Unwrapping Software Projects Success in Asia: Assessing the Role Of Authentic Leadership, Psychological Empowerment, and Job Engagement in Project Success Using a Serial-Mediation Approach

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Abstract
This research examines the impact of authentic leadership style on project success through mediation effects of psychological empowerment and job engagement in the software industry of Pakistan. Data were collected from 343 self-reports of employees working on different software projects in Pakistan. As per results, authentic leadership enhanced project success directly and indirectly through the serial-mediation effects of psychological empowerment and job engagement. The current findings contribute to prior literature in many ways: (i) social exchange theory—by identifying new antecedents and outcomes of job engagement; (ii) leadership literature—by offering an integrated framework with psychological empowerment and job engagement as two explanatory mechanisms (mediators) linking the under researched authentic leadership to project success; (iii) project management literature—by unwrapping new antecedents (i.e., authentic leadership, psychological empowerment, and job engagement) to project success; offers an empirical case for the potential applications of the undermined leadership style, authentic leadership, in the software sector.

Keywords
authentic leadership, psychological empowerment, job engagement, project success, software project

Introduction
Globally, the software development industry provides significant competitive advantages to public and private sector enterprises in reducing operating costs and enhancing efficiency; consequently contributing to the sustainable development of organizations, industry, and society. The importance of software projects has increased over the last three decades, especially during the COVID-19 outbreak. Despite that, the varying impact of several human factors in software projects often threatens project success and causes high failure rates (Kirmizi & Kocaoglu, 2020; Leu & Lee, 2017). There is consistent evidence that several human factors, directly and indirectly, affect project success (Bhatti et al., 2021; Emiliano de Souza et al., 2021; Salman et al., 2021). Of these factors, leadership style is considered an important predictor of project success (Latif et al., 2020; Khan, Jaafar et al., 2020; Raziq et al., 2018). Apart from recent studies confirming the significant impact of leadership styles on project success (see Aga et al., 2016; Ali et al., 2020; Bhatti et al., 2021; Latif et al., 2020), the positive psychological attributes of authentic leadership make it the most attractive choice to ensure project success (Avolio & Gardner, 2005). Khan (2020) argued that authentic leadership could play a significant role in project success, while Ofori (2008) defends its proven effectiveness in the project management domain. Walumbwa et al. (2008, p. 94) defined authentic leadership as “a pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing

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of information, and relational transparency on the part of leaders working with followers, fostering positive self-development.” Because authentic leaders incite positive job-related attitudes, psychological empowerment (hereafter PsyEmp), and work engagement among followers (Khan, 2020; Oh et al., 2018; Towsen et al., 2020), the chance of project success could increase significantly. These leaders nurture constructive psychological capacities (Avolio & Gardner, 2005; Ofori, 2008), psychological capital (Adil & Kamal, 2020), work engagement (Bamford et al., 2013), well-being (Ilies et al., 2005), and job meaningfulness among followers (Chaudhary, 2021). That said, there is a paucity of comprehensive empirical models in the current literature linking the antecedents, mediators, and outcomes (e.g., project success) of authentic leadership style (Khan, 2020). As of this article, the potential link between authentic leadership and project success through the mediating effect of PsyEmp and job engagement remains widely unexplored.

Therefore, this study has made an initial attempt aims to fill prior knowledge gaps by integrating authentic leadership style (antecedent), project success (outcomes), PsyEmp, and job engagement (mediators) in a unified serial mediation model. Extant studies have shown that lack of PsyEmp disrupts employee motivation and project goals (Ali et al., 2020; Khan, 2020; Khan, Jaafar et al., 2020). PsyEmp, originating from an individual’s perception of their competency, autonomy, impact, meaning (Spreitzer, 1995), may encourage employees to deliver the expected performance in any task or situation (Kazlauskaite et al., 2011; Kundu et al., 2019). Authentic leaders increase followers’ intrinsic motivation, self-determination, and trust (antecedents to PsyEmp) by showing severe concern about their needs (Hsiung, 2012; Walumbwa et al., 2010). Conger and Kanungo (1988, p. 474) viewed PsyEmp as “a process of enhancing feelings of self-efficacy among organizational members through the identification of conditions fostering powerlessness and through their removal by both formal organizational practices and informal techniques of providing efficacy information” to achieve organizational success. Apart from PsyEmp, job engagement is another possible predictor of project success (Khan, Jaafar et al., 2020) that triggers positive job-related attitudes and improves followers’ psychological state (Schaufeli et al., 2002). In many modern organizations, the authentic leadership style is practiced to strengthen followers’ abilities to generate high engagement and performance (Karam et al., 2017). Employee work satisfaction and performance increase when they experience positive feelings (Diener et al., 1999; Wright & Cropanzano, 2000). Engaged employees deliver better results than employees that are less or not engaged (Rich et al., 2010). Thus, it is rational to assume that PsyEmp and job engagement facilitate the impact of authentic leadership on project success.

This paper contributes to extant social exchange theory (SET) by investigating the theorized yet unexplored association among authentic leadership, PsyEmp, and project success. Second, this paper adds to the project management literature to explain how authentic leadership contributes to project success while explaining the mediating mechanism of PsyEmp and job engagement. Third, this study responds to recent research calls for investigating the serial mediation effect of PsyEmp and job engagement on project success (Khan, 2020; Khan, Jaafar et al., 2020; Khan, Malik et al., 2020; Latif et al., 2020).

The structure of this article is as follows. The first section presents a review of literature and hypothesis development. The second section outlines the methodology. The third section discusses the main results and findings. The final section includes a discussion and conclusion comprising the main results, implications, limitations, and future directions. Figure 1 illustrates the serial mediation model explaining the impact of authentic leadership on project success through the serial mediation effect of PsyEmp and job engagement.

**Figure 1. The conceptual model.**

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**Literature Review and Hypotheses**

**Organizations, Project Management, and Leadership**

Organizations are often characterized as a deliberate grouping of individuals to accomplish some specific purpose or goals, where individuals perform only two kinds of work, that is, projects and operations (Robbins et al., 2009). Projects are considered unique as they are temporary activities constrained by a specific timeline (beginning-end) to create a unique service or product. With individuals as key to both project and organizational success, academics in organizational behavior have been exploring the implications of human behaviors and actions at work. Previous research suggests that different aspects of organizational culture affect the motivation of organizational members, a process or mechanism through which members are directed, energized, and sustained to achieve some goals. All organizations are unique in terms of their culture, comprising shared principles, traditions, values, work ethics, and the manner of doing things that impact members’ acts (Robbins et al., 2009).
Ethical culture, environments, and leaders have been found to have a significant positive effect on cognitive empowerment and motivation among members enjoying less delegation and more autonomy (Raziq et al., 2018). Organizations with ethical climate trust leaders, who in turn trust employees, allowing them to contribute actively, share new ideas, be creative, and experiment for creativity and innovation without fearing negative repercussions. This process (based on mutual trust, cognitive contract, and compliance with ethical norms) incites respect for top management, leaders, and peers, committing employees to pursue shared goals, performance, and success (cf. Chouaib & Zaddem, 2013; Littman & Littman, 2019).

As explained by the Project Management Institute, project management refers to the use of specific tools, skills, knowledge, and techniques to deliver a valuable product or service, for example, software development, to improve a business process. An important aspect of project management is manning, comprising the process of placing the right kind and size of the workforce in the right roles at the right time to achieve project success. A manning strategy also involves efficient mobilization of resources for members and teams of a project, enabling them to accomplish objectives, tasks, and goals based on deadlines set in contractual requirements (Project Management Institute [PMI], n.d.). O’Brochta (2016), explaining the essence of the PMI Code of Ethics and Professional Conduct, asserted that “project ethics matter. . . Not only do ethics allow us to act in a way consistent with our beliefs, they are the key to executing projects successfully. This is because ethics lead to trust, which leads to leadership, which, in turn, leads to project success.” This statement suggests that leaders who emphasize trust, authenticity, ethics, and optimism are more likely to generate project success.

Of few differences, authentic leaders endorse authenticity, establish lasting relationships with followers, and expect them to be authentic, while transformational leaders are more focused on transforming their subordinates into leaders (Gardner et al., 2005; Luthans & Avolio, 2003). Servant leaders prioritize the needs of followers before themselves, but authentic leaders are more genuine in their stance as they exercise self-authenticity to exercise effective management. Authentic leaders are more practical in enacting relational transparency, self-awareness, ethical viewpoint, and balanced processing, while ethical leaders are conceptual. They must become ethical and walk the talk to gain credibility among followers (cf. Brown & Treviño, 2006). In the modern commercial setting, authentic leaders are preferred (Avolio et al., 2004; Luthans & Avolio, 2003) to create authentic leadership qualities in their followers (Avolio et al., 2004; Ilies et al., 2005) for optimistic and constructive decision-making behaviors (Luthans & Avolio, 2003), a process generating many positive organizational outcomes, for example, leader-follower relationships, engagement, follower emulating and developing authentic leadership, and satisfaction. Beyond that, contemporary knowledge economies mandate methodological and consciousness smart, authentic leaders to unwrap the complexity of managerial activities and action through thoughtfulness and awareness of cognitive positioning of organizational members and key stakeholders (Warszewska-Makuch et al., 2015). Authentic leaders are relatively more relevant in the current business context because they are always conscious about their shortcomings, natural competencies, abilities and strive hard to address gaps within themselves and others. As project environments are dynamic and constrained by time, strong bonding and trust by authentic leaders are needed to enable swift improvements and corrections in the structure of an enterprise and its values. Authentic leadership stands on the foundation of reciprocity, such that they nurture authenticity among followers (future leaders), enabling them to run the system as new leaders (cf. Begley, 2006).

**Authentic Leadership and Project Success**

The topic of project success has been extensively debated in the project management literature, where most researchers have focused on dimensions and assessment criteria of project success (Shenhar & Dvir, 2007; Wang & Huang, 2006). Past evidence suggests that the project success dimensions vary across different industries. For instance, “triple constraints” are the key assessment criteria of project success in the field of construction and engineering: Was the project completed in the defined scope? Was the project completed in the anticipated budget and time? Was the quality of the overall project satisfactory? (Aga et al., 2016; Raziq et al., 2018). In early 2000, project success was measured through achieving clients’ expectations and meeting the company’s strategic objectives (Ika, 2009; Jugdev & Müller, 2005), but such criteria have extended beyond clients’ satisfactions to more stakeholders, for example, users, project team, and customers (Aga et al., 2016). Nonetheless, these criteria have remained a widely debated topic for researchers (Angus et al., 2005).

Many scholars have examined the human factors affecting project success in the last four decades. In particular, scholars have focused on the effect of various leadership styles, yet previous findings suggest that no single leadership style is best for every project (Bhatti et al., 2021; Raziq et al., 2018; Thite, 2000; Turner & Müller, 2005). The authentic leadership style is an emerging leadership style that demonstrates high potential due to its dynamic characteristics: hopeful, moral/ethical, resilient, future-oriented, transparent, and optimistic. Because authentic leaders prioritize followers’ growth (Luthans & Avolio, 2003: 243), these leaders can play a significant role in project success (Khan, 2020). While acting on individual institutions and values, authentic leaders invest time and resources to gain trust and respect from followers. These leaders build credibility in front of their followers (Avolio & Gardner, 2005). Followers enact positive attributes of their leaders, display integrity, and try to
institutionalize the values and beliefs of their leaders (Avolio & Gardner, 2005). As followers visualize the behaviors of authentic leaders at a higher level of honesty and fairness, they show a great level of commitment in their performance toward the desired goals (Ilies et al., 2005; Yukl et al., 2002). Authentic leaders give their best in different projects because they recognize and greatly value stakeholder expectations (Khan, 2020; Toor & Ofori, 2008).

Drawing from the social exchange perspective, Walumbwa et al. (2008) stated that when followers see high-level authentic behavior of leaders, it enhances their willingness to put extra effort and work toward shared goals to reciprocate the highly-valued follower-leader relationship. Penger and Černe (2014) added that authentic leadership generates intrinsic motivation among followers by allowing them to take concrete steps toward personal development. Consequently, followers realize that they are achieving more than they predicted (Ilies et al., 2005). Besides, these leaders have a deep sense of motives, commitment, and passion for going forward with a high level of integrity and expertise (Avolio et al., 2004). Schaub and Pavlovic (1983) elaborated that “the profession of engineering calls for men with honor, integrity, technical ability, business capacity, and pleasing personalities.” Serving as role model, authentic leaders employ extra effort in monitoring and correcting their subordinate’s mistakes while simultaneously guiding and developing them into future leaders (Avolio & Gardner, 2005; Toor & Ofori, 2008). Thus, it is safe to assume that authentic leaders significantly contribute toward project success.

**Hypothesis 1: Authentic leadership is positively related to PsyEmp.**

**The Role of PsyEmp in the Authentic Leadership-Project Success Nexus**

PsyEmp is an individual’s attitude toward work that entails an inspirational disposition (Spreitzer, 1995) with numerous positive attributes and values that enable individuals or groups to feel that they can control and handle their work (Hechanova et al., 2006). PsyEmp allows individuals to feel more self-efficacy and job autonomy in performing their tasks, thereby developing a positive change within the organizational environment (Avolio & Gardner, 2005). PsyEmp is often measured through four components: (i) meaning offers an individual the concept of alignment between his/her values, standards, and beliefs toward work role (May et al., 2004; Renn & Vandenberg, 1995); (ii) self-determination is the autonomy that helps individuals select a work or job for themselves (Conger & Kanungo, 1988); (iii) competence is an individual emotion of self-efficacy and motivation regarding the achievement of assigned work (Bandura, 1986); (iv) impact can be defined as the level to which individuals recognize that their task or efforts create a difference in accomplishing the motive of a work (Spreitzer, 1995). In a psychologically safe climate, team members feel open to discussing issues, do not hesitate to share concerns, and are willing to learn on the job (Jha, 2019). Clarke (2010) advocated that psychological safety facilitates conditions that increase PsyEmp by making employees feel more secure, free from the perception of being controlled by superiors and organizational processes (Carmeli, 2007). This cognitive freedom helps employees develop constructive voice behavior (Wong et al., 2010). The proponents of social exchange theory (Cook et al., 2013) argued that employees feel comfortable, empowered, attached, work without fear, and perform when supervisors/leaders attempt to create a psychologically safe environment (Jha, 2019).

Several organizational employee behaviors and actions are often explained using the social exchange perspective. The theory posits that any behavior and action of an individual is contingent on the outcome of a cognitive evaluation (cost-benefit analysis) of how others have rewarded them (Blau, 1964). Emerson (1976) stated that social exchange comprises a series of social transactions that produce obligations. Researchers have also examined several processes explaining the influence of leadership (e.g., empowerment) (Keller & Dansereau, 1995). Many scholars have established the mediating role of PsyEmp in the link between leadership humility and project success (Ali et al., 2021). Previous studies have shown that authentic leadership is linked to many positive work-related outcomes across different sectors, for example, coal mining and education (Shapira-Lishchinsky & Tsemach, 2014; Towsen et al., 2020). Yet, the relevance of authentic leadership style and its application in the software industry remains unexplored to this date (Khan, 2020).

Among authors that link the social exchange theory to authentic leadership (e.g., Ilies et al., 2005; Walumbwa et al., 2008), Penger and Černe (2014) noted that authentic leaders cultivate an atmosphere ideal for supporting the self-determination of followers and are better at nurturing intrinsic motivation. By targeting positive attributes of followers, authentic leaders help followers improve their capacity to deliver optimal outcomes (Avolio & Gardner, 2005; Luthans & Avolio, 2003). These leaders lay solid foundations for developing PsyEmp through their following capacities and skills: (i) self-awareness—authentic leaders incite self-awareness among followers and show them the implications of such awareness; (ii) internalized moral perspective—they work on the values and morals of followers and teach them ways to resist pressure from others; (iii) balanced processing—they show followers how to take balanced decisions that are genuinely based on objective analysis of all source of information, disregarding personal views; (iv) relational transparency—they maintain transparency in dealing with others or followers (Walumbwa et al., 2008). As a result, psychologically empowered group members positively contribute to project team goals and efficiently complete their assigned group tasks; consequently enhancing the possibility of project success (Ali et al., 2020; Khan, Jaafar et al., 2020).
As a key factor of performance and creativity (Sun et al., 2012), PsyEmp motivates and emotionally link followers to project or organizational goals (Ali et al., 2020; Chughtai & Buckley, 2011; Rich et al., 2010). Kahn (1990) added that work engagement could be captured in three ways: (i) physical—leaders can assess whether [or not] employees are physically active in the workforce; (ii) emotional—emotional engagement enables employees to attach meaning to their work and atmosphere around them (Saks, 2006, p. 602); (iii) cognitive—cognitive component develops employee mindfulness about their official role at the workplace (Ganuthula & Sinha, 2019). Burnout and engagement are considered as opposite concepts (Schäufeli & Bakker, 2004; Schäufeli et al., 2002). Individuals showing greater engagement in their tasks display deep attachment to their work and organization (Schäufeli & Salanova, 2007). Despite that, empirical models on the antecedents, mediators, and outcomes are limited and scarce, even though it is recognized as a critical performance indicator (Christian et al., 2011; Macey & Schneider, 2008), especially in the project management literature. Factors of work engagement have become vital for organizations because disengaged employees can significantly increase organizations or project costs (Matthews et al., 2018).

From a leadership perspective, extant works support the positive association between authentic leadership and employee work engagement (Bamford et al., 2013). Chaudhary and Panda (2018) found that followers of authentic leaders exhibited a high level of work dedication and satisfaction. In another study, Avolio and Gardner (2005) established that authentic leaders facilitated internalizing regulations at the employee level through positive modeling. This approach increased employee motivation; consequently increasing engagement, well-being, and performance. Besides, authentic leaders significantly enhance employee engagement in the following ways: by providing opportunities to their followers for development; by offering autonomy to their followers (an essential factor of engagement) (Markos & Sridevi, 2010); by giving incentives that motivate and encourage subordinates to engage in their job (Aboramadan et al., 2021). Many scholars have examined [and found support for] the mediating effect of work in the association between authentic leadership and different outcomes, for example, creativity performance, career satisfaction, and organization performance (Aboramadan et al., 2021; Chaudhary & Panda, 2018). In parallel, management researchers agree that employee engagement contributes to employee satisfaction, commitment, and performance (Boukenenoghe et al., 2022; Suhartanto & Brien, 2018). Based on the above discussion, it is safe to assume that job engagement inhibits the potential to explain the relationship between authentic leadership and project success, as hypothesized below.

**Hypothesis 2:** PsyEmp mediates the relationship between authentic leadership and project success.

**The Role of Job Engagement in the Authentic Leadership-Project Success Nexus**

Job engagement, also referred to as employee or work engagement (Bates, 2004; Richman, 2006), has become an important topic of debate and research among practitioners, academic researchers, and governments in the past few decades (Bal et al., 2013; Saks, 2006). Schaufeli et al. (2002, p. 74) described work engagement as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption.” Engaged employees are characterized as individuals that are more diligent (vigor), more attached to their job task (dedication), and more drowned in their work absorption (Chughtai & Buckley, 2011; Rich et al., 2010). Kahn (1990) added that work engagement could be captured in three ways: (i) physical—leaders can assess whether [or not] employees are physically active in the workforce; (ii) emotional—emotional engagement enables employees to attach meaning to their work and atmosphere around them (Saks, 2006, p. 602); (iii) cognitive—cognitive component develops employee mindfulness about their official role at the workplace (Ganuthula & Sinha, 2019). Burnout and engagement are considered as opposite concepts (Schäufeli & Bakker, 2004; Schäufeli et al., 2002). Individuals showing greater engagement in their tasks display deep attachment to their work and organization (Schäufeli & Salanova, 2007). Despite that, empirical models on the antecedents, mediators, and outcomes are limited and scarce, even though it is recognized as a critical performance indicator (Christian et al., 2011; Macey & Schneider, 2008), especially in the project management literature. Factors of work engagement have become vital for organizations because disengaged employees can significantly increase organizations or project costs (Matthews et al., 2018).

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**Hypothesis 3:** Job engagement mediates the relationship between authentic leadership and project success.

**The Serial Mediation Effect of PsyEmp and Job Engagement**

There are several reasons to believe that PsyEmp and job engagement are intertwined. In different studies, the former has been used as a vital antecedent of job engagement in two and four-dimensional PsyEmp models (Bhatnagar, 2012). Mathieu et al. (2006) explained that PsyEmp is the experience of responsibilities and authority, important determinants of job engagement (Macey & Schneider, 2008). PsyEmp also incites persistence, initiative effort, and behavioral engagement among followers (Macey & Schneider, 2008; Spreitzer, 1995). As psychologically empowered groups enjoy more autonomy in their job, they become more effective in realizing groups success (Kirkman & Rosen, 1999). PsyEmp plays a vital role in developing the understanding among followers that their work is more impactful and meaningful (Khan, Jaafar et al., 2020). With PsyEmp contributing to several employee resources (e.g., confidence, motivation, control, work satisfaction, and job engagement) (Wang & Lee, 2009), its positive impact on project success seems plausible. Christian et al. (2011) argued that job engagement entails motivational components representing the active service of individual resources toward the work or a task. Job engagement becomes more critical in some situations. For instance, individuals posted on international projects in different countries need high engagement support while adjusting to the new working environment and maintaining performance levels (Hemmasi & Downes, 2013; Vromans et al., 2013).

While some studies have reported a significant positive link of authentic leadership with PsyEmp (Shapira-Lischinsky & Tsemach, 2014) and job engagement (Joo et al., 2019), others suggest that job engagement significantly
increases project success (Maddison Warren, 2016). Authentic leaders are different from other leadership types in accommodating, acknowledging, prioritizing, and integrating the practical needs of individuals, teams, organizations, and cultures. These leaders are known for demonstrating high resilience and standing firm against organizational views and pressures when helping employees to achieve their goals autonomously (Begley, 2001). The balanced processing and relational transparency of authentic leaders lend more autonomy and accelerate the development of PsyEmp among followers (Walumbwa et al., 2008). Thus, followers start believing that they are essential and valuable to their organization, making them more optimistic about their task, organization, and the future (Wang et al., 2021). At the same time, the sense of autonomy (due to PsyEmp) allows followers to be more engaged in their job (Aggarwal et al., 2020). In short, it is logical to believe that authentic leaders enhance followers’ PsyEmp (Khan, 2020) that incites them to engage in their work (Khan, Javed et al., 2020; Oh et al., 2018) to increase the chances of project success (Khan, 2020; Latif et al., 2020).

**Hypothesis 4:** The association between authentic leadership and project success is serially mediated by PsyEmp and job engagement.

**Methodology**

**Sample and Procedures**

With the country’s capital home to many software firms, the technology sector has introduced new trends and ideas. There has been steady growth in the software sector of Pakistan in the past few years. As per the Pakistan Software Export Board (PSEB), the software industry size is around USD 6.5 billion, predicted to increase by 3.5% in the coming 5 years. The domestic software market is predominantly export-driven. Yet, the industry heavily relies on the imported latest services and technologies. Between 2018 and 2019, the software exports of Pakistan comprised around USD 5 billion, approximately 8% above the last year. The software sector of Pakistan holds a vital position in the global markets due to the existence of well-known software brands from the United Kingdom, United States, Spain, Germany, and China (Pakistan-Country Commercial Guide, International Trade Administration, n.d.). In Pakistan, software houses have paid marginal attention to employee concerns related to job security, salary, perks incentives, motivation, ownership, loyalty, team building, ethical values, open communication, leadership styles, skill development, dignity, and respect. With management operations shrouded with unnecessary secrecy, the prevailing lack of trust and dialog among employer-employee and employee-employers have resulted in high turnover rates, non-compliance with ethical codes, and cases of employees stealing or leaking information (Sajid et al., 2008). For sustainable growth of the industry and its global expansion, new management approaches are needed to engage and retain knowledge workers, value talent, enhance employee productivity, improve work quality and environment, and make employees feel more respected, valued, and affiliated (cf. Raziq et al., 2018; Sajid et al., 2008). Testing the current leadership model is an attempt in the same direction. Data were collected from software industry professionals enrolled in different courses in different universities of Islamabad, Pakistan. These respondents had more than 2 years of project-related experience in the software sector. A total of 394 survey questionnaires were distributed. Academic references with postgraduate research experience administered the survey. After excluding 51 survey instruments with missing information, 343 usable questionnaires were extracted. The response rate was 87%. Due to legal restrictions imposed by the academic institutions, the following demographic information of the participants was disclosed.

Table 1 shows the participants’ demographics.

Moreover, data were analyzed using SPSS 26.0 and MPlus Editor 8.1. Econometricians and social science researchers consider structural equation modeling (SEM) an influential multivariate testing methodology for causal modeling (Reisinger & Mavondo, 2007). The current study adopted path analysis to test causal paths hypothesized in this study. In the MPlus Editor 8.1, path coefficients and model fit are tested using the Maximum Likelihood Estimation (MLE) approach.

**Ethics Statement**

All potential procedures were adhered to safeguard compliance with national and international ethical standards. All procedures in this study involving human participants comply in strict accordance with the Belmont Report, and Nuremberg...
Confirmed Factor Analysis and Model Goodness

Table 4 shows the confirmatory factor analysis (CFA) and model goodness outputs. CFA is the most appropriate statistical tool for testing scales and the structure of factors (Holgado-Tello et al., 2010). A base model (BM) was compared with competing models (Model 1–Model 6). As per the commonly accepted standards, CMIN/DF= 1 to 3; root mean square error of approximation (RMSEA) ≦ 0.08; standardized root means square (SRMR) ≦ 0.08; comparative fit index (CFI) ≦ 0.9 (Hayes, 2013). The fitness indicators of the BM, including the RMSEA, SRMR, and CFI, were superior and exceeded the threshold standard, compared to Model 1 to Model 6. Also, the BM reflected the lowest AIC and BIC values, while the AIC penalized the more complex models (i.e., Model 1–Model 6; see for review, Burnham et al., 2011).

Hypotheses Testing

Table 5 displays the summary of the results of the hypotheses testing: direct and indirect effects results. Figure 2 presents the empirical model based on the results of the four hypotheses. As anticipated, the results supported hypothesis1 by showing a significant and positive relationship between authentic leadership and project success, as evident by the $b=0.209, 95\% CI=[0.092, 0.327]$, $p<.001$. As predicted in hypothesis 2, the results corroborated the mediating effect of PsyEmp in the relationship between authentic leadership and project success, where $b=0.134, 95\% CI=[0.064, 0.204]$, $p<.01$. Third, the current estimates confirmed the mediating effects of job engagement in the authentic leadership-project success nexus ($b=0.089, 95\% CI=[0.045, 0.141]$, $p<.01$), as hypothesized (H3). Finally, the current results confirmed the serial-mediation effects of PsyEmp and job engagement in the link between authentic leadership and project success, where the indirect path coefficients were significant, that is, $b=0.063, 95\% CI=[0.032, 0.102]$, $p<.01$. As the direct path and indirect paths between authentic leadership and project success were significant, it was concluded that PsyEmp and job engagement partially mediated the relationship between authentic leadership and project success.

Discussion

The main findings are discussed hereafter. First, the results showed that authentic leadership positively influenced project success in the software firm of Pakistan. This finding adds empirical foundations to prior beliefs that project success in the software industry could be accomplished through the leadership style (cf. Aga et al., 2016; Bhatti et al., 2021; Khan, Jaafar et al., 2020; Raziq et al., 2018). These researchers persist that leadership style plays an instrumental role in driving employee motivation and ensuring the success of software projects. Second, this result supports prior notions that project leaders...
Table 2. Reliability and Validity Statistics.

| Variables | Constructs | Factor loading | SE  | CR    | AVE | CR   | Cronbach's α |
|-----------|------------|----------------|-----|-------|-----|------|---------------|
| AL        | AL1        | 0.774          | 0.022 | 34.918** | 0.671 | 0.97 | .969          |
| AL       | AL2        | 0.789          | 0.021 | 37.688** |       |      |               |
| AL       | AL3        | 0.786          | 0.021 | 37.102** |       |      |               |
| AL       | AL4        | 0.845          | 0.016 | 52.088** |       |      |               |
| AL       | AL5        | 0.848          | 0.016 | 54.049** |       |      |               |
| AL       | AL6        | 0.869          | 0.014 | 63.312** |       |      |               |
| AL       | AL7        | 0.863          | 0.014 | 60.42**  |       |      |               |
| AL       | AL8        | 0.86           | 0.015 | 58.623** |       |      |               |
| AL       | AL9        | 0.851          | 0.016 | 54.884** |       |      |               |
| AL       | AL10       | 0.685          | 0.029 | 23.358** |       |      |               |
| AL       | AL11       | 0.855          | 0.015 | 56.122** |       |      |               |
| AL       | AL12       | 0.832          | 0.018 | 46.406** |       |      |               |
| AL       | AL13       | 0.838          | 0.017 | 49.329** |       |      |               |
| AL       | AL14       | 0.813          | 0.019 | 42.175** |       |      |               |
| AL       | AL15       | 0.782          | 0.022 | 35.246** |       |      |               |
| AL       | AL16       | 0.798          | 0.021 | 38.326** |       |      |               |
| PE        | PE1        | 0.803          | 0.02  | 40.009** | 0.637 | 0.955 | .954          |
| PE        | PE2        | 0.802          | 0.02  | 39.754** |       |      |               |
| PE        | PE3        | 0.836          | 0.017 | 48.267** |       |      |               |
| PE        | PE4        | 0.778          | 0.022 | 35.011** |       |      |               |
| PE        | PE5        | 0.815          | 0.019 | 42.222** |       |      |               |
| PE        | PE6        | 0.84           | 0.017 | 49.935** |       |      |               |
| PE        | PE7        | 0.824          | 0.018 | 44.829** |       |      |               |
| PE        | PE8        | 0.736          | 0.026 | 28.654** |       |      |               |
| PE        | PE9        | 0.891          | 0.013 | 69.156** |       |      |               |
| PE        | PE10       | 0.709          | 0.028 | 24.986** |       |      |               |
| PE        | PE11       | 0.709          | 0.028 | 25.027** |       |      |               |
| PE        | PE12       | 0.817          | 0.019 | 43.032** |       |      |               |
| JE        | JE1        | 0.769          | 0.023 | 33.406** | 0.654 | 0.971 | .97           |
| JE        | JE2        | 0.738          | 0.026 | 28.936** |       |      |               |
| JE        | JE3        | 0.772          | 0.022 | 35.412** |       |      |               |
| JE        | JE4        | 0.809          | 0.019 | 43.431** |       |      |               |
| JE        | JE5        | 0.818          | 0.018 | 46.023** |       |      |               |
| JE        | JE6        | 0.813          | 0.019 | 41.722** |       |      |               |
| JE        | JE7        | 0.829          | 0.018 | 45.942** |       |      |               |
| JE        | JE8        | 0.848          | 0.015 | 55.225** |       |      |               |
| JE        | JE9        | 0.86           | 0.014 | 62.226** |       |      |               |
| JE        | JE10       | 0.866          | 0.014 | 63.608** |       |      |               |
| JE        | JE11       | 0.857          | 0.014 | 60.212** |       |      |               |
| JE        | JE12       | 0.877          | 0.012 | 70.227** |       |      |               |
| JE        | JE13       | 0.867          | 0.013 | 64.247** |       |      |               |
| JE        | JE14       | 0.841          | 0.016 | 53.861** |       |      |               |
| JE        | JE15       | 0.802          | 0.019 | 41.73**  |       |      |               |
| JE        | JE16       | 0.781          | 0.021 | 37.198** |       |      |               |
| JE        | JE17       | 0.732          | 0.025 | 29.236** |       |      |               |
| JE        | JE18       | 0.638          | 0.032 | 19.868** |       |      |               |
| PS        | PS1        | 0.667          | 0.031 | 21.569** | 0.601 | 0.954 | .955          |
| PS        | PS2        | 0.707          | 0.028 | 25.175** |       |      |               |
| PS        | PS3        | 0.714          | 0.027 | 26.006** |       |      |               |
| PS        | PS4        | 0.753          | 0.024 | 30.851** |       |      |               |
| PS        | PS5        | 0.753          | 0.024 | 30.821** |       |      |               |
| PS        | PS6        | 0.759          | 0.024 | 31.674** |       |      |               |
| PS        | PS7        | 0.755          | 0.024 | 31.033** |       |      |               |
| PS        | PS8        | 0.716          | 0.027 | 26.216** |       |      |               |
| PS        | PS9        | 0.856          | 0.016 | 55.188** |       |      |               |
| PS        | PS10       | 0.811          | 0.02  | 41.157** |       |      |               |

(continued)
Table 3. Mean, Standard Deviation, Pearson's Correlations, and Validity Statistics.

| Construct dimensions | M    | SD   | AL   | PE   | JE   | PS   |
|----------------------|------|------|------|------|------|------|
| AL                   | 3.786| 0.726|      |      |      |      |
| PE                   | 3.705| 0.698| 0.549*|      |      |      |
| JE                   | 3.764| 0.709| 0.502**| 0.54**|      |      |
| PS                   | 3.764| 0.762| 0.495**| 0.522**| 0.539**|      |

Note. N = 343. AL = authentic leadership; PE = psychological empowerment; JE = job engagement; PS = project success; AVE = average variance extracted; CR = composite reliability.

* p < .01. ** p < .001 (two-tailed).

Table 4. Model Goodness and Fitness Comparison.

| Models                 | CMIN/DF | RMSEA | SRMR | CFI   | TLI   | AIC    | BIC    |
|------------------------|---------|-------|------|-------|-------|--------|--------|
| Baseline model         | 1.423726| 0.035 | 0.043| 0.966 | 0.963 | 34208.08| 35140.65|
| Model 1                | 3.613719| 0.087 | 0.142| 0.787 | 0.772 | 37823.07| 38736.45|
| Model 2                | 4.220633| 0.097 | 0.163| 0.738 | 0.719 | 38825.69| 39739.07|
| Model 3                | 4.200829| 0.097 | 0.107| 0.74  | 0.721 | 38792.97| 39706.35|
| Model 4                | 4.111169| 0.095 | 0.117| 0.747 | 0.729 | 38644.86| 39558.24|
| Model 5                | 2.599352| 0.068 | 0.102| 0.87  | 0.861 | 36146.14| 37067.19|
| Model 6                | 3.223747| 0.081 | 0.135| 0.819 | 0.806 | 37176.39| 38097.44|

Note. BM (AL, PE, JE, PS); Model 1 (AL + PE, JE + PS); Model 2 (AL + JE, PE + PS); Model 3 (AL + PE + JE, PS); Model 4 (AL + PE + PS, JE); Model 5 (AL + PE, JE, PS); Model 6 (AL + JE, PE, PS). CMIN/DF = 1 to 3; RMSEA and SRMR ≤ 0.08; CFI ≥ 0.9; TLI ≥ 0.9. “+” Merge into one factor. AL = authentic leadership; PE = psychological empowerment; JE = job engagement; PS = project success; CMIN/DF = minimum discrepancy per degree of freedom; AIC = Akaike information criterion; BIC = Bayesian information criterion; RMSEA = root mean square error of approximation; SRMR = standardized root mean square; CFI = comparative fit index; TLI = Tucker-Lewis’s index.

Table 5. Model Outputs: Summary of Direct and Indirect Effects.

| Hypotheses with indirect and direct effects | Estimate | SE    | T     | p     | BC 95% CI |
|-------------------------------------------|----------|-------|-------|-------|-----------|
| Direct effects                            |          |       |       |       |           |
| AL → PE                                   | 0.549    | 0.067 | 8.192 | <.001 | 0.413 0.675|
| AL → JE                                   | 0.295    | 0.051 | 5.731 | <.001 | 0.195 0.396|
| H₁: AL → PS                               | 0.209    | 0.059 | 3.55  | <.001 | 0.092 0.327|
| PE → JE                                   | 0.378    | 0.056 | 6.763 | <.001 | 0.267 0.485|
| PE → PS                                   | 0.244    | 0.07  | 3.479 | <.001 | 0.104 0.377|
| JE → PS                                   | 0.302    | 0.068 | 4.449 | <.001 | 0.17 0.432|
| Indirect effects                          |          |       |       |       |           |
| *H₂: AL → PE → PS                         | 0.134    | 0.039 | 3.461 | <.001 | 0.064 0.204|
| *H₃: AL → JE → PS                         | 0.089    | 0.027 | 3.303 | <.001 | 0.045 0.141|
| **H₄: AL → PE → JE → PS                   | 0.063    | 0.019 | 3.253 | <.001 | 0.032 0.102|

Note. BC 95% CI refers to the bias-corrected 95% confidence interval; Estimate refers to the effect estimate using 1,000 bootstrap samples; H₁ to H₄ represent the study hypotheses. AL = authentic leadership; PE = psychological empowerment; JE = job engagement; PS = project success.

*Denote mediation and **refers to serial mediation.
must exhibit authenticity to successfully implement the project (Khan, 2020; Ofori, 2008). Third, this finding validates previous claims that authentic leadership is a key to project success due to its favorable impact on team performance (Lyubovnikova et al., 2017). The character and personal integrity lie at the heart of authentic leadership. It affects the leader’s actions and decisions and influences their self and followers’ well-being (Avolio & Gardner, 2005). Fourth, this research has responded to earlier calls for complex and empirical leadership and project success frameworks (Bhatti et al., 2021; Khan, 2020; Latif et al., 2020; Raziq et al., 2018).

Fifth, the current results demonstrated that PsyEmp fully mediated the link between authentic leadership and project success, offering empirical support that PsyEmp is an important predictor of project outcomes (Khan, 2020). Psychologically empowered employees of authentic leaders perceiving autonomy in their task (Avolio & Gardner, 2005; Zhang et al., 2020) and feel inspired and dedicated to achieving the targeted goals of the project (Khan, Javed et al., 2020). Sixth, the present results indicate that job engagement positively mediated the association between authentic leadership and project success. Past studies suggest that authentic leadership may influence subordinates to engage in positive thinking and feeling through emotions (Avolio et al., 2004), yet there is a lack of empirical models on the mediating effect of job engagement in the authentic leadership-project success nexus. Thus, this study has established that job engagement plays a crucial role in realizing project success under authentic leadership. In short, employees are more committed to the success of the project in the presence of authentic leaders because they experience more PsyEmp and job engagement under their management, a view consistent with earlier concepts (Avolio & Gardner, 2005; Khan, 2020; Luthans & Avolio, 2003; Towsen et al., 2020).

**Theoretical Implications**

Some relevance of the current findings for the authentic leadership theory and research are discussed hereafter. First, in response to future directions in the authentic leadership theory (Brown & Treviño, 2006; Gardner et al., 2005), the present findings expand the literature by providing an alternate explanation to the influence exerted by authentic leaders on multiple factors (i.e., PsyEmp, job engagement, and project success) in a commercial context with limited, research and scarce literature, that is, software industry and project management (Dvir et al., 2002; Khan, 2020; Ofori, 2008).

Second, the findings broaden the current literature linking authentic leadership to social exchange theory by empirically demonstrating the reciprocal response of followers to the highly-valued social transactions (Keller & Dansereau, 1995) and relationships enabled by superior display of authentic leadership (Penger & Černe, 2014; Walumbwa et al., 2008). Third, the current empirical framework extends knowledge in a relatively new stream of research stressing the profound role of leadership in project management (Littman & Littman, 2019; Shenhar & &Dvir, 2007; Turner & Müller, 2005; Wang & Huang, 2006), especially in IT projects (Sheffield & Lemétayer, 2013; Thite, 2000). The findings empirically demonstrate employee cognitive decision-making process showing how they link authentic leadership qualities to PsyEmp and engage (sequential mediators) to achieve shared outcomes in the software projects.

**Practical Implications**

A few practical implications drawn from current findings are as follows. To begin with, the results call for promoting internalized moral perspectives, self-awareness, relational transparency, and balanced processing to enhance PsyEmp and job engagement among followers for project success. Project managers are encouraged to demonstrate strong transparency in their daily routine tasks, offer a positive self-development atmosphere for employees, and encourage subordinates to become part of the decision-making process for project success. Moreover, the current results suggest that authentic leaders significantly influence followers’ perception of cognitive empowerment at the workplace, contributing to job engagement and project success. This notion implies that authentic leadership strengthens followers’ beliefs about the meaningfulness and impact of their work while simultaneously assuring them about their competency and autonomy. Being aware of their fundamental values, project leaders openly and fearlessly exhibit their values. They display no fear in showing how their moral and ethical values fortifying their decisions promote transparency and integrity. Thus, the present results assert that managers should solicit and accommodate employees’ views, even if they disagree or challenge the personal viewpoint of the leader. They should actively explore, encourage, and value others’ viewpoints before decision-making. They should objectively evaluate the vast array of data and viewpoints when making decisions. These initiatives would enable managers to promote authenticity, enabling empowerment and job engagement, consequently increasing project success probabilities.

![Figure 2](https://example.com/figure2.png)

**Figure 2.** The structural model.

*\( p < .01 \), **\( p < .001 \).

...
and linking such decisions to the project’s goals would solicit augmented ownership of project outcomes. Also, software enterprises are expected to initiate leadership mentoring and training programs to promote authenticity at the workplace as these programs have proven effects on employee performance and attitudes (Dvir et al., 2002).

Congruent with the above, the study’s finding implies that project managers who show genuine care concerning their subordinates and value their concerns in terms of moral and ethical standards contribute to more engaging and empowering relationships at the workplace, a view consistent with earlier assertions (Walumbwa et al., 2010). When project leaders initiate a culture of bidirectional conversation about project members’ competencies and strengths and the way they could make a genuine difference, such behavior is more likely to nurture a high identification sense with the leaders, sentiments of empowerment, engagement, and increased chances of project success. With more input, resources, and autonomy, project members would be motivated to take more ownership and responsibility of the project, particularly when they perceive that their leaders are displaying overall fairness, balanced approach, trustworthiness, engagement, ethical standards, and authenticity (see Khattak et al., 2019 for more engagement and empowerment strategies).

Furthermore, the study established that although authentic leadership directly affects project success, the serial mediation mechanism (involving PsyEmp and job engagement) partially explains the favorable project outcomes of authentic leaders. This result implies that organizations should focus on: (a) developing and selecting leadership candidates demonstrating authentic attributes; (b) instigating development and training activities and programs aimed at enhancing authentic leadership (cf. Avolio & Gardner, 2005; Luthans & Avolio, 2003) and PsyEmp (cf. Avolio & Gardner, 2005; Luthans et al., 2007, 2008; Zhang et al., 2020). These initiatives could have a favorable influence on project outcomes. Through different PsyEmp improving techniques, project managers and enterprises could also trigger other positive outcomes, for example, work-related satisfaction, performance, happiness, and commitment (Luthans et al., 2005, 2007, 2008; Walumbwa & Schaubroeck, 2009; Youssef & Luthans, 2007). Additionally, the current results encourage the enterprises to develop aggressive programs and strategies to establish new educational institutions to nurture young and existing IT talent for the software development industry. Also, the domestic human pool should be sustained through short training programs and updated curriculums.

Limitations and Future Directions

A few limitations of this study are discussed for future research. First, the cross-sectional nature of the study limits drawing strong inferences regarding causality. Future research studies should target longitudinal and/or experimental research design to explain generalizable causal inferences. Second, this study is limited to project management professionals that restrict the generalizability of the research findings to other sectors. Thus, future studies can focus on other work contexts, cultures, sectors, and counties. Third, few characteristics of respondents, such as respondents’ gender, age, and experience, may act as confounders but have not been examined in our study. Future research should examine this impact as well. Fourth, the current study investigates only authentic leadership. Still, future research studies may investigate the linkage of different leadership styles such as smart leadership, spiritual leadership, and transitional leadership in the current model (Khan, Jaafar et al., 2020; Latif et al., 2020). Finally, exploring other moderating variables (pro-active personality, commitment, and culture) in the relationship would bring fresh insight.

Conclusion

The primary purpose of this study was to provide an alternate perspective on the vital role of authentic leaders in project success by explaining the effect of two unexplored mediators, that is, PsyEmp and job engagement. As per the current findings, employees in the software industry of Pakistan perceived that authentic leadership positively affected project success. Second, employees believed that authentic leaders were instrumental in inciting PsyEmp that contributed to their job engagement. Third, through a serial mediation effect, authentic leaders incite PsyEmp that enhances job engagement, increasing project success probability.

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