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**Will we rock teleworking? The impact of technology self-efficacy, IT openness and online communication attitudes on project's success.**

Márcia Santos Crespo

Master's Degree in Social and Organizational Psychology

Supervisor:

Doutor Aristides Ferreira, Associate Professor  
ISCTE - Instituto Universitário de Lisboa

October, 2021

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CIÊNCIAS SOCIAIS  
E HUMANAS

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Departament of Social and Organizational Psychology

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## **Acknowledgements**

This year was a great challenge for me. Starting with isolating myself at home thanks to COVID and ending with all projects I was lucky to embrace during this period. It wasn't for sure an easy year, it was hard to find an internship, hard to get participants, but I never thought of quitting. I'm very thankful for accomplishing all I've dreamt for this final year, having a great supervisor believing in my infinite ideas, and even more. If isn't enough, I joined two research projects alongside this dissertation process. I can say I lived inside online project teams and so this dissertation made a lot sense to be made while I was also a project member.

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## **Resumo**

Prevê-se que o teletrabalho tenha vindo para ficar, da mesma forma que a constante evolução tecnológica, o que obriga as pessoas a estarem preparadas para atualizar as suas competências continuamente. Para clarificar se membros de projetos estão confortáveis com o teletrabalho, esta investigação propõe compreender a associação entre autoeficácia tecnológica, um traço de personalidade (abertura às tecnologias), e as atitudes de comunicação online com fatores de sucesso do projeto percebidos. Este estudo quantitativo foi conduzido durante a pandemia enquanto a maioria dos colaboradores estavam sujeitos ao trabalho virtual obrigatório. Começa com a adaptação e validação de uma medida, para trazer as atitudes de comunicação online para o campo laboral. No estudo principal, os dados foram recolhidos recorrendo a um questionário de autorrelato, divulgado online a membros de projetos. A amostra conta com 289 participantes, a maioria trabalhando exclusivamente online (73%). Os resultados sugerem que se os membros de projetos acreditarem que podem utilizar tecnologias, estarão mais dispostos para as utilizar. Este modelo adiciona à literatura a importância que as atitudes perante a comunicação online, a autoeficácia tecnológica e a abertura às tecnologias têm no sucesso dos projetos no contexto do teletrabalho. Estes resultados podem alertar profissionais para a importância de considerar as crenças individuais de autoeficácia tecnológica dos membros das equipas, e não apenas a eficácia coletiva ou estritamente a eficácia dos gestores do projeto. São discutidas contribuições teóricas, implicações práticas com diretrizes para otimização do sucesso das equipas, limitações e direções para estudos futuros.

**Palavras-chave:** autoeficácia tecnológica, teoria do comportamento planeado, atitudes de comunicação online, abertura às tecnologias, sucesso do projeto

### **Categorias e Códigos de Classificação da APA:**

3650 Atitudes dos Colaboradores & Satisfação no Trabalho

3660 Comportamento Organizacional

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## **Abstract**

Telework is expected to prevail in the future and so is the constant technological evolution, which requires individuals to be able to update their competencies continuously. To clarify if project members are comfortable with telework, this research provides an understanding of the association technological self-efficacy (TSE), a situation-specific personality trait (openness to IT), and online communication attitudes have with perceived project success factors. This quantitative study was conducted during the pandemic while most employees had mandatory online work. It begins with a measure adaptation and validation, to bring attitudes towards online communication into the work field. For the main study, data was collected through a self-report survey distributed online to members of projects. The sample has 289 participants, mostly working exclusively online (73%). Results suggest that if project members believe they can use technologies, they will be more willing to use them. Our research model contributes to the existing literature by emphasizing the importance attitudes toward online communication, TSE and openness to IT have on the success of a project while teleworking. The results of this research may bring awareness to professionals for the importance of considering team member's individual technological self-efficacy and not only team's collective efficacy nor strictly PM's efficacy. Theoretical contributions are discussed, together with practical implications with guidelines to optimize team's success. Limitations and directions for future research are presented too.

**Keywords:** Technological self-efficacy, planned behavior theory, online communication attitudes, openness to IT, project success

### **APA Classification Categories and Codes:**

3650 Personnel Attitudes & Job Satisfaction

3660 Organizational Behavior

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### **Glossary of Acronyms**

AMOS	Analysis of MOment Structures
CSE	Computer Self-Efficacy
CSF	Critical Success Factors
MOCA	Measure of Online Communication Attitude
MOCAT	Measure of Online Communication Attitude - Telework
PA	Path Analysis
PBC	Perceived Behavioral Control
PCA	Principal Component Analysis
PIIT	Personal Innovation in the domain of Information Technology
PM	Project Manager
PMI	Project Management Institute
PSE	Perceived Self-Efficacy
R&D	Research and Development
SEM	Structural Equation Modeling
SE	Self-Efficacy
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TSE	Technological Self-Efficacy
UA	Uncertainty Avoidance

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## **Introduction**

Telework was our best ally when we had to be apart from each other during pandemic times. With a closer human-technology interaction new research questions arise, especially in the work field, where everything changed. Telework existed before, was studied before, but became a reality for the first time for most people recently. With this newly experience, people started to understand its advantages, namely more flexibility and work-life balance, so that now it's almost certain that from now on work will be divided between remote and on-site contexts (Deloitte, 2021). In some cases, these changes were exacerbated, for instance, at the end of 2020 was announced that "Deloitte will close four of its 50 British offices as it reviews its real estate portfolio in the coronavirus pandemic but will retain the staff on work-from-home contracts." About 500 employees from the company are going to telework permanently, "forever" (Reuters, 2020). This is the proof that work is already changing for good and it's not just adapting because or for the pandemic situation. In fact, telework is expected to prevail in the future (Abrams, 2019; Deloitte, 2021) but despite the advantages that have been discussed, other authors point out strong disadvantages, for both employees and for employers. Before debating the consequences of teleworking, it's crucial to clearly understand it's antecedents, by clarifying employee's beliefs regarding their working conditions. It's our duty as psychologists to understand its challenges to simplify and improve workers' experience.

Despite not being considered as a STEM discipline, Psychology intersects with almost every discipline, since disciplines are composed by humans and humans interact. In multidisciplinary teams is essential to have psychologists to facilitate communication among members. In fact, "psychological knowledge is essential to scientific and technological innovation", as "technology requires the use of human operators, and thus understanding human capacities and limits is essential to implementing technological advances" (Bray, 2010, p.13)

Regarding the constant technological evolution, what is trendy one day, can quickly became outdated months later and the same happens to employees' skills (Shakina et al., 2021), which undermines our understanding of specific technological skills. And to keep up with a world changing so quickly, individuals must be able to develop, upgrade, and reform their competencies continuously, regulating the cognitive, motivational, affective, and social determinants of their functioning (Bandura, 2009). Meaning that the only factor that stays constant is their mechanism to stay able to believe they're able to develop new skills, their self-efficacy appraisals. Despite reflecting today, these findings are nothing new, Bandura (1995)

launched his book *Self-Efficacy in Changing Societies*, and most of what he refers on that book reflects on the situation we've been living since the pandemic begun. Current situation has triggered the technological transformation and subsequent need to adapt and keep updated. As the author argues "the rapid pace of technological change and accelerated growth of knowledge are placing a premium on capability for self-directed learning" (p.17). If not, skills can become outdated quickly. So, adaptive skills and benefits came from one's sense of personal efficacy.

As if technology revolution wasn't enough, organizations are also changing the way projects are organized. Organizations are progressively choosing more to structure their work into projects (Kennedy et al., 2020). Project structuring involves a timely planning of factors such as human resources, budget goals, time goals and scope goals that are needed to ensure the aimed results are accomplished, given the constant modification in the ways of working in organizations (Cahill, 2020). As people are the basis of the project, even if we have the same conditions, the same resources and goals for a project but in two teams with different people, we will certainly come up with different project solutions (Chiocchio et al., 2015). The big variable on project performance is people and that is why it is important to analyze individual's beliefs and attitudes within the project scope. Are people really open to experience new types of technology and developing new tech skills? Do people actually perceive themselves as good technology users? Are they having positive attitudes towards online communication while working online in a project?

To understand these issues, it's important to remember that behavior is guided by intentions and based on Ajzen's theory of planned behavior (1991, 2020) there is a strong association between intentions and behavior, though this relation can be influenced by other variables. In this study we intend to understand what the contributions of online communication attitudes, technological self-efficacy, and openness to IT towards project's success are. Essentially, our priority is to understand individuals' self-efficacy beliefs towards project's tasks, their attitudes toward online communication in the context of working online in project, their intentions to use technology and how these factors contribute to project success.

The current study proposes bringing attitudes towards online communication to the work field. Until now, literature has been mostly focused on understanding online communication attitudes in informal communication (Brody, 2018; Denker et al., 2018; Gioia & Boursier, 2021; Ledbetter, 2009). The current research aims to go beyond and study online communication attitudes in a formal context, telework use in projects. Moreover, the study tries to overstep the current focus on project managers beliefs regarding their competences by filling the gap of understanding all members beliefs. Particularly, takes both Ajzen and Fishbein and

Bandura's models to telework and project management literature, by focusing on technological self-efficacy and openness to IT project members' beliefs. Since there's no evidence relating self-efficacy with project performance for the team members, nor particularly for TSE, it fills an existing gap on literature.

To sum up, the main goal is to provide a comprehensive understanding of the association of TSE, a situation-specific personality trait (Openness to IT) and attitudes toward online communication with perceived project success factors.

Finally, to summarize how this dissertation is structured, it begins with the theoretical framework where each of the constructs in this study will be explained, exploring their roots, related themes and how they've been understood by researchers. Next, study 1 is dedicated to one of the constructs, online communication attitudes. As it's a recent and poorly studied variable in terms of organizational behavior, we decided to make an adaptation to the telework context and validate a Portuguese version of it. On the main study methods and results are presented. And to conclude, results are discussed, together with theoretical and practical contributions, limitations, directions for future research and final conclusions.

## **Theoretical Framework**

The rapid pace of technological change and accelerated growth of knowledge are placing a premium on capability for self-directed learning. As good schooling fosters psychosocial growth and to prepare students for their future works, formal education must equip students with intellectual tools, self-efficacy beliefs and intrinsic interests that remain through life. For that reason, most research on self-efficacy belief has been focused on students' beliefs in their efficacy to learn, teachers' beliefs in their efficacy to promote learning (Bandura, 1995).

However, good schooling does not happen always, there are people that remain with the belief they're just not good with technologies until they arrive at the work world. As stated on the previous century, "the modern workplace requires efficacious individuals with versatile cognitive and self-management skills that enable them to master changing technologies throughout their vocational careers" (Bandura, 1995, p.22). This statement remains a reality these days.

As pointed in the book *The psychology and management of project teams* there is a need to better understand the linkages between individual-level factors with organizational-level factors as project management scholars are largely unaware of the work on teams in organizational psychology and seem to not worry about connections between organizational tasks and individual skills. Still, organizational capabilities need to be viewed in light of individual qualities (Chiocchio et al., 2015). Therefore, it's essential to study beliefs behind the usage of technology for working in projects because there's no research on project management area regarding individuals' psychological beliefs and attitudes.

### **Theory of Planned Behavior**

Theory of planned behavior (TPB) was created by Ajzen (1991) and it's an extension of theory of reasoned action (TRA), by Ajzen and Fishbein (1975). To understand the differences between the two, Madden and colleagues (2016) made a comparison of TRA and TPB and concluded that TRA is applicable when the behavior is under individual's volitional control, when this doesn't happen, TPB is superior predicting behavior. This means that TRA only explains behaviors which people believe that they can execute whenever they are willing to do so. Since that's not always true, Ajzen (1991) extended his model to TPB by adding a third behavioral determinant on the previous model: *perceived behavioral control* (PBC).

TPB states that human behavior is guided by three considerations that shape individual's intentions: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 2002; Ajzen & Fishbein, 1975)

*Behavioral beliefs* or *attitudes* are beliefs about the likely consequences or other attributes of behavior (Ajzen 2002). The authors propose to use the term *attitude* referring the evaluation of an object, concept, or behavior along a dimension of favor or disfavor, good or bad, like or dislike, which differs from affect. They state affect, contrasting with attitude, includes generalized mood states without a well-defined object of reference. However, they recognize that attitudes may be influenced by moods and emotions (Ajzen & Fishbein, 2000).

*Normative beliefs* result in perceived social pressure or subjective norm, they focus on the perceptions one's have about the normative expectations of other people (Ajzen, 2002 Ajzen, 2012). These perceptions are determined by the total set of readily accessible normative beliefs concerning the expectations of important referents people (individual or group). There are two sources of normative beliefs. Norms can be based on what is expected from us, by being told or by inferring what important others want us to do (injunctive norms) or based on the observed or inferred actions of those important social referents (descriptive norms). Therefore, unlike attitudes, they depend on the interaction with others (Ajzen, 2012).

*Control beliefs*, or *perceived behavioral control* (PBC) relate with the presence of factors that may further or hinder performance of the behavior (Ajzen 2002). According to Ajzen (1991) PBC refers to people's perception of the ease or difficulty of performing a behavior. The author clarifies the difference between PBC and the notion of perceived locus of control, as the last one is a generalized expectancy that remains stable across different behaviors, whereas PBC can, and usually does, vary across situations and actions. So, if people believe their outcomes are determined by their own behavior (internal locus of control), it doesn't mean they believe they can perform certain behaviors. For example, despite having an internal locus of control and working hard, at the same time people may believe that their chances of becoming a rich person are very small (low PBC).

TPB also states that *intentions* guide behavior. Intentions include motivational factors that influence behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, to perform the behavior. Generally, the stronger the intention to engage the behavior, the more likely its performance should be (Ajzen, 1991). According to Fishbein and Ajzen (1975) there are three conditions influencing the degree of the relationship between intentions and behavior: the degree to which the measure of intention and the behavioral correspond with respect to their levels of specificity; the constancy of intentions between time of measurement and performance of the behavior and the degree to which carrying out the intention is under the volitional control of the individual, meaning the degree of someone being able to decide if has the will to perform the behavior or not. To

measure intentions, when using TPB, it is assumed that individuals' implicit or passive intentions are accessible in memory, and can be brought into conscious awareness, thus it's possible to measure them with self-reports (Ajzen & Dasgupta, 2015).

TPB has been successfully used to explain innumerable behaviors, in a great variety of domains (Ajzen, 2020). Recently authors used it to explain intention to use technology (Teo & Lee, 2010; Watson & Rockinson-Szapkiw, 2021), green consumer behavior (Nimri et al., 2020; Sharma et al., 2020), ecological behavior (Passafaro et al., 2019) and behavioral intention to adopt smart grids (Perri et al., 2020). Concerning changing circumstances, Jimmieson and colleagues (2008) had studied TPB in organizational change processes and recommended TPB model as suitable theory to understand employee responses to change. Since change is a part of worklife today, we believe TPB will enable us to understand beliefs regarding technology use and also predict its impact on project work success.

In the current study we're not tackling normative beliefs since normative beliefs relate with other's expectations and several studies have pointed out its inconsistency (Armitage & Conner, 2001; Lee et al., 2020; Mathieson, 1991; Nguyen et al., 2019). On a study using TPB to predict individual's intention to use an information system, attitudes, and *perceived behavioral control* (PBC) were confirmed as predictors but not subjective norms. The author suggests that social pressure seem to not influence individual's decisions to use spreadsheet, while attitude had a slightly stronger effect on intention when compared to PBC (Mathieson, 1991). In a recent meta-analysis on TPB to predict knowledge sharing behavior, attitude has the strongest relationship with intention, followed by perceived behavior control and subjective norms have the weakest (Nguyen et al., 2019). Also, recently authors used TPB to understand the use of mediation in project disputes and found that only PBC and attitudes can predict significantly behavioral intentions, subjective norms had no significant impact (Lee et al., 2020). Other researchers suggest that normative variables on TBP are weakening the model and some work on them needs to be done (Armitage & Conner, 2001). However, in the case of entrepreneurial intentions studies show that subjective norms have the strongest effect on intention (Kautonen et al., 2015).

Our priority is to understand individuals' self-efficacy beliefs towards project's tasks, their attitudes toward online communication in the context of working online in project, their intentions to use technology and how these factors contribute to project success.

### ***PBC and Self-Efficacy***

PBC is based on people's perceptions of their ability to perform a given behavior, was built on *self-efficacy* construct by Bandura. According to Ajzen (2020), there is no conceptual difference between perceived behavioral control and self-efficacy, they are alike. In fact, this control beliefs are factors considered by individuals that can facilitate or inhibit their performance of behavior, such as needed skills and opportunities, time and money, cooperation by others and so on. They are assumed to produce an overall level of perceived control or what Bandura calls *self-efficacy* (Ajzen & Dasgupta, 2015). The difference between self-efficacy in social cognitive theory and in TPB is that the role of perceived behavioral control goes beyond its effect on perseverance, is a general model valid for any behavior (Ajzen, 2012). So, we can assume that self-efficacy is one determinant of behavior.

Ajzen (2002) created the concept of PBC, clarifying that the term “perceived behavioral control” should be read as “perceived control over performance of a behavior”, and it’s based on perceived self-efficacy (PSE) construct by Bandura. Bandura (1997) conceptualized perceived self-efficacy as an allude to “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p.3). Ajzen (2002) sustains that the PBC and PSE are similar, and both relate to individual’s perceived ability to perform a behavior or sequence of behaviors. Also, there is evidence that sustains self-efficacy as the best predictor of intention PBC factors research (Trafimow et al., 2002). However, Ajzen (2002) points that the general definition of perceived self-efficacy beliefs “differs greatly from perceived behavioral control, which is focused on the ability to perform a particular behavior” (p. 667). From my perspective, the distinction is only lexical as both have the same concern after all. Since there’s a clear problem in psychology theory bridging (Leaper, 2011), we believe that on TPB makes much more sense to bridge Bandura’s theory and not create another name for the same construct as Ajzen (2002) did. So, in this study there’s no PBC designation, but only PSE inside the TPB model.

### **Self-Efficacy**

Individual’s self-efficacy (SE) beliefs are core to predict behavior (Ajzen, 2020; Bandura, 1997; Trafimow et al., 2002). Self-efficacy beliefs have also been shown to be the one of best predictors of individual performance in several study-fields for over 30 years (Blomquist et al., 2016).

Starting by the roots, according to Bandura (1978) perceived self-efficacy can shape one’s performance by efficacy expectations. Which are convictions that one can successfully execute

a required behavior, a task, to produce the outcomes. These efficacy expectations, are the primordial determinant of people's choice of events, but not alone. Along with appropriate skills and incentives, they can determine one's quantity of effort expended and the period investing effort to deal with stressful situations (Bandura, 1978). These beliefs are so important that the author "beliefs of personal efficacy are the key of human agency" (Bandura, 1997, p.3). As if individuals don't believe they have the power to produce results, they will not be able to make things happen. So, it's this belief of being able to make things happen (SE) that makes us act, in other words, produce a certain behavior.

There are some related constructs that are commonly confused with SE and it's imperative to distinguish them. Self-concept is a complex view of oneself that is presumed to be formed by direct experiences and evaluations adopted from significant others. Therefore, while perceived SE is related with judgements of personal capability, self-esteem relies on judgments of self-worth. It's also important to clarify the difference between perceived SE and locus of control. Locus of control concerns beliefs about whether actions affect outcomes, while perceived SE concerns beliefs about whether one can produce certain actions (Bandura, 1997).

SE it's considered the primary determinant of emotional and motivational states and behavioral change (APA, 2020). However, behind SE, to reach expectations of personal efficacy, there are four great sources of information: performance accomplishments, vicarious experience, verbal persuasion, and physiological states (Bandura, 1978). The first are based on personal mastery experience and the idea that successes raise mastery expectations whether repeated failures lower them; particularly if the mishaps occur early during events. The second, vicarious experience, is based on social comparisons, it's not about one's capabilities, but having another person as a role-model, observing others having success, increase one's perception of self-efficacy. The third, verbal persuasion, relies on suggestion, verbal suggestions are implemented to lead people believing they can do it (e.g., feedback), easy source but easy to extinguish with disconfirmation experiences too. Finally, emotional arousal, is based on states of psychological arousal, from which people make attributions of their efficacy expectations, wherein usually high arousal results on performance decreasing.

In the organizational context, employees must rely on at least one of these four SE antecedents to execute their tasks (Bandura, 2009). That's why their managers should verify if every employee has the necessary resources to perform their tasks and if not, which source of information is more adequate for each person. For that, all these four sources should be considered when planning employee or team members tasks, to guarantee that everyone has

trust in their skills in order to perform well and make the project succeed. Authors have studied the impact self-efficacy has in the organizational context:

“Unless employees believe they can gather up necessary behavioral, cognitive, and motivational resources to successfully execute the task in question (whether working on a product/service or developing a strategic plan), they will most likely dwell on the formidable aspects of the project, exert insufficient effort, and, as a result, fail (Luthans & Stajkovic, 1998, p.63)

Beyond its importance in the organizational context, SE is a dynamic construct that changes over time with the acquirement of new information and experiences (Bandura, 1978). This dynamic feature increases difficulty for managers to supervise, unless they keep continuously providing feedback and training to employees (Dimotakis et al., 2017; Karl et al., 1993). Several authors have found that training has a positive influence on computer self-efficacy, as familiarity leads to more self-efficacy (Tai, 2006; Torkzadeh et al., 2010). This is particularly important nowadays, we all live stressful times, there's no doubt and companies cannot expect good performances without adequate incentives and employee training.

### ***Technological Self-Efficacy***

Since telework demands workers to execute their tasks by means of technology, we specifically choose one type of SE, technological self-efficacy (TSE). In fact, the connection between technology and self-efficacy has been studied for almost 30 years, starting with Bandura's statements, namely, his suggestion that workplaces require efficacious individuals with versatile cognitive and self-management skills to deal with changing technologies (Bandura, 1995). Until today, several studies were made (Compeau & Higgins, 1995; Ertmer et al., 1994; Pan, 2020; Shu et al., 2011; Staples et al., 1999), including meta-analysis (Karsten & Mitra, 2015) and the linkage is sustained, for instance a recent study found that general SE promotes positive engagement with technology (Alnoor et al., 2019).

This strong connection led to the appearance in literature of the construct *computer self-efficacy* (CSE), defined as “an individual's perception of his or her ability to use a computer in the accomplishment of a job task” (Compeau & Higgins, 1995, p.193). While technological self-efficacy (TSE) is defined as “the belief in one's ability to successfully perform a technologically sophisticated new task” (McDonald & Siegall, 1992, p.467). Recently, Maican and colleagues (2019) defined TSE as “one's personal judgment of the capacity to use technology to accomplish specific goals” (p.119). TSE construct differs from CSE only because it's specific for computer devices (Karsten, 2012; Torkzadeh et al., 1999). However,

Wang and colleagues (2013) consider CSE as a dimension of TSE. Other authors distinguish general CSE from specific CSE, defining the first as an individual's perception of ability across multiple computer applications and the specific CSE to point to just a single computer activity or application (Downey, 2006).

Older literature has been focused on CSE, with metanalysis regarding this topic being all about CSE and not TSE but recognizing the construct's importance. Notably, Karsten and colleagues (2012) considered CSE to be a construct of primary interest, associated with a wide range of cognitive, attitudinal, and behavioral outcomes for several areas, including organizations. Nowadays, with the emergence of different devices like smartphones and tablets, individuals have expanded their arsenal of technological work tools, and CSE is an outdated term. Same happens for computer mediated communication, despite being widely used in studies, "computer" term doesn't make much sense from now on (Carr, 2020). Human communication is now more complex than just computers and more challenges for the communication discipline arise. Other authors support this idea, "computer technology includes most technology from obvious computers with screens and keyboards to mobile phones", even household appliances or navigation systems (Dix, 2009, p.1327). In fact, "human-computer interaction is now effectively human-technology interaction", which leads to new challenges and study interests in this study field (Dix, 2017, p.6).

Recent studies have shown that TSE is determinant to mitigate the effects of technostress. For instance, TSE has a moderating role between technostress and burnout, suggesting that TSE can be used to mitigate the effects technostress has on employee performance (Yener et al., 2020). Also plays a role in moderating the effects of technostress on counterproductive work-behavior and innovation resistance. with the potential to mitigate the detrimental effects caused by technostress and counter-productivity (Kim & Lee, 2021). Moreover, higher CSE levels can significantly decrease technostress caused by technology's complexity and fear of coworker replacement (Shu et al., 2011).

### ***Self-Efficacy and Performance***

In the academic field there are many studies indicating perceived self-efficacy influences performance (Bouffard-Bouchard, 2010; Stajkovic et al., 2018). There is evidence showing that self-efficacy beliefs can increase if individuals' desires in novel settings, a recent meta-analysis has suggested that self-efficacy mediates the relationship between individual differences in Big Five traits and academic performance (Stajkovic et al., 2018). Evidence from the work field shows that beliefs on the capability to execute virtual tasks, including

communicating at work influence performance (McDonald & Siegal, 1992) and also demonstrated that online setting self-efficacy can be positively associated with both higher perceived levels of performance (Staples et al., 1999). However, other researchers discuss the lack of positive relationship between SE and subsequent performance in a specific task (Richard et al., 2006).

On the individual level, there are some studies indicating that SE has a positive relationship with work performance (Stajkovic & Luthans, 1998) and even for project-based teams (Schaffer et al., 2012). On the group level, there is also evidence that self-efficacy has a positive correlation with employee job performance (Varshney & Varshney, 2017). Likewise, high levels of perceived efficacy for remotely conducted collaborative work have more positive job attitudes and achieve higher job performances than those of low perceived efficacy (Staples et al., 1999). If perceived self-efficacy can influence performance, it's essential to understand if people believe in their own technological capabilities so they can be willing to achieve the projected results by telework.

Particularly for *technological self-efficacy* (TSE), on their research, the authors McDonald and Siegal (1992), showed that employees with higher levels of TSE had better performance when compared with employees with lower TSE levels. As their hypothesis regarding TSE were mostly supported, they suggested that “there are many positive outcomes for organizations when employees pursue perceived themselves as self-efficacious” (p.471). Also, in a meta-analysis, Stajkovic and Luthans (1998) thrive to understand the strength of relationship between self-efficacy and performance. They concluded that the correlation between the two was significant but average (.38) They pointed that self-efficacy could be a better predictor of work-related performance than personality trait-based constructs commonly used in organizational research. In the same way, in other extents, such as academic grades, there is evidence suggesting that students with higher levels of TSE tend to get better grades and that instructors can promote TSE (Wang et al., 2013). Conversely, in a on-site setting study with security agents, levels of self-efficacy beliefs are the cause of significance for the effects of both individual positive orientation (the feature of facing reality from a positive stance) and work engagement on their job performance (Alessandri et al., 2015). The authors conclude that according to the results “a strong sense of efficacy is a crucial motivational factor in ensuring the effectiveness of continued efforts and commitment to achieve a goal” and “a weak sense of efficacy compromises the transformation of strivings into desired achievements” (p.782). Therefore, in both work settings, online or on-site, low levels of employee's self-efficacy beliefs can be an obstacle to the organization

performance. TSE beliefs when teleworking, are even more critical, managers need to understand, before making the decision of changing from physical environment to telework environment, if workers believe in their own technological skills.

## **Attitudes**

Besides self-efficacy, attitudes are also recognized as being a motor of behavior, they can motivate behavior (Eagly and Chaiken, 1993). There are several definitions of attitude, as attitude is a complex psychological construct, authors generally diverge on defining it (Greenwald, 1968). In this study we tried to identify which definition is more popular currently and so we recognize attitude as a “psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p. 1).

This inner tendency is a state that is internal to the individual, and it's saturated with associations involving cognitions, affects, or behaviors, but not necessarily with all three types of associations. *Cognitive* associations, or propositional knowledge, may be present (e.g., working online increases multitasking) along with *affective* associations (e.g., fear of not being able to work with a software) and memories of past *behaviors* (e.g., failing on a computer task). These representations of attitude may be stored in memory and can be activated when the individuals are presented with attitude related cues (e.g., objects or situations). An individual does not have an attitude towards an entity unless responding evaluatively to it on an affective, cognitive, or behavioral basis. To assess attitudes, it's necessary to infer them by affective, cognitive, or behavioral responses (Eagly & Chaiken, 1993). In this study we're using cognitive responses to infer attitudes toward online communication.

Cognitive responses are thoughts or ideas about the attitude target and are commonly conceptualized as beliefs, which consist of associations individuals establish between the attitude target and several attributes (e.g. negative, positive, neutral) resulting on a positive or negative evaluation that is located in a continuum (Eagly & Chaiken, 1993; Ajzen and Fishbein, 1975).

Meta-analytic evidence shows that, considering the consequences of performing a behavior when first forming an attitude, storing consistent evaluative information, and holding confident attitudes are the main factors that allow people to use these attitudes as a basis for future behaviors (Glasman & Albarracín, 2006). Some authors even say that attitude objects' have a “mental residue of experience” which “may take any of a variety of simple or more complex forms because it can include a wide range of cognitive, affective, and behavioral associations” (Eagly & Chaiken, 2007, p.599). Other authors also recognize that attitudes are based on one's

information about the object and add that the reception and acceptance of new information can lead to attitude change (Ajzen & Fishbein, 2000). So, attitudes are not totally stable or dependent of past experiences, some new experiences can overcome past ones and lead to attitude change.

Attitudes are correlated with future behaviors more strongly when they are easy to recall (accessible) and stable over time; in fact, research shows that direct behavioral experience may influence attitude (Glasman & Albarracín, 2006). Hence, when individuals have positive experiences with technology, they probably have positive attitudes toward technology. In addition, our review indicates that attitude expression and direct behavioral experience affect the attitude–behavior correspondence by influencing attitude accessibility. Since project members were using online communication in order to execute their tasks, we assumed attitudes toward online communication were accessible for them and stable over time.

Self-efficacy beliefs are also relevant to the formation of attitudes process. Agarwal and coworkers (2000) considered SE beliefs as key antecedents of the perceived cognitive effort (ease of use) associated with technology usage. Even in the consumer behavior field SE was found to play a substantive role in shaping individuals' attitudes via a cognitive route (perceived usefulness and ease-of-use) and an affective route (pleasure, arousal and dominance (Kulviwat et al., 2014).

### ***Online Communication Attitudes***

Ledbetter (2009) describes *online communication attitudes* as “a cluster of cognitive and affective orientations that may foster or inhibit an individual’s tendency to communicate online” (p.465). Attitudes toward online communication may therefore be decisive on one’s predisposition to communicate online, and so individuals might differ in the attitude towards it. Like the general attitudes, online communication attitudes depend on the previous experience’s individuals may have when interacting online, and on the cognitive, affective, and behavioral associations they created (Eagly & Chaiken, 2007). Therefore, we seek to understand if the sense individuals make on online communication while working results in positive or negative attitudes.

Ledbetter (2009) revealed individual attitudes toward online communication through exploratory and confirmatory factor analysis, by demonstrating the existence of five dimensions for online communication attitude: self-disclosure, apprehension, miscommunication, social connection and ease (Ledbetter, 2009). Each of these dimensions is described below, with explanations for integration in the current study.

*Self-Disclosure.* People scoring high on this dimension are more likely to communicate with their same-sex friend via online communication and are less shy when communicating online. They feel more comfortable sharing personal information across online channels. Ledbetter (2009) results revealed an association with patterns of media use in same-sex friendships. Since we are interested in studying attitudes toward online communication in working contexts, where information shared is professional and not personal, it doesn't make sense to include this dimension, it was dropped.

*Apprehension* is the attitude related to fear, feelings of awkwardness, confusion, and nervousness when communicating online, it's manifested every time individuals show higher levels. It means that, when communicating online, the individual experiences feelings of fear and anxiety. In the extreme, it can even mean someone is experiencing technostress while working (Brivio et al., 2018; D. G. Kim & Lee, 2021).

*Miscommunication.* When individuals express high scores on this attitude, they're potentially believing that online communication inhibits mutual understanding and that it can possibly lead to negativity and conflict. According to the Theory of Planned Behavior, attitude toward behavior is related to the individual's positive or negative feelings to perform a specific behavior (Yasin et al., 2020). In this case, negative feelings derived from apprehension and miscommunication attitudes may certainly impact work performance.

*Social Connection.* For individuals who score high on this dimension, online communication is seen with good eyes and its core to assure their social life and connection with friends. If they lost online communication, it would decrease their contact with friends and turn their social life upside down. In the current study we assume that work is not a portion of social life and thus must not be included as an attitude towards online communication in the working context.

*Ease.* This dimension is related to the appreciation of convenience and enjoyment which online communication gives. Individuals scoring high on ease dimension tend to perceive online communication as a convenient, efficient, and enjoyable form of communication. In the working context, this concept of ease has also been widely studied inside technology acceptance theories, and proved to be associated with intention to adopt it (Ollo-López et al., 2020; Zhang et al., 2020). Similarly, perceived ease of use of telework has demonstrated to be positively associated with attitude toward telework (Silva-C et al., 2019).

In sum, in the current study we choose to approach the following attitudes: apprehension, miscommunication, and ease. On study 1, only apprehension, miscommunication, and ease

attitudes are considered as on study 2 the hypothesis related focuses on these three attitudes too.

This study was based on MOCA (Measure of Online Communication Attitude) which was developed mainly with the intention to establish that separate dimensions of online communication attitude exist, even if past researchers were divided between a unidimensional or a multidimensional conceptualization of relational communication patterns (Ledbetter, 2009). Unlike the present study, the author made his study in the context of media use in the context of friendship online interactions, so his study background was not the same as this study, which led to the need of doing a telework context adaptation, beyond the cross-cultural one, since the beginning. The author, Ledbetter (2009) recognizes the theme potential adding the need for future research: “these studies call for clearer theoretical conceptualization of channel effects in communication research and accompanying methodological sophistication for scholars studying this topic” (p.483). For this reason, there was a need to add an online communication measure towards telework in literature, and that’s what our *study 1* is about.

### **Project’s Success**

Projects are changing work practices. Organizations are choosing each time more structuring the working in projects (Kennedy et al., 2020). That forces timely planning, as for resources or time goals, which is necessary to assure that the expected outputs are achieved, given the repeated transformation of work practices in organizations (Cahill, 2020). This transformation was accentuated with the pandemic, most companies started to work remotely, and now it’s expected that telework will prevail (Deloitte, 2021), making it essential to understand the influence of individual variables in the way the project teams work.

A project is defined as a temporary organization, which is the project team, created to execute project tasks (Chiocchio et al., 2015). Furthermore, according to Project Management Institute (PMI, 2017) a project has three main features. Beyond being temporary (having a beginning and an end defined), a project should have a progressive and planned elaboration and its end should culminate in a unique service, product, or result. So, the fulfillment of project objectives may produce one or more deliverables. For example, a unique product (e.g., the correction of a defect in an end item); a unique service or a capability to perform a service (e.g., a business function that supports production or distribution); a unique result, such as an outcome or document (e.g., a research project that develops knowledge that can be used to determine whether a trend exists or a new process will benefit society); and a unique

combination of one or more products, services, or results (e.g., a software application, its associated documentation, and help desk services).

Each project has life cycles. Within a project life cycle, there are generally one or more phases that are associated with the development of the product, service, or result. These are called a development life cycle. Development life cycles can be predictive, iterative, incremental, adaptive, or a hybrid model (PMI, 2017, p.19).

There are many approaches about how many phases exist when it comes to project management. Generally, approaches range between three to five phases. The most common is to assume four phases and in this study, we decided to pick a four phases approach to feature the cycle of project development (Khang & Moe, 2008; Pinto & Prescott, 1988)

1. conceptualizing phase
2. planning phase
3. execution phase
4. termination phase

The first phase, *conceptual phase*, features the creation and development of the project idea, definition of main goals, assessing alternatives and generating interest. The second phase, *planning phase*, is when the distribution of tasks between project members, time scheduling, estimating needed resources and negotiating approvals (if applicable) starts. The third phase, *implementation phase*, marks the beginning of developing the activities and tasks planned on the previous phases and involves reviewing and revising project plans together with continuous monitoring of the activities. Lastly, the fourth phase, *final phase*, signals the closing or completing of the project, where the project final outputs are revised and disseminated (Pinto & Prescott, 1988; Khang & Moe, 2008). According to PMI (2017) associated with the four phases, there are five process groups, discrete or one-time events to link the different phases outputs: (1) Initiating process group aims to define a new phase or a new project or a new phase of an existing one. (2) Planning process group, where is required to establish the scope of the project, refines objectives and the course of action the achieve them. (3) Executing process group are intended to perform in order to complete the work defined in the previous plans. (4) Monitoring and controlling process group requires tracking, reviewing, and regulating of the project progress, identifying areas with changes needs and starting those changes. (5) Closing process group is performed to end all activities across process groups to formally close the project or phase.

It's important to clarify that not only from standard management area does project management exist. There are different disciplines using project management in their practices,

with different types of projects and producing different products (Youker, 2017; Wingate, 2015). And what types of projects can we consider? It's possible to distinguish different types of project according to its resulting outputs/products as recognized by Youker (2017). The author identified nine types of projects, such as *administrative projects* (product e.g., installing a new accounting system), *construction projects* (product e.g., a building or a road), *maintenance of process projects* (product e.g., electric generating station or IT software updating), *new product development projects* (product e.g., a new drug or a vaccine) or *research project* (product e.g., feasibility study or knowledge creation). Other authors emphasize that in this last type, particularly, research and development (R&D), it's also possible to have projects. However, in this type of project the definition of project scope is not needed (Wingate, 2015). On R&D, the project success idea differs from the standard projects, R&D project success is in the decision that move experiments along and prove or disprove the hypothesis. Still, R&D projects require organization and planning just like standard projects, they go by the same phases, maybe with different focuses, different timings. For instance, several research teams spent a great amount of time on conceptualizing the project, before its approval, while for maintenance projects the core phase it's execution. Overall, organizations may do several types of projects and may have different methodologies for that different types of projects, yet the project life cycle remains the central organizing concept that supports project management methodologies (Chiocchio et al., 2015).

According to the phase projects are situated, success can differ (Belout & Gauvreau, 2004; Matthias et al., 2017). Indeed, depending on the point of time when the assessment is carried out, project success assessment differs, making time dependency a criterion that plays a main role on project success (Matthias et al., 2017).

In the project management field, to measure the degree of success or failure of projects and the extension to which the results are achieved there are used three concepts: efficiency, effectiveness and efficacy (Zidane & Olsson, 2017). However, they have different meanings, that must be clarified. *Efficiency* implies meeting all internal requirements (e.g., goals, costs) and producing an output in a competent and qualified way. *Efficacy* means, giving the produced results the potential to lead to an effective by having the quality to do it so. *Effectiveness* relates with passing the stage of being efficacious (e.g., satisfying or exceeding all customer requirements). Both project efficiency and effectiveness are concepts widely used in project management literature, efficacy it's the least used concept (Sundqvist et al., 2014; Zidane & Olsson, 2017). Above all, having success in a project means meeting planned objectives, cost, and time targets, ensuring customer and team satisfaction (Serrador & Turner, 2014). In fact,

it is common to use meeting project's scope, time, and budget goals as measures of success, it's the traditional way to measure project success, called *iron triangle* (Matthias et al., 2017; J. K. Pinto & Slevin, 1988). However, new approaches have been suggesting that the iron triangle is not enough to explain a project's success and therefore other variables like team satisfaction should be included (Jugdev & Müller, 2005; Matthias et al., 2017; Müller & Jugdev, 2012; Serrador & Turner, 2014). We choose to include overall project success, client's satisfaction, and team satisfaction, and not be restricted to traditional iron triangle of project efficiency, because recent literature has established that project success is now a much wider concept (Caccamese & Bragantini, 2012; Pollack et al., 2018; Serrador & Turner, 2014). Though, in this study, success is evaluated through perceived overall project success and perceived project efficiency, because despite being based on objective data, it's reported by participants' perceptions.

Evidence linking work performance with project success only exists on the PM perspective, with literature showing a positive influence of PM performance on project success (Mir & Pinnington, 2014). In fact much attention has been standing for the project manager skills alone, it's link with PM's age (Hoxha & McMahan, 2019), the impact of PM's leadership type on the project success (Harwardt, 2020; Maqbool et al., 2017), soft skills of project managers significantly contributed to project success (Zuo et al., 2018), and also the influence of PM's self-beliefs on project success (Lemboye, 2019). However, it's highly recognized, *all project members contribute to the success* (Oh & Choi, 2020). These authors studied the relationship between emotional, managerial, and intellectual competences of team members and concluded that not only the managers impact the project success, but all team members contribute. Therefore, if all members' contributions are decisive for the achievement of success, why should literature be just focused on the manager's competences?

Overall, it seems that individuals' beliefs regarding project work context was oddly forgotten in literature. Therefore, using the basis of TPB we will try to understand individuals' beliefs towards the online based work setting.

### ***Attitudes and Project Success***

Attitudes toward online communication are not studied in the work field, nor in the project-based field. Literature on attitudes toward online communication exists essentially to explain social media use and social interactions (Brody, 2018; Dorrance Hall et al., 2018; Gioia & Boursier, 2021). That's why we adapted and developed an existing measure (see Study 1). Indeed, we only found studies relating attitudes toward online communication in several

contexts (as mentioned before in this paragraph) or relating actual online communication with performance.

Regarding the impact of online communication on performance, research seemed to have no clear answer about the connection of the two. More recent literature has demonstrated the positive impact of online communication on performance. It seems that online communication can be even more effective in completing project works when compared to face-to-face communication (Musa et al., 2015). Maican et al. (2019) suggest similar results, as they concluded that using online communication can predict teachers' and researchers' success in academic life. Moreover, teams using online communication seem to have better performances when compared to the ones that don't use it (Ehsan et al., 2008). Other authors concluded that online communication in virtual teams can lead to higher performances when a psychologically safe communication climate exists, a team climate where team members can openly share knowledge and information without fear of being criticized or disapproved (Glikson & Erez, 2020). Whereas, meta-analytical research suggests that online communication may decrease group efficiency (Baltes et al., 2002). In sum, contradicting past research, lately there is a tendency for individuals to become more used to technology and develop positive attitudes towards it.

Regarding project management, recently, Kennedy and coworkers (2020) suggested that online communication in project teams can be a strategic advantage for achieving a better performance. However, there's no evidence to supporting individual's attitudes and its impact on project success. Thus, with this background, it seems relevant for us to explore what online communication attitudes are associated with project success and if being willing to experiment new technology will mediate the connection between the two. Consequently, we propose the following hypothesis:

**H1a:** Apprehension attitude will be negatively associated with project efficiency.

**H1b:** Miscommunication attitude will be negatively associated with project efficiency.

**H1c:** Ease attitude will be positively associated with project efficiency.

**H2a:** Apprehension attitude will be negatively associated with project success.

**H2b:** Miscommunication attitude will be negatively associated with project success.

**H2c:** Ease attitude will be positively associated with project success.

### ***Self-Efficacy and Project Success***

In a meta-analysis, Stajkovic and Luthans (1998) reported a significant average correlation of 0.32 between self-efficacy and working performance. In the current study, we're interested in

understanding if this correlation verifies also for project-based work. While Blomquist et al. (2016) revealed that the relationship between project management SE and project management performance is significative and positive, they didn't reveal the results for project members. However, it's important to study PM's skills' self-beliefs as it is for the other project team members, especially in changing times, where online working is the basis of performance. That's why we're interested in understanding project team members' beliefs and not just PM's.

Higher self-efficacy is widely associated with higher performance in areas such as computer training (Gist et al., 1989), education (Rex & Roth, 1998), computing behavior (Downey, 2006). Interestingly, in the project management field authors call the attention on self-efficacy beliefs for PMs. A study concluded that PM's SE beliefs improve their effectiveness (Jacobs & Kamohi, 2017). Another study indicated the influence of self-efficacy on a failing project, explaining it by a phenomenon called *self-efficacy bias*, when a PM with higher SE may underestimate the risks of a project, compared with a lower SE one (Jani, 2011). Conversely, there's no evidence relating self-efficacy with project performance for the team members nor particularly for TSE. Therefore, we propose the following hypothesis:

**H3a:** TSE will be positively associated with project efficiency.

**H3b:** TSE will be positively associated with project success.

### **Intentions, Technological Acceptance, and Openness to IT**

TPB postulates that the intention to engage in a certain behavior is the proximal antecedent of a voluntary action. It's a behavioral disposition to act in a certain way, under appropriate circumstances. Because intentions can anticipate actions, Ajzen (2012) suggests that to act in a certain way, individuals have to rely on their intentions according to the information, skills, abilities, and other internal factors they have, and that are required to perform the behavior. The author sustains that individuals with a consistently high control can perform a behavior if they're motivated and intentions alone are certainly enough to predict behavior. Therefore, individuals who intend to perform the behavior and who have a high degree of control over it should be most likely to perform it. Intentions also vary in their degree of generality or specificity, the lowest level (specific) consisting of intentions to engage in a particular action in a given context and time frame. The highest level of intentions (general) features intentions that once formed, can be automatically activated by internal or external cues, encouraging the performance of a relevant behavior (Ajzen & Dasgupta, 2015). Overall, it's clear that intentions are very difficult to theorize because of their variability.

Additionally, the author of TPB points out the instability of intentions, recognizing that correlation between intentions and behavior tends to decline with the passage of time, as different behavioral fields have revealed (Ajzen & Dasgupta, 2015). Therefore, adding personality traits seemed to solve this problem. Similarly, some authors suggest the inclusion of personality traits in social cognitive models linking them with behaviors and intentions (Farrukh et al., 2018).

As intentions are unstable, we searched for other theories that could help us explain if people are interested in using technology on their project tasks. We went to technology acceptance model (TAM) theory. TAM explains how intentions to adopt technology are formed by two primary factors: perceived ease of use and perceived usefulness (Davis, 1989). But there's a construct that goes beyond TAM, explaining individual's differences by understanding how perceptions are formed and their role in the development of technology use intentions (Agarwal & Prasad, 1998). This construct is called *personal innovation in the domain of information technology*, or *PIIT* for short, and it's defined by the authors as "the willingness of an individual to try out any new information technology" (p. 206). It was created because no reference to this disposition was included in any of the dominant technology acceptance models. The authors consider PIIT like a construct that does beyond technology acceptance, it goes beyond how intentions are formed, adding the role of individual traits to understand technology adoption process (Agarwal & Prasad, 1998). In the present study, we also assumed that technology acceptance and PIIT are two distinct concepts. However, to facilitate comprehension, we decided to call *PIIT* simply *Openness to IT*, as we believe it's a clearer definition since it relates with Big Five Personality dimension: Openness to experience. Openness trait involves active imagination, preference for diversity of experiences, and intellectual curiosity (McCrae & Ingraham, 1987). In this case, the experience is interacting with technological information while executing project tasks.

Research shows that there are two personality traits that are determinants of PIIT, Resistance to Change and Openness, with positive relationship between PIIT and openness (associated with creativity and non-conventional thinking) and a negative relationship between PIIT and resistance to change (Nov & Ye, 2008). Therefore, it seems that openness to IT relates to openness to change and intention to use technology, regardless of its evolution and differences arising due to changes.

Authors have been focused on TSE association with acceptance (TAM model). More recently, Pan (2020) demonstrated that technology acceptance and technology self-efficacy are correlated. Regarding the constant technological evolution, what is trendy one day, can quickly

become outdated months later and the same happens to employees' skills (Shakina et al., 2021). More than acceptance, in this study we will understand individuals' intention to reinvent their technological competences (openness to IT). Moreover, using IT overtime seems to increase the innovativeness and intention to use IT, as a research with students suggests (Simarmata & Hia, 2020). Hence, encouraging individuals to use IT freely, can consequently lead to higher openness to IT.

Some authors hypothesize that SE beliefs in the task domain of computing are strongly influenced by the extent to which individuals believe that they are personally innovative with respect to information technology (Agarwal et al., 2000). SE may have been reported as superior to controllability in predicting intention due to measurement redundancy (Rhodes & Courneya, 2003).

Concerning the direct connection between openness to IT and self-efficacy, there's not much evidence, and literature is mostly from academic related studies. From a general level, there is evidence showing that the openness to experience trait does not relate significantly with self-efficacy (Stajkovic et al., 2018). However, regarding IT specific variables, there is evidence showing that individuals with PIIT characteristics show higher CSE (Thatcher et al., 2002). To understand if almost 20 years later, on a context where technology usage is mandatory, this evidence remains, we propose the hypothesis:

**H4:** Higher TSE will be related with higher openness to IT

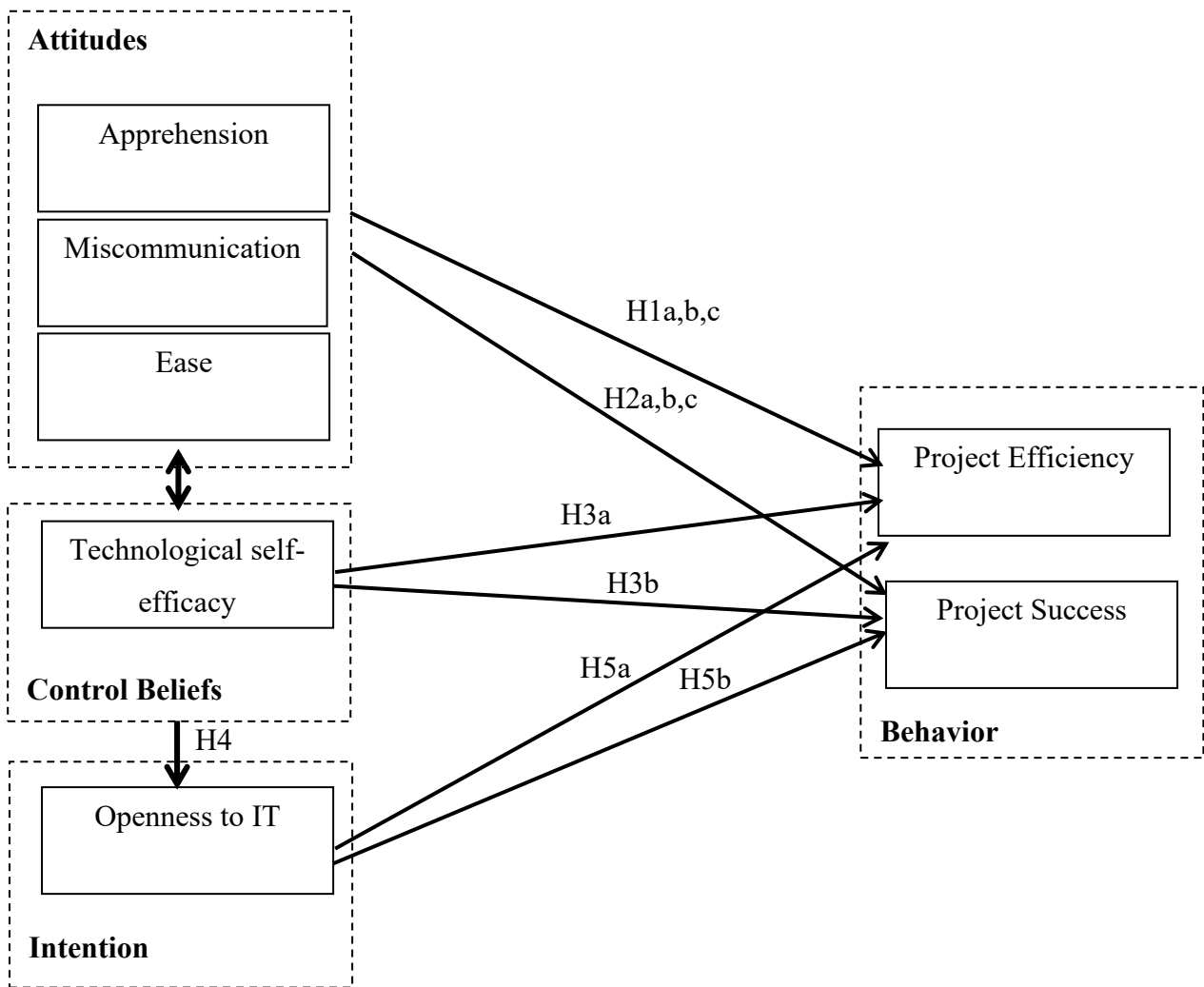
Likewise, regarding openness to IT and performance, research evidence diverges. On one hand, some authors consider openness to experience as a trait that significantly affects performance (Ashkanasy et al., 2007). Specifically, there's evidence showing a relationship between PIIT trait and performance expectancy (Ramírez-Correa et al., 2019). On the other hand, according to a recent meta-analysis, the openness to experience trait does not relate significantly with academic performance (Stajkovic et al., 2018). Similarly, another author shows that openness to experience is not related with virtual teams' performance (Zaharie, 2021). There are also some authors that highlight the importance of openness for explaining performance but with differences only occurring in patterns of change over time (Minbashian et al., 2013). There's no consensus. From the project management field, no evidence was found. Therefore, we propose two hypotheses to investigate this relationship:

**H5a:** Higher openness to IT will be related with higher project efficiency.

**H5b:** Higher openness to IT will be related with higher project success.

Following H4 and H5, the mediating role of openness to IT between TSE and project success dimensions arises. Therefore, we will test this mediation to follow up recent work regarding this measure (Gu et al., 2018; Svendsen et al., 2013).

In sum, in this study we try to understand to what extent the constructs of the Theory of Planned Behavior, attitudes, self-efficacy and intention (openness to IT) can predict project's success (see hypothesized model on figure 1). Hence, in this research we try to use TPB and Bandura's theory to explain project's success in an online context.



**Figure 1.** Theoretical model

## Study 1: MOCA's Adaptation and Validation

### Method

#### *Participants*

This survey was diffused on social networks to facilitate the thesis progress. This item content validation survey was done by 50 Portuguese participants, but only 25 were completed, as we deleted missing responses, only 25 were valid. The respondents were university students, attending bachelor's or master's degrees, about 70% were female, and their ages ranged between 20 and 39 years old.

#### *Measures*

Based on MOCA (Ledbetter, 2009), a valid, reliable, and empirically derived measure of online communication attitude, we made a survey with questions for each of the MOCA's adapted version (Measure of Online Communication Attitude - Telework, MOCAT) items. For each MOCAT item the following questions were made (in Portuguese): "I can understand the sentence above", "This sentence measures the dimension *apprehension*" – another dimension, according to the original article belongingness- in a 5-point Likert scale, ranging from *totally disagree* to *totally agree*. After these Likert-based questions was a blank space box for item improvement suggestions.

#### *Procedure*

The authors conducted a deep psychometric analysis, following the established steps: preparing content validation form, selecting a review panel, conducting content validation, reviewing domain and items, providing score on each item (Yusoff, 2019). The last step "calculating CVI" was not accomplished due to the mixed nature of the collected data - qualitative and quantitative methods integration.

Firstly, a contact the original author, Andrew Ledbetter, was made to explain what was wanted to do with the measure and ask for his permission to doing it so. Then, carefully analyzing each item, we concluded that some of the dimensions didn't fit in the context of online work, so we excluded two dimensions: Self-disclosure and Social Connection. This decision was also made because it was difficult to get deep insights for so many items. Next, we prepared a survey with all items from the other three dimensions (*apprehension*, *miscommunication*, and *ease*).

According to Brislin (1970) back-translation, bilingual technique, and pretest procedures (field-test to ensure future participants will comprehend all items) are some of the techniques used to ensure the quality of cross-cultural questionnaires. So, with that in mind, secondly, we translated items of the three remaining dimensions to Portuguese and then a back-translation was done by a bilingual (Portuguese, English) to see the match between the two languages and make sure all sentences had sense. Due to the specific context that this study was projected, some items were modified to make sure items had a telework orientation. Therefore, we changed and adapted items to online working context. The result was an adapted measure the authors called MOCAT.

The authors presented the survey to participants to review each item. This survey was presented in Portuguese, where participants were asked to evaluate if the item sentence was measuring what was supposed to (relevance), comprehension and Portuguese language clarity in a Likert scale (quantitative data). Suggestions to improve each sentence were asked too (qualitative data). We considered that content validity is an important criterion of measurement validity, that includes the validity and representativeness of construct definition, clarity of instructions, linguistic aspects such as content and grammar, representativeness of the item pool, and the adequacy of the response format (Koller et al., 2017).

### ***Data Analysis***

Survey data was exported from Qualtrics platform using Excel. To analyze data, we separated comprehension scores from construct validity score means, for each item/sentence. Suggestions to improve comprehension were also considered. Then, the best items were selected by dimension, with the criteria of choosing the ones with higher scores in terms of comprehension and construct validity, combining the higher mean scores, lower standard deviation, and written suggestions.

### **Results**

At the beginning 18 items from three dimensions were considered. However, after data analysis, because we had to make decisions in order to go accordingly to the parsimonious model, and keep the measure as simple as possible, doubtful items were deleted. Therefore, items with the weakest scores on comprehension, and items with weak convergent and discriminant validity were excluded. In case of outliers in written suggestions items were excluded, we assume inconsistency in those cases. Also, one item was excluded due to high similarity with another. Then, the remaining items were excluded due to weak scores, and some

had their sentences modified. None was added (see table 1). Which totalizes six excluded items: items numbers three, four, seven, 13, 16 and 17. Items number three, four, seven and 17 were deleted because of the weak scores. Item number 13 was excluded because of divergences in improvement suggestions. Number 16 was excluded due to being too long and its high similarity with number 14, also 16 was the most reliable one on the original article.

Moreover, 12 items, the ones with the strongest scores were included. Four items, items number five, six, 14 and 15, were included with no changes, along with eight items that were modified but also included, items number one, two, eight, nine, 10, 11, 12 and 18. So, at the end the 12 items remain (see final version on table 2).

**Table 1.** English and Portuguese versions of MOCA telework-adapted items and results

Nr. Dimension	MOCA (original)	Initial Item (survey)	Final Item (post-survey)	Comprehension score mean	Construct validity score mean	Result
1 Apprehension	I feel awkward when communicating online.	<i>Sinto-me estranho/a quando comunico online.</i>	<i>Sinto-me desconfortável quando comunico online.</i>	4.08 (1.13)	4.24 (0.71)	<b>Modified and Included</b>
2 Apprehension	I feel apprehensive about communicating online.	<i>Sinto-me apreensivo/a sobre comunicar online.</i>	<i>Sinto-me apreensivo/a perante a comunicação online.</i>	4.20 (1.02)	4.36 (0.97)	<b>Modified and Included</b>
3 Apprehension	I cannot think clearly when I communicate online.	<i>Não consigo pensar de forma clara quando comunico online.</i>	_____	4.00 (1.13)	3.92 (1.23)	Excluded
4 Apprehension	The lack of nonverbal cues (such as eye contact, facial expressions, etc.) in e-mail makes me feel uncomfortable.	<i>A falta de pistas não verbais (como contacto visual ou expressões faciais, etc.) em emails deixa-me desconfortável.</i>	_____	4.16 (1.22)	3.92 (1.23)	Excluded
5 Apprehension	I feel tense and nervous when communicating online.	<i>Sinto-me tenso/a e nervoso/a quando comunico online.</i>	<i>Sinto-me tenso/a e nervoso/a quando comunico online.</i>	4.24 (1.03)	4.08 (1.20)	<b>Included</b>
6 Apprehension	It bothers me that I cannot see people when communicating online	<i>Incomoda-me não conseguir ver as pessoas quando comunico online.</i>	<i>Incomoda-me não conseguir ver as pessoas quando comunico online.</i>	4.12 (1.34)	4.16 (1.22)	<b>Included</b>
7 Apprehension	My words become confused and jumbled when I try to communicate online.	<i>As minhas palavras ficam confusas e desordenadas quando tento comunicar online.</i>	_____	4.12 (1.24)	4.04 (1.31)	Excluded

8	Apprehension	I am afraid to voice my opinions when interacting with others on the computer.	<i>Tenho medo de expressar as minhas opiniões quando interajo com os outros por computador ou por computador.</i>	<i>Tenho medo de expressar as minhas opiniões quando interajo com os outros por computador ou outro dispositivo.</i>	4.16 (1.46)	4.40 (1.13)	<b>Modified and Included</b>
9	Miscommunication	When communicating online, lack of feedback from the other person can lead to misunderstandings.	<i>Quando comunico online, a falta de feedback por parte da outra pessoa pode levar a mal-entendidos.</i>	<i>Quando comunico online, a falta de feedback ou de reações por parte da outra pessoa pode levar a mal-entendidos.</i>	4.60 (0.69)	4.69 (0.69)	<b>Modified and Included</b>
10	Miscommunication	Miscommunication occurs frequently online.	<i>As falhas de comunicação ocorrem frequentemente em contexto virtual.</i>	<i>As falhas de comunicação ocorrem frequentemente quando comunicamos em contexto virtual.</i>	4.40 (0.94)	4.64 (0.62)	<b>Modified and Included</b>
11	Miscommunication	When reading online messages, it is easy to take meanings that the sender did not intend.	<i>Ao ler mensagens online, é fácil perceber significados não pretendidos pelo remetente.</i>	<i>Ao ler mensagens online é fácil interpretar incorretamente a mensagem do remetente.</i>	4.32 (1.05)	4.28 (0.92)	<b>Modified and Included</b>
12	Miscommunication	Sometimes people interpret online communication more negatively than the message sender intended.	<i>Às vezes as pessoas interpretam a comunicação online mais negativamente do que pretendido pelo remetente da mensagem.</i>	<i>Às vezes as pessoas interpretam a comunicação online mais negativamente do que pretendido pelo remetente</i>	4.64 (0.69)	4.48 (0.81)	<b>Modified and Included</b>
13	Miscommunication	Misunderstanding online can easily lead to conflict.	<i>Mal-entendidos online podem facilmente levar a conflito.</i>		4.68 (0.61)	4.48 (0.81)	Excluded due to inconsistency
14	Ease	I like that some forms of online	<i>Gosto que algumas formas de comunicação</i>	<i>Gosto que algumas formas de comunicação</i>	4.44 (0.80)	4.60 (0.63)	<b>Included</b>

	communication do not require both people to be online at the same time.	<i>online não exigam que as pessoas tenham de estar online ao mesmo tempo.</i>	<i>online não exigam que as pessoas tenham de estar online ao mesmo tempo.</i>			
15 Ease	When life gets busy, the Internet is a great way to communicate efficiently.	<i>Quando se tem uma vida ocupada, a Internet é uma ótima maneira de comunicar de forma eficiente.</i>	<i>Quando se tem uma vida ocupada, a Internet é uma ótima maneira de comunicar de forma eficiente.</i>	4.52 (0.70)	4.56 (0.80)	<b>Included</b>
16 Ease	One thing I like about online communication is that I can still send someone a message when they aren't available to talk on the phone.					Excluded due to high similarity w/ nr. 14
17 Ease	I enjoy communicating online.	<i>Eu gosto de comunicar online.</i>		4.44 (0.94)	3.84 (1.25)	Excluded
18 Ease	Online communication is convenient.	<i>A comunicação online é conveniente.</i>	<i>A comunicação online é uma mais-valia.</i>	4.40 (0.98)	4.16 (1.08)	<b>Modified and Included</b>

*Note:* English version of MOCA alongside the Portuguese and telework-adapted version, MOCAT with validation scores and results, ordered by item number

**Table 2.** Final version of MOCAT

<i>Item nr.</i>	<i>Dimension</i>	<i>Text (EN)</i>	<i>Text (PT)</i>
1	Apprehension	I feel awkward when communicating online.	<i>Sinto-me desconfortável quando comunico online.</i>
2	Apprehension	I feel apprehensive about communicating online.	<i>Sinto-me apreensivo/a perante a comunicação online.</i>
3	Apprehension	I feel tense and nervous when communicating online.	<i>Sinto-me tenso/a e nervoso/a quando comunico online.</i>
4	Apprehension	It bothers me that I cannot see people when communicating online.	<i>Incomoda-me não conseguir ver as pessoas quando comunico online.</i>
5	Apprehension	I am afraid to voice my opinions when interacting with others on the computer.	<i>Tenho medo de expressar as minhas opiniões quando interajo com os outros por computador ou outro dispositivo.</i>
6	Miscommunication	When communicating online, lack of feedback from the other person can lead to misunderstandings.	<i>Quando comunico online, a falta de feedback ou de reações por parte da outra pessoa pode levar a mal-entendidos.</i>
7	Miscommunication	Miscommunication occurs frequently online.	<i>As falhas de comunicação ocorrem frequentemente quando comunicamos em contexto virtual.</i>
8	Miscommunication	When reading online messages, it is easy to take meanings that the sender did not intend.	<i>Ao ler mensagens online é fácil interpretar incorretamente a mensagem do remetente.</i>
9	Miscommunication	Sometimes people interpret online communication more negatively than the message sender intended.	<i>Às vezes as pessoas interpretam a comunicação online mais negativamente do que pretendido pelo remetente.</i>
10	Ease	I like that some forms of online communication do not require both people to be online at the same time.	<i>Gosto que algumas formas de comunicação online não exijam que as pessoas tenham de estar online ao mesmo tempo.</i>
11	Ease	When life gets busy, the Internet is a great way to communicate efficiently.	<i>Quando se tem uma vida ocupada, a Internet é uma ótima maneira de comunicar de forma eficiente.</i>
12	Ease	Online communication is convenient.	<i>A comunicação online é uma mais-valia.</i>

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## Study 2: Main Study

### Method

#### *Procedure and Participants*

Data was collected through an online survey in Qualtrics. To fill this survey, participants were requested to read the study purpose and to give their approval on an informed consent explaining and assuring their voluntary participation, confidentiality, and anonymity. On the informed consent participants had also a paragraph to understand the three factors that being part of a project, predicates, according to PMI (2017):

1. Being temporary, which means, the project should have a beginning and an end defined.
2. Its end should culminate in a unique service, product, or result.
3. Have a progressive and planned elaboration defined.

The survey was administered in both English and Portuguese. Participants were recruited by distributing the link to the survey in professional networks on social media groups, professional platforms, and via email (to associations and acquaintances linked with projects). Therefore, the data was collected using a non-probability sampling method, namely convenience sampling.

From 614 responses, only 342 were completed. Given the validity criteria to consider a response valid, only 289 participants remain. The criteria were having a minimum of three minutes to respond, deleting incongruent answers and cases where participants selected all the same answer option. All participants that registered for the withdrawal were contacted to inform the withdrawal was made and the winner was notified in order to receive the prize, in May 2021.

Concerning participants' demographic features, 61% were female, 38% were male and 1% of participants chose to not indicate their sex. Participants were aged between 18 to 24 years old (47.8%) and between 25 to 34 years old (31.1%), followed by the ones aged between 35 to 44 (12.1%). Educational level was largely high, with most respondents having a bachelor's or equivalent degree (40.5%), master's degree (42.6%) and PhD (9.7%).

Concerning *project-related* statistics, participants' project sectors were divaricated, however it was mostly from Education/Academic (61.6%), followed by Information technologies (13.8%) and by Industry (7.6%). Also, 45% of the respondents were leaders on their projects. For the work setting, while answering the survey, most participants reported they

were working exclusively online (73%), only 13 participants were working exclusively on-site (4.5%), the remaining (22.5%) were working in a blended work setting. Regarding communication setting most participants reported they used most frequently synchronous communication (e.g., voice and video calls, 57.8%) when compared to asynchronous communications (e.g., mails and chat, 37.4%) or other means (e.g., face-to-face, 4.8%).

### **Measures**

The measures used in the current research were translated and back translated following the procedures recommended by Brislin (1970). All items were translated from English to Portuguese by two independent contributors and then back translated by a third contributor. Back-translation confirmed that the meaning of most items had been preserved in the process. The items that were unsatisfactorily translated were analyzed a second time and their translation corrected. Then, the final version of the translation was verified.

Sociodemographic questions were made at the end to feature the sample. There were also some control questions. To avoid participant's fatigue effects in matrix tables, the choice sequence was randomized.

**Measure of Online Communication Attitudes on Telework (MOCAT).** The original Measure of Online Communication Attitudes (Ledbetter, 2009) wasn't yet validated to Portuguese, so translation and retroversion were needed at first. Also, an adaptation was made to better fit this construct in the telework context (see study 1). This construct was assessed using 12 items of this measure, from three different dimensions: apprehension, miscommunication, and ease. An example of an *apprehension* item is "It bothers me that I cannot see people when communicating online", from *miscommunication* is "Miscommunication occurs frequently online", and from *ease* is "Online communication is convenient". Participants answered using a Likert-type scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Higher scores on *apprehension* dimension means feelings of awkwardness, confusion, discomfort, and nervousness towards the online communication set. Scoring high on *miscommunication* means having a belief that online communication inhibits mutual understanding and can potentially produce negativity and conflict. High scores on *Ease* show perception of online communication as a convenient, efficient, and enjoyable form of communication. Cronbach alpha was .85 for apprehension dimension, .73 for miscommunication and .66 for ease. According to Bonett and Wright (2015) above .65 it's possible to take conclusions, so this measure shows good psychometric features. The explained

variance for this measure was low for each dimension ( $r^2_{\text{apprehension}} = 32,9\%$ ;  $r^2_{\text{miscommunication}} = 19,6\%$ ;  $r^2_{\text{case}} = 8,4\%$ ).

**Technological Self-Efficacy Scale.** This measure was provided by Maican et al. (2019), author of a simpler version of the original measure (X. Gu et al., 2013; Venkatesh et al., 2003) and translated to Portuguese. Four items were used, measured on a five-point Likert scale, ranging from “never” to “very frequently.” In the present study we adapted so that the items were more general and directed to the project, an example is “I feel confident that I can effectively use technology in my project tasks”. High scores on technology self-efficacy mean having confidence in the personal capacity to use technology to accomplish specific goals, in this case to accomplish project goals.

This measure has shown a very good internal consistency ( $\alpha = .89$ ). EFA revealed high explained variance for TSE ( $r^2 = 75,9\%$ ).

**Personal Innovativeness in the Domain of Information Technology (Openness to IT).** This measure was translated to Portuguese, we didn't find a Portuguese version from the Agarwal and Prasad (1998) original measure. It has four items and respondents answered using a seven-point Likert scale ranging from “Strongly disagree” to “Strongly agree”. A demonstration item is “Among my peers, I am usually the first to try out new information technologies”. This construct explains the role of individual traits in technology adoption and scoring high on this measure generally means being more likely to take risks, and to develop more positive intentions toward the use of an innovation.

This measure revealed a very good internal consistency ( $\alpha = .85$ ) and high explained variance ( $r^2 = 60,6\%$ ).

**Project Success Measure.** It was measured with project success tool developed by Serrador and Turner (2014). This is an evolution from previous existent measures that they analyzed and adapted for better measurement. It's important to clarify that this evaluates perceived project success as reported by participants, therefore relies on subjective experiences. The measure has six questions each about different project features achieved: timeline, budget, scope, team assessment, client assessment, overall success. The first three features concern project efficiency and the last three related to overall success.

**Project Efficiency.** The first three questions concerned to meeting *timeline* goals, meeting *budget* goals, meeting *scope/requirements* goals. This was measured using a seven Likert scale with five percentage choices, ranging from “>60%” to “1-14%” over time/over budget/requirements missed, one option for meeting goals and other to exceed meeting those goals. Item for meeting *timeline* goals is “How successful was the project in meeting project time goals?”, for *budget* goals is “How successful was/is being the project in meeting project budget goals?” and for *scope/requirements* goals is “How successful was/is being the project in meeting scope and requirements goals?”. This dimension revealed a good internal consistency ( $\alpha = .80$ ) and high explained variance ( $r^2 = 72,1\%$ ).

**Project Success.** To measure the questions on *project team's satisfaction*, *client's satisfaction* and *overall success*, respondents used a five Likert scale ranging from “failure” to “very successful”. The items for this dimension were “How do you rate the project team's satisfaction with the project?” for *project team's satisfaction*; “How do you rate the client's satisfaction with the project's results?” for *client's satisfaction* and “How do you rate the overall success of the project?” for *overall success*. This dimension revealed a good internal consistency ( $\alpha = .80$ ) and high explained variance ( $r^2 = 71,6\%$ ).

### **Control Variables**

**Gender.** This was a relevant control variable because research on IT adoption is contradictory for gender differences. Past research has focused on these differences and a gender gap is identified, some authors sustain that “technology is a male-dominated arena, that males are more competent users of technology, and other social and cultural norms and factors” (Cai et al., 2017, p.10) and it's supported because socialization as the key role on this societal imposed belief (Vekiri & Chronaki, 2008). Indeed, recently authors suggested the perpetuation of gender differences concerning the technology acceptance and use dimensions, with women scoring lower than men for self-efficacy and facilitating conditions, and higher than men for performance expectancy (He & Lee, 2009; Maican et al., 2019). However, for personal innovativeness factors, Pilav-Velic et al. (2020) indicated that gender it's not significantly pending for one of the dichotomy sides. We will clarify that by adding gender on the model. We found a significant relationship between gender and openness to IT ( $p < 0.01$ ;  $\beta = 0.51$ ,  $t = 3.46$ ), with men scoring higher ( $M = 5.00$ ), when compared to women colleagues ( $M = 4.55$ ).

**Project Phase.** It was essential to control project phase for project efficiency, as according to some authors, through the course of the project as phases change, members' perceptions of

efficiency also change (Jugdev & Müller, 2005; Pinto & Prescott, 1988). Was assessed with a multiple-choice question, with five possible answers, one of the four project phases or the option N/A. This option was available for cases where participants may find that because their current project phase was very initial (with undefined factors), it was too difficult to evaluate the success (e.g., initial phases). However, this variable didn't show a significative effect on project efficiency ( $p = 0.05$ ;  $\beta = 0,19$ ;  $t = 1.97$ ).

**Work Setting.** It's known that the work setting (online vs. on-site) can impact performance. Still, literature is consistent regarding this discussion, there is mostly evidence showing positive impact of online setting over traditional settings (Gajendran et al., 2015; Gajendran & Harrison, 2007; Golden & Gajendran, 2018; T. Kim et al., 2021; Martin & MacDonnell, 2012; Martínez-Sánchez et al., 2007). Negative impact of online setting over traditional settings are attributed to specific variables like lack of responsibility in that context (Delanoeije & Verbruggen, 2020; Solís, 2017). Moreover, there are some studies suggesting there no differences between settings (Shen et al., 2007). To test differences between work settings we used SPSS v27 to make an ANOVA. Regarding the dimensional analysis of the project efficiency and project success, we didn't find significant differences between online, on-site, or blended work settings. Yet, following the same idea of past PM research, of analyzing critical factors on work settings (Verburg et al., 2013). We analyzed each one of the six factors inside those two dimensions, we found *project team's satisfaction* and *overall success* variables did show significance between the work settings. Online setting ( $N_{team} = 198$ ,  $M_{team} = 3.70$ ,  $SD_{team} = 0.76$ ,  $p < .05$ ;  $N_{overall} = 184$ ,  $M_{overall} = 3.74$ ,  $SD_{overall} = 0.71$ ,  $p < .05$ ) demonstrated slightly lower levels when compared to blended ( $N_{team} = 64$ ,  $M_{team} = 3.6$ ,  $SD_{team} = 0.85$ ,  $p < .05$ ;  $N_{overall} = 59$ ,  $M_{overall} = 3.83$ ,  $SD_{overall} = 0.83$ ,  $p < .05$ ) and on-site ( $N_{team} = 13$ ,  $M_{team} = 3.85$ ,  $SD_{team} = 0.56$ ,  $p < .05$ ;  $N_{overall} = 13$ ,  $M_{overall} = 3.77$ ,  $SD_{overall} = 0.83$ ,  $p < .05$ ) settings. However, the difference is very subtle and because N is also very uneven, we assume that there are no differences between work settings.

### **Data Analysis**

To conduct data analysis, IBM SPSS Statistic version 27 was used. After reversing the items, we started to assess the measure's psychometric qualities.

As some measures were adapted, all were translated to Portuguese and there were two answering languages used, we conducted an exploratory factor analysis for each measure, with a KMO test and Bartlett's Test. All scales presented data suitability, with significance on

Bartlett's test and a KMO above 0.7 (Hair et al., 2006). EFA was made with the rotational method Varimax with Kaiser's Normalization, and factors were extracted by a PCA. EFA of each measure confirmed dimensions, revealed items loadings and cross loadings. Loading values ranged between .62 and .90, which show good definition of the factors on study (Ford et al., 1986); apart from MOCAT item number four that saturated in the wrong factor with a loading value of .46, and PIIT item number three with .38. Then, to reinforce EFA's results, the Cronbach Alfas of each scale were estimated, using descriptive option "Scale if item deleted". The results were congruent, and we deleted the fourth of MOCAT and third item of PIIT (see appendices A to D for more details). Then we recalculated the Cronbach alphas for the extracted factors, without those two items and created composite measures by factor. Finally, composite variables were created for each dimension assessed.

To test the hypothesized model, we used IBM SPSS Statistic (version 27) with the extension of IBM SPSS Amos v27 (Arbuckle, 2020).

## **Results**

### ***Descriptive Statistics***

Means, standard deviations and correlation coefficients of the variables from this study are presented on Table 3.

Concerning attitudes toward online communication on the telework context (seven-Likert scale) participants mostly demonstrated low levels of apprehension ( $M = 2.88$ ,  $SD = 1.32$ ), medium levels of miscommunication ( $M = 4.52$ ,  $SD = 1.15$ ), and high levels of ease ( $M = 5.45$ ,  $SD = 1.10$ ). Overall, in this study, it seems that online communication attitudes are positive, however there are some doubts on miscommunication dimension.

On TSE, participants reported very high levels of beliefs in their own capabilities to use technology in order to execute their tasks ( $M = 4.23$ ,  $SD = 0.68$ ), as it can be concluded by the mean close to the five-Likert of the response scale. Conversely, on Openness to IT, a seven-Likert scale, participants demonstrated medium to high willingness to take risks and innovate when dealing with technology ( $M = 4.73$ ,  $SD = 1.36$ ).

Regarding project success measures, on project efficiency dimension (seven-Likert scale) participants reported relatively high levels ( $M = 4.68$ ,  $SD = 1.44$ ), which is similar to project success dimension levels (five-Likert scale,  $M = 3.73$ ,  $SD = 0.69$ ).

Finally, control variables demonstrated that most participants were female ( $M = 1.38$ ,  $SD = 0.49$ ) and the majority of the participants reported their projects were somewhere between planning and implementation phases.

Concerning bivariate correlations, apprehension attitude has shown a positive significant relation with miscommunication attitude ( $r = .43$ ,  $p < .01$ ), and a negative relationship with ease attitude ( $r = -.23$ ,  $p < .01$ ). As for the connection between ease and miscommunication attitudes, surprisingly revealed as positive and significant ( $r = .22$ ,  $p < .01$ ). In sum, all MOCAT's dimensions have shown significant correlations among each other. Correlations vary from small to medium effect (Cohen, 1962, 1992).

TSE and openness to IT have shown the greatest positive association ( $r = .43$ ,  $p < .01$ ). Apprehension attitude is negatively associated with TSE ( $r = -.35$ ,  $p < .01$ ), while ease attitude is positively associated with TSE ( $r = -.35$ ,  $p < .01$ ). All of these correlations show medium effect between variables (Cohen, 1962, 1992).

Project success two dimensions are positively and significantly associated ( $r = .33$ ,  $p < .01$ ) as expected. As for the connections between online communication attitudes and project success dimensions apprehension attitude as shown negatively associated for both project efficiency ( $r = -.27$ ,  $p < .01$ ) and with project success ( $r = -.14$ ,  $p < .05$ ), miscommunication attitude as negatively associated only with project success ( $r = -.15$ ,  $p < .05$ ), and ease as demonstrated a positive linkage between both project efficiency ( $r = .15$ ,  $p < .05$ ), and project success ( $r = .22$ ,  $p < .01$ ). Additionally, TSE demonstrated a positive connection between both project efficiency ( $r = .17$ ,  $p < .01$ ), and project success ( $r = .24$ ,  $p < .01$ ). Thus, project success variables have only demonstrated small effects (Cohen, 1962, 1992).

Interestingly, for control variable gender, bivariate correlations have shown that Openness to IT revealed a significant positive association with participant's gender ( $r = .17$ ,  $p < .01$ ). Nevertheless, this correlation shows a small effect between variables (Cohen, 1962, 1992).

**Table 3.** Descriptive Statistics and Correlation Coefficients for Study Variables

Variable	<i>M</i>	<i>SD</i>	<i>N</i>	1	2	3	4	5	6	7	8	9
1. Project Phase	2.63	0.84	289	—								
2. Gender	1.38	0.49	286	.118*	—							
3. Attitude: Apprehension	2.88	1.32	289	-0.07	0.00	(.85)						
4. Attitude: Miscommunication	4.52	1.15	289	-0.06	-0.04	.434**	(.73)					
5. Attitude: Ease	5.45	1.10	289	0.03	-.151*	-.225**	.219**	(.66)				
6. Technological Self-Efficacy	4.23	0.68	289	0.00	-0.04	-.354**	0.08	.351**	(.89)			
7. Openness to IT	4.73	1.36	289	0.01	.166**	-0.03	0.08	0.08	.426**	(.85)		
8. Project Efficiency	4.68	1.44	281	.121*	0.03	-.269**	-0.06	.146*	.169**	0.00	(.80)	
9. Project Success	3.73	0.69	279	0.04	-0.06	-.144*	-.152*	.219**	.237**	0.11	.326**	(.80)

\*\*  $p < .01$  (two-tailed); \*  $p < .05$  (two-tailed).

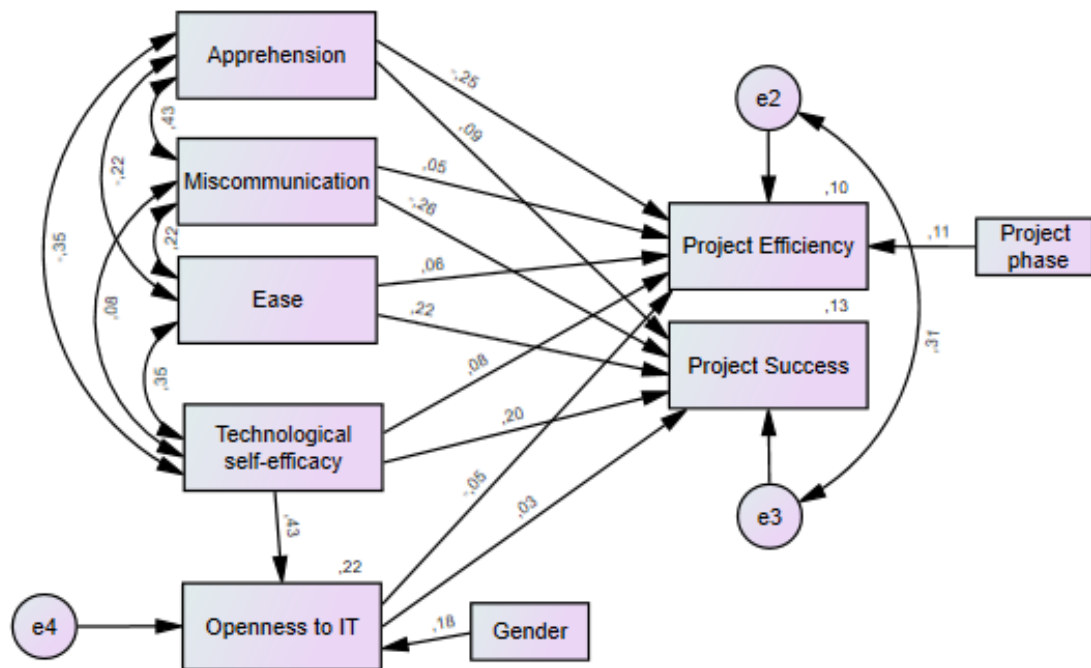
*Note:* Project Phase 1=Conceptualization, 2=Planning, 3=Implementation, 4=Final; Gender 1=F, 2=M; Cronbach alphas are presented on ().

### ***Study Model***

To test our hypothesized model, we used IBM SPSS Statistic (version 27) with the extension of IBM SPSS Amos v27 (Arbuckle, 2020).

Goodness-of-fit indexes in our theoretical model demonstrated to be acceptable. As shown in Figure 2, CMIN/DF value is 1.35 ( $< 3$ ), fitting value is inside the limits and the other parameters also meet the standard requirements (RMSEA = .04  $< 0.08$ , CFI = .98  $> 0.90$ ; Hu & Bentler, 1999, Kline, 2005). NFI = .94  $> .9$ , which represents a good adjustment (Marôco, 2010). Because we have missing values regarding different phases of project that prevented participants from assessing all factors of their project's success, standardized RMR is not defined for any of these models. Similarly, because of these missing values, it was not possible to execute a bootstrap on AMOS, mandatory to test openness to IT mediation between TSE and project success dimensions.

Study's model is a Multivariate Multiple Linear Regression, that explained 10% and 13% of the variance of project efficiency and project success variables, respectively. It's also explained 22% of the variable Openness to IT variance. Five paths were demonstrated to be significant: Attitude: Apprehension  $\rightarrow$  Project Efficiency ( $\beta = -0.25$ ,  $t = -3.46$ ,  $p < .05$ ); Attitude: Miscommunication  $\rightarrow$  Project Success ( $\beta = -0.26$ ,  $t = -3.84$ ,  $p < .05$ ); Attitude: Ease  $\rightarrow$  Project Success ( $\beta = 0.22$ ,  $t = 3.56$ ,  $p < .05$ ); Technological self-efficacy  $\rightarrow$  Project Success ( $\beta = 0.20$ ,  $t = 2.79$ ,  $p < .05$ ); Technological self-efficacy  $\rightarrow$  Openness to IT ( $\beta = 0.43$ ,  $t = 8.27$ ,  $p < .05$ ). Figure 2 shows the model with standardized estimates of the regression coefficients and the  $r^2$  of dependent variables. Table 4 shows paths tested.



Note:  $\chi^2 (16) = 21.63$ , RMSEA = .04, CMIN/DF = 1.35, NFI = .94, CFI = .98

**Figure 2.** Tested model without control variables

**Table 4.** Test of hypotheses

<i>Paths</i>			<i>β value</i>	<i>β</i> <i>standardized</i>	<i>SD</i>	<i>t value</i>	<i>p value</i>	<i>Hypothesis</i>	<i>Result</i>
Attitude: Apprehension	→	Project Efficiency	-0.27	-0.25	0.08	-3.46	***	H1a	Supported
Attitude: Miscommunication	→	Project Efficiency	0.05	0.04	0.09	0.62	0.54	H1b	Unsupported
Attitude: Ease	→	Project Efficiency	0.08	0.06	0.08	0.97	0.33	H1c	Unsupported
Attitude: Apprehension	→	Project Success	0.05	0.09	0.04	1.21	0.23	H2a	Unsupported
Attitude: Miscommunication	→	Project Success	-0.16	-0.26	0.04	-3.84	***	H2b	Supported
Attitude: Ease	→	Project Success	0.14	0.22	0.04	3.56	***	H2c	Supported
Technological self-efficacy	→	Project Efficiency	0.17	0.08	0.16	1.07	0.28	H3a	Unsupported
Technological self-efficacy	→	Project Success	0.20	0.20	0.07	2.79	***	H3b	Supported
Technological self-efficacy	→	Openness to IT	0.86	0.43	0.10	8.27	***	H4	Supported
Openness to IT	→	Project Efficiency	-0.05	-0.05	0.07	-0.79	0.43	H5a	Unsupported
Openness to IT	→	Project Success	0.01	0.03	0.03	0.42	0.67	H5b	Unsupported

Note: \*\*\* =  $p < .05$  (two-tailed)

### ***Hypothesis Test***

Hypothesis 1 predicted that each attitude toward online communication would be related with project efficiency. Results demonstrated that only apprehension attitude had a significant connection with project efficiency factors ( $\beta = -0.25, t = -3.46, p < .05$ ), and this connection is negative as expected. Thus, individuals' apprehension appeared to have negative consequences on project efficiency factors. Consequently, H1a was supported, unlike H1b (miscommunication negative connection) and H1c (ease positive connection).

Hypothesis 2 predicted that each attitude toward online communication would be related with project success. Results demonstrated that both miscommunication and ease attitudes had a significant connection with project success factors. With miscommunication attitude being negatively associated with project success factors ( $\beta = -0.26, t = -3.84, p < .05$ ) and ease attitude being positively associated with project success factors ( $\beta = 0.22, t = 3.56, p < .05$ ), as expected. Which suggests that individual's miscommunication attitude might have a negative influence on project success factors, while individual's ease attitude seemed to facilitate project success factors. Thus, H2b and H2c were supported, contrasting H2a (apprehension negative connection).

Hypothesis 3 explored the connection between TSE and project success dimensions. Results have shown that TSE had a significant positive relationship with the project success dimension ( $\beta = 0.20, t = 2.79, p < .05$ ), nor with project efficacy. Therefore, individuals with high TSE beliefs appeared to be more successful in terms of project team's satisfaction, client's satisfaction, and overall success, whereas for meeting timeline goals, meeting budget goals, meeting scope/requirements goals, TSE beliefs had no impact. Hence, H3b was supported, while H3a was not supported.

Hypothesis 4 was focused on clarifying the connection between TSE and openness to IT. As anticipated, higher levels of TSE induce higher openness to IT ( $\beta = 0.43, t = 8.27, p < .05$ ). Moreover, it seems that individuals more willing to experiment and use new technology in their tasks (with higher openness to technology), will most likely perceive their project as successful. Consequently, H4 was supported.

Hypothesis 5 predicted a positive influence of openness to IT on project success dimensions. However, this path didn't show significance. Therefore, H5a and H5b were not supported.

## **General Discussion**

This research presents an understanding on antecedents of project success based on TPB ideology. Above all, aims to recognize if it's possible for project members' to be successful while teleworking, by considering if attitudes toward online communication, technology self-efficacy and openness to IT have an impact on project success.

There is a need to understand attitudes toward online communication in the telework context, this research presents a first study, study 1, to validate and adapt an existing measure (MOCA). The main study, study 2, proposes the understanding of the theoretical model presented in the theoretical framework section.

### **Findings**

Study 1 results reveal a measure, MOCAT, to assess attitudes toward online communication in a telework context, with a total of 12 items, with a Portuguese and an English version. MOCAT's shows good psychometric features, and all three dimensions demonstrate significative correlations between each other. In the main study, MOCAT demonstrates good psychological features. This measure is an attempt to understand online communication attitudes on teleworking contexts and has good psychological features, adding a new tool available for future studies. Also, enables managers and HR professionals to understand how their staff perceive online communication, whether positively or negatively.

Concerning study 2, we present below the discussion of the five hypotheses.

Hypothesis 1 is divided in three attitudes toward online communication and only one, apprehension attitude shows a significant association with project efficiency, and it's negative as expected. Hence, individuals' apprehension to use online communication appears to have negative consequences on project efficiency factors (meeting timeline goals, meeting budget goals, meeting scope/requirements goals).

Hypothesis 2, like the first, is divided in three attitudes toward online communication, two of them, miscommunication, and ease, demonstrate a significant association with project success. While miscommunication attitude shows a negative association with project success factors, ease attitude shows a positive association with project success factors (project team's satisfaction, client's satisfaction, and overall success). So, our results suggest that project members' miscommunication attitude has a negative influence on project success factors, while individuals' ease attitude appears to facilitate project success factors.

To sum up, the exploratory hypothesis 1 and 2 determine an association between online communication attitudes and project success dimensions. It seems that apprehension relates to project efficiency factors (meeting specific goals), while miscommunication and ease are associated with project success factors (team's satisfaction, client's satisfaction, and overall success). These findings go accordingly with literature on online communication in virtual teams that suggest increased productivity and team performance on such context (Ehsan et al., 2008). Also, go along online communication usage association with success in academic life (Maican et al., 2019). Based on this evidence, we believe that as years go by, individuals are becoming more used to the fact that they have to deal with online communication on a daily basis, and so developing positive attitudes towards it. Consequently, these positive attitudes reflect on success factors. As online communication in project teams can be a strategic advantage for achieving a better performance (Kennedy et al., 2020), so do online communication attitudes can be strategic to achieve success.

Hypothesis 3 is partially supported, association between TSE and project success dimensions. Results have shown that TSE appears to have a significant positive relationship with the project success dimension, but not with project efficiency. Therefore, project members with high TSE beliefs seem to perceive themselves as more successful in terms of project team's satisfaction, client's satisfaction, and overall success, but no impact in terms of meeting timeline goals, meeting budget goals, meeting scope/requirements goals. Our results seem to go on the same way as general SE literature results, confirming the association between SE and performance (Blomquist et al., 2016; Luthans & Stajkovic, 1998), and following the prospection of project effectiveness for PM's (Jacobs & Kamohi, 2017). However, regarding project efficiency, a possible explanation for the absence of association with TSE can be the lack of personal control of such measures, as efficiency measures are under the control of PM's. Other context variables such as leadership, project features, client's profile can go beyond PM's control too.

Hypothesis 4 is supported and goes as Thatcher et al. (2002) results, higher levels of TSE induce higher openness to IT. Despite, the link between SE and personality traits seems to be unclear (Stajkovic et al., 2018), there's evidence suggesting that situation-specific traits have more influence on IT situation-specific individual differences when compared to broad traits, such as openness to experience (Thatcher et al., 2002). Maybe that can explain why openness to experience (broad trait) doesn't explain but openness to IT (situation-specific trait) does. Moreover, our results suggest that individuals with higher openness to technology, who are

more willing to experiment and use new technology in their tasks, are most likely to perceive their project as successful.

Hypothesis 5 is not supported, openness to IT seems to have to impact neither on project success nor on project efficiency. Therefore, our results go against authors who consider openness to experience as a trait that significantly impacts performance (Ashkanasy et al., 2007; Minbashian et al., 2013; Ramírez-Correa et al., 2019). Whereas, our results support the idea that openness to experience trait doesn't relate with performance (Stajkovic et al., 2018; Zaharie, 2021).

Apart from the hypothesis tested, control variables have also some interesting findings to discuss.

Starting with gender, gender proved to be a significant factor, diverging from Pilav-Velic et al. (2020) research, that reveals personal innovativeness factors as not influenced by gender. Even though, our sample is mostly constituted by women (61%), men (38%) demonstrate more openness to IT, which perpetuates the gender gap (Cai et al., 2017; Vekiri & Chronaki, 2008).

Concerning project phase impact, though past research claims that during course of the project as phases change, members' perceptions of efficiency also change (Jugdev & Müller, 2005; Pinto & Prescott, 1988), results from the current study tell otherwise, as no significance is found between the four considered phases (conceptualizing phase, planning phase, execution phase, and termination phase).

Lastly, we investigated critical factors on work settings (Verburg et al., 2013), each one of the six factors inside project success dimensions, and found *project team's satisfaction* and *overall success* variables did show significance between the work settings. However, the difference is too subtle, and this finding must be cautiously interpreted, given that most participants reported they were working exclusively online (73%), only 13 participants were working exclusively on-site (4.5%), the remaining were working in a blended work setting (22.5%) we assume that there are no differences between work settings. Results can only point to the conclusion that telework alone produces perceived satisfactory project success results.

### **Theoretical Contributions**

The current study is one of the first attempts to approach attitudes towards online communication in the work field. So far, literature has only been focused on online communication attitudes in informal communication purposes. Moreover, the authors find

direct associations between each online communication attitude and each project success dimension.

This study attempts to bring both Ajzen and Fishbein and Bandura's models to telework and project management literature. Mainly, because it suggests that both attitudes, intentions and self-efficacy are related with a behavioral outcome, project success. Moreover, this study provides a comprehensive understanding of TSE beliefs association with individuals' perceived project success factors. This fills an existing gap in literature, since evidence relating self-efficacy with project performance has been only focused on PMs (Blomquist et al., 2016; Jacobs & Kamohi, 2017; Jani, 2011), leaving aside the rest of the team members. Adding also evidence from the technological form of SE. And understanding workers' beliefs regarding technology for their tasks is critical because literature suggests that one of the best ways to prevent technostress is to provide support to individuals when implementing new technology (Berg-beckhoff et al., 2018). Therefore, without TSE self-beliefs, project members will possibly not be able to perform on their best since most tasks involve using technology and online communication is needed to collaboration work

This research also attains to clarify the association between TSE and situation-specific personality traits (Openness to IT), showing a positive and significative connection between the two variables.

Furthermore, this study was conducted during an unusual timing, during the pandemic. Most employees were mandatory and exclusively working online for several months already. We consider this a critical timing to assess technology related beliefs, as there is already a habituation to the online context of work. According to our results, it seems that the habituation is positive and shows willingness to keep teleworking.

Finally, interestingly, our control variables analysis contributes to build an outlook about gender differences regarding openness to IT trait. It seems that in projects women show slightly less openness to explore new technologies, disagreeing with recent findings that demonstrated no significant differences between genders regarding this construct (Pilav-Velic et al., 2020). Also, our results clarify that during the project path, the change of phases seem to have no influence on members' perceptions of efficiency, contrary to what was expected (Jugdev & Müller, 2005; Pinto & Prescott, 1988). Additionally, telework working set seems to have neither a negative impact nor a positive impact on the perceived project success results, in line with Shen and colleagues (2007), evidence related with work setting and performance

## **Practical Implications**

Research's findings have several implications for the management of virtual teams and for the management of human resources in organizations.

Firstly, it's critical for managers to deliberate each team member's attitudes towards online communication, in order to adjust the way meetings are performed, to make every employee comfortable with the course of the meeting, assuring that no one fails to accomplish their goals because of the meeting channel (online, blended or on-site). In case there's no alternative but to meet online, it's important to establish at the beginning of meetings the rules, putting everyone as comfortable as possible, giving and controlling airtime for every member to contribute to discussion.

Secondly, this study results demonstrate that TSE beliefs impact project success factors such as team's satisfaction, client's satisfaction, and overall success. Therefore, managers should have a deep look into employees' TSE beliefs before distributing tasks among them, giving them support when they struggle and preparing them when work peaks come up. Indeed, providing a vision of future work can increase self-efficacy beliefs (Oh, 2020), maybe managers can deliver cues of the tasks to do, timely, to prepare employees for their functions in order to lead them to believe in their own capability.

Thirdly, concerning TSE and Openness to IT, we point out some guidelines to optimize team's success during HR related processes. For instance, on recruitment and selection processes, HRM's must consider that perceived SE is a good indicator for those interested in hiring for, or improving specific skill sets (Blomquist et al., 2016). Meaning that to hire personnel to telework functions, it's essential to assess if they have high levels of TSE, especially in times and on functions where skills are constantly being updated (Shakina et al., 2021). However, that's not an exclusion factor, as some authors suggest that TSE can be improved with training (Torlzadeh et al., 1999). Besides, regarding Openness to IT trait, assessing this trait is also important for selection processes, as matching people to tasks according to their personality types may help organizations improve productivity and quality (Da Cunha & Greathead, 2007; Minbashian et al., 2013). Concerning this trait, our results suggest that there's still work to do in schools concerning technology gender differences, demystifying gender roles to close gender gap (International Labour Organization, 2013).

Concerning performance management, the authors advise managers to consider that success indicators are dependent of individuals' beliefs, therefore, more than analyzing the

numbers, it's important to clarify if breaks in performance assessment can be related with context changes, from telework to on-site work or vice versa.

Lastly, in integration and socialization processes, recognizing that new members may cause trouble when they enter an organization remotely, hence considering their online communication attitudes is vital to assure they understand the information shared, quality of organization's socialization processes and most importantly, be more aware of newcomers feeling engaged with the organization.

### **Limitations and Directions for Future Research**

This study has a quantitative nature and uses self-report measures only and that leads to several limitations. Regarding quantitative nature, given the pandemic situation this study only relies on online survey data. It was beneficial when compared to qualitative studies as it's easier to generalize findings, but threatens the control of distractors, interruptions that may interfere with the veracity of respondents' answers or even the truth of respondents itself. Future research may consider replicating this study adding qualitative methods to better understand individuals' experiences and dynamics inside the team. Qualitative approaches provide a holistic understanding of individuals experiences, and its meanings (Rahman, 2016). Therefore, it would be interesting to conduct interviews and observations in the field (e.g., infiltrate teams' video calls and face-to-face meetings) to understand the consequences online communication has on projects and comparing with on-site context. Concerning measures' limitations, there is evidence suggesting self-report Likert scale often can lead to social desirability and acquiescent responding biases, especially when measuring attitudes and personality traits (Kreitchmann et al., 2019). Therefore, future studies may consider using methods to control for these biases.

This study has limitations concerning cultural differences. On study 1, we validated MOCAT in the Portuguese version but not to other language versions. Since we had participants from several countries, we were not able to control if they were fluent in English as it's mandatory to ensure they understand each item clearly, which posits a limitation. Moreover, we didn't account for cultural specificities between countries, and that can possibly impact results. The Hofstede study shows that Portugal is one of the countries in the world with greater uncertainty avoidance (UA; Hofstede Insights, 2021), which may decrease self-efficacy in the use of new technologies and lead to greater apprehension scores. Hence, the authors suggest further research on cultural differences between countries, for instance comparing

whether this model would be replicated in countries with lower UA. On the other hand, the remaining measures we used (TSE, PIIT and project success) were not validated for the Portuguese population, yet we translated them. Therefore, future studies may consider validating the measures to the target sample.

In this study, most participants were members of a specific type of project, more than half were members of academic projects, followed by IT projects and industry projects. The authors suggest that future studies make comparisons between different types of projects. Still, this study provides a first understanding of academic projects' reality. However, we believe that replicating this study exclusively with project teams from organizations would provide more insights about employee's beliefs regarding telework variables.

Another limitation of this research was its cross-sectional nature. Future studies may consider repeated measures on different project phases, as Matthias et al. (2017) suggested that further research is necessary to investigate the relation between success measures, field of application and project phase to understand if success measures are also related to project phases. Yet, in the current research, the authors measured project phases as control variable and results demonstrated no significant differences between the four considered phases.

Despite age being broadly related to attitudes toward technology use (Cai et al., 2017), in the present study we decided not to control effects between age groups, since about 70% of our sample was situated between 18 to 34 years old and that's not representative of the population. Nevertheless, we believe our results can be age-biased and thus, the positive outlook towards technology can be explained by participants' young age, as literature suggests (Hauk et al., 2018), however there are some authors who disconfirm age differences (Chung et al., 2010). Further research should consider age comparisons.

Another possible limitation is the context this study, it was conducted during the pandemic, while most employees were mandatory and exclusively working online. Despite our positive results, pointing to a positive habituation and willingness to keep teleworking, further research needs to investigate if outside this context the results are similar or differ.

In this study it was not possible to test Openness to IT as a mediator between TSE and project success, however, to overcome this limitation, we used SPSS v.27 to test it and no significance was found. Still, because it's a personality trait and following a trend (Chiorri et al., 2015; Dalvi-Esfahani et al., 2020; Watjatrakul, 2020), we tried to test it as a moderator, still no significance was found. Therefore, we suggest that future studies may investigate if other

personality measures (e.g., general openness to IT, conscientiousness) might show other results.

Finally, other project success measures can be considered to measure efficacy, efficiency, or effectiveness. Critical success factors (CSF; as timeline, budget, scope) this research uses, that emerged in the 1980s are still valid, nevertheless CSFs vary by project types, life cycle phases, industries, nationalities, individuals, and organizations (Müller & Jugdev, 2012), which are difficult factors to control. Especially in an open survey study like this one. In this study we did our best to control these factors and we found no significant differences; future studies should also keep this in mind. Following literature novelties, future studies may include recent measures of skill level of project managers Blomquist et al. (2016) or e-Work Self-Efficacy Scale, also directed for project managers, evaluates six units of competence, between them are team management, stakeholder management, project planning, project execution, project evaluation (Tramontano et al., 2021), it would be very interesting for future studies to understand the impact TSE as specifically for project managers.

## **Conclusion**

Telework is expected to prevail in the future (Abrams, 2019; Deloitte, 2021;), understanding its challenges, is essential in order to simplify and improve workers' experience, regardless of their work settings. Results suggest that if people believe they can use technologies, they will be more willing to use them. Our research model contributes to the existing literature by emphasizing the importance attitudes toward online communication, TSE and openness to IT have on the success of a project while teleworking. Moreover, this study also provides an attempt to bring attitudes towards online communication into the work field. The outcomes of this research may bring awareness to managers to consider team members' individual technological self-efficacy and not only team's collective efficacy or strictly PM's performance. Findings also enable us to present some guidelines to optimize team's success during HR related processes.

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## Appendix

### Appendix A

#### *MOCAT Rotated Component Matrix*

	Component		
	Apprehension	Miscommunication	Ease
I feel uncomfortable when communicating online	.798		
I feel apprehensive about communicating online.	.750		
I feel tense and nervous when communicating online.	.850		
It bothers me that I cannot see people when communicating online.		.456	-.300
I am afraid to voice my opinions when interacting with others on the computer or other device.	.789		
When communicating online, lack of feedback from the other person can lead to misunderstandings.		.794	
Miscommunication occurs frequently online.	.404	.661	
When reading online messages, it is easy to take meanings that the sender did not intend.		.679	
Sometimes people interpret online communication more negatively than the message sender intended.		.675	
I like that some forms of online communication do not require both people to be online at the same time.		.360	.623
When life gets busy, the Internet is a great way to communicate efficiently.			.821
Online communication is convenient.			.744

*Note:* Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 5 iterations. Item four deleted.

## Appendix B

### *TSE Component Matrix*

	Component
	1
Whether the technology content is difficult or easy, I am sure that I can understand it.	.815
I usually do well using technology.	.877
I feel confident that I have the necessary skills to use technology for tasks.	.891
I feel confident that I can effectively use technology in my project tasks.	.899

*Note:* Extraction Method: Principal Component Analysis; 1 component extracted.

## Appendix C

### *PIIT Component Matrix*

	Component
	1
If I heard about a new information technology, I would look for ways to experiment with it.	.883
Among my peers, I am usually the first to try out new information technologies.	.831
In general, I am hesitant to try out new technologies.	.375
I like to experiment with new technologies.	.902

*Note:* Extraction Method: Principal Component Analysis; 1 component extracted.  
Item three deleted.

## Appendix D

*Project Success Rotated Component Matrix*

	Component	
	Efficiency	Success
How successful was/is being the project in meeting project time goals?	.808	
How successful was/is being the project in meeting project budget goals?	.882	
How successful was/is being the project in meeting scope and requirements goals?	.853	
How do you rate the project team's satisfaction with the project?		.780
How do you rate the client's satisfaction with the project's results?		.871
How do you rate the overall success of the project?		.815

*Note:* Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 3 iterations.

