

Using Smartphones to Prevent Cross-Functional Team Knowledge Hiding: The Impact of Openness & Neuroticism

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Abstract—The study examines the behaviour of two characteristic traits on knowledge retention, mediated using modern smartphone usage in the corporate environment of cross-functional teams. For the investigation, a self-made model was applied that associates the personality, focusing on the traits of neuroticism and openness towards new concepts and statistically evaluates the effect of increased technological usage. A dataset of 101 individuals working in cross-functional teams was used to test the model. A total of four main hypotheses were developed and statistically tested. Exalted presence of openness towards new experiences was evaluated as a critical factor leading to decreasing knowledge retention. Furthermore, although it was deducted, that neuroticism could not be verified as a knowledge limiting factor in the applied model, smartphone usage could drastically reduce its potentially dangerous factors by using efficient and short communication channels, reaffirmation and commendation by higher-ups and colleagues alike to bolster the missing self-esteem and self-consciousness of neurotic individuals. In contrast, openness was not connected significantly to deliberate knowledge hiding, as individuals incorporating this trait presumably tend to use technological tools of all kinds inherently due to their eagerness to experiment.

Keywords—smartphone, neuroticism, openness, personality, cross-functional team

1 Introduction

Interpersonal communication has been curtailed as a result of the COVID-19 pandemic [1] and the concomitant household quarantine and social isolation. Businesses have had to adjust to allow for mobile working. The demand for mobile devices such as smartphones and laptops skyrocketed as soon as the home quarantine began. Work might be done without physical presence thanks to the move to mobile devices and the usage of virtual conference rooms. Smartphones are used for phone calls and

conference calls. Smartphones are also utilized for mobile access to information and resource management [2], [3]. Knowledge retention in particular is a dangerous development in cross-functional teams as the process of managing the transfer of inflow and outflow of knowledge is constantly disrupted on the level of progress velocity and resource spending [4].

Smartphones are especially important in cross-functional teams, which are frequently formed solely for a project's duration. Temporary cross-functional teams have emerged since the Covid-19 pandemic, including team members who have never met in person owing to home quarantine. Virtual meetings inside the organization compensate for the lack of face-to-face touch. In academics, the link between smartphone use and productive work has gotten a lot of attention. The influence of smartphone use at work has been empirically validated by several writers. Benefits such as greater flexibility [5], [6] and improved performance have been identified by some [7]. Other studies have discovered negative psychological impacts of smartphone usage, such as smartphone reliance [8] or permeability between work and family life based on workload and supervisor expectations [9], which raises the risk of work-family life imbalance.

Overall, current research reveals that while smartphone use improves team performance, it might also have detrimental psychological consequences. However, no studies have been discovered that specifically address team members' personality psychology in connection to smartphone use in competitive environments. As a result, as a function of the personality qualities openness and neuroticism, the study explores the impact of smartphone use on (negative) team performance. The study looks at the aspect of knowledge retention within the context of poor team effectiveness.

This study's methodology is based on the impacts of two specific personality factors on information retention, and it examines how much smartphone use sustainably increases or dampens the outcome. Firstly, two hypotheses are introduced, that verify the general integrity of the conceptual model, followed up by two impacting mediators to analyze how recent technological, organizational and psychological measures have altered the effects of personality traits on the effectiveness of team members. Cross-functional teams were selected in particular as these teams depend crucially on the performance and exchange of information and skills of each and every individual to reach certain goals. Any effect measured in these circumstances can also be applied to general team structures, albeit in a different nuance.

2 Literature review

Communication technologies, in principle, promote individuals to collaborate in different locations at different times. Even though gadgets are switched off, emails are screened, and incoming calls may go to voicemail [10], data suggests that companies expect employees to be accessible for work outside of the office [11]. Employees at all levels now use telecommunications as their major mode of communication. As a result, in recent years, smartphones have become a vital communication instrument. They play a role in everyday life as well as the business sphere, as they considerably boost people's accessibility regardless of their location [12], [13].

A psychologically secure communication atmosphere has been shown to have a favourable influence on the knowledge transfer of multicultural teams in the previous studies [14], [15]. The initial communication from a team member has a substantial influence on subsequent team communication, which in turn favours the establishment of a secure team communication environment and the resultant knowledge transfer and team performance, especially in virtual teams [16]. As a result, the ability to communicate virtually through smartphones is critical for information transmission. Cross-functional teams only exist momentarily to solve a problem or implement a project in multidisciplinary initiatives, when various personnel arrive from other departments, and initial acquaintances and continual communication occur often.

Because the team members come from all backgrounds and have varying levels of knowledge, knowledge management is very critical. According to a previous study, knowledge management mostly relates to short-term organizational, financial, and technological benefits or drawbacks, excluding long-term innovative consequences [17]. Understanding smartphone usage in cross-functional teams is especially important in this field since it has a significant impact on communication and information transfer. Knowledge sharing is especially important for cross-functional teams since it improves social cohesiveness [18]–[20], problem-solving [14], and performance [21]–[23]. Knowledge hiding is the polar opposite of knowledge sharing.

The “intentional attempt by an individual to withhold or conceal knowledge that has been requested by another person” is what knowledge hiding is described as [24]. There are three types of knowledge retention: evasive hiding, acting dumb, and rationalized hiding are all examples of hiding [24]. Evasive hiding is when you make a commitment to help but don’t plan to, or when you give information that isn’t what the person is looking for. Playing dumb entails acting as though you don’t know something when in fact you do. The practice of rationalized hiding entails blaming others or implying that one is unable to supply sought information. According to surveys, the use of a smartphone is frequently linked to communication and entertainment.

Playing stupid entails acting as though the selected individual does not know something when you do. When someone fails to deliver required information, they rationalize it by blaming others or implying that they are unable to do so.

Active imagination, aesthetic sensitivity, responsiveness to inner sentiments, originality, and judicial independence are all linked to openness to experience [25]. Individuals with a high level of openness are more open to considering unorthodox ideals and feel both good and negative emotions more deeply than those with a low level of openness [25]. Furthermore, highly open individuals are known for their creativity, flexible thinking, and culture [26], and as a result, they have more favourable attitudes toward learning new things and are more eager to participate in learning situations [27]. Because it represents a person’s curiosity and uniqueness, openness is a major predictor of information sharing, according to Cabrera et al. [28]. People that are more open are more inclined to participate and help others. People that are open to learning and contributing are more likely to do so. As a result, we propose the following hypothesis:

Hypothesis 1 (H1). High levels of openness have a negative effect on knowledge hiding.

In contrast sadness, anxiousness, and concern are all negative traits associated with neuroticism [29]. Individuals with high degrees of neuroticism are unlikely to cooperate or engage in information sharing with others since doing so may jeopardize their standing within the company. Individuals with high levels of neuroticism engage in potentially harmful coping methods such as self-blame and rumination [30], accumulate threat-related stimuli excessively, and are more prone to view neutral events as hazardous [31]. Negative emotions such as fear, wrath, humiliation, depression, and guilt are also more common in such people [32], [33], and they report lower levels of life satisfaction [34], [35].

As a result, this research implies that high neuroticism has an impact on how people interact with one another in a shared area, as well as their willingness to participate in knowledge-sharing activities. Previous research has found a strong link between neuroticism and information retention. In this regard, neuroticism attenuated the relationship between a negative attribute and the inclination to hide knowledge [36], as well as acted as a direct impact on knowledge resetting in more recent experiments [37], [38].

Wang and Yang [39], on the other hand, found no link between neuroticism and the desire to share information in their research. In general, however, evidence suggests that neuroticism improves information retention. There has been no more research on this topic in relation to smartphone use so far. As a result, we formulate the following second hypothesis:

Hypothesis 2 (H2). High levels of neuroticism have a positive effect on knowledge hiding.

As pointed out previously, the technological capabilities of the modern age, namely, extensive use of smartphones and other digital tools are not just desired by management, but also promoted using further software, ranging from chatting and video meeting tools, cloud software, e-mails and many more. While these insights seem self-explanatory, previous research has indicated, that holistically research in this research field is still lacking [40] These tools allowed a buildup of never before experienced interconnectivity both on a vertical (between colleagues) and horizontal level (between different management levels), shortening present communication channels and building up an extensive exchange between colleagues, allowing a reduced interruption through eliminating redundant learning efforts [41].

The reduced barriers of getting into contact with both internal and external colleagues negate the dangers of miscommunication as brief (re)affirmations, questions or comments can be directly sent out, receiving answers in a short time window. Cooperative structures that foster the interdisciplinary exchange between professionals, a crucial trait of cooperative teams, allow briefer orientation periods, where individuals get to know each other's personality and strengths and weaknesses alike. In addition, cooperative environments need frequent communication as different cultural, methodic, organizational and processing structures and targets converge to find hybrid solutions sufficing each and every team member. The use of modern technology therefore must significantly impact the characteristic traits of individuals of all backgrounds in one way or another. As a result, we formulate the two following hypotheses:

Hypothesis 3 (H3). The high frequency of smartphone use has a negative moderating effect on the relationship of openness and knowledge hiding.

Hypothesis 4 (H4). The high frequency of smartphone use has a negative moderating effect on the relationship of neuroticism and knowledge hiding.

Figure 1 illustrates the conceptual model and associated hypotheses this study aims to test.

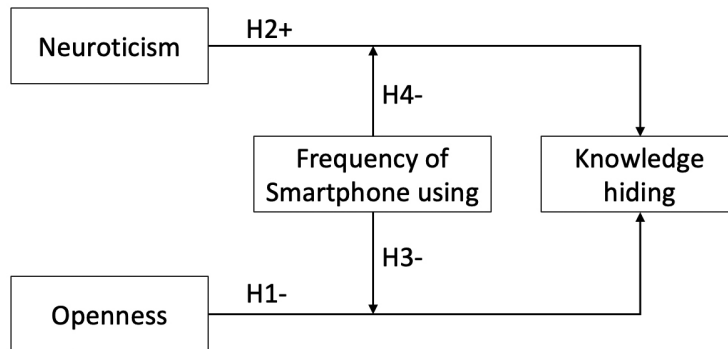


Fig. 1. Conceptual model

3 Methodology

3.1 Material

The latent constructs in the model were measured through different scales.

First, to measure personality traits, the scale of Benet-Martínez & John [29] was used. This scale is an abbreviated survey designed to elicit the Big-5 personality traits with 5 questions per trait instead of the traditional 20 questions. The abbreviated survey was intentionally used so that the survey dropout rate could be reduced, as web surveys are generally associated with low response rates [42]–[44].

Second, the scale of Connelly et al. [24] was used to measure knowledge hiding. The second-order construct of knowledge hiding subsumes three latent constructs, namely evasive hiding, playing dump and rationalized hiding consisting of 4 questions each.

Third, to measure the willingness of smartphone using, items created by the author were used, as no survey to this extent has taken place from the previous literature.

3.2 Procedure

To empirically investigate the conceptual model and to test the hypotheses, a survey targeting cross-functional team was conducted. Our respondents were asked to complete a structured, questionnaire containing 25 questions using metric scales. In addition, demographic data (age, education, gender) were also collected. The survey

was created on SoSciSurvey.com to collect the data. All the participants took part in the study between 11st of January and the 1st of March 2022.

Since the study uses data based on self-reports, another important task was to consider the issue of common method bias (CMB). To reduce CMB, the data were collected in two phases. If the interval is too long, the causal relationship of the collected data could evaporate. Conversely, if the interval is too short, the data could influence each other [45], which may affect the causal relationship between frequency of smartphone using and knowledge hiding [46]. Following previous studies, the survey was conducted with a 4-week delay [47]. CMB was additionally avoided by taking into consideration the concepts of Podsakoff et al. [48], [49] when designing the questionnaire. The questions were clearly separated; those related to the independent constructs were asked prior to those related to the dependent ones. Only one rating scale throughout the questionnaire was applied. Further, the specific purpose of our project was not revealed. The items were additionally rotated within the study to avoid primacy and recency effects [50] and order bias [51]. There was no time limit for giving an answer.

Hierarchical linear regression, a special form of multiple linear regression analysis, was used to statistically control for certain variables, to determine whether the addition of variables improves the total variability of the model. If across the models the adjusted R2 increases, a steady improvement in exploratory power can be assured.

4 Results

The descriptive statistics for the major variables of interest in the study are provided in Table 1. Age was significantly correlated with neuroticism ($r = -.23, p < .05$). Further, positive correlation between education and age was significant ($r = .32, p < .01$).

Table 1. Means, standard deviations, latent variable intercorrelations and Cronbach’s α

	Variables	M	SD	1	2	3	4	5	6	7	Cronbach’s α
1	Knowledge Hiding	4.01	2.24	1							.94
2	Openness	4.87	1.28	-.16	1						.90
3	Neuroticism	4.13	1.37	.02	-.05	1					.89
4	Smartphone using	4.31	1.82	-.02	-.14	-.03	1				.88
5	Age	31.12	5.12	-.09	.17	-.23*	-.15	1			–
6	Gender	1.69	.49	-.03	-.4	.11	-.23	-.27	1		–
7	Education	4.18	.87	-.03	.12	-.17	-.06	.32**	-.15	1	–

Notes: $n = 101$, ** $p < 0.01$, * $p < 0.05$.

The hypotheses were tested using series of hierarchical linear regression analysis with Stata 14 (Table 2). All variables were standardized to mitigate multicollinearity. Additionally, collinearity diagnostics indicated that multicollinearity was not a significant issue (with tolerance indicators ranging from .74 to .93 and VIF scores

ranging from 1.06 to 1.34). First, the control variables (namely: gender, age, and education) were inserted in Model 1, followed by the independent variables (openness and neuroticism) and the moderator variables (frequency of smartphone using) in Model 2. Model 3 includes the interactions (openness X frequency of smartphone using; neuroticism X frequency of smartphone using) related to the outcome variable, knowledge hiding. Model 3 shows an improvement and significance in exploratory power, made visible in Table 2.

Table 2. Effects of Smartphone using on knowledge hiding

Variable	Model 1 Beta	SE	Model 2 Beta	SE	Model 3 Beta	SE	Results
<i>Independent variable</i>							
Openness			-.28	.18	-.38*	.17	H1 supported
Neuroticism			-.01	.17	.05	.16	H2 not supported
<i>Moderator variables</i>							
Frequency of smartphone using			-.10	.13	-.09	.12	
<i>Interaction effects</i>							
Openness X Frequency of smartphone using					.13	.09	H3 not supported
Neuroticism X Frequency of smartphone using					-.29**	.08	H4 supported
<i>Control variables</i>							
Age	-.02	.04	-.05	.05	-.02	0.04	
Gender	-.45	.28	.02	.51	-.12	0.43	
Education	-.46	.49	-.40	.28	-.10	0.23	
R ²	-.01			-.02		.11*	
ΔR ²				-.01		.13	

Notes: n = 101, **p < 0.01, *p < 0.05.

Model 3 shows that openness is negatively and significantly associated with knowledge hiding ($\beta = -.38, p < 0.05$), supporting H1. H2 predicts that there is an association between neuroticism and knowledge hiding. The results in Model 3 indicates a positive effect, but it is not significant, therefore H2 is not supported. The interaction effect of frequency of smartphone using on openness and knowledge hiding is positive, but not significant, thus rejecting H3. Moreover, the results indicate a consistent pattern of negative and significant relationship between neuroticism and knowledge hiding moderated by frequency of smartphone using ($\beta = -.07, p < 0.01$), thus confirming H4. The moderating effect of neuroticism is shown in Figure 2. The simple slopes analysis revealed that the association between the frequency of smartphone using and knowledge hiding weakens significantly at high levels of neuroticism.

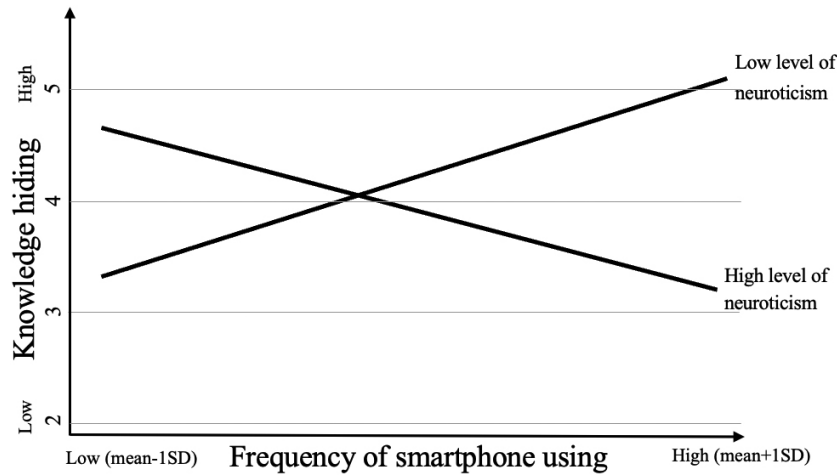


Fig. 2. The moderating effect of neuroticism on smartphone using and knowledge hiding

5 Discussion

So far, this paper has described the present impacts of two important personality qualities on information retention in the context of cross-functional teams, as well as their psychological implications. Furthermore, the idea of widespread business-related mobile phone use was included, with the expectation of considerable effects as a mediating factor. The goal was to explain ties to respondents' knowledge concealment behavior using a tailored questionnaire based on insights from past research.

Two primary ideas were developed: First, the impacts of a neurotic personality and the paramount importance of mobile phone usage as an influential mediator and secondly, the effects of the opposing personality trait of openness, which seems to be less dependent on the respondent's mobile phone use due to converging reasons. All these variables were combined to determine the statistical relationship between them and, as a result, to derive implications for the effective deployment of cross-functional teams.

5.1 Theoretical implications

The current study's findings reveal that neuroticism has no definitive positive relationship with knowledge hiding, which is inconsistent with earlier findings (H2). Still, mobile phone usage could be verified as a crucial tool towards negating its effect. Heterogenous responses in a strictly limited environment like cross-functional teams are not experienced with the exalted presence of neuroticism; members of said groups have multiple years of experience in so-called cooperative climates, where shared targets with heterogenous intellectual capital pools naturally demand a high amount of cooperation. As a result, the factors of neuroticism are shortly presented, focusing on

the strong influential factor of smartphone use, immensely beneficial to the containment of knowledge retention.

Neuroticism is a contentious personality attribute since it is most often only partially visible in the responses. Linked to several negative aspects such as irrational anxiety, higher than usual tensions to coworkers and high fluctuations of temper neuroticism is an anxiety trait, that is commonly associated with knowledge hiding [29]. Individuals suffering under extensive peculiarity of this characteristic develop negative attitudes towards other colleagues and become reluctant to cooperate due to low self-confidence and a constant need for self-reassurance [52]. Typical reactions of individuals with high levels of neuroticism are fear of being overlooked or embarrassed, irrational guilt or disgust of their own character [53]. Consequently, neuroticism manifests in a high compulsory dedication towards self-monitoring, escalating in a diminishing ability to control impulses and cope poorly with stress [54]. This lack of emotional stability is in dire need of supervision lack thereof results in losing control over affected individuals and their surroundings [55]. Disregarding this issue for too long may permanently block the exchange channels of tacit knowledge and explicit knowledge, that cross-functional teams rely so heavily on [56].

Neurotic individuals can highly profit from the extended use of mobile phones in corporate environments, namely through the lower barriers of communication among team members and higher-ups. These positive effects are not limited to certain business fields, allowing cross-functional teams, assembled by different individuals with high expertise, to benefit equally from modern communication tools. Sales, marketing, IT and higher-ups receive tools for the faster reaction between customers and employees alike, making the use of this technology inevitable in order to ensure the competitiveness and targeted market performance of oneself organization [57].

Coincidentally the results from the quantitative analysis propose, that self-confident individuals tend to retain more knowledge when extensively using smartphones: While this insight was just an auxiliary condition, so far previous studies, to the knowledge of the authors, focusing on cross-functional teams in that regard, could not reproduce similar results. Consequently, the effect of mobile phones on highly trained individuals with unique expertise in their field might follow asymptomatic behaviour compared to other organizational work environments. Presumably, based on the career and educational background of the respondents of the study, individuals with extremely low levels of neuroticism tend to overestimate their self-esteem, fearing their social status and reputation in cross-functional environments and rather withhold knowledge to resort to their competitive advantage in critical situations and thereby overshadow and influence others.

On the contrary, the negative link between openness and knowledge concealment could be confirmed (H1). Openness towards new experiences is deemed as a crucial trait, that is necessary to establish adaptive thinking and a focus on inter-organizational innovation [58]. Other studies implicated the necessity to think out-of-the-box, namely from the perspective of colleagues and higher-ups alike to strive for a shared learning rather than an individual one [26]. This study could confirm the negative relationship, meaning a missing stance towards responding to changing environments, innovation and realistic ideas and goals are directly leading to conscious knowledge hiding. In contrast, purposeful knowledge sharing is only achievable via established

keenness to study and adapt to new methods and concepts [59]. The use of smartphones is a particular mediating factor in this regard, as the statistical analysis could not confirm a significant impact factor. However, based on the previously mentioned research individuals with high levels of openness already implement technical innovations regarding smartphone usage in their daily life. Consequently, a hard distinction between the trait of openness and non-smartphone usage is hardly achievable, emphasizing the crucial role of communication, task-solving and cooperation smartphones already fulfil in their daily life at the current time.

5.2 Practical implications

Considering the theoretical consequences of the selected two characteristic traits, presented in this paper, on knowledge hiding, we deduct the following recommendations. We strongly suggest the focus of individuals responsible for leadership in cross-functional teams to shift towards developing emotional stability and intelligence among team members. A deeper social exchange between members is crucial to deconstruct possible barriers leading to knowledge retention. Past research has indicated that a wider catalogue of rewards, either through monetary measures or praise through higher ups allows all participants to acknowledge and enhance the shared importance of knowledge distribution [52]. Similarly, we strongly suggest expanding on measures to promote communication channels based on previous research [60], independent from their status of officiality, among team members, as the promotion of constant exchange allows individuals with high neuroticism to have a stable input and output environment, feeling redeemed and acknowledged by colleagues and higher-ups alike. The technological capabilities of smartphones play a pivotal role in this regard, as they expand on the technological and organizational environment to allow simultaneous collaboration and real-time communication in the first place. Management practices that emphasize accountability, based on evaluation and reward mechanics, allow neurotic individuals to perceive knowledge sharing as psychologically positively perceived motivation [55]. Thus, the nervousness, worriedness and constant scrutinization of themselves can effectively be eliminated. The additional attention further allows managers to intervene in case any optimization needs to take effect.

Lastly, managers and decision-makers of cross-functional teams should declare the improvement of innovation capability as their top priority [61]. This skill is vital to develop additional value to all invested companies participating in cross-functional teams and improve overall employee and firm performance [62].

These effects are particularly paramount, as neurotic individuals tend to outperform their constraints [55]. Although mostly based on wrong motivation, namely insecurity, the anxiety of failure and similar devastating emotions, an adapted leadership can turn the tide and effectively use the immense focus of detail and motivation of these team members to increase overall productivity and effectiveness.

Previous research [52]–[55] have so far limited themselves to theoretical studies or non-industrial, mostly scholarly environments. To the knowledge of the authors, this paper is unique in its methodology in including the analysis of quantitative results from Central European individuals, heavily invested in cross-functional team structures.

6 Research limitations and future research suggestions

However, there are also negative effects connotated to the excessive use of smartphones in work environments, which were not considered in this paper.

The rise of mobile and home offices due to the worldwide pandemic situation caused many employees of all sectors to lose the clear distinction between work and leisure time. The missing presence in certain work environments can have varying effects on the psyche of workers, depending on their own characteristic traits. Changing organizational and procedural shakeups without proper change management can have long-lasting effects on every organization member. The constant urge to be online and available in all sorts of situations influences both temporary and long-lasting interpersonal and intrapersonal behaviour, as previous research indicates [63], [64]. Furthermore, the adaptation of additional technology, especially smartphone usage can be a detrimental security risk [65]–[67].

Additionally, the analysis and influence of other mediating factors were not considered, namely features like trust among different colleagues, the potential of high knowledge asymmetry among team members and the individual steps taken by members to improve their self-efficacy and thereby dampen the effects of neuroticism in the environment of cross-functional teams. Potential further research questions could revolve around:

Research question 1: How do the tools and applications of adaptive leadership change in dynamic cross-functional environments, if individuals with greatly diverging characteristic traits collide?

Research question 2: What concepts of innovation management can be introduced in order to allow unregulated innovation in cross-functional teams, without limiting certain individuals with a set of characteristic traits?

7 Conclusion

This study has examined the effects of two character traits from the Big Five Model, namely neuroticism and openness towards new experiences on knowledge retention, moderated by the use of business-related phone use through the adaptation of a questionnaire directed on individuals occupied in cross-functional team organizations.

Results of the quantitative research point out, that neuroticism by itself is not a crucial trait in deciding the success rate of cross-functional teams. However, based on previous research and the significant impact smartphone usage has on its presence it was determined that inadequate leadership and missing structures can quickly lead to blocking innovation and additional money and time resource spending to reach certain goals. The consecutive use of mobile phones in these situations allows individuals to build up permanent communication and feedback channels, that dampen the critical dangers of growing knowledge retention and restore balance in cross-functional teams.

Openness towards new experiences could be verified as an integral issue that affects knowledge hiding. Similarly, to previous research acknowledgements, its presence is essential for knowledge sharing. The missing significant effect of smartphone usage on this character trait was led back to the fact, that individuals with high levels of openness already tend to implement smart technology like smartphones in their daily life. As a result, its

effect is already statistically present in the simple detection of the trait and further emphasizes the crucial presence of smart communication in today's corporate environment.

Recommendations include but are not limited to fostering the agreeableness among employees and managers alike and the constant evaluation of current measures to promote an innovation-expanding environment without letting individuals, with a highly neurotic profile feel left out or mistreated. Future research should focus mainly on the other three character traits of the Big Five Model not analyzed in this study as well as the adoption of leadership tools recommended as potential solutions to critical situations in cross-functional teams.

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