohesion within a team can be built through small actions such as sharing personal and professional experiences, confidently expressing one's abilities, and consistently behaving in a predictable manner.

Trust in leader and trust in team

Gillespie (2011) differentiates between reliance-based trust and disclosure-based trust. There is a distinction between trust, perceived trustworthiness, and trusting behavior. Perceived trustworthiness refers to one's beliefs about another's trustworthy character. Several dimensions of trustworthiness have been proposed, including ability, integrity, benevolence, predictability, openness, and loyalty, and while beliefs about trustworthiness and other factors such as disposition to trust inform the decision to trust, actualization often requires a "leap of faith" beyond these assessments. Trusting behavior is the behavioral manifestation of trust, such as a leader delegating an important task or confiding confidential information to a follower. To measure trust in organizational contexts (p.187), the author offers a 10-question behavioral trust inventory. Gillespie's intent is to adequately measure trust as the "willingness to be vulnerable," and psychological safety is a critical component of the relationship between team leader and team member, and between team member pairs. Half of the items in the behavioral trust inventory measure reliance-based trust and half measure disclosure-based trust on a 7-point scale (1 = not at all willing; 7 = completely willing). Example items include "Depend on your leader or team to back you up in difficult situations," (reliance-based)

and “Confide in your leader or team about personal issues that are affecting your work” (disclosure-based).

Team serving culture

Liden (2015) describes the “behavioral norms and shared expectations” of placing a priority on helping others. Behaviors can be “substantially influenced by upper-level leadership.” Walumbwa (2010) examines leader influence over culture and how serving climate moderates the influence of employee commitment to the leader, suggesting that servant leadership plays a key role in creating positive work environments that promote good citizenship behavior among employees. Leadership programs aimed at improving procedural justice and serving climates can be made even more effective by including training in servant leadership skills. It is essential for managers and supervisors to be fair in their decision-making processes and to openly discuss work-related practices and policies to encourage good citizenship behavior. When leaders are fair, employees are more likely to learn and engage in behaviors that benefit others within the organization.

Team performance

Hackman (2002) proposes three dimensions of team performance, 1) that the team is a real team and not merely a collection of co-actors, 2) together setting off in a compelling direction, and 3) following an enabling framework. We adopt this perspective on team performance as it lends itself to measuring individual perceptions of team performance, and understanding each member’s answer to the question “how are we doing as a team?” Wageman (2005) argues that the strongest theoretical basis for high team performance is that a team that puts in enough effort, uses a performance strategy

that is appropriate for the task at hand, and has the necessary talent is likely to achieve a high level of effectiveness. On the other hand, teams that do not fulfill one or more of these functions - by not putting in enough effort, using poorly aligned performance strategies, or lacking the necessary talent - are likely to fall short of meeting client standards for acceptable performance. The authors validate an instrument which reliably provides direct measures of a team's standing on each of the three process criteria for effectiveness (Wageman, 2005).

Mission significance

An interesting aspect of team performance is the overall significance of what the team is setting out to accomplish, and asking "how critical is the team's mission?" Mission significance is the degree to which the objective of the team is important to the organization funding the project. Colbert et al. (2008) develop a scale to assess the importance of goals in a study of CEO-TMT alignment. Tihula (2009) explores team formation in small firms and categorize team purpose as one of five over-arching objectives: growing the firm, controlling the business, distributing liability, dealing with deficient performance, and pursuing efficiency. At an organizational level, Bergeron (2007) finds that managers value tasks involving challenging-type citizenship behaviors (OCB) less than affiliative-type OCB. The author also finds that managers value prohibitive-type OCB less than promotive-type OCB. We conceive the significance of the team's primary objective or reason for formation having a direct positive effect in our model.

Time spent onboarding new team members as a moderator

Leader investment in sensemaking and onboarding tasks for new team members varies widely in project team formation. Little empirical research is available, though there are theoretical arguments for sensemaking as a critical function of leadership (Weick, 2005). Ericksen and Dyer (2004) find a long and limited mobilization strategy, along with a pre-planned launch meeting, can result in teams leaving the formative phase of project development with little time, inadequate staffing, and uncertainty about their tasks. The model suggests that instead of treating factors such as team and task design as fixed, it may be better to view them as outcomes of the mobilization and launch phase and as important inputs for subsequent phases of project team development. We are interested in exploring sensemaking and onboarding time in the context of high-performing limited-time teams. We conceive the time investment required to onboard new team members as a moderator in our model.

Team size

At some point, the size of a project team becomes too large for the accountable individual to lead effectively. Walter (2016) evaluates three computational heuristics to identify an ideal average, among scenarios where workers can be assigned to multiple projects at the same time. A high number of assignments can result in large project teams and workers being spread across different projects. Large teams can lead to decreased productivity due to increased coordination effort and social loafing, while spreading workers across projects can result in losses due to frequent switching between tasks. To address these inefficiencies, the authors developed a mixed-integer linear program that

minimizes the average project team size and reduces scattering. The program takes into account multi-skilled workers with varying skill levels who also have responsibilities within their departments. In another study, Pearce (2004) examines citizenship behavior within teams: leadership, commitment, perceived support, and team size to draw a boundary around the maximum team size among change management teams. The authors find that team leader behavior, team commitment, and perceived team support all have significant impacts on team citizenship behavior. Team size, on the other hand, has little to no effect in this non-software industry example. We intend to understand a set of similar constructs in limited-time team systems and propose team size as a moderator in our model.

RESEARCH DESIGN

The essence of the model is that servant leadership, trust, and cohesion create a team serving culture (a mediator determining ***how***), together with mission significance, which leads to high team performance, moderated by contextual constructs that determine ***when*** the effect of team serving culture on high team performance is greatest and when the effect is least.

Conceptual Framework

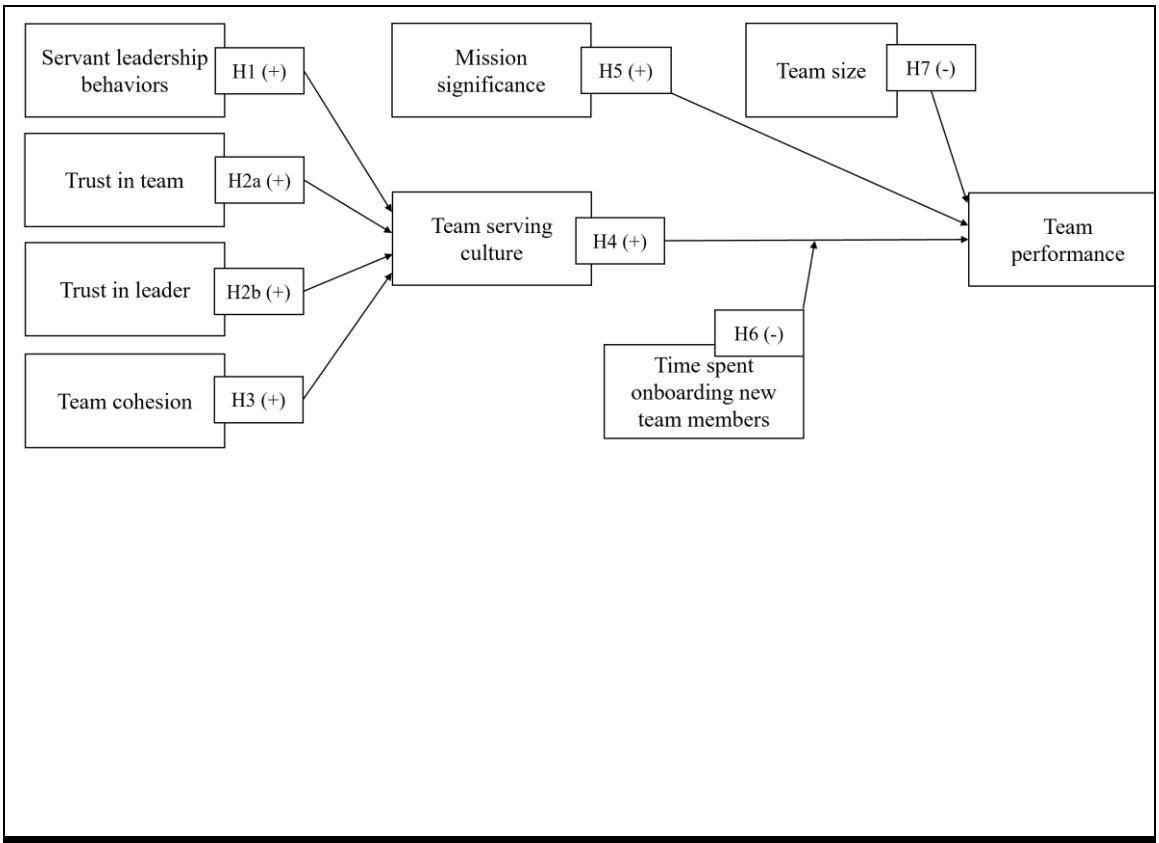

Figure 1 The Conceptual Research Model

Theoretical Development and Hypotheses

Christensen-Salem (2021) models a positive relationship between servant leadership behaviors and team cohesion. Our analysis focuses on how a leader's behavior can shape the culture and cohesiveness of their team. The leader's actions play a crucial role in creating a sense of unity and collaboration within the team. Servant leadership behaviors are particularly important for building strong bonds and achieving high performance in teams with limited time to work together, and central to our analysis is how an individual leader's behavior influences their team through building a context of team culture or "team-ness". The phenomenon of team culture and team life uniquely emerges in the context of the leader's behaviors, and therefore, servant leadership behaviors are essential to delivering the high degree of team cohesion required for high performance in limited-time teams: ***H1: Servant leadership behaviors positively affect team serving culture in limited-time high-performing teams.***

Gillespie (2011) differentiates between reliance-based trust and disclosure-based trust. Trust, perceived trustworthiness, and trusting behavior are distinct concepts. Perceived trustworthiness involves one's beliefs about another person's character and trustworthiness. There are several proposed dimensions of trustworthiness, including ability, integrity, benevolence, predictability, openness, and loyalty. While these beliefs and other factors like disposition to trust can inform the decision to trust someone, it often requires a "leap of faith" beyond these assessments. Trusting behavior is the act of demonstrating trust, such as when a leader delegates an important task or shares confidential information with a follower. To measure trust in organizational contexts

(p.187), the author offers a 10-question behavioral trust inventory, where half of the items measure reliance-based trust and half measure disclosure-based trust on a 7-point scale (1 = not at all willing; 7 = completely willing). Example items include “Depend on your leader or team to back you up in difficult situations,” (reliance-based) and “Confide in your leader or team about personal issues that are affecting your work” (disclosure-based). We propose two hypotheses based on previous research as follows: ***H2a: Trust in team positively affects team serving culture in limited-time high-performing teams.*** ***H2b: Trust in leader positively affects team serving culture in limited-time high-performing teams.***

Walumbwa (2010) and Awasthi (2022) examine leader influence over culture and how serving climate moderates the influence of employee commitment to the leader. The authors find that team cohesion delivers commitment to serving the team. We find this to be an intriguing path for understanding commitment across the larger network of relationships between all team members and extend this concept of team cohesion beyond an observed commitment to the team member, but also team member service to one another. If servant leadership plays a key role in creating positive work environments that promote good citizenship behavior among employees by influencing culture and serving climate, then leadership programs that focus on improving procedural justice and serving climates can be even more effective when they include training in servant leadership skills. It is important for managers and supervisors to make fair decisions and openly discuss work-related practices and policies to encourage good citizenship behavior. When leaders are fair, employees are more likely to engage in behaviors that benefit others within the organization. We propose the next hypothesis measured by prior work in the

organizational behavior field, so the effects are clear in the current context of high-performing limited-time teams. ***H3: Team cohesion positively affects team serving culture in limited-time high-performing teams.***

Hackman (2002) proposes three dimensions of team performance, 1) that the team is a real team and not merely a collection of co-actors, 2) together setting off in a compelling direction, and 3) following an enabling framework. We adopt this perspective on team performance as it lends itself to measuring individual perceptions of team performance, and understanding each member's answer to the question "how are we doing as a team?" This leads us to propose a hypothesis relating to team serving culture as a mediator between servant leadership and performance. ***H4: Team serving culture positively affects team performance in limited-time high-performing teams.***

At an organizational level, Bergeron (2007) finds that managers value tasks involving challenging-type citizenship behaviors (OCB) less than affiliative-type OCB. The author also finds that managers value prohibitive-type OCB less than promotive-type OCB. This leads us to consider the question: what differences in team performance may be observed in the context of more-important versus less-important reasons for team formation? Tihula (2009) explores team formation in small firms and categorize team purpose as one of five over-arching objectives: growing the firm, controlling the business, distributing liability, dealing with deficient performance, and pursuing efficiency. Finding significance and meaning in work are generally important in professional life and we propose higher value and lower value team outcomes in a manner consistent with Bergeron's description of affiliative (positive valence) and

prohibitive (negative valence) activities. Our model contemplates project significance among one of five options, scaled 1 (very low significance) to 5 (very high significance), ranked in order of the perceived impact of the mission on the organization, from lowest to highest: 1) dealing with poor performance, 2) distributing liability, 3) pursuing efficiency, 4) controlling the business, and 5) growing the firm. We conceive the importance of the teams' mission exhibiting a direct positive effect on high team performance in our model with the following hypothesis: ***H5: Mission significance positively affects team performance in limited-time high-performing teams.***

Leader investment in sensemaking and onboarding tasks for new team members varies widely in project team formation. Little empirical research is available, though there are theoretical arguments for sensemaking as a critical function of leadership (Weick, 2005). We are interested in exploring sensemaking and onboarding time in the context of high-performing limited-time teams. Forrester and Drexler (1999) propose a practitioner-oriented model for team-based performance identifies composition, coherence, and supportive system presence as the critical keys to team formation and balance. These theoretical and practical descriptions support one another in that they emphasize the importance of cognitive map-building and the role of the leader in setting the collective members in a common direction. Furthermore, the longer a team has to wait until a new team member is fully immersed in the situation and flow of the team's productive work, the more at-risk the team's performance will be. We conceive the time investment required to onboard new team members as a moderator in our model with the following hypothesis: ***H6: as the amount of time for the onboarding process increases,***

it will weaken the strength of the positive relationship between team serving culture and high performance.

Pearce (2004) examines citizenship behavior within teams: leadership, commitment, perceived support, and team size to draw a boundary around the maximum team size among change management teams. Increases in the number of team members working on a project and directly managed by a team leader contribute to a higher cognitive load on the team leader, and adding team members on a project reduces the degree to which close collaboration between team members can occur for limited time teams to perform at a high level. For example, in a case where the count of team members is increased from six to 15, the number of person-to-person or dyad relationships in the member network increases from 15 [that is, (6*5)/2] to 105 [(15*14)/2]. When a team is aimed at a set of objectives that must be completed in a limited time, the additional communication and coordination overhead required to function as a unit becomes a tougher challenge with every person added to the team after approximately eight. We therefore conceive large team size exhibiting a direct negative effect on high team performance with the following hypothesis: ***H7: As team size extends beyond eight team members per servant leader, performance will suffer in limited-time teams.***

RESEARCH METHODOLOGY

Participants and Procedure

We propose soliciting survey responses from 400 adult program managers, solution architects, and developers in the United States using the MTurk platform in three sequential rounds: validating the measurement instrument in round 1 and round 2 (after making the appropriate edits to the measurement items based on the results from round 1) and testing the full theoretical model and hypotheses in round 3.

Research Design

Informed pilot

Immediately after IRB approval, we conducted an informed pilot with seven of our FIU DBA colleagues (Joe, Courtney, Rob, Elizabeth, Angel, Alex D., & Sherrard) to 1) gain insights on the content and structure of the survey instrument, 2) validate the expected amount of time required from each respondent, and 3) ensure the proper functioning of the survey instrument configuration on the Qualtrics platform.

There were several insightful points by the participants in the informed pilot panel. First, we reduced the length of the survey instrument from 67 to 55 items to ensure that the time required to complete the task does not exceed 10 minutes, resulting in an average of 8 seconds per question and additional time for participants to read a) the informed consent page, b) context-setting sentences at the top of each item group page, and c) four screening questions.

Second, two control variable questions were identified as “double-barreled”, that is, asking the subject for a single response to a multi-part question, indicated by “and” in the item’s predicate. We split the items accordingly and removed the irrelevant content.

Third, two reviewers suggested an additional question to indicate the person or persons responsible for forming the team in the first place. The reasonable justification for the question is that it will lend additional context for whether there is a difference between the experiences of team leaders directly responsible for the makeup of the team and team member selection, and the experiences of team leaders where member selection and formation was not their responsibility. Finally, there were several important interface enhancements suggested and implemented, and we appreciate the thoughtful time and effort invested by the informed pilot participants.

Measurements

Four independent variables combine to form a direct positive effect on Team serving culture, which in turn has a direct positive effect on the dependent variable Team performance.

Table 1 A summary of measurement dimensions

Construct	**Role in this study**	**Item count and scale**	**Reference**
Team performance	Dependent variable (DV)	Nine items, scaled 1 (strongly disagree) to 7 (strongly agree)	Cavanaugh (2021)
Servant leadership behaviors	Independent variable (IV)	Seven items, scaled 1 (strongly disagree) to 7 (strongly agree)	Liden (2014)
Team cohesion	IV	Six items, scaled 1 (strongly disagree) to 7 (strongly agree)	Dobbins (1986)

Trust in leader	IV	Ten items, scaled 1 (not at all willing) to 7 (completely willing)	Gillespie (2011)
Trust in team	IV	Ten items, scaled 1 (not at all willing) to 7 (completely willing)	Gillespie (2011)
Team serving culture	IV, ***mediating*** the effect of servant leadership, cohesion, and trust on DV	Sixteen items, scaled 1 (strongly disagree) to 7 (strongly agree)	Liden (2014) ; Hogan and Coote (2014)
Mission significance	IV, with a ***direct*** effect on DV	Five items, scaled 1 (strongly disagree) to 7 (strongly agree)	Tihula (2009) ; Colbert et al. (2008)
Time spent onboarding new team members	IV, ***moderating*** the positive relationship between mediator (Team serving culture) and DV	Number of weeks	Weick (2005)
Team size	IV, with a ***direct*** effect on DV	Number of team members	Pearce (2004)

Dependent variable: high-performing teams

Describing the requirements for concrete, measurable team performance metrics, Wageman (2005) asserts “Instruments intended for use in helping teams perform better must focus on variables that are known to affect performance, can be manipulated, and are applicable across a variety of team types and settings so that norms can be developed for use in interpreting a team’s scores.” In this spirit, Cavanaugh (2021) offers a survey measuring a framework proposed by Hackman (2002). Six questions in two categories define the instrument, whereas,

When our real team is set in a compelling direction:

1. “Our group works toward common goals that everyone articulates in the same way.
2. Each group member understands how individual contribution affects group performance.
3. Each group member taps into the skills of others.”

A high-performing team builds social and subject-matter resources in an enabling structure:

1. “Our group is positive and motivated, even in challenging times.
2. Our group regularly seeks added information.
3. Our work approach provides opportunities for regular modification and improvement over time.”

Independent variable: servant leadership behaviors

Liden (2014) introduced a 7-item version “SL-7” of the 28-item scale proposed by Liden (2008) “SL-28”. Both instruments measure the seven essential dimensions of servant leader behavior, and SL-7 captures the seven most frequently cited servant leadership behaviors on a scale of 1 to 7 as follows:

1. “My leader can tell if something work-related is going wrong.
2. My leader makes my career development a priority.
3. I would seek help from my leader if I had a personal problem.
4. My leader emphasizes the importance of giving back to the community.
5. My leader puts my best interests ahead of his/her own.

6. My leader gives me the freedom to manage demanding situations in the way that I feel is best.
7. My leader would NOT compromise ethical principles in order to achieve success."

Independent variable: team cohesion

Dobbins (1986) developed and validated an 8-question instrument using the scale 1 (strongly disagree) to 5 (strongly agree). An (R) following the item denotes reverse coding, and those items will not appear on our survey.

1. The members of my team get along well together.
2. The members of my team will readily defend each other from criticism by outsiders.
3. I feel that I am really a part of my team.
4. I look forward to being with the members of my team each day.
5. I enjoy belonging to this team because we are friends.
6. The team which I belong to is a close one."

Independent variables: trust in team and trust in leader

Questions measuring Trust in team and Trust in leader follow Gillespie (2011), "Please indicate how willing you are to engage in each of the following behaviors with your Team Member or Leader, by circling a number from 1 to 7:

1. Rely on your leader's task-related skills and abilities.
2. Depend on your leader to manage a critical issue on your behalf.

3. Rely on your leader to represent your work accurately to others.
4. Depend on your leader to back you up in demanding situations.
5. Rely on your leader's work-related judgments.
6. Share your personal feelings with your leader.
7. Discuss work-related problems or difficulties with your leader that could work against you.
8. Confide in your leader about personal issues that are affecting your work.
9. Discuss how you honestly feel about your work, even negative feelings, and frustration.
10. Share your personal beliefs with your leader."

Independent variable: team serving culture as a mediator

Measuring Team serving culture, with a slight variation on the SL-7 instrument as described by Liden (2014). "Managers and employees at our store…

1. can tell if something work-related is going wrong.
2. make employee career development a priority.
3. would seek help from others if they had a personal problem.
4. emphasize the importance of giving back to the community.
5. put others' best interests ahead of their own.
6. give others the freedom to manage tricky situations in the way that they feel is best.
7. would NOT compromise ethical principles in order to achieve success."

Independent variable: team serving culture, an alternate scale

Hogan and Coote (2014) model team serving culture as an antecedent to innovation and performance from the organization's perspective, where team serving culture is a composed of team cooperation, responsibility, and appreciation, measured by nine questions as follows:

1. "Cooperation among different work teams is valued highly.
2. The organization values integration and sharing among teams throughout the firm.
3. We place great value on co-ordination among different work teams.
4. We place great value on every employee being proactive in his (or her) role.
5. The organization values employees using their initiative.
6. We value employees taking responsibility for their work.
7. We place great value on recognizing and rewarding employees' accomplishments.
8. Taking time to celebrate employees' work achievements is valued in this firm.
9. We place great value on showing our appreciation for the efforts of each employee."

Independent variable: mission significance

Mission significance is the degree to which the team's objective is important to the organization sponsoring the project. Colbert et al. (2008) developed a three-item scale to assess the importance of goals in a study of CEO-TMT alignment. Three items assess the subject's perception of the importance of the goal to the organization, to what extent the organization was actively pursuing the goal, and to what extent the management team

was spending time planning and setting objectives for achieving the goal. We adopt this pattern in our instrument.

Independent variable: team size

As the number of people on the team grows beyond eight, we expect team performance to decrease. We note that West (1996) suggests a nonlinear relationship between team size and team innovativeness (which we expect to be an indicator of performance).

Independent variable: time spent onboarding as a moderator

We expect the average amount of time spent onboarding a new team member to have a negative effect, weakening the strenght of the postive relationship between team serving culture and team performance.

Control variables

We will collect ancillary variables in the survey instrument, which we expect to exhibit correlations, but exist outside the causal path in which we are interested.

1. Total years of experience,
2. Number of years of experience as a team member,
3. Number of years of experience as a team leader,
4. What percentage of the project work was performed remotely, that is, not co-located with the team in a single physical location,
5. Primary industry in which the subject operates,
6. Number of years of experience in the industry in which the subject operates, and

7. Age.

Screening questions

We intend to solicit responses from subjects with real team experiences, and therefore propose the following screening questions to ensure that respondents understand that we consider a team as more than simply a collection of individuals focused on a task.

1. Each group member is equally committed to the group's success.
2. Each group member demonstrates complete ownership of assigned tasks.
3. Our group jointly takes ownership of how things get done.

Threats to validity

Two threats to construct validity stemming from our sampling and survey procedure are cause for concern, from Van de Ven (2016) #3 Hypothesis guessing—participants guess the hypothesis, and #4 Evaluation apprehension—participants present positive impression. Our concern is that the survey questions will lead the respondents into wanting to pick the socially acceptable answer. We will attempt to address this risk through a two-fold approach: 1. include several control variables in the survey, to indicate at a minimum, the number of years of team member and team leader experience, and 2. ask respondents about the dependent variable, team performance, at the beginning of the survey to minimize the two threats we identified in the survey instrument.

Data Analysis

The study will employ the Structural Equation Modeling (SEM) technique using R to validate and assess the hypothesized model. We analyze the data by conforming to a stepwise process with the following components:

1. Using SPSS:
    a. Data hygiene, suppressing records that failed the survey attention questions,
    b. Exploratory factor analysis, and
    c. Scale reliabilities for the retained items measuring the constructs.
2. Using R lavaan package:
    a. Confirmatory factor analysis, including fit indices,
    b. A full path analysis of the structural equation model, with each survey item loading on its related latent construct,
    c. Testing alternative models with IVs and control variables as moderators,
    d. Path coefficient confidence intervals (ensure CI does not contain 0), and
    e. Construct reliability & validity.

Results

Blind pilot study – Developing the measurement model

Our analysis first assesses the reliability and discriminant validity of the survey items on their respective constructs in a blind pilot study. We collected data through Amazon MTurk on July 17, 2023, where voluntary subjects answered 64 survey

questions using the Qualtrics platform. We retained complete responses from 217 adults in the United States based on survey completion time greater than three minutes. An initial exploratory factor analysis (EFA) revealed many items with cross loading among the six multi-item constructs we hypothesized, we therefore embarked on a stepwise EFA. We then performed reliability analysis using Cronbach's alpha to understand the internal consistency of our survey items, extracted six theorized factors, and report our factor loadings for the retained items as a summary in Table 2 and in greater detail in Table 3. We note that Cronbach's alpha is above the conventional threshold 0.7 (Schmitt, 1996) for every construct except Team Serving Culture. Schmitt (1996) describes a common situation where the calculated Cronbach's alpha falls below the 0.7 conventional threshold but the correlations between items are strong and the latent construct of interest is sufficiently important to relax the common floor value in EFA. We therefore conclude that our net instrument exhibits high reliability after retaining those items with high factor loadings in our stepwise EFA.

Table 2 Pilot study Exploratory Factor Analysis (n=217)

	Items	α	Dropped items	Retained items	α
Team Performance	9	0.831	4	5	0.801
Servant Leadership Behaviors	7	0.773	4	3	0.681
Trust in Leader	10	0.867	10	0	
Trust in Team	10	0.855	10	0	
Team Cohesion	6	0.781	3	3	0.769
Team Serving Culture	7	0.783	4	3	0.641

Note: Cronbach's alpha is reported first for all items (center column), then for retained items only (rightmost column).

Table 3 Pilot study Descriptive statistics (all items, n=217)

Construct (Reference)	**Item Code**	**Mean**	**SD**	**α**

Team Performance Cavanaugh (2021)	THP_01	5.27	1.069	0.831
	THP_02	5.24	1.142	
	THP_03	5.34	.987	
	THP_04	5.24	1.036	
	THP_05	5.27	1.116	
	THP_06	5.12	1.092	
	THP_07	5.32	1.157	
	THP_08	5.26	1.040	
	THP_09	5.26	1.014	
Servant Leadership Behaviors Liden (2014)	SLB_01	5.06	1.187	0.773
	SLB_02	5.11	1.184	
	SLB_03	4.97	1.232	
	SLB_04	5.04	1.301	
	SLB_05	5.03	1.168	
	SLB_06	5.18	1.139	
	SLB_07	4.78	1.261	
Trust in Leader Gillespie (2011)	TL_01	5.16	1.132	0.867
	TL_02	5.06	1.325	
	TL_03	5.05	1.115	
	TL_04	4.95	1.279	
	TL_05	5.17	1.126	
	TL_06	5.06	1.431	
	TL_07	4.96	1.184	
	TL_08	4.82	1.215	
	TL_09	4.98	1.278	
	TL_10	5.11	1.212	
Trust in Team Gillespie (2011)	TT_01	5.27	1.111	0.855
	TT_02	5.04	1.243	
	TT_03	5.09	1.248	
	TT_04	4.94	1.082	
	TT_05	5.15	1.066	
	TT_06	5.10	1.293	
	TT_07	4.90	1.242	
	TT_08	4.98	1.260	
	TT_09	4.90	1.180	
	TT_10	5.11	1.115	
Team Cohesion Dobbins (1986)	TC_02	5.18	1.036	0.781
	TC_03	5.12	1.147	

	TC_04	5.30	1.062	
	TC_05	5.15	1.121	
	TC_07	5.20	1.073	
	TC_08	5.28	1.083	
Team Serving Culture Liden (2014) ; Hogan and Coote (2014)	TSC_01	5.13	1.147	0.783
	TSC_02	5.11	1.144	
	TSC_03	5.06	1.046	
	TSC_04	4.99	1.293	
	TSC_05	5.05	1.129	
	TSC_06	5.04	1.158	
	TSC_07	4.77	1.295	

Note: We report item mean and standard deviation by the order in which the items appeared in the survey instrument.

Our pilot study is intended to understand how validity and reliability of the survey items based on theoretical justification and extant empirical work. To that end, we examine every item under an exploratory factor analysis using SPSS. After stepwise item removal for those which were weakly associated with any construct and others which loaded heavily on multiple constructs, we report means and standard deviations of the retained items in detail, and Cronbach's alpha for the construct measured by the retained items in Table 4. We therefore conclude that our net instrument exhibits high reliability, after retaining those items with high factor loadings in the stepwise EFA.

Table 4 Pilot study Descriptive statistics (retained items, n=217)

Construct (Reference)	**Item Code**	**Mean**	**SD**	**α**
Team Performance Cavanaugh (2021)	THP_01	5.27	1.069	0.801
	THP_03	5.34	0.987	
	THP_04	5.24	1.036	
	THP_06	5.12	1.092	
	THP_08	5.26	1.040	
	THP_02	*N/A*	*N/A*	
	THP_05	*N/A*	*N/A*	

	THP_07	*N/A*	*N/A*	
	THP_09	*N/A*	*N/A*	
Servant Leadership Behaviors Liden (2014)	SLB_02	5.11	1.184	0.681
	SLB_04	5.04	1.301	
	SLB_06	5.18	1.139	
	SLB_01	*N/A*	*N/A*	
	SLB_03	*N/A*	*N/A*	
	SLB_05	*N/A*	*N/A*	
	SLB_07	*N/A*	*N/A*	
Team Cohesion Dobbins (1986)	TC_03	5.12	1.147	0.769
	TC_05	5.15	1.121	
	TC_08	5.28	1.083	
	TC_02	*N/A*	*N/A*	
	TC_04	*N/A*	*N/A*	
	TC_07	*N/A*	*N/A*	
Team Serving Culture Liden (2014) ; Hogan and Coote (2014)	TSC_03	5.06	1.046	0.641
	TSC_06	5.04	1.158	
	TSC_07	4.77	1.295	
	TSC_01	*N/A*	*N/A*	
	TSC_02	*N/A*	*N/A*	
	TSC_04	*N/A*	*N/A*	
	TSC_05	*N/A*	*N/A*	

Note: We report mean and standard deviation for retained items by the order in which the item appeared in the survey instrument. Items italicized with N/A are survey items with low loadings/cross-loadings and are not factored in computing α of the scale.

Our Mission significance construct in the pilot study was deficient and poorly measured with a single question and is not reported in the EFA results above. We therefore adapted the measurement instrument based on theoretical justification and empirical results published by Colbert et al. (2008) in a five-item scale to assess the significance of the project to the organization.

Main study

The main study uses collected data through Amazon MTurk, collecting responses to 80 survey questions using the Qualtrics platform. We retain complete responses from 399 adult users in the United States. Respondents work primarily in information services, finance and insurance, health care, and manufacturing, and the teams on which they work are primarily oriented toward growing the business and keeping the operation running smoothly.

More than 20% of respondents report they were responsible for forming the team, while in a separate question, 86% report they were a leader on the project they worked on. Regarding project time spent with virtual presence (not physically co-located), 61% spend more than half of the project collaborating virtually, while 5.5% spend no time in physical presence with their fellow team members. Five to seven years is the most common answer to two questions on years of total experience and years of industry experience, while more than half of our subjects have one to four years of experience as a team leader. Table 5 summarizes ten categorical control variables with frequencies and percent of total responses.

Table 5 Main study Sample summary, control variables (n=399)

Variable	Value	Frequency	Percent
Primary industry	Accommodation and Food Services	17	4.3%
	Agriculture, Forestry, Fishing and Hunting	13	3.3%
	Arts, Entertainment, and Recreation	9	2.3%
	Construction	18	4.5%
	Educational Services	15	3.8%
	Finance and Insurance	58	14.5%
	Health Care and Social Assistance	45	11.3%
	Information	135	33.8%
	Management of Companies and Enterprises	28	7%

	Manufacturing	29	7.3%
	Mining, Quarrying, and Oil and Gas Extraction	3	0.8%
	Other Services (except Public Administration)	3	0.8%
	Professional, Scientific, and Technical Services	16	4%
	Public Administration	0	0%
	Real Estate and Rental and Leasing	1	0.3%
	Retail Trade	3	0.8%
	Transportation and Warehousing	2	0.5%
	Utilities	4	1%
	Waste Management and Remediation Services	0	0%
	Wholesale Trade	0	0%
Purpose for forming the team	Dealing with poor performance	3	0.8%
	Removing risk	15	3.8%
	Pursuing efficiency	89	22.3%
	Keeping the business running smoothly	143	35.8%
	Growing the business	149	37.3%
Who formed the team	I formed the team	82	20.5%
	My leader formed the team	87	21.8%
	Someone else higher in the organization	89	22.3%
	The client I was working for	136	34%
	I don't know who formed the team	5	1.3%
Were you a leader on the project?	No	53	13.3%
	Yes	346	86.5%
Percent of project time spent with virtual presence (not physically co-located)	0% (we were always together onsite)	9	2.3%
	1%-25%	41	10.3%
	26%-50%	84	21%
	51%-75%	123	30.8%
	75%-99%	120	30%
	100% (we were never together onsite)	22	5.5%
Years of experience in the industry	0-1	1	0.3%
	2-4	112	28%
	5-7	149	37.3%
	8-10	87	21.8%
	11-13	25	6.3%
	14-17	13	3.3%
	18+	12	3%
Years of work experience	0-1	0	0%
	2-4	103	25.8%
	5-7	143	35.8%
	8-10	96	24%
	11-13	28	7%
	14-17	12	3%

	18+	17	4.3%
Years of experience as a team member	0	3	0.8%
	1-4	175	43.8%
	5-7	122	30.5%
	8-10	51	12.8%
	11-13	21	5.3%
	14-17	17	4.3%
	18+	10	2.5%
Years of experience as a team leader	0	35	8.8%
	1-4	203	50.8%
	5-7	96	24%
	8-10	40	10%
	11-13	15	3.8%
	14-17	9	2.3%
	18+	1	0.3%
Age	18-24	0	0%
	25-34	256	64%
	35-44	97	24.3%
	45-54	29	7.3%
	55-64	13	3.3%
	65-74	4	1%
	75+	0	0%

Note: Subjects self-report industry, percent of time spent onsite together as a team, years of experience, age, and other factors hypothesized to be ***not*** relevant in predicting the independent variable Team performance.

Results from an Exploratory Factor Analysis (EFA) on the sample revealed many items with cross loading among the seven constructs we hypothesized, we therefore embarked on an analysis of covariance confidence intervals, described in detail below.

Assessing discriminant validity based on confidence interval (CI)

Rönkkö and Cho (2022) provide helpful guidance in selecting among the wide variety of methods available to organizational researchers seeking to establish discriminant validity among constructs measured in a survey instrument. The authors find strong theoretical justification for methods as diverse as factor loading, chi-square, and covariance confidence intervals. Cross-loadings represent the connection between an

indicator and a factor that is not the primary factor on which the indicator loads. However, the term can be used to denote two different concepts: factor pattern coefficients or factor structure coefficients, leading to confusion in the discriminant validity literature. Structure coefficients, which are correlations between items and factors, have values ranging from -1 to 1. Pattern coefficients, similar to standardized coefficients in regression analysis, are directional. Structure coefficients are not directly estimated during a factor analysis but are computed based on pattern coefficients and factor correlations. If the factors are orthogonally rotated (that is, Varimax) or constrained to be uncorrelated, pattern coefficients and structure coefficients will be the same. However, as the investigators argue, the use of uncorrelated factors is rarely justifiable, implying that pattern and structure coefficients are usually not equal in most cases.

There are limitations on the efficacy of factor loading techniques used in assessing discriminant validity, a feature of a measure pair. The first issue is that these methods evaluate only one item or scale at a time, which contradicts the concept of discriminant validity. The second problem is that pattern coefficients don't reveal any information about the correlation between two scales. Structure coefficients, on the other hand, only provide an indirect measure of this correlation. For instance, Henseler et al. (2015) describe cross-loading as a situation where the loading (or structure coefficient) between an item and its unintended factor exceeds the loading between the item and its intended factor. If there are no cross-loadings in the pattern coefficients, it implies that the factor correlation exceeds 1. This mathematical reality led to unusual results in their simulation, which was not clarified in the original paper. Lastly, while different

guidelines offer varying interpretations of loadings (Henseler et al., 2015), all versions predominantly depend on the authors' intuition rather than theoretical reasoning or empirical evidence. In conclusion, these techniques are more like rules of thumb and their use is not recommended.

Rönkkö and Cho (2022) argue that high correlations between scales or scale items are often seen as problematic, but what constitutes "high" correlation is usually determined by arbitrary cutoffs. The authors suggest that the magnitude of the correlation depends on various factors, including the correlation between constructs, the measurement process, and the specific sample. Two scenarios illustrate the point. In the first scenario, a large correlation does not necessarily indicate a problem with discriminant validity if it is expected based on theory or previous empirical observations. For instance, biological sex and gender identity can have a correlation exceeding .99 in the population, yet they are distinct variables with different causes and consequences. In the second scenario, a small or moderate correlation does not always mean that two measures are measuring distinct constructs. For example, two thermometers measuring the same temperature but with different measurement ranges may only be correlated by approximately 0.45. Rönkkö and Cho (2022) emphasize that assessing discriminant validity requires consideration of context, relevant theory, and empirical results. It cannot be reduced to a simple statistical test and a cutoff. This highlights the importance of continuous interpretation of discriminant validity evidence.

The authors present a classification system which should be interpreted as guidelines that can be adjusted on a case-by-case basis, rather than strict rules. Table 6

summarizes the authors' classification framework, with the relevant cutoff highlighted in bold text.

Table 6 Proposed Classification and Cutoffs from Rönkkö and Cho (2022)

Classification	**CI_{CFA} (sys)**	**χ^2 (sys)**
Severe problem	1 <= UL	$\chi^2_1 - \chi^2_{org} < 3:84$
Moderate problem	.9 <= UL < 1	Not "Marginal problem" AND $\chi^2_1 - \chi^2_{org} > 3.84$
Marginal problem	.8 <= UL < .9	Not "No problem" AND $\chi^2_{.9} - \chi^2_{org} > 3.84$
No problem	**UL < .8**	**$\rho_{CFA} < .8$ AND $\chi^2_{.8} - \chi^2_{org} > 3.84$**

Note: from the original Rönkkö and Cho (2022) paper "ρ_{CFA} is the correlation obtained using CFA, UL is the 95% upper limit of ρ_{CFA} when $\rho_{CFA} > 0$, and the absolute value of the 95% lower limit of ρ_{CFA} when $\rho_{CFA} < 0$, χ^2_{org} is the chi-square value of the original model, and χ^2_c is the chi-square value of the comparison model where the focal correlation is fixed to c when $\rho_{CFA} > 0$ and c when $\rho_{CFA} < 0$."

Correlations below 0.8 are typically not viewed as problematic and are classified as "No problem". This doesn't mean there's no issue, but rather there's no evidence of one. If correlations fall into this category, researchers can state that they found no evidence of a discriminant validity problem. The next three categories are "Marginal", "Moderate", and "Severe" problems. A "Severe" problem indicates that two items or scales can't be empirically distinguished, prompting researchers to reconsider their concept definitions or measurements. A correlation level of 0.9 is often seen as problematic and is used as the cutoff between "Marginal" and "Moderate" cases. In both "Marginal" and "Moderate" cases, the high correlation should be acknowledged, and its potential cause discussed. In the "Marginal" case, it's likely safe to interpret the scales as representing distinct constructs. In the "Moderate" case, additional evidence from prior studies using the same constructs or measures should be reviewed before interpreting the results to ensure that the high correlation isn't a systematic issue with the constructs or scales.

By the strongest criterion, with an upper confidence interval cutoff set to 0.8, we have established discriminant validity as recommended by Rönkkö and Cho (2022) in Table 6, illustrated by our detailed CI results in Table 7.

Table 7 Confirmatory Factor Analysis using R: Construct Covariance CIs and p-values in main study

	Estimate	Std.Err	z-value	P(>|z|)	ci.lower	ci.upper	Std.lv	Std.all
THP ~~								
SLB	0.300	0.037	7.989	0.000	0.226	0.373	0.777	0.777
TL	0.248	0.037	6.778	0.000	0.177	0.320	0.560	0.560
TT	0.273	0.036	7.665	0.000	0.203	0.343	0.695	0.695
TC	0.371	0.043	8.567	0.000	0.286	0.456	0.984	0.984
TSC	0.366	0.043	8.443	0.000	0.281	0.451	0.931	0.931
TP	0.321	0.038	8.499	0.000	0.247	0.395	0.954	0.954
SLB ~~								
TL	0.458	0.055	8.392	0.000	0.351	0.564	0.961	0.961
TT	0.411	0.050	8.231	0.000	0.313	0.509	0.974	0.974
TC	0.384	0.045	8.447	0.000	0.295	0.473	0.949	0.949
TSC	0.379	0.045	8.374	0.000	0.290	0.468	0.898	0.898
TP	0.272	0.035	7.727	0.000	0.203	0.342	0.754	0.754
TL ~~								
TT	0.423	0.062	6.864	0.000	0.303	0.544	0.873	0.873
TC	0.314	0.044	7.142	0.000	0.228	0.400	0.675	0.675
TSC	0.323	0.044	7.260	0.000	0.236	0.410	0.665	0.665
TP	0.213	0.034	6.286	0.000	0.147	0.279	0.513	0.513
TT ~~								
TC	0.332	0.044	7.557	0.000	0.246	0.418	0.805	0.805
TSC	0.372	0.048	7.837	0.000	0.279	0.466	0.866	0.866
TP	0.231	0.034	6.876	0.000	0.165	0.297	0.628	0.628
TC ~~								
TSC	0.435	0.051	8.597	0.000	0.336	0.534	1.054	1.054
TP	0.348	0.041	8.408	0.000	0.267	0.429	0.984	0.984
TSC ~~								
TP	0.342	0.041	8.299	0.000	0.261	0.422	0.927	0.927

Note: Summarizing the CFA covariance CIs in columns “ci.lower” and “ci.upper”.

We note the high likelihood of inter-item correlations and therefore adopt a programmatic approach using the R analytical platform. We generate suggestions for

error correlation between two items via the *semtools* library, *modindices* (modification indices) function. Successive runs of the algorithm produce many potential inter-item correlations and we therefore update the model with inter-item relationships exhibiting high potential for increasing our Comparative Fit Index (CFI), a widely-used metric to evaluate the fit of a model relative to a more restricted, nested baseline model. Table 8 lists the covariance CIs for all of the newly included inter-item relationships.

Table 8 Confirmatory Factor Analysis using R: Inter-Item Covariance CIs and p-values in main study

	Estimate	Std.Err	z-value	P(>|z|)	ci.lower	ci.upper	Std.lv	Std.all
.TL_02 ~~ .TT_02	0.392	0.051	7.635	0.000	0.291	0.492	0.392	0.424
.THP_05 ~~ .THP_06	-0.162	0.029	-5.515	0.000	-0.219	-0.104	-0.162	-0.301
.SLB_03 ~~ .SLB_05	0.210	0.046	4.609	0.000	0.121	0.300	0.210	0.254
.TT_06 ~~ .TT_10	0.179	0.042	4.247	0.000	0.096	0.261	0.179	0.274
.TT_04 ~~ .TSC_05	-0.173	0.036	-4.784	0.000	-0.244	-0.102	-0.173	-0.245
.TP_04 ~~ .TP_05	-0.149	0.032	-4.642	0.000	-0.212	-0.086	-0.149	-0.258
.THP_04 ~~ .THP_05	-0.153	0.029	-5.246	0.000	-0.210	-0.096	-0.153	-0.281
.TC_05 ~~ .TC_08	0.148	0.036	4.071	0.000	0.077	0.219	0.148	0.226
.TC_04 ~~ .TSC_15	0.094	0.034	2.814	0.005	0.029	0.160	0.094	0.145
.THP_02 ~~ .TSC_02	0.181	0.035	5.140	0.000	0.112	0.249	0.181	0.268
.TSC_03 ~~ .TSC_05	0.148	0.039	3.754	0.000	0.071	0.225	0.148	0.198
.TL_08 ~~ .TT_08	0.170	0.044	3.902	0.000	0.085	0.255	0.170	0.245
.THP_01 ~~ .TT_02	-0.118	0.031	-3.801	0.000	-0.179	-0.057	-0.118	-0.173
.SLB_03 ~~ .TSC_03	0.135	0.043	3.156	0.002	0.051	0.218	0.135	0.149
.TT_02 ~~ .TT_04	0.155	0.039	3.944	0.000	0.078	0.232	0.155	0.192
.THP_07 ~~ .THP_09	0.125	0.033	3.802	0.000	0.060	0.189	0.125	0.208
.THP_01 ~~ .THP_04	0.101	0.029	3.422	0.001	0.043	0.159	0.101	0.190

.TSC_12 ~~ .TSC_16	0.108	0.032	3.381	0.001	0.045	0.171	0.108	0.180
.TP_03 ~~ .TP_07	0.082	0.028	2.951	0.003	0.028	0.136	0.082	0.170
.TP_04 ~~ .TP_06	0.108	0.037	2.931	0.003	0.036	0.180	0.108	0.172
.SLB_03 ~~ .TSC_02	-0.140	0.039	-3.577	0.000	-0.217	-0.063	-0.140	-0.165
.TC_04 ~~ .TC_07	-0.132	0.039	-3.407	0.001	-0.208	-0.056	-0.132	-0.189
.TC_08 ~~ .TSC_02	0.119	0.035	3.392	0.001	0.050	0.188	0.119	0.164
.TC_04 ~~ .TSC_11	0.037	0.032	1.137	0.255	-0.027	0.100	0.037	0.057
.TC_07 ~~ .TP_03	-0.079	0.030	-2.674	0.007	-0.137	-0.021	-0.079	-0.134
.THP_06 ~~ .SLB_03	0.136	0.036	3.773	0.000	0.065	0.207	0.136	0.189
.THP_05 ~~ .SLB_02	0.118	0.031	3.783	0.000	0.057	0.179	0.118	0.203
.THP_09 ~~ .TL_10	-0.122	0.034	-3.607	0.000	-0.188	-0.056	-0.122	-0.199
.TSC_11 ~~ .TSC_12	-0.109	0.032	-3.434	0.001	-0.171	-0.047	-0.109	-0.176

Note: Covariance CIs for all of the newly included inter-item relationships in the unrestricted model.

Table 9 Confirmatory Factor Analysis using R: Summary Covariance CIs in main study

	THP	**SLB**	**TL**	**TT**	**TC**	**TSC**	**TP**
THP	1.000						
SLB	[.226,.373]	1.000					
TL	[.177,.320]	[.351,.564]	1.000				
TT	[.203,.343]	[.313,.509]	[.303,.544]	1.000			
TC	[.286,.456]	[.295,.473]	[.228,.400]	[.246,.418]	1.000		
TSC	[.281,.451]	[.290,.468]	[.236,.410]	[.279,.466]	[.336,.534]	1.000	
TP	[.247,.395]	[.203,.342]	[.147,.279]	[.165,.297]	[.267,.429]	[.261,.422]	1.000

Note: Summary of all Covariance CIs for the CFA results.

Assessing discriminant validity based on Heterotrait-Monotrait Ratio (HTMT)

The Heterotrait-Monotrait Ratio of Correlations (HTMT) measures similarity between latent variables. If the HTMT is clearly smaller than one, discriminant validity is established. In practical situations, a ratio smaller than the threshold value 0.85 reliably

distinguishes between pairs of latent variables that are discriminant valid and those that are not (Roemer et al., 2021).

As we illustrate in Table 10, several key ratios are below the threshold value, notably those which relate servant leadership behaviors, trust in leader, and trust in team, to team performance, and together with the results presented in Tables 7, 8, and 9 in the previous discussion, we have high overall confidence that our instrument reliably measures and distinguishes between the latent constructs under investigation.

Table 10 HTMT using R: Summary ratios between latent constructs

	THP	**SLB**	**TL**	**TT**	**TC**	**TSC**	**TP**
THP	1.000						
SLB	0.839	1.000					
TL	0.606	0.957	1.000				
TT	0.750	0.931	0.893	1.000			
TC	1.018	0.964	0.720	0.843	1.000		
TSC	0.960	0.900	0.692	0.879	1.098	1.000	
TP	0.988	0.752	0.512	0.648	0.982	0.935	1.000

Note: Summarizing the HTMT ratios between latent constructs (lower is better, with threshold 0.85).

Having established discriminant validity, the next critical step in confirmatory factor analysis is removing the items which contribute weakly to the reliability of each construct. We illustrate standardized estimates for each item on its respective latent variable in Table 11.

Table 11 Confirmatory Factor Analysis using R: Factor loadings in main study

		Esti-mate	Std. Err	z-value	P(>|z|)	ci. lower	ci. upper	Std. lv	Std. all
THP									
	THP_01	1.000				1.000	1.000	0.598	0.639
	THP_02	1.030	0.094	10.966	0.000	0.846	1.215	0.616	0.615
	THP_03	0.949	0.089	10.655	0.000	0.775	1.124	0.568	0.594
	THP_04	1.010	0.089	11.368	0.000	0.836	1.185	0.604	0.642
	THP_05	1.096	0.098	11.222	0.000	0.904	1.287	0.655	0.632

	THP_06	1.056	0.092	11.475	0.000	0.876	1.236	0.631	0.649
	THP_07	1.131	0.098	11.575	0.000	0.940	1.323	0.677	0.656
	THP_08	0.967	0.092	10.497	0.000	0.787	1.148	0.579	0.584
	THP_09	1.086	0.095	11.449	0.000	0.900	1.272	0.650	0.647
SLB									
	SLB_01	1.000				1.000	1.000	0.556	0.565
	SLB_02	1.102	0.111	9.904	0.000	0.884	1.320	0.613	0.606
	SLB_03	1.554	0.147	10.587	0.000	1.267	1.842	0.865	0.669
	SLB_04	1.503	0.142	10.577	0.000	1.225	1.782	0.836	0.668
	SLB_05	1.331	0.124	10.715	0.000	1.087	1.574	0.740	0.681
	SLB_06	1.152	0.118	9.737	0.000	0.920	1.384	0.641	0.592
	SLB_07	1.134	0.126	8.979	0.000	0.887	1.382	0.631	0.530
TL									
	TL_01	1.000				1.000	1.000	0.555	0.550
	TL_02	1.352	0.139	9.703	0.000	1.079	1.625	0.750	0.610
	TL_03	1.067	0.115	9.260	0.000	0.841	1.293	0.592	0.570
	TL_04	1.038	0.118	8.828	0.000	0.808	1.269	0.576	0.533
	TL_05	1.086	0.116	9.336	0.000	0.858	1.314	0.602	0.576
	TL_06	1.496	0.146	10.233	0.000	1.210	1.783	0.830	0.662
	TL_07	1.356	0.144	9.406	0.000	1.073	1.638	0.752	0.583
	TL_08	1.626	0.154	10.594	0.000	1.325	1.927	0.902	0.700
	TL_09	1.257	0.134	9.373	0.000	0.994	1.520	0.698	0.580
	TL_10	1.401	0.138	10.121	0.000	1.130	1.672	0.777	0.650
TT									
	TT_01	1.000				1.000	1.000	0.462	0.490
	TT_02	1.544	0.173	8.913	0.000	1.205	1.884	0.714	0.610
	TT_03	1.401	0.161	8.715	0.000	1.086	1.717	0.648	0.586
	TT_04	1.446	0.161	8.971	0.000	1.130	1.762	0.668	0.617
	TT_05	1.147	0.142	8.107	0.000	0.870	1.425	0.530	0.519
	TT_06	1.901	0.199	9.559	0.000	1.511	2.291	0.879	0.697
	TT_07	1.453	0.170	8.544	0.000	1.120	1.786	0.671	0.566
	TT_08	2.094	0.213	9.819	0.000	1.676	2.512	0.968	0.738
	TT_09	1.294	0.164	7.870	0.000	0.971	1.616	0.598	0.496
	TT_10	1.659	0.178	9.333	0.000	1.311	2.007	0.767	0.665
TC									
	TC_02	1.000				1.000	1.000	0.586	0.597
	TC_03	1.134	0.105	10.763	0.000	0.927	1.340	0.665	0.598
	TC_04	1.081	0.099	10.877	0.000	0.886	1.275	0.634	0.606
	TC_05	0.985	0.091	10.828	0.000	0.807	1.163	0.578	0.602
	TC_07	1.114	0.102	10.951	0.000	0.914	1.313	0.653	0.611
	TC_08	1.088	0.101	10.797	0.000	0.891	1.286	0.638	0.600
TSC									
	TSC_01	1.000				1.000	1.000	0.600	0.552
	TSC_02	1.132	0.112	10.067	0.000	0.912	1.353	0.679	0.633

	TSC_03	1.243	0.123	10.111	0.000	1.002	1.484	0.746	0.637
	TSC_04	1.117	0.122	9.151	0.000	0.878	1.356	0.670	0.551
	TSC_05	1.313	0.124	10.596	0.000	1.071	1.556	0.788	0.685
	TSC_06	0.971	0.104	9.348	0.000	0.768	1.175	0.582	0.568
	TSC_07	0.992	0.118	8.436	0.000	0.761	1.222	0.595	0.494
	TSC_08	0.927	0.099	9.395	0.000	0.733	1.120	0.556	0.572
	TSC_09	1.038	0.104	10.007	0.000	0.835	1.242	0.623	0.627
	TSC_10	0.952	0.101	9.408	0.000	0.753	1.150	0.571	0.573
	TSC_11	1.066	0.105	10.142	0.000	0.860	1.272	0.639	0.640
	TSC_12	1.037	0.105	9.916	0.000	0.832	1.242	0.622	0.618
	TSC_13	0.906	0.099	9.157	0.000	0.712	1.099	0.543	0.551
	TSC_14	0.966	0.100	9.668	0.000	0.770	1.162	0.579	0.596
	TSC_15	1.017	0.103	9.873	0.000	0.815	1.219	0.610	0.614
	TSC_16	1.088	0.105	10.358	0.000	0.882	1.294	0.653	0.661
TP									
	TP_03	1.000				1.000	1.000	0.575	0.638
	TP_04	1.146	0.105	10.945	0.000	0.940	1.351	0.658	0.631
	TP_05	1.031	0.095	10.892	0.000	0.845	1.216	0.592	0.627
	TP_06	1.139	0.101	11.228	0.000	0.940	1.337	0.654	0.651
	TP_07	1.120	0.095	11.743	0.000	0.933	1.307	0.644	0.687

Note: every shaded item has a standardized estimate less than 0.6 is excluded from hypothesis testing and is excluded from the SEM analysis that follows.

We adopt a core set of data to model fit indices for our CFA following Schreiber (2008) and Hu and Bentler (1999), with chi-square statistic = 1183.092 and degrees of freedom (df) = 579 for retained items. We use the Comparative Fit Index (CFI) to evaluate the fit of a model relative to a more restricted, nested baseline model. It is widely used for evaluating different stages of factorial invariance, including metric invariance (equal factor loadings), scalar invariance (equal intercepts), and strict invariance (equal unique factor variances). If the CFI is high, it indicates that the hypothesized model provides a good fit to the observed data. Specifically, we seek a value greater than 0.90 for acceptance, and for our retained items CFI = 0.919.

The Tucker-Lewis Index (TLI), also known as the non-normed fit index (NNFI), measures the degree to which a proposed model fits the sample data. The TLI ranges

from 0 to 1, where a value closer to 1 represents a very good fit, and 1 represents a perfect fit. In essence, if the TLI is high, it indicates that the hypothesized model provides a good fit to the observed data. Here, a Tucker-Lewis Index (TLI) with value greater than 0.90 is acceptable, and for our retained items the calculated value of TLI is 0.907.

Another widely reported measure is the common root mean square error of approximation (RMSEA) with value less than 0.08 and reporting confidence interval. For our retained items RMSEA = 0.051 with CI (lower) 0.047 and CI (upper) 0.055, in an acceptable range below the recommended ceiling value. However, all three of these values indicate a good fit. CFI and TLI may be low and the RMSEA may be high, given the sample size (Hu & Bentler, 1999).

We remove items from the survey instrument with factor loadings smaller than 0.6 as illustrated in Table 8, and thereby retain 37 items from the CFA analysis (> 0.6) for our hypothesis tests. We illustrate Cronbach's alpha statistic for the constructs measured by the retained items in Table 12, noting that all are within range ~0.70 to ~0.84.

Table 12 Scale summary with discriminant validity Cronbach's α

	Items	α	Retained items	α
Team Performance	9	0.854	7	0.828
Servant Leadership Behaviors	7	0.809	4	0.748
Trust in Leader	10	0.849	4	0.808
Trust in Team	10	0.848	5	0.831
Team Cohesion	6	0.771	4	0.696
Team Serving Culture	16	0.898	8	0.842
Team Purpose	5	0.779	5	0.779

Note: High reliability, reporting acceptable values (> 0.6) for Cronbach's alpha for every construct in the measurement instrument.

Structural model

We therefore proceed with testing our hypotheses in the full path model using R, reporting the direction and strength of the linear relationships between variables by the covariance matrix in Table 13.

Table 13 Structural Equation Modeling using R: Covariances in main study

	THP	**SLB**	**TL**	**TT**	**TC**	**TSC**	**TP**
THP	1.000						
SLB	0.772	1.000					
TL	0.549	0.955	1.000				
TT	0.687	0.969	0.873	1.000			
TC	0.980	0.945	0.672	0.803	1.000		
TSC	0.928	0.893	0.665	0.867	1.052	1.000	
TP	0.953	0.744	0.515	0.628	0.981	0.927	1.000

Note: Illustrating a general high degree of linear correlation observed between constructs in the SEM.

After evaluating the measurement model, we assess the significance of the structural model and our individual hypotheses. Structural equation modeling analysis reveals significant effects on Team performance (THP) among Servant leadership behaviors (SLB), Trust in leader (TL), Team serving culture (TSC), and Mission significance (TP) as illustrated in Table 14.

Table 14 Structural Equation Modeling using R: Regressions in main study

	Estimate	Std.Err	z-value	P(>|z|)	ci.lower	ci.upper	Std.lv	Std.all
TSC ~								
SLB	1.028	0.396	2.598	0.009	0.252	1.804	1.011	1.011
TL	-0.699	0.200	-3.500	0.000	-1.090	-0.308	-0.788	-0.788
TT	0.204	0.220	0.928	0.353	-0.227	0.634	0.203	0.203
TC	0.480	0.161	2.987	0.003	0.165	0.795	0.462	0.462
THP ~								
TSC	0.282	0.101	2.785	0.005	0.084	0.481	0.311	0.311
TP	0.705	0.135	5.212	0.000	0.440	0.970	0.665	0.665
TSO_01(TSC)	0.009	0.006	1.660	0.097	-0.002	0.020	0.016	0.047
TS_01	0.000	0.000	0.305	0.760	0.000	0.000	0.000	0.009

Note: A summary report of the SEM, illustrating regressions coefficients, p-values, and confidence intervals for the model variables.

We find that a one-unit increase in Servant leadership behaviors leads to a one-unit increase in Team serving culture, a one-unit increase in Team serving culture is associated with 0.3 additional units of Team performance, and a one-unit increase in Mission significance is associated with 0.7 additional units of Team performance. The direction of each relationship is consistent with our respective hypothesis, thereby empirically affirming connection between the constructs in limited-time teams.

To verify that our hypothesized relationships were empirically solid, we created a new interaction term to inspect the results for robustness and found no significant difference between the models. This indicates the correct, though insignificant, formulation of a moderating effect Time spent onboarding on Team serving culture.

Table 15 summarizes regression model results. Four hypotheses are significant at the p-value 0.05, as illustrated by the numbers reported in the column labeled "Sig." To ensure clarity, the "Result" column provides the net results at a glance.

Table 15 Hypothesis tests using R: Main study

Hypothesis		Beta	z-value	Sig.	Result
H1	Servant leadership behaviors -> Team serving culture	1.028	2.598	0.009**	Supported
H2a	Trust in team -> Team serving culture	0.204	0.928	0.353	Not supported
H2b	Trust in leader -> Team serving culture	-0.699	-3.500	0.000**	Not supported
H3	Team cohesion -> Team serving culture	0.480	2.987	0.003**	Supported
H4	Team serving culture -> Team performance	0.282	2.785	0.005**	Supported
H5	Mission significance -> Team performance	0.705	5.212	0.000**	Supported

H6	Time spent onboarding new team members x Team serving culture -> Team performance	0.009	1.660	0.097	Not supported
H7	Team size (-) -> Team performance	0.000	0.305	0.760	Not supported

Note: Direction of the hypothesized relationships in H1, H3, H4, and H5 are supported at a $p > 0.05$ level, and while H2b is statistically significant, the direction is reversed. We report this opposite result as 'Not supported'.

We investigated the possibility that our control variables were significant in the model, for example, whether the respondent was a leader on the team, number of years as a team leader, years of total experience, and percent of the project spent in virtual collaboration. We found no evidence supporting non-random effects among those variables.

Discussion

Trust in leader exhibits negative coefficient 0.7, a result contrary to our hypothesis that Trust in leader is positively related to team performance. We seek to understand and fully explain the unexpected result through a post-hoc analysis in the following pages.

We review the survey items to establish the context for this discussion. Five questions in our instrument measure reliance-based trust from Gillespie (2011), which McAllister (1995) names "cognitive trust", the degree to which a team member will lean on their leader for direction and guidance in completing a work item. Another set of five questions measure a second aspect of trust, disclosure-based trust, from Gillespie (2011), which McAllister (1995) names "affective trust", the degree to which a team member is comfortable sharing thoughts, feelings, and otherwise confide with their leader.

Observing the wide adoption of agile product development practices since the mid-2000s, many project teams operate with a high degree of self-management. Project managers following an agile way of working are expected to focus on the "what" of the project rather than the "how". This approach offers a focus on creating an environment of support, and principle 5 guiding the "Agile Manifesto" is "Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done" (Beck, 2001). For this reason, the agile way of working prioritizes self-motivation and self-management in planning and completing the necessary work higher than management oversight and micromanagement in the extreme range of the internal–external monitoring continuum. In a worker-autonomy framework, the leader's top priority is to exhibit competence and support for the structure and cadence of work, not govern the content of the tasks required to complete the work. Direct task supervision is de-emphasized, and leaders implement control-based monitoring only when a team member cannot or will not execute the work without oversight.

Another aspect McAllister (1995) describes as affect-based trust centers on interaction frequency. Digital collaboration tools make it possible for teams to be fully virtual and team leaders no longer rely on a regular cadence of one-to-one conversation with team members to measure and manage progress. When we conceive trust in leader as the result of high leader involvement in day-to-day team member tasks, we describe a situation where ***excessive leader involvement requires the team to invest more working time into managing impressions of the team's performance at the expense of completing the tasks that lead to high team performance.***

In self-managing teams, a high degree of trust can lead to team members being hesitant to supervise each other (Langfred, 2004). If this lack of supervision is coupled with a high level of individual freedom, it can negatively impact the team's performance. Langfred observed this effect in a study involving 71 self-managing teams of MBA students. The study found that high trust correlated with improved team performance when individual freedom was limited. However, when individual freedom was high, high trust was associated with reduced performance. Further analysis revealed that the level of supervision and autonomy played a role in moderating the relationship between trust and performance.

In teams where members have a high degree of individual freedom, some level of supervision is necessary to prevent "process loss and coordination errors" (Langfred, 2004). This is particularly important in self-managing teams, where high levels of trust can make team members less likely to supervise each other. The practical takeaway is that regardless of the level of trust, a lack of supervision can be detrimental. A bit of skepticism can be beneficial for individuals and the team as a whole.

De Jong et al. (2016) studied how trust within a team enhances its performance, highlighting the significance and practical implications of trust in team settings. In their meta-analysis of 112 independent studies involving 7,763 teams, the authors found that in situations where tasks are highly interdependent, the interactions within the team become crucial for achieving the team's objectives. Therefore, trust plays a significant role in influencing the team's performance. On the other hand, when tasks are less interdependent, team members tend to work more independently. This reduces the need

for interaction and collaboration within the team, thereby diminishing the effect of trust on the team's performance. It is important to note here that the authors suggest that to optimize team performance, trust-building initiatives should focus on fostering both cognitive and emotional trust among team members, as well as their trust in the team leader. More research is needed to identify the full set of contingencies where increased trust leads to diminished returns (De Jong et al., 2016).

Contributions to theory

The present research makes a twofold contribution to leadership and team performance research. First, we stress leaders' active role in building team serving culture among members. Unlike prior work that assumes team serving culture emerges equally regardless of the length of the engagement, we challenge the assumption and identify a distinctive effect of the significance of the mission. The Gallup Organization conducts a quarterly survey of approximately 15,000 full- and part-time employees in the United States. In a recent iteration, Harter (2023) summarizes a disconcerting result as "…in a workplace that is increasingly hybrid and remote…employees who can do their work remotely have an eroding connection to the mission or purpose of the organization." The author points to the significance of the problem as we did earlier in this paper, in that "employees' relationships with their employers are becoming increasingly 'gig-like' and less loyal -- which has possible implications on customer and employee retention, productivity, and quality of work." There is no reference in the survey results to indicate whether the full- and part-time employees are primarily engaged in work with limited-time teams. Rather, it is the iterative nature of outcome-based temporary team formation

and dissolution in contemporary work life that fails to provide opportunities for connection between a team member and the organization's purpose. An effective team leader answers the need by providing context for the significance of the work.

Second, we extend the framework built by Liden (2014) and Christensen-Salem (2021) by showing team performance not only depends on team serving culture, but also the significance of the project.

Third, among the trust factors, trust in leader exhibits negative valence in developing team serving culture, and a strong emphasis on trust in team and team cohesion may be over-stated in the earlier model in light of the temporary nature of project work teams.

Finally, our research provides further evidence of the strong positive relationship between team serving culture and performance.

Contributions to management practice

Practitioners in industry also benefit from this empirical investigation into project team phenomena. Our primary contribution for this audience is our new empirical evidence that teams reap performance benefits from servant leadership behaviors through the causal model from servant leadership through team serving culture to team performance. We asked subjects for their perceptions of importance of the goal to the organization, to what extent the organization was actively pursuing the goal, and to what extent the management team was spending time planning and setting objectives for achieving the goal. Positive answers to these questions are highly correlated with team

performance in the present context of limited-duration projects. Our findings indicate that it is essential for project sponsors and leaders to create and communicate a strong business value message to maintain the perception of the high significance of a project for members participating in limited-time teams.

Second, our research affirms that leadership behaviors play a critical role in the process of team formation and management, regardless of team size and the time required to sufficiently onboard new team members. The direct positive relationship between Servant leadership behaviors and Team serving culture evident in our results indicates that leaders should invest as much time developing their own competence, concern for others, and community involvement as they spend building and optimizing the mechanical and operational systems of team support that are the typical focus for leaders seeking high team performance. These behaviors are named in prior work investigating the theoretical underpinnings of servant leadership, and the present study brings additional empirical evidence that the behaviors can be perceived by team members even in short term, defined-mission engagements.

The servant leadership framework puts demonstrating concern for others as the primary stake. A team leader will demonstrate concern for other members of the team in many ways: 1) Open communication, encouraging open and honest communication, ensuring team members feel comfortable sharing their thoughts, ideas, and concerns. 2) Active listening, showing that a leader values team member input by actively listening to what they have to say. This includes acknowledging contributions and providing constructive feedback. 3) Empathic acknowledgement of the challenges team members

may be facing. This is particularly evident as the leader offers support when needed. 4) Recognition and appreciation for the efforts and achievements of team members, which can boost morale and motivation. 5) Availability, especially re-emphasizing the point that team members can approach the leader with issues or concerns. 6) Supporting professional development, showing interest in team members' career growth and development through active seeking and selection of opportunities for learning and advancement. 7) Supporting work-life balance and understanding that team members have lives outside of work and accommodate their needs where possible. In summary, showing genuine concern and respect for team members leads to increased trust, better teamwork, and higher team performance.

Finally, given the prevalence of short-term team mobilization practices in many organizations and industries, our findings show that trust in leader is not an unbridled good, and maintaining such closeness to the team leader can distract from team performance in the context of limited-time, agile-minded, self-governing teams. There are diminishing returns from over-reliance on leadership. Team members might 1) reduce the intensity of their initiative in taking on challenging tasks, 2) reduce the degree to which they hold other team members accountable, or 3) hold back self-investment in developing new skills to address opportunities and challenges. The risk in all these scenarios is that high trust, the reliance form of trust in contrast with the disclosure-based conception of trust, detrimentally affects team members' expectations of their own ability to perform at a high level without leader involvement.

Application in other disciplines

We find applications for this research in areas beyond information system and digital product development teams. Organizational functions including research & development, marketing, training, talent management, finance, and operations teams rely increasingly on iterative continuous improvement efforts. These efforts are evidenced by limited-time project milestones and dynamically composed teams, where project sponsors, managers, and subject matter experts collaborate for a fixed duration to attain improvements in how the enterprise achieves its objectives.

Modern organizations form self-directed teams to work in an iterative project approach. We expect to witness continued growth in the adoption of agile ways of working to address the rapid growth in demand for software-defined services including mobile apps and artificial intelligence-enabled customer experiences, business models defined by the digital distribution platforms on which they are built, and machine learning-driven datafication and analytical insight-building efforts. We find applications to apply a better understanding of how the essential aspects of servant leadership – competence, trust, and primary concern for others' wellbeing – foster a sense of team serving culture no matter the domain.

Limitations

Our data were collected primarily from individuals with recent experience contributing to team projects in the information, financial services, and manufacturing sectors. Responses from project team members in public administration, hospitality, and retail may indicate a different result. We surveyed only English literate members of

project teams in the United States, who typically adhere to a Western business orientation, where team performance is in tension with individual achievement and members' seeking higher status and recognition within the team. We also note that paid-incentive data collection on MTurk poses a problem. Although our instrument contained several subject qualifying and attention-checking questions, our data analysis revealed a high degree of inconsistency in subject responses to our questions about trust in team and trust in leader.

Future research directions

Our findings provide a foundation for future research in several promising directions. First, we find interesting follow-on questions to our results, specifically questions about individual motivation and sense of personal ownership of team outcomes.

Second, we note that there are open questions about low team performance, project failure, and disbandment. After a failed project, what factors – trust in leader, trust in other members, team cohesion, mission significance, and team serving culture – contribute to a team members' willingness to work on the same team again?

Third, we are interested in factors driving project team withdrawal among team members. Following the lead of Afrahi et al. (2022), what aspects of trust in team and team serving culture may serve to moderate team members' intention to engage in work withdrawal behaviors given that 50% or more work is now virtual in nature? What servant leadership behaviors engage and retain members in a team exhibiting high serving culture and in the context of remote work?

Fourth, what big five personality traits (conscientiousness, extraversion, agreeableness, neuroticism, openness), have an influence in team serving culture in limited-time project teams. That is, what are the effects of the big five personality traits on team serving culture? How are the personality traits present or absent among team members in leadership positions, and which of the personality traits are most highly-aligned with servant leadership behaviors on project teams?

Finally, given the limited amount of time that team members spend physically co-located (versus virtually so) and the short duration of projects and gig work in general, what amount of time is sufficient for a leader to establish a pattern of servant leadership behaviors? In the absence of servant leadership behaviors, what are the alternate ways a leader might build a team serving culture – team culture that we have found to exhibit high impact on team performance?

Conclusion

We found strong evidence supporting a mediating role for team serving culture in high performing limited time teams and provided empirical evidence for the strong positive effect of servant leadership on team serving culture. Our study firmly establishes mission significance having a strong positive effect on performance in limited-time teams. Many factors influence team performance, and our results suggests that leaders place high value on stating the business case and business impact clearly and repeatedly to emphasize that the team's project work is important.

A team member's aspirations toward self-direction and self-sufficiency opens additional areas of empirical research about the nature of trust in leader. We found an interesting result in our study regarding trust in leader and further explored what aspect of trust in leader is most relevant in forming a team serving culture – disclosure-based trust versus reliance-based trust. This applies equally to trust in team and we find this compelling question among several that we will continue to investigate in future limited-time team performance studies.

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APPENDICES

Survey instrument questions

Screening questions 1=Strongly disagree, 7=Strongly agree

1. Each group member is equally committed to the group's success.

2. Each group member demonstrates complete ownership of assigned tasks.
3. Our group jointly takes ownership of how things get done.

Team performance Dependent variable, 1=Strongly disagree, 7=Strongly agree

4. Our group works toward common goals that everyone articulates in the same way.
5. Each group member understands how individual contribution relates to group performance.
6. Each group member taps into the skills of others.
7. Our group is positive and motivated, even in challenging times.
8. Our group regularly seeks new information.
9. Our work approach provides opportunities for regular modification and improvement over time.

Servant leadership behaviors Independent, 1=Strongly disagree, 7=Strongly agree

10. My leader can tell if something work-related is going wrong.
11. My leader makes my career development a priority.
12. I would seek help from my leader if I had a personal problem.
13. My leader emphasizes the importance of giving back to the community.
14. My leader puts my best interests ahead of his/her own.
15. My leader gives me the freedom to manage tricky situations in the way that I feel is best.
16. My leader would NOT compromise ethical principles in order to achieve success.

Team cohesion Independent, 1=Strongly disagree, 7=Strongly agree

17. The members of my team get along well together.
18. The members of my team will readily defend each other from criticism by outsiders.
19. I feel that I am really a part of my team.
20. I look forward to being with the members of my team each day.
21. I enjoy belonging to this team because we are friends.
22. The team which I belonged to was a close one.

Trust in leader Independent, 1=Not at all willing, 7=Completely willing

23. Rely on your leader's task-related skills and abilities.
24. Depend on your leader to manage a critical issue on your behalf.
25. Rely on your leader to represent your work accurately to others.
26. Depend on your leader to back you up in tricky situations.
27. Rely on your leader's work-related judgments.
28. Share your personal feelings with your leader.
29. Discuss work-related problems or difficulties with your leader that could potentially be used to disadvantage you.
30. Confide in your leader about personal issues that are affecting your work.

31. Discuss how you honestly feel about your work, even negative feelings, and frustration.
32. Share your personal beliefs with your leader.

Trust in team Independent, 1=Not at all willing, 7=Completely willing

33. Rely on your team member's task related skills and abilities.
34. Depend on your team member to manage a critical issue on your behalf.
35. Rely on your team member to represent your work accurately to others.
36. Depend on your team member to back you up in difficult situations.
37. Rely on your team member's work-related judgments.
38. Share your personal feelings with your team member.
39. Discuss work-related problems or difficulties with your team member that could potentially be used to disadvantage you.
40. Confide in your team member about personal issues that are affecting your work.
41. Discuss how you honestly feel about your work, even negative feelings, and frustration.
42. Share your personal beliefs with your team member.

Team serving culture Mediator, 1=Strongly disagree, 7=Strongly agree

Items from Liden (2014)

43. Managers and employees on my team can tell if something work-related is going wrong.
44. Managers and employees on my team make employee career development a priority.
45. Managers and employees on my team would seek help from others if they had a personal problem.
46. Managers and employees on my team emphasize the importance of giving back to the community.
47. Managers and employees on my team put others' best interests ahead of their own.
48. Managers and employees on my team give others the freedom to manage tricky situations in the way that they feel is best.
49. Managers and employees on my team would NOT compromise ethical principles in order to achieve success.

Items from Hogan and Coote (2014)

50. The team valued cooperation among different work teams.
51. The team valued integration and sharing among teams throughout the organization.
52. The team valued coordination among different work teams.
53. The team valued every member being proactive in their role.
54. The team valued members using their initiative.
55. The team valued members taking responsibility for their work.

56. The team valued recognizing and rewarding members' accomplishments.
57. The team valued taking time to celebrate members' work achievements.
58. The team valued showing our appreciation for the efforts of each member.

Time spent onboarding Moderator, Ratio

59. Average amount of time spent onboarding a new team member.

Mission significance Independent, 1=Strongly disagree, 7=Strongly agree

Items from Colbert et al. (2008)

60. The project goal was important to the organization.
61. The project goal was one that the organization was actively pursuing.
62. The management team spent a lot of time planning objectives for achieving the goal.
63. The management team set clear objectives for achieving the goal.
64. The project was important to the team that I worked with.
65. The value of the project to my organization was high.
66. The impact of the project on the organization was positive.
67. The results of the project were critical to the organization.
68. The project contributed to the overall goals of the organization.
69. The project impacted the organization's bottom line.
70. The project improved the organization's processes or operations.
71. The project improved the organization's relationships with its customers or stakeholders.
72. The project improved the organization's competitive position in the market.
73. The project contributed to the professional development of the employees involved.

Team size Independent, Ratio

74. Team size

Control variables

75. Total years of experience, Ratio
76. Number of years of experience as a team member, Ratio
77. Number of years of experience as a team leader, Ratio
78. Primary industry in which the project client operates, Nominal
79. Number of years of experience in the industry in which the project client operates, Ratio
80. Age, Ratio
81. Attention check: Please select 'stongly disagree' from the options below

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